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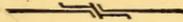
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GUERNSEY

SOCIETY OF NATURAL SCIENCE

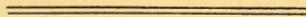
AND

LOCAL RESEARCH.



VOLUME II.

1890-1894.



Guernsey:

PRINTED BY THOMAS MAUGER BICHARD,
BORDAGE STREET.

1895.



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SOCIETY OF NATURAL SCIENCE

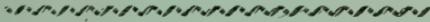
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REPORT AND TRANSACTIONS

1890.



Guernsey :

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→≡· *LIST OF OFFICERS, 1890-91.* ≡→

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MR. A. COLLENETTE.

MR. J. L. PITTS.

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MR. J. B. NICKOLLS.

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SIR E. MACCULLOCH, F.S.A.

PRESIDENT :

MR. THOMAS GUILLE.

VICE-PRESIDENT :

MR. JOHN WHITEHEAD, F.G.S., F.A.S., &c.

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COMMITTEE :

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MR. G. DERRICK.

MR. A. COLLENETTE.

MR. S. G. HUGO.

MR. C. DE LA MARE.

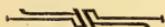
MR. E. D. MARQUAND.

❧ *LIST OF MEMBERS.* ❧



- | | |
|---|--|
| Mr. F. Allès, Bon Air. | Mr. S. Le Cocq, Saumarez Street. |
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Terrace. |
| Mrs. Boley, St. Martin's. | Rev. F. E. Lowe, M.A., St. Stephen's
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| Mr. J. Bougourd, Gipps Land. | Mr. W. A. Luff, Mount Row. |
| Mr. G. Bowie, Panorama House. | Mr. E. D. Marquand, Fermain House. |
| Mr. A. Burgess, St. John's. | Mr. A. Mourant, Rozel Terrace. |
| Mr. F. Carey, Grange. | Mr. J. Mourant, jun., Rozel Terrace. |
| Mr. J. J. Carey, F.R.G.S., Ronceval. | Sir E. MacCulloch, F.S.A., Le Pollet. |
| Miss B. Carré, Cameron Place. | Mrs. Myres, Seonie Villa. |
| Miss Chotin, Saumarez Street. | Mr. J. Nicolle, Mount Row. |
| Mr. A. Collenette, F.M.S., Le Héchet. | Mr. P. Nicolle, Foulon. |
| Mrs. A. Collenette, Le Héchet. | Mr. J. B. Nickolls, Grange. |
| Colonel Collings, Eaton Place. | Mrs. Noble, St. Martin's. |
| Miss M. B. Collings, Clifton. | Mr. J. S. Paint, Arcade. |
| Mr. D. Corbet, Forest. | Rev. W. C. Penney, M.A., Elizabeth
College. |
| Miss R. Cole, Canichers. | Mr. J. L. Pitts, F.S.A. (Normandy),
Canichers. |
| Mr. H. Crousaz, De Beauvoir Terrace. | Mr. Z. Roberts, St. Andrew's. |
| Mr. H. Cumber, Rue Poudreuse. | Rev. A. Robins, M.A., Rohais. |
| Mr. G. Derrick, Valnord. | Miss M. Rose, Valnord. |
| Mr. C. De La Mare, Mount Durand. | Mr. F. Rose, F.D.S., Vauvert. |
| Mr. Espinasson, Hauteville. | Mrs. Rose, Vauvert. |
| Mrs. J. Gardner, Old Government
House. | Mr. T. C. Royle, Arcade. |
| Miss F. A. Gilbert, Ladies' College. | Mr. F. G. Taylor, De Beauvoir
Terrace. |
| Capt. P. Groves, Candie. | Miss Turner, Ladies' College. |
| Mr. F. Guerin, High Street. | Mr. W. Sharp, Granville House. |
| Miss Guille, Union Street. | Mr. R. L. Spencer, Esplanade. |
| Mr. T. Guille, Montauban. | Mr. J. Whitehead, F.G.S., Royal Hotel |
| Miss Heppel, Ladies' College. | |
| Mr. A. Hewitt, Saumarez Street. | |
| Mr. S. G. Hugo, Allez Street. | |
| Mr. A. Humphries, Stanley Road. | |
| Mr. J. D. Jenkins, Mansell Street. | |
| Mr. J. Johns, George Road. | |

TRANSACTIONS OF THE SOCIETY.



Monthly Meeting held on November 12th, 1889, Mr. J. Whitehead, Vice-President, in the chair.

There was a good attendance of members, and a few visitors. Two gentlemen—Rev. G. Robins, and Mr. James Mourant, jun.,—having been proposed for election as members of the Society, the real business of the evening began. Mr. E. D. Marquand read a most interesting and instructive paper entitled “How Insects Breathe” :—

Insects having no lungs or analogous organs, their respiration differs entirely from that of the higher animals; and further—a point which was too frequently overlooked—insects never breathe through the mouth. Although there is great uniformity in the general plan as regards the breathing apparatus of insects, there is an almost infinite variety in its details; but in the most common and typical forms the aeration of the blood is provided for by the introduction of air into every part of the body through a system of minutely distributed airtubes, which penetrate even the smallest and most delicate organs; and the outer air enters these tubes through a series of tiny holes or spiracles which are placed on each side of the body. One of the simplest forms of spiracle is that of a caterpillar, the whole series of which—nine on each side—are easily seen with a hand-lens. It consists merely of a cleft membrane, and the caterpillar has the power of opening and closing these apertures at will. The spiracle of the common housefly is a much more complex affair, a beautiful interlacement of branches, like miniature trees, springing from the edges of the outer ring—a perfect network of filaments, interwoven so intricately that no drawing can adequately represent it. In the larva of the common cockchafer the spiracle takes the form of a kind of sieve of extreme fineness. In the larva of the crane-fly the centre of the spiracle is occupied by an impervious disc from which radii stretch out to the margin—the one great object aimed at and attained in every instance being the complete and perfect exclusion of the most minute particles of dust or other extraneous matter and yet the free admission of air. But besides this wonderful contrivance there is yet a further provision of nature

for the more perfect safe-guarding of the spiracles, and that is their position. In the perfect insects they are often concealed and always protected in some way. Mr. Marquand described the respiratory apparatus of the common gnat larva, and alluded to some other curious forms of aquatic insect life, and then went on to describe the airtubes or *tracheæ* by means of which the air is distributed throughout the entire system. The larva of *Dytiscus* (the great water-beetle) affords an example of the typical respiratory system of insects. These air vessels extend throughout the entire body; they are distributed through every organ, and accompany the most minute nerves through their whole course. By a simple mechanism familiar to everyone in the flexible gas pipe of our houses—namely, the winding of a loose spiral thread within a stout elastic outer membrane—the tube is always kept distended. In some insects, especially those adapted for powerful flight the *tracheæ* are dilated at intervals into oblong vesicles or sacs which form reservoirs of air; but no such sac-like expansions occur in grubs or larvæ, nor in insects that constantly reside on the ground.

Mr. A. Collenette contributed a paper on "October, the wettest month of the year in Guernsey," being the result of observations made and recorded during the past forty-seven years, first by the late Dr. Hoskins, and latterly by Mr. Collenette himself. To avoid reading out a vast number of figures, and at the same time to appeal more forcibly to his hearers through the medium of the eye, Mr. Collenette had prepared with great skill an elaborate chart, which showed at a glance the various points to which the lecturer wished attention directed.

An animated conversation naturally followed the reading of each paper, and a hearty vote of thanks was accorded to the gentlemen who had contributed them.

*Monthly Meeting held December 10th, 1889, Mr. H. Crousaz
in the chair.*

There was a very good attendance of members, and several visitors. The Rev. G. Robins and Mr. J. Mourant, jun., were unanimously elected members of the Society, and Miss M. B. Collings, Miss B. Carré, Mrs. Noble, and Mr. F. G. Taylor were proposed for election at the next meeting.

Mr. C. De La Mare read the first part of a paper on "The correlation and relative age of the rocks of the Channel Islands."

In this he dealt at some length with the gneiss and diorite, which he considered had been proved to belong to the

Archæan system. He then went on to speak of the Jersey argillites, which had been identified with the *schists de St. Lô*, and which were considered to be the basement beds of the Cambrian formation.

An interesting and animated discussion followed the reading of the paper.

Mr. A. Collenette then read the following short note on "The occurrence of soft clay in the form of pentagonal crystals":—

During the excavation of a well at the Ville-au-Roi during the summer of 1882, I noticed that the clay thrown out by the labourers in compact shovelfuls broke, on falling to the ground, into well-marked pentagonal shapes. One of these pieces, taken at hazard, I picked up and retained. Its measurement is as follows: $2\frac{3}{4}$ inches, width $1\frac{7}{8}$ inches. It has five sides roughly equal. The clay undoubtedly presents an example of the effects of geological pressure in the formation of cleavage lines. It deserves to be examined chemically. Its colour and weight appear to be different from the usual brick clays of the island. There is no doubt a large deposit *in situ*.

The clay crystal referred to has been presented by Mr. Collenette to the Museum. Mr. R. Spencer had prepared a paper on "A Dredging Excursion off Guernsey," but the writer being unable to be present at the meeting, the paper was read by Mr. G. Derrick. It was written in a lively, chatty style, and was much enjoyed.

Hearty votes of thanks were accorded to Mr. De La Mare and Mr. Spencer.

Monthly Meeting held January 12th, 1890, Mr. J. Whitehead, Vice-President, in the chair.

The attendance of members was unusually large. The minutes of the last meeting having been read and confirmed, the following ladies and gentleman were elected members of the Society, namely, Miss M. B. Collings, Miss B. Carré, Mrs. Noble, and Mr. F. G. Taylor. Mrs. J. Gardner, Mr. H. Cumber, jun., and Mr. A. Burgess, were proposed for election at the next meeting. The formal business of the evening over, Mr. F. Rose, F.D.S., read the first section of a paper on "Some notable Oral Equipments in the Vertebrata." In this section, Mr. Rose dealt with the *cold-blooded* vertebrates. Introducing his subject with a general description of the human tooth, and its implantation in the jaws, he went on to describe the homologies of the teeth of various classes of

Vertebrates and their development, and the different methods of attachment of teeth. Thence he proceeded to speak of some interesting departures from the typical methods of attachment as, for example, in the pike and hake. Examples of dentition amongst fishes next claimed attention. (a) The elasmobranchii, *e.g.*, sharks and rays; (b) The teleostii, *e.g.*, pike, salmon, &c. (c) the rostral teeth of the saw-fish, and this was followed by an account of the dentition amongst reptiles, with a detailed description of the poison fangs of snakes, and the parts concerned in striking. The lecture throughout was most interesting, and was illustrated with diagrams previously prepared, and sketches on the black board, together with several specimens illustrative of different parts of the subject.

Mr. C. De La Mare followed with the concluding portion of his paper on "The correlation and relative age of the rocks of the Channel Islands." The following *résumé* will briefly show the conclusions to which the author arrived as to the probable age and order of the rocks of the islands viewed in the light of the recent investigations:—

(a) That the gneiss and hornblende schists, the diorite, the granites of Herm and Jethou, as well as some of the Guernsey granites, also a large proportion of the dark blue diorite or diabase dykes, and perhaps some of the pink felsites of Guernsey and Alderney are Archæan. (b) That the Jersey argillites, the Jersey and Cobo granites, the remainder of the diabase dykes, the quartz felsites and rhyolites, the Jersey conglomerate and the Alderney grits are comprised within the limits of the Cambrian system. (c) That the mica-trap dykes belong to the Carboniferous period. (d) That with the exception of some superficial pleistocene deposits no newer rocks are found in the Channel Isles.

The late hour precluded much discussion on the papers. Hearty votes of thanks to the contributors of them brought a most interesting meeting to a close.

Monthly Meeting held February 12th, 1890, the President of the Society, Mr. T. Guille, in the chair.

Notwithstanding the inclement weather, the attendance was good. The minutes of the last meeting having been read and confirmed, the Secretary announced that *The Report of the Smithsonian Institution* (Washington), for 1885, in two large volumes, had been presented to the Society by that Institution.

Three new members were elected:—Mrs. John Gardner, Mr. H. Cumber, jun., and Mr. A. Burgess; while the following ladies and gentlemen were proposed for election at the next meeting:—Mrs. E. A. Myers, Mrs. F. Rose, Miss M. Rose, Miss Chotin, Messrs. D. Corbet, F. B. Guerin, and J. J. Carey, F.R.G.S.

The President expressed his pleasure at seeing so many ladies joining the Society, but he wanted to know "Where are the young men?"

Mr. E. D. Marquand, who was to have read the first paper, being unable to attend through a severe cold, Mr. P. Nicolle read his paper on "Our Winter Visitors, the Woodcock, Snipe, and Jack." The author described at some length these birds, their habits, and habitats, and interspersed his remarks with the results of his own, and other local sportsmen's observations on these birds during many years past. An animated conversation followed the reading of the paper, which had been listened to with much pleasure, and a hearty vote of thanks was accorded to Mr. Nicolle for it.

Mr. Luff read the following note, which will no doubt interest local lepidopterists, and also exhibited specimens of the butterflies referred to in it:—

In the January number of the *Entomologist*, Mr. F. W. Hawes announced his discovery of *Hisperia Lincola*, a species of Skipper Butterfly not hitherto recorded as British. After reading the article I examined the specimens labelled *H. Thaumias* in my own collection, and finding amongst them three specimens which I had taken in Jersey on June 21st, 1871, answering to the description of *H. Lincola*, I sent them to Mr. Hawes for his opinion, and he kindly sent me the following reply:—

"DEAR SIR,—You need have no doubt whatever that the three *Hisperias* you sent me are *H. Lincola*. Your specimens resemble those in the Doubleday Collection at Bethnal Green Museum here, in being of a browner hue than those I captured in 1888. The distinction between *Thaumias* and *Lincola* as regards coloration on under side of antennæ is very pronounced, especially when seen under a strong microscope. It is very interesting to know that *Lincola* is a native of Jersey, especially as suggesting its probable occurrence in the South of England. We shall, no doubt, hear of many in widely different localities after next season; at present, Essex and the eastern counties generally are its only known habitats."

There is no record of either of these species of butterfly being found in Guernsey.

The meeting closed with a hearty vote of thanks to the President.

Monthly Meeting held March 13th, 1890, Mr. H. Crousaz in the chair.

Mrs. Myers, Mrs. F. Rose, Miss M. Rose, Miss Chotin, and Messrs. D. Corbet, F. B. Guerin, and J. J. Carey were elected members of the Society.

Mr. E. D. Marquand read a paper on "A Fly's Foot," and illustrated the subject by a rough Indian ink sketch. He would endeavour to give a simple and intelligible description of the structure of a fly's foot—one of those marvels which are seldom noticed, because they come under daily observation.

The five joints composing the foot terminate in a pair of stout, curved horny claws, and behind or under these there are two fleshy flaps or pads. Long before the invention of the microscope it was well known that atmospheric pressure acting on these flaps enabled the fly to walk in any position. Gilbert White, of Selborne, a century ago explained this with great simplicity and clearness. Substantially the old naturalists were correct; but they fell into error in supposing that each pad formed a *single* sucker only, whereas it is a sort of cushion studded with a vast number of exceedingly minute ones. Each of these minute suckers is a hollow tube broadening at the apex; in fact a trumpet-shaped hair; and at times a tiny drop of viscous fluid passes down through it, which assists adhesion by more effectually excluding the air. That the adhesion of a fly's foot is not produced by atmospheric pressure alone is proved by the fact that it will retain its position in the interior of an exhausted receiver; and that an adhesive fluid can be and is at times secreted is evidenced by the marks which are left on a clear surface of glass. Some have supposed that the viscous secretion is employed at all times and under all circumstances; but this Mr. Marquand was disposed to doubt, because it would be obviously a useless expenditure of valuable material. The different operations he conceived would be varied in this way: upon the upper surface of a horizontal body or a perpendicular one offering a good foothold, like the side of a table cloth for instance, the claws alone would be employed—the suckers here would be evidently impediments. In ascending a moderately rough, perpendicular body—say a wall or a door—the pads with their suckers would be used; and upon a very smooth surface, such as a window pane the additional employment of the viscid secretion from some or all of the suckers would then be required. The claws (having a distinct set of muscles) are used as levers in raising the pads in order to lift the foot, and the reason why flies are seen in autumn adhering to walls and windows, and unable to move is because an internal parasitic fungus has so weakened the insect that it has not strength to detach the cushions. If there were no suckers it would fall to the ground.

The paper was thoroughly enjoyed, and a discussion

followed. Mr. Rose proposed a vote of thanks to Mr. Marquand, which was carried by acclamation.

Mr. G. Bowie followed with a paper on "Vermin, and the Balance of Nature." The subject is an extensive one, and in the time at his disposal, Mr. Bowie could, of course, deal with only a small portion of the subject. He confined himself mainly to the rat, rabbit, blackbird and sparrow, and the aphids.

A lively discussion, in which several members took part, followed, and a hearty vote of thanks, proposed by Mr. Marquand, to Mr. Bowie brought the meeting to a close.

Monthly Meeting held 24th April, 1890; Mr. E. D. Marquand in the chair.

There was a large attendance of members, and the meeting, generally, was of a most interesting character. Mrs. Boley, of St. Martin's, was elected a member of the Society. Two papers were read: the first by Mr. A. Collenette, F.C.S., on "The Evolution of the Bee," and was illustrated by a large chart and diagrams. The second paper was by Mr. F. Rose, F.D.S., on "The Honey Bee." After reading his paper, Mr. Rose explained "The Bar-frame Hive," and other appliances used by modern beekeepers, the different apparatus being exhibited. The efforts of both gentlemen to interest and instruct were thoroughly appreciated. Mr. W. A. Luff exhibited larvæ of the Guernsey Tiger Moth, and the Glanville Fritillary, and Mr. Philip Nicolle, the nest and eggs of the Long-tailed Titmouse, a rather rare visitor to this island, but which is breeding here this season. The usual votes of thanks brought a most enjoyable meeting to a close.

Monthly Meeting held May 20th, 1890, Mr. J. Whitehead, Vice-President, in the chair.

There was a rather larger attendance than usual, about one half of the number being ladies. The first paper read was one by Mr. P. Nicolle, describing the habits of the Long-tailed Titmouse (*Parus Caudatus*). This charming little bird is somewhat rare in Guernsey though common in Hampshire and other parts of England. It is extremely active, and, when building, will often fearlessly attack other birds, even those larger than itself. Its food consists of insects and larvæ; it seems to prefer caterpillars and small slugs. After

minutely describing the plumage of the "Tit," Mr. Nicolle proceeded to a description of its nest, from a specimen taken on the 24th April, in the C atel parish. It was built at the top of a laurestinus hedge, and so closely resembled the surrounding wood and foliage that for some time it escaped notice. It is composed of moss, small fragments of bark and wool, and plentifully lined with feathers. It is in shape an oval ball, with one small orifice near the top. It contained four eggs. Through the kindness of a friend he had been able to procure the nest and eggs, and now had the pleasure of presenting them to the museum. From its situation this wonderfully beautiful nest was in daily peril of being demolished by egg-hunting boys, and therefore Mr. Nicolle had less compunction in taking it in the interests of the Society. The Honorary Secretary, Mr. W. Sharp, next read a charming paper on the *Echinus*, or Sea Urchin, a singular creature which occurs commonly on our coast. The marvellous structure of the shell, the spines and the sucking-feet, as well as the extraordinary dental apparatus known as "Aristotle's Lantern," were minutely described in an interesting manner, and well-preserved examples were handed round to illustrate the author's remarks. Both papers were much appreciated, and gave rise to a very interesting conversation. A hearty vote of thanks was awarded to the contributors. It was proposed shortly to re-commence the series of summer excursions.

Monthly Meeting held June 10th, 1890, Mr. J. Whitehead in the chair.

The minutes of the last meeting having been read and confirmed, the following gentlemen were proposed for election at the next meeting, namely, Captain Percy Groves, Mr. H. L. Humphreys, and Mr. J. Jenkins.

Mr. F. Rose, F.D.S., then read an interesting paper on "Reason, Instinct, and Reflex Action, their Mutual Relations and Place in Evolution." He illustrated certain parts of his paper with carefully prepared diagrams, showing the different degrees of cerebral development in different animals. The paper, which was evidently the result of much reading and observation, was listened to with much attention, and followed by a lively discussion.

A hearty vote of thanks having been accorded to Mr. Rose for his paper, the subject of an excursion on June 25th, was discussed, and eventually the place decided upon was

Jethou, the arrangements for the excursion being left to the Secretary.

Monthly Meeting held July 8th, 1890, Mr. J. Whitehead, Vice-President, in the chair.

The minutes of the last meeting having been read and confirmed, Captain Percy Groves, Mr. H. L. Humphreys, and Mr. J. Jenkins were elected members of the Society, and Miss Gilbert, Miss Turner, Miss Heppel and Miss Beaty were proposed for election at the next meeting.

Mr. Derrick then read a lively, chatty description of the Excursion to Jethou on June 25th, to which was appended the list of Lepidoptera and Coleoptera, found by Mr. Luff on that occasion. Mr. Marquand followed with a paper on "The Flora of Jethou." Mr. Marquand succeeded in identifying during the few hours he was on Jethou no less than 133 flowering plants and ferns, among them one species found in one spot only in England, and one in the north-west of France. This was exhibited by Mr. Marquand, as were also the moths, butterflies, beetles and bees captured by Mr. Luff.

Mr. Collenette, F.C.S., next read a note on "The Geology of Jethou," exhibiting specimens of the rocks in illustration of his subject.

The island of Jethou is practically an immense outcrop of a single rock. The appearances and weathering differ but little in the various visible portions, and the eye is at once caught by the general squareness of the detached and semi-detached blocks. In most cases the section is but slightly removed from a perfect square, the lines formed by the angles running along for several feet almost parallel.

The enormous size of the blocks is worthy of remark. One block quite detached, and by no means the largest, which measured roughly 12 feet square and 10 feet long, would weigh nearly 120 tons. Some of the immense blocks on the west side would be three times that weight.

Present appearances give an idea that Jethou was originally more than twice its present height, and possessed very steep sides. Owing to this very little soil has been retained, and the rock masses are pretty freely visible *in situ* all over the island.

The rocks at the summit show but small differences, but on the sea shore especially towards the north-east there is more variety.

The general character of the rock is, I believe, a quartz-syenite, that is, the chief minerals are felspar, quartz and hornblende. I have not traced any mica hence. I do not name it a granite, though the appearance *in situ* gives the impression that it is one.

The first specimen I submit, I look upon as typical of the mass of the rock (No. 1). I obtained it from a portion of the cliff which

has been exposed by a landslip, on the north-east of the island. This specimen contains good crystals of quartz, white or slightly pink felspar, and hornblende well crystallised. I have carefully examined the specimen for mica, but I cannot satisfy myself that it is present. The stone weathers first whitish, owing to the formation of kaolin, and then into green and red shades.

No. 2 is a specimen taken from the out-crop overhanging the beach opposite Crevichon. This specimen brings out the effects of weathering fairly well, but gives us no new facts.

No. 3, taken from the west side, is different in colour, owing to its containing less quartz and more felspar.

No. 4 is a piece of quartz from the only vein I saw; this specimen gives the width of the vein. The absence of mica in the adhering decomposed rock, is, I think, sufficient proof of the syenitic nature of the rock.

No. 5, a close-grained variety, which gives some idea of the changes due to weathering. In these the formation of kaolin is plainly visible. Pink felspar has also been largely replaced in the rock by a brick-red variety.

No. 6.—This specimen I consider one of considerable interest. In passing along the north-east face, I was struck by a band of red rock some three feet wide, running from the beach into the sea, having all the appearance of an intrusion. I spent some time here endeavouring to obtain a good representative piece, but I had to satisfy myself with a piece partially weathered owing to the impossibility of removing specimens from the unweathered portions with the means at my disposal. The matrix of the rock is red felspar; besides this there is a white variety, some quartz and a green mineral. The latter I am inclined to look upon as a decomposition product, probably *viridite*, but I may be mistaken. The colour is too light for chlorite, too dull for mica, as well as incorrect in shape. This is probably a rock, the true nature of which can only be determined by a petrographic examination.

If I am correct in my idea of the constitution of this band, it is a felstone and an intrusion. The red and green colours give to this intrusion a peculiar appearance, and it strikes me as quite peculiar to Jethou. At all events I do not remember seeing an equivalent rock in Guernsey.

I do not look upon this paper as exhaustive, and consider the points I have raised to be mere indications of the work to be done. I think, however, that we are justified in believing the rocks of Jethou to be distinct modifications well worthy the study of an expert.

Mr. Roberts also exhibited two specimens of the rocks of Crevichon. Votes of thanks to Mr. Austin Lee for permission to visit Jethou, and also to his agent, Mr. J. Torode; to the readers of the papers, and to the Secretary for organising the excursion, brought the meeting to a close.

*Monthly Meeting held September 9th, 1890, Mr. T. Guille,
President, in the chair.*

The minutes of the last meeting having been read and confirmed, Miss Gilbert, Miss Turner, Miss Heppel and Miss Beaty were unanimously elected members of the Society, and Messrs. T. C. Royle and Thomas Johns proposed for election.

Mr. Hugo then exhibited a piece of quartz containing specks of gold found in Guernsey, and he read a letter from the finder, who presents the specimen to the Museum.

Mr. D. Corbet then followed with a paper on "Witchcraft in Guernsey," in which he gave an amusing account of the present day superstitions in this particular in Guernsey, concluding with a quotation from one of his own poems in Guernsey *patois*.

A long and animated discussion followed the reading of this paper. Mr. Luff read the following notes on (1) The occurrence of *Aglossa pinguinalis* (The Tabby Moth) in a greenhouse, and (2) *Nonagria geminipuncta*. Several specimens of each kind of moth were exhibited :—

In September, 1889, a gentleman residing at St. Andrew's, brought me several black larvæ which he said were swarming on the floor of his greenhouse, and he naturally enough wished to know what they were, and if they would be likely to injure his grape vines.

I visited the spot and found hundreds of these larvæ in silken tubes extending to the depth of from 1½ to 2 inches into the ground.

On the surface of the ground these tubes were continued, and were covered with fragments of dried leaves and stems from the vines and excrement from the larvæ. I secured specimens and sent several to an entomologist in London, who had access to preserved larvæ and coloured drawings of most of the British species of Lepidoptera, but he was puzzled and could not name them; he then sent specimens to be exhibited to the members of the South London Entomological Society, and received the following reply :—

It is a beetle larva, and feeds upon decayed vegetables—not uncommon. The President is not sure of its name; it was shown to a lot of people in the room, but no one could give more information.

Not being satisfied with this answer, I determined to try and rear the larvæ in the hope of getting the perfect insect. I gave several to Mrs. Boley, who was the first to rear it, and it turned out to be a common moth, namely, *Aglossa Pinguinalis*.

On referring to Humphrey and Westwood, Morris and Stephen's Works on the British Lepidoptera, I find they all say that the larvæ feed upon butter, lard, and other oleaginous substances.

In the number of the *Entomologist's Monthly Magazine* for February, 1884, there is, however, a very complete life history of

this species from the pen of the late William Buckler, where the butter feeding theory is disposed of.

M. Rolander, who has followed the history of these larvæ in the place I have cited in the *Memoires de L'Academie des Sciences de Suède*, said that they fed on many sort of eatables, as lard, butter, and dried meat, and for that reason they willingly dwelt in the larder and in the offices. He has seen them eat butter and lard with avidity. He has rubbed all the body with lard and with butter without their having appeared to suffer injury; one knows that the ordinary larvæ are suffocated as soon as one stops their spiracles with oil or some other greasy matter. But M. Rolander has remarked that the larvæ are able to hide their spiracles in folds of the skin to avoid their being matted and stopped by the greasy matter surrounding them.

He does not say that he has seen them reside in coverings in form of fixed tubes; he appears not to have known that M. De Reaumer had spoken of them inhabiting a fixed sheath, for he said they had not been described by any author.

Now, after my recent experience, the foregoing extracts afford me most convincing evidence that Rolander was not really acquainted with the larva until it had ceased feeding. I can only suppose that he must have somehow deceived himself in imagining that which he asserted of its food and of its spiracles, ingeniously suiting the one to the other, but it seems something more strange that for more than a hundred years all authors who have written on the *Pyralides* have gone on copying the above, and commenting on it as one of the stock facts in this branch of natural history.

Mr. Buckler's larvæ were found in farm stables forming tubes on the surface, but not entering the ground. He says "the tubes were covered externally with small fragments of straw and wheat husks on which the larvæ must have fed."

In my case the larvæ no doubt fed on the leaves and dried stems and berries of the vine which strewed the floor of the greenhouse, and had not been disturbed.

It is interesting to note that the habit of boring into the ground has not been recorded before. From a spadeful of earth about a foot square, which I placed in a box and covered with gauze, more than twenty imagoes made their appearance.

I paid another visit to the greenhouse last month, and although the ground had been all thoroughly dug up and beaten down hard during last winter, the larvæ are again boring in all directions.

NONAGRIA GEMINIPUNCTA IN GUERNSEY.

After reading an article by Mr. Hodges in *The Entomologist's Record* "On the Habits of the larvæ of *N. Geminipuncta*," and having once taken a specimen of the perfect insect in Guernsey, I started off on August 3rd to search for pupæ.

The food plant is the common reed (*Arundo Phragmites*) inside the stems of which the larvæ feed. I found a suitable locality

where the reeds grow abundantly, and after some hours diligent search brought away twenty reed stems, each containing a pupa.

The plants containing larvæ or pupæ are readily apparent by the withered appearance of the top shoots. The larva commences to feed in the upper part of the stem of the reed, and when it has eaten out all the centre it gnaws its way out, and re-enters the stem in the lower and thicker portion, and before changing into pupa it prepares for itself a ready means of exit by gnawing through the inner coats of the stem leaving only the thinnest outer skin which is transparent, and when the moth is ready to emerge is easily broken through.

The pupæ are very much elongated and extremely lively. Being afraid that the stems would soon dry up, and by contracting kill the enclosed pupæ, I opened all of them very carefully, took out the pupæ, and placed them on damp moss. Up to the present fifteen have emerged, only one of them being crippled.

For many years this insect was very rare in collections. Stephens says in his "Illustrations of British Entomology," printed in 1829, "Of this remarkably conspicuous species I have hitherto seen but four specimens, one of these is in the British Museum."

Monthly Meeting held October 9th, 1890, Mr. E. D. Marquand, in the chair.

The minutes of the last meeting having been read and confirmed, Messrs. T. C. Royle and T. Johns were elected, and the Rev. J. Woodhouse was proposed for election.

A paper on "Submarine Air-breathing Animals," by Mr. J. Sinel, was read by the Hon. Sec. This interesting paper gave rise to a lively discussion.

Mr. Luff followed with a paper on "*The Hemiptera-Heteroptera* of Guernsey," and illustrated his remarks with specimens of the different varieties named. Many of these are rarities, and among them the *Æpophilus Bonnaireii*, a marine species. After an interesting conversation following the reading of Mr. Luff's paper, the meeting closed.

Annual General Meeting held October 30th, 1890, Mr. T. Guille, President, in the chair.

The following report was read by the Hon. Sec. :—

"MR. PRESIDENT, LADIES AND GENTLEMEN,—It is always a delight to chronicle success, and your Council feel a decided pleasure in presenting you the 8th Annual Report, for the year just over has been one of unprecedented success in the annals of this Society, if measured by the increase in

its numbers, and the general interest taken in its operations by its members. The Society now boasts of 62 members, as compared with 37 at the end of last year, and notwithstanding the increased annual subscription. The Monthly Meetings have been more largely attended than in previous years, and there are undoubted signs of an increased interest being taken in the various branches of Natural History. This is due, no doubt, in a great measure, to the interesting and instructive papers which have been read from time to time. Little attention, however, has been given so far to the subject added last year for the investigation of the Society, namely, the local Archæology, Folklore, and Language. It is hoped that in the coming year it may receive the attention it deserves, for valuable material in these matters is slowly but surely passing away, and will ere long be irrecoverably lost. The excursion to Jethou (the only one made by the Society this year) was a great success, and our best thanks are due to Mr. Austin Lee for permission to visit the island. This excursion, besides affording members and their friends a delightful day's outing at a place which but very few of them had before visited, enabled one member to prepare a most valuable paper on the "Flora of Jethou." Of the Museum and its ever-increasing riches, the President will have something to say presently. The publication of the Transactions of the Society begun last year has been continued. The following works have been presented to the Society during the year :—

1.—A complete set of Guide Books to the British Museum of Natural History, from the Trustees of the British Museum.

2.—Report of the Smithsonian Institution, Washington, for 1886, and that of the National Museum for 1886 and 1887.

3.—Eight volumes of the Transactions of the Peabody Museum, by Mr. Whitehead.

4.—Report and Transactions for 1889 of the Penzance Natural History and Antiquarian Society.

The Council gratefully acknowledge the kindness of Messrs. Guille and Allès, who, besides aiding the Society in other ways, continue to provide them gratuitously with a room for the periodical meetings. In conclusion, we hope that the Society may go on and prosper as well in the coming year as it has prospered in the past."

WILLIAM SHARP, Hon. Sec.

The Report having been approved, the Hon. Treasurer (Mr. Luff) read the financial statement, from which it appeared that the expenditure was £11 14s. 11d., and the Receipts £18 1s. 9½d., leaving a balance in favour of the Society of £6 6s. 10½d.

Then followed the retiring President's address:—

LADIES AND GENTLEMEN,—It is a very pleasant thing after the lapse of another year, and on the occasion of this, our eighth annual meeting, to be able to congratulate each other on such a satisfactory record of progress and success as this Society, happily, has to show. As I said last year, I much regret that as President of this Society I have not been able to attend a larger number of its meetings during my tenure of office; but as you know, it has been simply lack of opportunity and not want of desire, that has kept me away. It is very gratifying to know, however, that the Society has not thereby materially suffered. We fortunately reckon within our ranks a number of thoroughly able and devoted working members, who are labouring on in a systematic manner, and the results of whose careful investigations are a real gain to the cause of local science. The carefully-compiled lists of plants, insects, &c., which we owe to their skill and perseverance, are such as any Natural History Society might feel proud of. They have added a precision to the various branches of local study which these subjects never possessed before; and the results are not only of great interest for home students, but they are also of considerable importance as data upon which English naturalists may draw when requisite, and upon whose correctness they may implicitly depend. The richness and variety of our local fauna and flora are well known. It is, therefore, the more necessary in the interests of general science that their riches should be recorded and their rarities be made known.

The Society's newly-added department of antiquities and folk-lore is also one that promises some very interesting results, when it is a little more worked. A commencement has been made in this direction, and the subject is one which ought to commend itself to all members who have an opportunity of assisting, even though ever so little. Old customs, old sayings, ancient legends, quaint beliefs, and popular superstitions are rapidly passing away; and while the disappearance from the popular creed of some of these survivals is a thing that in itself may be rejoiced over, yet, as incidents in the history and development of popular thought, and as

way-marks in the path of civilization and of local progress, the memory of them is well worth preserving, and ought by no means to be neglected.

I cannot help referring with real pleasure and satisfaction to the many interesting papers on different departments of natural science which have been read before this Society by several of its members, as well as to the lectures recently given in the Hall of this Institution by Messrs. Collenette and Marquand in connection with our winter lecture course. And referring, for a moment, more especially to this general work of the Guille-Allès Library and its popular lectures, may I not solicit your assistance in diffusing the interesting revelation of natural science which formed the topic of these papers and lectures, in a still more popular form, and in a direction where I conceive much good will be accomplished? Mr. Allès and myself, in rearing this Institution, designed to open its doors to all classes or sections of our community; but if there was one class more than another that we intended to benefit through its means, it was that which up to the present time has kept aloof from its advantages—I mean the working class. Why have they not come? Are they under the impression that they would not be welcome; or are not the terms of admission—as reasonable as they are—adapted to their means? Surely anyone who can afford to spend as much as most of our working-men do in perfectly useless if not unhealthy luxuries, ought to be able to devote the ten farthings weekly, which would furnish them with a bountiful supply of solid mental food. I am very anxious that an earnest effort should be made to bring this useful class within our fold. As an experiment, could not *penny lectures*—not mere amusing *penny readings*—but lectures conveying solid information, not only in natural history and physical science generally, but on those arts and sciences which bear directly on their respective trades, be given with advantage and profit? Aided by the illustrations which the powerful lantern we possess places at our command, I believe these entertainments would prove powerful counter-attractions to the demoralizing influences which are sapping the foundations of our moral and intellectual life.

It is sometimes brought forth as an excuse for the working-class that they have no time for reading or study, or for attendance at such entertainments as I propose. But this is a groundless assertion. I challenge anyone to prove that he has led a busier life than I myself have from my youth up. Yet during my busiest days, when not ten but twelve

and sometimes fourteen hours of the twenty-four have been absorbed in arduous daily duties, I have still found time to devote short seasons to the cultivation of those studies of nature which I am now so intent upon recommending to others; and this because I believe that such studies will help to make each one—as I hope they have made me—a better and happier man.

I cannot imagine, on the wide face of the creation, a more melancholy sight than that of a human being living—is that the proper term?—*vegetating*, rather, for twenty, forty, perhaps eighty years, on this beautiful globe, and then leaving it after this long space of wasted time with no more appreciation of its beauties and wonders than “the beast that perisheth.”

These views on the wider diffusion of natural science among the people are not the outcome of merely recent convictions on my part. A few days since I accidentally came across a letter dated from New York in 1851, addressed to the late Nicholas Le Beir, secretary of the Farmers' Club at the Castel, Guernsey, and written in acknowledgment of the honour conferred upon me by that Club, on electing me a member of their body. I feel tempted to read you a few sentences of that letter in order to show you that the views I now advocate on this subject are identical with those I held at that earlier period of my life:—

“The rich mines of literature and science have, my dear sir, been too long considered the exclusive “patent right” of the wealthy and learned few; and it is high time that the mechanic, the artisan, and the worker of the soil, should wake up from the death-like torpor and apathy with which they have been so long afflicted, and be made sensible of the inexhaustible stores of substantial unalloyed pleasure, of the rich intellectual feasts, of which they (in the midst of abundance) are daily depriving themselves, through their own negligence.

“The thousand barriers which of yore tended to hinder or slacken the progress of knowledge are now no longer serious obstacles to its diffusion or cultivation. The philosopher of the present day, unlike the heathen priest of old, who studied science but with the special view of converting it into an engine of delusion and superstition, delights in communicating his discoveries, in explaining them familiarly, and in pointing out their application to the useful and ornamental arts. The unenviable reputation which some branches of natural science once enjoyed as being under the special patronage of the Prince of Darkness, no longer need deter any ardent lover of nature from prying into her most hidden mysteries, under the fear of being branded as a professor of the “black art”; and instead of being thought inimical to the teachings of her younger sister—

revealed religion—science now counts among her most zealous votaries the brightest ornaments of the Anglican and other branches of the Christian Church. The Press too, that potent engine of civilisation, is with the celerity of thought, daily spreading far and wide the brightest emanations of the human intellect, and the sublime revelations of scientific inquiry; and surely whilst such presses as those of the Chambers', the Knights', the Bohns', and a host of others are engaged in this work, it cannot be said that it is merely working for the benefit of a privileged class.

"In view of these facts then, shall he who is condemned by a cruel fate to toil day after day, from the grey dawn to the setting sun, for the pittance necessary to supply his continued wants, be left to act his tedious part in the dull drama of life—his career a long uninterrupted struggle for existence, unrelieved by a single cheering ray of "divine philosophy"—by a single aspiration worthy of a being endowed with such noble capacities, and yet not be appraised that within the swarthy envelope that shrouds the mysterious chambers of his soul, heaven has secreted a key, which legitimately employed would literally unfold to his wondering vision "a new heaven and a new earth," making him the happy possessor of pleasures and riches of which he could form no previous conception, of enjoyments eminently calculated to allay the bitterness of toil, to lighten the pressure of adversity, and to render even his cruel lot comparatively enviable and happy? Shall the industrious cultivator of the soil—he whose lot is cast in the very laboratory of nature's most interesting operations—he to whom the warbling birds, the murmuring rivulets, the sweetly smiling flowers, the perfumed zephyrs, are daily bringing notes of invitation to her well supplied banquet—shall *he* also be allowed to remain deaf to all these pressing appeals, and to close his eyes on the beautifully varied panorama which is ever passing in review before him? The cool refreshing beverage which Nature distils from her bosom for his use; the balmy air which he breathes; the "gentle dew" and refreshing shrubs that crown his fields with plenty, and clothe his meadows with verdure; the beautiful structure of plants, their endless varieties, their splendidly variegated flowers, the manner of their growth and reproduction; the action of manure on soils; the revolution of the seasons; the phenomena of heat, light and combustion; the habits and instincts of animals—all these are themes suggested by objects and phenomena immediately surrounding him and having intimate reference to his own vital interests—themes which properly investigated would enlarge his conceptions, give a charm to his long hours of labour, furnish him with topics of absorbing interest for his seasons of leisure and convert the otherwise Sahara of earth into a blooming Eden. It will be only in investigations such as these that he will indeed

"Find tongues in trees, books in the running brooks,
Sermons in stones and good in everything,

and that the broad face of Nature upon which he had perhaps hitherto

looked with disdain, will suddenly be reared into a magnificent temple, in which, at every step, he will feel constrained to bow in silent adoration and acknowledgment of the wisdom, the power and the goodness of its Divine Architect.

“These are but a tithe of the advantages and enjoyments arising from a well directed observation of the most ordinary phenomena of nature—phenomena, to which he who leads an unobtrusive rural life must be an everyday witness. But in these days of steamboats and railroads, of world’s exhibitions, agricultural fairs and cattle shows, the farmer will not certainly, like the vegetables he cultivates, ever remain rooted to the contracted span of earth from which he derives his nourishment. Interest or pleasure may urge him occasionally away from his daily avocations and the land of his birth; and here also a thousand new opportunities for the legitimate exercise of his imagination and the improvement of his mental faculties will be ever presented to his observation. But if his intellect has not been previously enriched with at least a moderate stock of general knowledge; if his imaginative powers have not been trained to a just appreciation of the sublime and beautiful in nature and art; all these opportunities for improvement will be entirely lost and will pass by unnoticed. Carried away by the popular current, like a straw drawn along the course of a rapid stream, he may indeed visit all “the lions” of the day, but of all these on his return naught but the empty name will remain. He may have travelled from Dan to Beersheba, but for him all has been ‘barren.’”

I hope, ladies and gentlemen, I have not exhausted your patience with these long details. I have felt that this was an opportunity, which I ought to profit from, in giving you my views on some measures of popular instruction, which, as you have seen, have occupied my thoughts during a long lifetime, and which I should wish to see realized.

And now, to return to the affairs of the Natural Science Society, it only remains for me, in thanking you for your uniform kindness during my term of office, to relinquish my position, and vacate the presidential chair. Last year, on the completion of the first twelve months of my presidency, you were good enough to re-elect me. Now, however, in accordance with the salutary rule that no President shall continue in office more than two years at a time, the selection of a successor is incumbent upon you, and, happily the choice of a suitable candidate will not be difficult. Although, as I have said before, I have not been able to attend the meetings so regularly as I could have wished, yet I have always taken the warmest interest in the Society’s welfare; and it has been a great pleasure to me—and so also it has to my friend and colleague Mr. Allès—it has been a pleasure to both of us to be

able to offer the Society the requisite accommodation in connection with this Library, and also the use of such scientific volumes as we have upon our shelves. I must especially thank our excellent Vice-President Mr. Whitehead, for the very kind and efficient manner in which he has so often supplied my place when I was unavoidably absent; also the Honorary Secretary Mr. Sharp, the Hon. Treasurer Mr. Luff, and various members of the Council for much valuable and opportune assistance, always most kindly and readily rendered. These courteous attentions, added to the constant support and sympathy of the members generally, have rendered my tenure of office a very agreeable one, and in now terminating it, I can only tender my warmest thanks to everyone concerned, and express an earnest hope that the Society may be still more prosperous and successful in the future than it has yet been in the past.

The election of the officers of the Society was then proceeded with. Mr. J. Whitehead was unanimously elected President for the ensuing year, and the following gentlemen were elected to compose the Council:—Messrs. F. M. Allès, A. Collenette, G. T. Derrick, E. D. Marquand, J. L. Pitts, and J. B. Nickolls. Mr. W. Sharp and Mr. W. A. Luff were re-elected Hon. Secretary and Hon. Treasurer respectively, with the thanks of the Society for their efficient services in the past. A hearty vote of thanks to Mr. Guille, the retiring President, concluded the formal business of the evening, and the members then proceeded to the Museum where the various recent additions were examined with much interest.





THE RAINFALL OF OCTOBER

(THE WETTEST MONTH OF THE YEAR).

BY MR. A. COLLENETTE, F.C.S., F.R. MET. SOC.

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It is not generally known that October is, in Guernsey, the wettest month of the year. The object of the paper is to place before the Society the figures on which the statement is grounded.

In commencing I draw attention to the fact that this enquiry, extending over the period of forty-seven years, would have been impossible except for the records accumulated by the late Dr. Hoskins. These records give us the details of forty years, and my own records complete the forty-seven year period.

Dr. Hoskins' records are complete as far as they go, but to use them they have to be analysed, averaged and classified. In this paper the work is undertaken as far as the rainfall of October is concerned.

I first draw your attention to the year just passed, and ending with the 31st of October. The table here given will show that this month has, this year, been the wettest of the twelve.

TABLE I. THE YEAR 1888-1889. Inches.

Month.	Rain-fall.	Month.	Rain-fall.	Month.	Rain-fall.	Month.	Rain-fall.
November..	6·56	February..	3·43	May.....	2·41	August....	2·70
December..	2·32	March	2·08	June.....	1·76	September.	0·92
January ...	1·30	April	1·80	July.....	2·39	October ...	8·75

October, this year, has given a quarter of the year's rainfall. During the same year there were 223 wet days—of this number October contributed 30. That is, this month gave 13 per cent. of the wet days instead of 8 per cent.

The average rainfall for each month has been worked out for the whole period of forty-seven years, and I now give this in a tabular form with the highest and lowest falls in each month. This table will be useful for future reference and is worth preserving.

COMPUTED FROM 47 YEARS OBSERVATIONS.

TABLE 2.

1843-1889 Inclusive.

Months.	Highest.			Lowest.			Average.	
	Days	Inches	Year	Days	Inches	Year	Days	Inches
January	26	7·90	1866	6	0·99	1858	18	3·97
February	27	5·78	1866	6	0·49	1857	16	2·70
March	30	6·44	1867	4	0·36	1854	15	2·53
April	24	5·13	1877	1	0·23	1854	14	2·30
May	22	4·62	1869	1	0·02	1880	12	2·23
June	23	5·03	1860	2	0·43	1868	11	2·07
July	21	4·53	1872	3	0·12	1869	11	2·27
August	23	6·01	1860	4	0·47	1849	12	2·35
September	28	9·39	1866	2	0·25	1865	14	3·15
October	30	11·04	1872	8	1·29	1866	19	4·86
November	30	9·08	1870	8	0·88	1867	19	4·66
December	29	11·47	1876	9	0·80	1844	19	4·08

The driest month is June and the wettest October. The average number of wet days in each month show that October, November and December are equal, but that October has the highest number in common with the others. The table, however, shows an exceptional instance in which the month of December in the year 1876 gave a higher record than that of any month of October, the figures being: October, 1872—11·04 in.; December, 1876—11·47 in.

October's position comes out strongly in the minimum falls, its driest year giving 1·29 (1866) against 0·99 the next (January, 1858).

THE MONTHS IN ORDER OF AVERAGE RAINFALL.

TABLE 3.

Inches.

1	2·07	June.	5	2·35	August.	9	3·97	January.
2	2·23	May.	6	2·53	March.	10	4·08	December.
3	2·27	July.	7	2·70	February.	11	4·66	November.
4	2·30	April.	8	3·15	September.	12	4·86	October.
Order	Inches	Months	Order	Inches	Months	Order	Inches	Months

FALLS OF 1 INCH AND OVER IN 47 YEARS.

TABLE 4.

YEAR.	JAN.	FEB.	MAR.	APRIL	MAY.	JUNE.	JULY.	AUG.	SEPT.	OCT.	NOV.	DEC.
1843					6, 1.11					7 { 1.11 12 } 1.10	23, 1.44	
1847										7, 1.30		
1848										19, 1.35		
1849										7, 1.05		3, 1.55
1850										23, 1.16		
1852								8, 1.33	23, 1.03	5, 1.80	15, 1.00	26, 1.11
1854								12, 1.66		6, 1.04 8, 1.11		
1855		3, 1.41										
1857							9, 1.61		23, 1.16			
1859		10, 1.36							{ 4, 1.14 9, 1.14 3, 1.54	24, 2.05		
1860									{ 21, 1.60 23, 1.10		6, 1.19	
1861											15, 1.02	5, 1.47
1862		24, 1.96									23, 1.11	30, 1.16
1863			6, 1.09		{ 14, 1.01 19, 1.09					{ 8, 1.03 11, 1.30		8, 1.16
1864								24, 1.85			{ 14, 1.03 23, 1.03	
1865	13, 1.39						11, 1.10				{ 20, 1.39 22, 1.15	
1866	{ 1, 1.11 11, 1.63 23, 1.19											
1867	6, 1.03								{ 10, 1.85 12, 1.04			1, 1.19
1868								18, 1.16				
1869												
1871	11, 1.08			4, 1.09			27, 1.07		24, 1.11			
1872			29, 1.05				25, 1.40	21, 1.12	{ 4, 2.13 12, 1.00 18, 1.01			21, 1.08
1873	20, 1.63						14, 1.12	{ 23, 1.04 24, 1.20				
1874							26, 1.10			28, 1.15		23, 1.32
1875									22, 1.12			
1876												{ 6, 1.20 21, 1.48
1877				16, 1.51						12, 1.65	12, 1.65	
1878		14, 1.03				30, 2.10	28, 1.14			{ 1, 1.77 13, 1.33		
1879	7, 1.05				28, 1.32	3, 1.00		28, 1.25	14, 1.40			
1880										{ 9, 1.08 10, 1.16 20, 1.04 21, 1.40 22, 1.20 25, 1.04 27, 1.09	19, 1.16	{ 17, 1.21 20, 1.30
1881	21, 2.03	8, 1.03									26, 1.23	
1882								31, 1.02	28, 1.13		12, 1.40	
1883									{ 23, 1.26 28, 1.11 3, 1.16			
1884							8, 1.10					3, 1.16
1885										30, 1.14		5, 1.05
1886												26, 1.20
1887											1, 1.05	
1888								15, 1.18		29, 1.45	12, 1.15	
No.	9	5	2	2	4	3	8	10	16	29	17	15
Avg.	1.35	1.35	1.07	1.30	1.13	1.40	1.25	1.22	1.24	1.32	1.24	1.24

I next take the whole of the falls of one inch and above which have occurred in the forty-seven years during any single day. These falls are 120 in number, of which October yields 29 or just under a fourth of the whole. The average of these heavy falls are shown on Table 4 and it will be seen that the average of October is not the greatest by three months; hence October gains its wetness not so much by the heaviness of its rain as by the number of heavy falls. There are five falls of over two inches in a day—of this October contributes three. The heavier days' fall in the whole period was that of the 11th October, 1865, viz., 2·87 in. During this period there has been no month without rain.

The average for October has been given in Table 2 as 4·86 inches. It will no doubt interest the Society to see the variations in this month. The average was exceeded in twenty-two years, viz. :—

TABLE 5.

Year.	Amt.	Exc'ss	Year.	Amt.	Exc'ss	Year.	Amt.	Exc'ss	Year.	Amt.	Exc'ss
1843	6·14	1·28	1854	7·00	2·14	1865	9·05	4·19	1880	10·45	5·59
1846	6·94	2·08	1855	5·99	1·13	1870	5·35	0·49	1882	7·20	2·34
1848	8·59	3·75	1857	5·68	0·82	1871	5·55	0·69	1885	6·21	1·35
1849	5·59	0·73	1859	6·21	1·35	1872	11·04	6·18	1886	6·72	1·86
1852	7·45	2·59	1862	6·88	2·02	1874	6·85	1·99	1889	8·75	3·89
1863	5·21	0·35	1875	6·00	1·14						

The above table shows three years only, the falls of which have exceeded 1889, viz., 1865, 1872 and 1880.

The average was not reached in twenty-five years, viz. :—

TABLE 6.

Year.	Amt.	Deficit									
1844	3·76	1·10	1856	2·66	2·20	1867	4·29	0·57	1879	1·98	2·98
1845	2·02	2·84	1857	1·79	3·07	1868	4·27	0·59	1881	3·12	1·74
1847	3·73	1·13	1860	3·25	1·61	1869	2·74	2·12	1883	3·53	1·33
						1873	2·51	2·35			
1850	4·67	0·09	1861	1·19	3·67	1876	3·42	1·44	1884	2·19	2·67
1851	4·76	0·10	1864	1·50	3·36	1877	3·66	1·20	1887	2·58	2·38
1853	4·24	0·42	1866	1·29	3·57	1878	3·94	0·92	1888	4·00	0·86

The average of wet years is 7·03 in., that of the dry years 3·08 in., the difference being 3·95.

As a matter of interest I append a table showing the amounts of rain and days of rain for the whole period in each month. This will bring out the difference in a marked way.

TABLE 7.

Month.	Total Rain-fall for the 47 years.	Total wet days for 47 years.	Month.	Total Rain-fall for the 47 years.	Total wet days for 47 years.
January	186·50	872	July.....	106·87	539
February.....	126·97	746	August.....	110·62	571
March.....	119·03	721	September ..	148·30	680
April.....	108·43	644	October.....	223·51	840
May.....	104·78	545	November...	217·08	901*
June.....	97·18	514	December...	191·25	876*

* These figures have been completed to the end of the year since the reading of the paper.

This table shows that though October is the wettest month as regards quantity of rain, it has not given so many wet days as January, November or December. Hence the inference is that the average wet day in October gives more rain than that of any other month. I conclude with a table showing this fact.

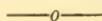
TABLE 8.

Month.	Average Rainfall per wet day.	Month.	Average Rainfall per wet day.
January.....	0·214	July.....	0·189
February.....	0·170	August.....	0·187
March.....	0·180	September ..	0·119
April.....	0·164	October.....	0·254
May.....	0·189	November.....	0·245
June.....	0·188	December.....	0·219

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ON THE CORRELATION AND RELATIVE AGES OF THE ROCKS OF THE CHANNEL ISLANDS.

BY MR. C. G. DE LA MARE.



THE Channel Islands, as is generally known, are entirely composed of igneous and unfossiliferous sedimentary rocks. The dispersion of these islands over a wide stretch of sea, and the smallness of their area are not favourable for obtaining a general view of their geological structure, notwithstanding that the rocks are well exposed in the coast lines and rocky beaches of the various islands as well as in quarries and road cuttings in the interior. Owing to these circumstances it is not easy to fix the ages of the various rocks to be found in these islands, and in the absence of fossils we have to trust to lithological resemblances and analogies which may prove misleading, so that the conclusions arrived at cannot be accepted as certain, and must only be looked upon as offering a certain degree of probability. As might be expected from the geographical position of the Channel Islands, their geological structure is more intimately related to that of north-western France than to that of England. It is therefore in that direction, where a large area of the more ancient rocks is exposed, that we should look for the key to unlock the problem involved in our rocks. But the structure of that part of the Continent had not been accurately determined until recently. It is therefore not to be wondered at that most of the geologists who have examined and written on the subject of the "Geology of the Channel Islands," have contented themselves with describing the various rocks and indicating their localities, and have but lightly touched on their relationship to each other, or to the rocks of better known districts. Of late years, however, great advances have been made both in England and on the Continent in the study of the more ancient rocks, and of the problems involved in their intricate relations and the metamorphoses to which they have been subjected. I have not had the advantage of

seeing a full account of the structure of north-western France as at present known, but Rev. E. Hill, F.G.S., has recently read before the Geological Society of England, various papers on the Channel Islands, in which he refers to the corresponding rocks in France, and mainly on the strength of these and of a treatise on the "Geology of Jersey," by M. Noury, which shows a careful examination of the structure of that island. I have ventured to put together a few remarks on the subject I have chosen for this paper. My conclusions in the main agree with those of Rev. Hill, but my point of view may be somewhat different.

Jersey contains by far the largest variety of rocks, which are evidently of various ages, and although their ages cannot be absolutely fixed, their relation to each other may at least be ascertained, so that this island may serve as a standard with which the others can be compared. The oldest rocks in the islands have, I consider, been proved to belong to the Archæan period. The term "Archæan" was introduced by Dana, an American geologist, in 1874, and is now generally applied to rocks older than the Cambrian formation in which sense it is synonymous with the term "Pre-Cambrian" also often used. These terms, however, must not be considered synonymous or co-extensive with "Metamorphic," as all Metamorphic rocks are not necessarily Archæan, nor all Archæan rocks Metamorphic. The Archæan period, it is evident from its definition, must include an enormous lapse of time, exceeding perhaps all the other periods put together. The greater part of the rocks in the Channel Islands belong to the Archæan formation, although Jersey has but a small area of them. To begin, however, with that island, a considerable portion of the reefs of rock known as "Banc du Violet," consists of diorite which is seen to be penetrated by masses and veins of red granite clearly of later date. Other patches of diorite are found at Grouville and near Sorel (St. John's), also penetrated in the same manner by the granite. No gneiss occurs, although a slight trace of gneissic structure in the rocks near St. Clement's is noticed by M. Noury. Near Vicard Harbour is found a rock to which M. Noury directs attention as being first noticed by him, and which he styles "Chloritoschiste." It is bordered by the quartz felsites or rhyolites which blend with it to a certain extent. I think this Chloritoschiste is also Archæan. The diorite above referred to does not penetrate other rocks, and therefore appears to be the oldest rock in Jersey. There is, however, at Anne Port, a vein of diorite intrusive in quartz felsite, and

two or three dykes of a dioritic nature cut the conglomerate. These, however, are quite different in appearance to the Archæan diorites above referred to, and are the newest rocks in Jersey. Almost the whole of Guernsey, in my opinion, belongs to the Archæan system. The northern part of the island consists of diorite sometimes approaching hornblende rock with syenitic and granitic veins. The southern part consists chiefly of gneiss, but diorite occurs in various parts. Many, probably the greater number of geologists, consider gneiss to be a metamorphosed sedimentary rock, but several of late years are inclined to regard it rather as a rock of igneous origin like granite, which has been deformed and acquired a fluxion structure under enormous pressure. Whatever may be the case in other districts, the appearances in Guernsey seem to me to favour the latter view. The diorite appears to me to be associated with the gneiss in the form of inclusions rather than of intrusions, and I am inclined to consider the gneiss as a modification of the syenites and granites (such as the coarse granite near L'Islet) of the northern part of the island. Some of the gneiss towards the west of the island, as at Richmond, is highly granitoid, while some of the syenite, as at Baubigny, has a gneissic structure. There is a considerable patch of rather fine-grained granite east of L'Ancrese clearly intrusive in the diorite, which also shows a gneissic structure, apparently the result of compression, and veins of similar granite intrude in the gneiss, which show the same structure though to a much less extent than the surrounding gneiss, and not always in the same direction. This granite, though of later date than the diorite and gneiss, may perhaps be put down as Archæan. The rocks of Sark consist chiefly of gneiss and hornblende schist, the latter much resembling in composition the Guernsey "Birds Eye" diorite. The gneiss appears to be intercalated in some places with the schist, and resembles that of Richmond previously referred to. The schist, as well as the gneiss, is in my opinion a modified igneous rock. However this may be, both the gneiss and schist probably belong to the Archæan system, to which Rev. Hill also refers the granite of Herm and Jethou, and the syenite or granite of Alderney. The Ecréhos are said to be composed of gneiss, probably also Archæan.

Next in succession to the rocks above described, I would place the "Argillite," found in Jersey, also called "Argillaceous Schist" and shale, and by M. Noury "Grès feldspathique." It is an unquestionable sedimentary rock. The bedding is generally very distinct, and it consists of alternating light

and dark grey layers, the latter being of a coarser texture than the others. No fossils have been found in it, but ripple marks are seen on the surface of some of the beds. This rock has been identified with the "Schistes de Saint Lô," which cover considerable areas in Normandy and Brittany. These "Schistes" are considered by French geologists to be the basement beds of the Cambrian system, but as they have hitherto proved unfossiliferous, they have been thought by some to be Pre-Cambrian or Archæan. In France they are said to rest on gneiss or other unquestionably Archæan rocks with which, however, they have nothing in common. In Jersey, the Argillite cannot, I think, be seen to rest on the Archæan diorite previously referred to, as in every locality I have examined granite intervenes, which granite is intrusive both in the diorite and Argillite. M. Noury, it is true, who considers the diorite to be of Cambrian age, believes it to be intrusive in the Argillite, but does not point out any positive proofs. That the Argillite is of more recent date than the diorite appears to me almost certain, but it is unquestionably older than all the remaining rocks of Jersey. The Argillite is hardened and altered in colour at its contact with the granite, but nothing resembling mica schist occurs. The rock called Claystone or Felspar porphyry occurs in various localities in Jersey, and is considered by several geologists to be an altered form of the Argillite. Such is also my opinion, and the probable cause, I think, is the eruption of the quartz felsite or rhyolite, although some portions of the (presumably) altered Argillite are at a considerable distance from the visible portions of the quartz felsite. There is no Argillite in Guernsey. M. Noury is mistaken in referring the Schistose Rock, near Pleinmont, to this formation. It is an intrusive dyke of very considerable width, and has a Schistose structure agreeing in direction with the foliation of the adjacent gneiss.

The next younger rock in Jersey is the granite already mentioned as intruding in the diorite and Argillite.* It also occasionally contains inclusions of these rocks. This rock has been referred to by Ansted and others as syenite, but as this term is now restricted to rocks in which quartz is either

* I have followed M. Noury on making the granite anterior to the Rhyolites but I am not sure this is correct. The absence from the Rhyolites of diabase veins, so numerous in the granite, is in favour of this view, but on the west of Fremont Point the granite is seen to intrude into a quartz felsite, which I consider belongs to the Rhyolite series, and if so the granite must be posterior to the older Rhyolites at least. M. Noury, without referring to the intrusion, mentions the rock in which it occurs and styles it a curite. He does not include it among the rhyolites, and considers it a modified argillite.

absent or only accidentally present, it is not applicable to the rock now under consideration. This granite like other similar rocks varies in colour, composition, and grain, but is generally of a pink colour due to the orthoclase felspar, which is abundant, and contains both mica and hornblende, though occasionally these minerals are almost absent. This granite is cut by numerous veins of a finer-grained granite or granite, which may be of somewhat later date, or may consist simply of fluid off-shoots from the main mass penetrating the already solidified portions. There are also numerous intrusive dykes of greenish rock which M. Noury calls diabase. In Guernsey, the Cobo granite resembles in a general way the Jersey granite above referred to, and I think may be of the same age. It is intrusive both in the gneiss and diorite, and is certainly much more recent than these rocks, as the very numerous dykes of dark blue fine-grained rock which penetrate them are cut off by the Cobo granite. This granite is indeed remarkably free from intrusive dykes, the few that are found in it being chiefly, if not all, mica-traps.

The next rock in order of age is again mostly typically found in Jersey. I allude to the quartz felsites or rhyolites. They vary very considerably in appearance, indicating difference in the original mode of formation or subsequent alteration. In some places they consist of porphyritic and euristic rocks, in other places they present a remarkable banded structure, doubtless due to the flowing of the rock when in a molten condition. Intermixed with the banded rhyolites are breccias, and large masses of altered Argillite. These latter rocks are especially conspicuous at Havre Giffard, in Trinity Parish. These structures are indicative of a volcanic origin, but the whole of the rocks appear to have undergone considerable subsequent alteration. Possibly the more compact and crystalline portions may represent the eruption of the rock through the Argillites, while the banded rocks and breccias may be due to the flowing of the molten rock on the surface, carrying along with it fragments and masses of the disrupted Argillites and of the already solidified portions of the erupted rock itself. These quartz felsites have attracted considerable attention from the spherulites occurring in many of the bands, some of them of considerable size. This appears to confirm the view that these rocks were formed at the surface. Dykes of quartz felsite are abundant in Guernsey, and still more so in Alderney, but rare or absent in Sark. These dykes are intrusive in the Archæan rocks, and may be connected with the Jersey rock above described, or they may

be modifications of granitic rocks. The banded rocks and breccias are confined to Jersey.

I now come to the remaining sedimentary rocks of the Channel Islands, viz., the Jersey conglomerate and the Alderney grits. I group them together, because though very different in appearance and composition, there is some reason for supposing they may be approximately of the same age if not contemporaneous. The Alderney grits consist of quartz with a large proportion of felspar grains, and are evidently derived from the disintegration of granitic rocks. Pebbles of quartz, granite, and quartz felsite occur in them. In one spot these grits are seen to rest on the quartz felsites intrusive in the granite, thus proving them to be younger. Rocks absolutely similar to these grits have been identified near Cape La Hague and also east of Cherbourg, by Rev. Hill and M. Bigot. Near Cape La Hague they rest directly on gneiss, in other places they overlie uncomformably the Schistes de St. Lô. This position corresponds with that of the "Conglomerat pourpré" in other localities, and notwithstanding some difference in different localities, it is doubtless the same rock. Rev. Hill considers the Alderney rock to be contemporaneous with the upper Cambrian of Lapworth, that is to say the Tremadoc Slates and Lingula Flags of Wales. The Jersey conglomerate rests on the quartz felsites or rhyolites, and contains pebbles derived therefrom, also granite ones; but by far the greater portion consists of Argillite pebbles derived from rocks similar to the Schistes de St. Lô I have previously described. The pebbles are of all sizes up to boulders of a yard in diameter. These boulders are found chiefly at the base, where curiously enough they are underlaid by or alternate with fine-grained pink sand-stones or sandy shales. Ansted suggested that this conglomerate, as well as the Alderney grits, may be triassic, while M. Noury considers it not older than the Permian period, but in Messrs. Le Vasseur et Carez's Geological Map, recently published, it is marked as Upper Cambrian Conglomerat Pourpré. I have noticed a large area of a very similar conglomerate between Granville and Coutances.

There now only remain to be considered some few dykes which cut both the Alderney grits and the Jersey conglomerates, and are therefore of more recent date. The chief part of these consist of what Rev. Hill refers to in his papers as mica traps. Examples of these are found in Jersey, Guernsey, Alderney, Sark and Jethou. They are composed chiefly of mica and felspar, and from their colour and rough-

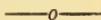
ness, and the glitter of the particles of mica have probably given rise to the statement found in the old treatises on the Channel Islands that emery was one of the products of these islands. One of these dykes, which occurs near the mouth of St. Sampson's Harbour, has been mistaken for a sandstone, although it occurs as a nearly vertical dyke. These mica traps are referred by Rev. Hill to the Kersantite group, which are assigned by Dr. Barrois to the close of the Carboniferous period. A few other dykes also cut the Jersey conglomerate; these are stated by M. Noury to be dioritic, although their state of disintegration renders it difficult to determine what their composition is. A large vein at Mannez, in Alderney, cuts the grits, which is considered by Rev. Hill to be a fine-grained diabase, but is styled an andesite by M. Bigot. Whether these last mentioned dykes are more or less recent than the mica traps, I see no evidence to determine.

If the above facts and inferences are accepted, it would appear that the gneiss, the hornblende schists, the chlorite schist, the diorite, the granites of Alderney, Herm and Jethou, and some of the Guernsey granites, also a large proportion of the dark blue veins, and, perhaps, some of the Guernsey and Alderney pink felsites, are Archæan—the Jersey Argillites, the Jersey and Cobo granites, the diabase dykes, the Jersey quartz felsites and rhyolites, and probably the quartz felsites of Alderney and Guernsey, the Jersey conglomerate and the Alderney grits are comprised within the limits of the Cambrian system, and the mica trap dykes belong to the Carboniferous period. With the exception of some superficial pleistocene deposits, no newer rocks are found in the Channel Islands.

P.S.—Since the above paper was read, a paragraph has appeared in the *Revue Scientifique* of October 18th, 1890, stating that M. de Lapparent on a recent visit to Jersey has determined that the quartz felsites or rhyolites belong to the Cambrian period, and not to the Permian as he had concluded on a former visit, and that these rocks are traversed by granulitic veins. Possibly, therefore, the granulite mentioned as cutting the granite may be of a later date also than the quartz felsites. A note of a communication on the same subject by M. De Lapparent to the (English) Geological Society in *Nature*, November 27th, 1890, says that M. De Lapparent assigns the conglomerate, which clearly overlies the quartz felsites to the very base of the Silurian formation.

A DREDGING EXCURSION OFF GUERNSEY.

BY MR. R. L. SPENCER.



To a naturalist the sea presents a very different aspect than to an ordinary uninterested individual. To the naturalist it is a friend—a companion—presenting itself in everchanging shapes, and furnishing an infinity of lessons and amusements; and in order to enjoy ourselves for a short time I propose we go for a little dredging. The tools we require are a dredge made specially for picking up minute objects, a line of ordinary strength, a pair of forceps for detaching small specimens from stones so as to avoid handling, two or three open-mouthed bottles, and a small box or basket.

Now we are all aboard and under sail, say from the Harbour across almost to the Ferrière rocks, we put over the dredge, paying out some twenty-five fathoms of rope; and as the wind, tide and circumstances in our case are made to order, everything goes favourably, no one is qualmish, but all are enjoying the summer breeze and the view of the Islands. We are close to Jethou, behind which lies Herm, and midway between Sark and Guernsey. We stand on our tack say for half an hour, then haul up the dredge, emptying the contents on to the floor of the boat, over which a piece of canvas has been put so as to prevent small creatures going through the chinks of the bottom boards. The dredge is emptied, and if we are not too far south over it goes again for a fresh batch. As soon as the rope is clear all hands are busy looking up the spoil; all creeping things small go at once into the basket for future identification. Zoophytes and tender articles are stowed carefully in our box, whilst soft-bodied animals are quickly popped into the bottle. I see we have a brittle star; he is a splendid subject, if you can get him whole—and we have a bottle specially prepared for him, a bottle of sea water in which a little chloral has been put with the charitable idea of sending him to sleep very quietly.

All is ready, the cork out, and the forceps pick him up. Before you can ejaculate "Oh!" he is in fifty pieces; you cannot find his legs, only a small black patch that you throw overboard in disgust; but he is not dead—only gone to grow fresh legs. Feeling a little disappointed you go on sorting out and getting rid of the stones, sand and *débris* by sending them overboard, only before they go you look into every cranny—for animals at the bottom of the sea seek every possible shelter they can. An old shell or root of seaweed may be a veritable treasure-house, but you have to hunt well for the treasure. As long as the tide serves this let-down and pick-up dredge process is repeated with varied success; now and then a blank occurs.

The spoils vary in accordance with the state of the bottom, because amongst small rocks and stones you get shells and small fish with now and then good specimens of Zoophytes. In sand we get burrowing animals and shells such as Cockles, Pectens, Quins, Dentalium, &c.; also soft-bodied worms as *Nereis*, the tube worms, burrowing shrimps, and a host of others. In broken ground, that is patches of rock, stones, sand, or clayey substances, we find many specimens of crustacea, and in accordance with our general want we should seek such spots. To enable us to do this we must engage a practical fisherman who knows the bottom as if he had been there all his life, and he can take us from spot to spot as we desire. I don't mean to say you are going to get the exact animal you want right off, but you must try for it and if not successful the first time you must have another try. Once you know his locality you are bound to have him, and it only requires perseverance to attain your object.

Now, if we consider our heap is big enough for all hands we will return to harbour a little wetter and perhaps a deal dirtier than when we started; but anyhow, we have had a fair day's catch and enjoyed the outing.

We are landed and our catch is brought home and put out a little at a time on the table, and by our various professors divided into groups as they please or fancy. We will put our spoils into our several professors' hands and sort as follows:—Crustacea, Zoophytes, Molluscoidea or soft-bodied animals, Starfish and Echini, Worms, Shells, and we find that we have

1. Crustacea: Edible crab, Lady or swimming crab, slow crab, spiders of three or four sorts, one about the size of a bean remarkable for length of leg (often three inches), spider crabs with a heavy growth of weeds on the shell, small

specimens of lobster, a beautiful specimen of the cray fish four inches long, some small objects like lobsters, flattened out with long claws, with bright red nodules (*Galathea strigosa*), and many forms that require us to go to the reference table to find names for.

2. Zoophytes (Ascidians), both common and compound. These are masses of jelly-like substance attached at the base to submarine objects, or united together in various ways, sometimes by a mantle, at others by a sort of common stalk. We have a lot of plant-like specimens, some flat, others like tufts or whorls of plants, but all under a live stem; they are all articulated. These are Zoophytes proper, and composed of a lot of small animals growing together on a common stalk in the same manner as the compound polypes with which they were formerly arranged. Some are soft, some horny, and some appear to feel and retract when touched; others are quite impassive. I daresay we have fifty or sixty sorts, amongst which, conspicuous by its bright colour, is the coral aru, as the fish women call it (*Gorgonia verrucosa*). We have also several specimens of *Plumularia*, *Corynactis viridis*, &c. Anemones, amongst which is a fine specimen of *Parasitica* on the back of a hermit crab, which, when open, is like the flower of an artichoke, only a beautiful pearly white. We have a lot of the coral insects' work, some in leaves, some in round nodules on pieces of stone, and sponges of different sorts. I would call your attention to the cover this affords—a favourite shelter to all kinds of small crustaceans, and many prizes would be found by a careful examination.

3. Soft-bodied animals.—We have *Aplysia* or sea-hare, both the large species and the one about $\frac{3}{8}$ of an inch long; this one takes you ten minutes to find at first, and after that you can find them by the dozen. Sea mice that shoot their spines into your fingers like a porcupine. Worms of various sorts, such as *Nereis*, *Sabella*, *Serpula*, and the curious *Synapta* that is covered all over with anchors.

4. We have in this group sea urchins—first the large one, reddish shell, with a small crop of white spines; that is *Echinus esculentus* or the edible echinus; a purple one with very thick spines, a light or dull green one with coarse spines; these are from a rocky bottom, whilst from the sand we have two sorts of heart-shaped urchins, or as the fishermen call them, Monkey Faces, and as the dredge has gone over a piece of green grass, we have been lucky enough to secure one of the oval grass-green echini about $\frac{7}{8}$ of an inch long, and

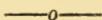
covered with minute green spines. Not very often that is found.

5. Our conchologist is in an ecstasy; he has had the sweepings of all, and he is delighted. He has specimens and duplicates of many sorts that he almost despaired of getting; but his greatest delight will be to find a *Galeoma turtoni*, a small white shell, like a boat amongst the *débris*; and his stock includes Oyster, Pecten, Cockle, Dentalium, Limpets of various sorts, Razor, several species of *Mactra*, *Cowries*, *Chiton*, *Scaphander lignarius*, and many others to employ him in his leisure hours to identify and classify. Amongst the lot of garbage left we find that we have several sorts of star fish from $\frac{1}{2}$ inch to twenty inches across, and of different shapes, although of the same family. We have the large *Asterias* that is often found twenty inches across, also the commonest *Uraster Rubens* with five points. The fishermen desire to extirpate the large *Asterias*, because it always gets into their lobster pots; with this laudable object in view they tear them limb from limb and throw them over, but they reckon without knowledge, as they simply make one star into five as each part grows, and has a separate existence, and a set of four legs grow on to the existing one. If we have been able to save a brittle star, an examination of him under the microscope will be found a very interesting study. We have also found a lot of different sponges, but as these are a very complicated family, and require a separate study, I shall simply say hand them over to the professor who takes that branch to decide by the number of hooks and triangles in their composition to what species they belong.

Having now cleared the table of specimens and swept up the *débris*, I retire.

SOME NOTABLE ORAL EQUIPMENTS IN THE VERTEBRATA.

BY MR. FREDERICK ROSE, L.D.S., R.C.S., ENG.



SECTION I.

As the subject I have undertaken is rather an extensive one, and as many technicalities must necessarily require to be explained so as to make the subsequent subject-matter intelligible to those who have not made a speciality of this branch of Zoology, I have decided to divide it into three sections, which I hope I may have the privilege of delivering on three separate evenings. Section I., which I propose taking for this evening will be somewhat introductory; but I hope as well to find time to complete all the remarks I propose to make on the teeth and jaws of the "Cold Blooded Vertebrates." Section II. will include "Warm Blooded Vertebrates"; and Section III. will be devoted to "Histological Characteristics."

One would like to make a study of this description either purely synthetic or purely analytical; and perhaps this would be the more strictly scientific method; but I think I can make my remarks more comprehensible, if I somewhat depart from this orthodox procedure.

As you are all more or less familiar with a human tooth, and its mode of implantation in the jaw, it will facilitate the comprehension of other forms of oral equipments to take this as a starting point, and use it as a means of comparison of the lower organisms.

I have here a human tooth sawn in two longitudinally, and to help towards a recognition of its parts, I have drawn it diagrammatically; and I shall assume throughout that no one present understands anything about my subject.

Proceeding from within outwards we perceive a hollow box, closed at the top or crown, and open by a fine tube at the bottom or root. This hollow box has at one time enclosed

the "Dental Pulp," a soft and highly vascular and sensitive body, which is the remnant of the soft Papilla from which the tooth in embryo has been elaborated by the deposition of lime salts in a definite direction. This process of development I hope to explain and illustrate in Section III.

The Pulp is the principal source of vitality to the tooth, and to it proceed through the canals before indicated the nerves and blood-vessels from the main trunks in the substance of the jaw-bones, carrying to the tooth the nutritive pabulum, and sensation.

Next to the Pulp we perceive a hard and ivory-like substance, the "Dentine," which makes up the principle bulk of most teeth in all the Vertebrates. Ivory of commerce is dentine from the teeth of the Elephant, and certain other animals. It is the tough and force-resisting portion of a tooth.

External to this on the crown we see the "Enamel," absent in the teeth of some vertebrates; a hard stone-like substance, for resisting the wear and tear of mastications. On the root the "Cementum"; a substance which in its histological characteristics is closely homologous to bone. Into and through this ramify blood-vessels and nerves, which, derived from the same source as those of the pulp, afford however sufficient nourishment to a tooth to retain it in the mouth in functional activity after the pulp has been destroyed by any cause. These vessels and nerves run through into the cementum from the investing membrane, which holds the tooth *in situ* in the bony socket; and which acts as a pad to resist shocks in mastication. It is called, where it covers the root, the perimentum or peridental membrane, and where it covers the bony socket, the periosteum. It is really one tissue differing in its different parts from the tooth toward the bone in its histological elements. Each tooth socket is divided from its neighbour by laminae of bone called the Alveoli; hence the name given to the bone in which the teeth are implanted, the "Alveolar process." Overlying this is the gum.

Please bear in mind these various names, for in speaking of the different classes of animals, I shall have many interesting modifications of structure to advert to.

I must now name the various teeth as we find them in a normal human jaw, and then I think the ground will be pretty well cleared for understanding the real subject-matter of my paper.

In the front we have in each jaw four "incisors" or

cutting teeth, named central and lateral; next come the "canine," vulgarly called eye teeth; then first and second "bicuspidés" or two cusped teeth, by Odontologists called Premolars; and lastly are the first, second and third molar or grinding teeth; the third molar being usually called the "Dens Sapiéntia" or wisdom tooth. This is the normal adult complement, thirty-two in all. The deciduous or temporary, or milk teeth as they are indiscriminately called, are only twenty in number, there being no bicuspidés, which grow in the places of the temporary molars, and no wisdom teeth or third molars.

Each tooth consists of a crown, neck, and root or roots.

Leaving minute particulars till the section dealing with histological characters, I will now endeavour to explain some of the interesting differences in the development, calcification, growth and fixation of the teeth of the various classes of animals.

All teeth develop from a germ of soft materials, which originates more or less deeply down in the jaw, becomes calcified or hardened by a conversion of its substance into the various tissues already alluded to, and gradually moving nearer to the surface of the jaws takes its proper position in the dental arch. We will now see how this takes place in different classes of Cold-blooded Vertebrates.

Amongst the Elasmobranchi, or Fishes with a cartilaginous skeleton, each tooth germ derives its origin *from its next oldest predecessor* (we might almost compare it to the growth of a plant from tubers). This method of succession also attains amongst Reptiles. But amongst the Teleostei, or Fishes with an osseous or bony skeleton, each tooth germ arises "*de novo*," developed by a modification of the epithelium of the jaw.

Amongst all these classes there is an endless succession of teeth.

The various methods of attachment of teeth in Vertebrates is very interesting. They are divisible under three main heads:—

1. Gomphosis, or implantation in a socket, more or less complete. This is the typical Mammalian attachment. There are a few examples amongst Fishes, *e. g.*, the rostral teeth of the Saw-fish; and also amongst the Reptiles, *e. g.*, Crocodiles and Alligators. Certain extinct birds also had teeth implanted in sockets. The fact of extinct birds having teeth at all, much more teeth implanted in sockets, has a

- most significant meaning to Evolutionists; as birds of recent times have no teeth.
2. Attachment by "fibrous membrane," as attains amongst the Elasmobranchii, *i.e.*, Sharks and Rays.
 3. "Ankilosis" or Bony union; the typical method that attains in the Teleostei, and in Reptiles, *i.e.*, such fish as the Pike, Salmon, &c.

There are many beautifully specialized modifications of these type methods of attachment to serve the peculiar end required, which I shall have to describe presently.

These will, however, be better comprehended when the typical methods have been fully understood.

Attachment by "Gomphosis" has been sufficiently described for our present purpose in my remarks on human teeth and jaws.

Taking the ordinary Skate or Ray, or Shark, we see an excellent instance of the method of attachment by "Fibrous union," and also are able to realise by the diagram before us the way in which the teeth arise, develope, and come into position.

In this order of fish the oral epithelium to which the teeth are attached are continuous with the skin of the back and belly; and is constantly, as the creature grows, sliding over the lips, and what was once inside the mouth comes outside. This peculiarity shows well the relationship between the dermal spines and the teeth.

As the skin slides outwards it carries along with it the rows of sharp teeth which, as they come into place, become erect and assume functional activity. As they wear down they fall off and the skin slides outwards, while fresh rows of teeth take their place.

In cases where the teeth are attached by "Ankilosis" there is almost always developed around it as it erupts a special porous kind of bone—a bone of attachment—which falls off or becomes absorbed when the tooth is lost.

I have not a specimen to illustrate the order of coming into place of teeth of this description; but will try and illustrate it by the diagram. The Pike is a capital instance of this method; but it is also one of the creatures which possesses as well a special set of teeth adapted for pretensile purposes. The plate in the book I show will give an idea of the myriads of teeth this creature possesses. In fact, every available spot on the inside of the mouth fairly bristles with sharp teeth.

The lower jaw is armed with a very formidable row of

teeth. The margin of the upper maxillæ has more, and there are but a few small ones on the premaxillæ; but there are three broad bands on the palate, the medium (on the vomer) looking backwards, and the two lateral (on the palate bones) looking backwards and inwards. On the tongue, the bronchial bones, and in fact covering the whole throat are teeth. Woe betide the poor wretch of a perch or roach which is once seized by this formidable enemy; or a man who gets his finger caught.

The teeth on the three bands on the palate are attached in a very special way. It is called the "watch-spring hinge" method. I will endeavour to draw it on the black-board.

The mackerel has also hinge teeth, but they do not spring into place of themselves, but lie down flat, pointing backwards, but are stopped from bending forwards by a buttress of bone.

The specimen of a "Sargus" or "Sheep's-head Fish" jaws I pass round will well illustrate another example of differentiation of organs to meet the requirements of a creature's environments.

A brief reference to the teeth of the "Pristis" or "Saw Fish" must close my remarks on Fishes, as a still more interesting family, the Reptiles, awaits our attention.

The oral equipment of the *Pristis* is the same as others of the shark and ray order; but the teeth which are fixed to the rostrum or snout, which give it its name of "Saw Fish," are very peculiar. They are socketed and attached by "gomphosis." A very rare feature in the attachment of the teeth of cold-blooded vertebrates. Moreover they grow from persistent pulps; another rare occurrence amongst that class.

REPTILIA.

Remembering at the outset that the teeth of reptiles are for the most part attached by ankylosis, and succeed one another from beneath, it will be interesting to notice a few of the most notable departures from this rule.

Starting with the most familiar the "Batrachia," we find that toads are edentulous, being endowed with hard plates of bone round the margin of the jaws, which serve the same purpose. Frogs have no teeth in the lower jaw, and only one row in the upper jaw, which are on the maxillary bones and a few on the vomer; and their method of attachment, growth, and development follows the rule sufficiently closely, as to warrant our passing them over in a paper like the present.

One point only might be noted. The teeth are attached by ankylosis, each tooth being perched on a little pedestal of bone specially formed for it. As the new tooth advances it causes absorption of the inner wall of this bone, and of the tooth, and finally takes its place actually in the pulp-chamber of its predecessor, which it pushes out on its point.

Newts and Salamanders are fairly normal.

Saurian reptiles, *i.e.*, lizards, &c., have an endless succession of rounded conical teeth, for the most part confined to the margins of the jaws.

Crocodiles and Alligators are remarkable for having socketed teeth, attached by "gomphosis." They are somewhat trihedral, but single pointed teeth, with certain ones specially developed; which varies according to the species. The teeth succeed each other vertically, each new tooth coming directly into the socket of its predecessor, which it displaces. There are never any additions numerically made, as the age of the creature advances.

But amongst the Ophidia we find some of the most remarkable differentiations of structure of the teeth in relation to the function they have to perform. In fact, so remarkable do I consider the poison-fangs of the Viperine snakes, that I have honoured them with a very special description, and several careful drawings, as I cannot get any specimens in the museum; and I unfortunately presented my own collection of skulls to the museum of my old College in London, about two years ago.

The dentition of the Ophidians is very uniform. They may be conveniently divided into two groups—the poisonous and non-poisonous or harmless snakes. Between these groups are many forms which unite in their persons some of the attributes of both these groups, in a modified degree. Thus for instance we may say, speaking roughly, that the teeth decrease in number the more venomous the snake, and *vice versa*; that the poison groove of the poison fang, which in venomous snakes forms a complete tube, becomes less and less deep amongst the more harmless species, and ceases to be differentiated at all in the typical harmless ones and is fixed immovably, and the tooth erectile; and that the "quadrate bones," of which more anon, are longer, and consequently the "gape" of the jaws is larger, the nearer we approach the true Vipers.

The semi-venomous snakes are called "Colubrine" poisonous snakes, after the "Coluber," a species of harmless

snakes. The "Cobra," and most of the Australian species present these intermediate characters.

Harmless snakes! save the mark—for who would call a Boa-Constrictor harmless, or pine for him as a bedfellow—have an endless succession of teeth arranged as follows: one row in the lower jaw, and two in the upper. One of these two upper rows is arranged on the maxillary bones, and the other, the internal, on the palatine and pterygoid bones. They are all ankylosed to the bone, and are strongly recurved backwards. The lower row fits in between the two upper rows.

Now, starting with a tooth from a harmless snake, we find it pointed and recurved, with perhaps a more or less deep groove down its external surface.

A Colubrine snake has the groove nearly closed into a tube, and in a true viperine snake, *e.g.*, a rattlesnake, it is closed completely with the pulp chamber, as it were wrapped round the poison tube.

The tube opens on the external surface of the fang, a little way from the end; this arrangement precludes the possibility of it getting stopped up when it pierces its victim. Hypodermic syringes are made on this plan.

Now I mentioned a structure called a "quadrate bone." I wish you to take special note of this, for it is one of those significant links in the chain of existence, which "he who runs may read." It is peculiar to reptiles and birds, and for these creatures which swallow their victims whole is a most useful, nay, necessary structure.

You will naturally expect this bone to be enormously developed in the typical viperine snakes, when I explain that its use is to enable the creature to open its mouth wider than can be attained in the way usually found in vertebrates.

A snake does not "swallow its victim, as we do," but gets outside it "by the movements of the quadrate bone."

I think it would perhaps be going a little too deeply into the subject for a general audience like the present, to enter into the minute anatomical details; for to those unfamiliar with the technical terms, it would perhaps rather confuse than elucidate my meaning. What I do want you to carry away in your memories is a general idea of the mechanism of the jaws of a viperine snake. I will therefore dismiss the names of the individual bones and muscles, in my short explanation.

When a venomous snake is at rest its poison-fang lies backwards in the mouth. By the movement of opening the

mouth the tooth is forced forwards by the drawing of certain ligaments on the maxillary bones which move with the teeth. This brings the poison tube in the tooth in a line with the canal in the poison-gland; whence issues the venom directly the tooth is erected to strike, propelled by the pressure of a ligament which tightens over the gland by the movement of erection of the tooth.

The victim is then swallowed whole, the "quadrate-bone" allowing the snake to open the mouth to an enormous extent; and the "bucket-handle" movement of the joints gives the creature power to, as it were, draw itself over, or "get outside" its food.

The structure here briefly referred to is well worthy of the careful study of my hearers, to whom I strongly commend it.

Before bidding good-bye to these interesting creatures I must mention a further beautiful provision of nature in the viperine Dental armature.

At the side of each poison-fang is developed a second or supplemental tooth. If the fang in use gets broken off another immediately springs up beside it so as to take its place.

SECTION II.—MAMMALIA.

In the first portion of this paper, which I had the honour of reading before you some months ago, I commenced by explaining as an introduction to my subject the relationship that teeth in man bear to one another, and the various parts of a tooth to each other and to their surrounding tissues, the jaws and gums; I then followed by a short reference to the attachment of the teeth to the jaws, and their methods of growth and development in all vertebrate creatures; and concluded by describing the oral equipments of a few specimens of cold-blooded vertebrates, specially differentiated to meet definite requirements: culminating in that most highly specialized structure the poison fang of a typical venomous or viperine snake.

For the better understanding of the subject for this evening by those who were not present on that occasion, or others who may not quite have grasped the details, I will very briefly refer to some of the introductory matter. We saw that the teeth of man consist of two sets. The deciduous or milk teeth, twenty in number, which are lost in childhood to give place to another set, better developed, larger and

stronger, and more numerous to meet the requirements of mastication of the more solid foods which form the aliment of the adult. The latter set number thirty-two. An anatomical preparation of a child's jaws aged $5\frac{1}{2}$ years exhibiting the succession of the permanent set of teeth *in situ* was here shown.

Commencing in the front of the mouth we have on each side, in both jaws, two incisor or cutting teeth, one pointed tooth called the canine or dog tooth (erroneously called the eye tooth) then in the milk set come two molar or grinding teeth. This completes the deciduous dentition of twenty. In the adult jaws come two teeth which have replaced the temporary molars, and are called by odontologists "premolars," and by dentists (from the peculiar shape of the crowns of these teeth in the human jaw) bicuspid, *i.e.*, teeth with two cusps or points; and after these in order come three molar teeth, the last one called the "wisdom tooth" or "*dens sapientia*." This makes up the requisite number of thirty-two. I may here remark that the typical mammalian dentition is forty-four as in the horse, but very few existing mammals possess this number.

As the consideration of the numerical differences of the teeth of animals would lead us into the consideration of dry detail unsuitable for the popular treatment of the subject, this brief notice of the question must suffice for this evening.

We next saw that a human tooth consists of three parts, *viz.*, the crown, the neck, and the root or roots, and that it is composed of a hard force-resistant substance called "dentine" or ivory enclosing a soft living substance called the "dental pulp" or formative and nutritive organ; and invested on the crown by a hard flinty substance called "enamel," and on the root by a hard substance analogous to bone called the "cementum."

We also saw that in most of the cold-blooded vertebrates there is an endless succession of teeth; that, for the most part they are of a very simple kind; and that they are generally "ankilosed" or fixed directly to a "bone of attachment," without any socket; and that in the Mammalia they are implanted in a distinct socket, into which they are held by a fibrous and vascular membrane called the "pericementum" or "peridental membrane."

We now see that the number is limited to not more than forty-four generally, the dolphins and porpoises being an exception, as they frequently have as many as 200, and these

of a very simple pattern. Yet remember they are distinctly of the Mammalian character, being attached by "gomphosis," *i.e.*, in a socket.

Now I propose for to-night to show that if the Mammalia lose numerically in their oral armature, this is amply made up for by a most interesting and wonderful specialisation of structure to meet the exigencies of their environments.

I have prepared a list in a tabular form to show roughly the proximity of relationship of the various species of Mammals, as at present known to Zoologists, and I have indicated with larger capitals those creatures which I consider present the most interesting and well-marked characteristics for such a brief and discursive paper as that of this evening.

It not being my object to enter into the subject of the classification of Mammals, further than is necessary for the understanding of their oral structures, I will state that a description of the teeth of the Placental Mammals will suffice for the Implacental genera also, as they are differentiated according to their modes of life on the same lines as their Placental brethren. It is a very singular fact however, and one worthy of note here, that the Implacental Mammalia are confined almost exclusively to Australia and a small portion of South America; and where they are now, geology tells us they have existed in past geological ages, and almost to the exclusion of the Placental order of beings.

In comparing the teeth and jaws of Mammals, we find that they may be roughly referred to three leading types, according to the sort of food the creature lives upon; and as the teeth are specialized to meet these requirements, so according to the great biological law of "correlation of growth" of the parts of an animal, do we find the jaws differentiated.

By-the-by, in passing, it is worthy of mention that the great Owen, the greatest osteologist I suppose that has ever lived said, according to this law of "correlation of growth" or "concomitant development," a thoroughly proficient osteologist ought to be able to portray any animal and build it up bone for bone exactly as it has existed, on seeing one bone or even one portion of a bone."

Thus we have teeth and jaws indicating by their structure a vegetable diet, and so their owners are called Herbivora. You will not find this name on the table of animals before you, for the simple reason that a vast number, although subsisting on a vegetable diet, have been classified in accordance with some special feature. Thus we find Elephants though

thoroughly vegetable eaters are classed in accordance with the peculiar structure and size of the nose or proboscis, and called "Proboscidea," or the hoofed animals called Ungugulata, and so on with the Sirenia, Hyracoidea, &c.

In this class the skull and jaws are ponderous in proportion to the size of the animal, and of great antero-posterior length; the glenoid cavity and condyle of the lower jaw are broad, round and flat, so as to admit of the grinding action necessary for reducing vegetable fibre to a pulp; and the molar teeth are broad, and very rough on the grinding surface caused by the uneven wearing of tissues of a different degree of hardness; the hardest substance, the enamel, standing out from above its investing tissue.

If you will oblige me by looking at the diagram of a horse's teeth, you will see typically displayed what I am endeavouring to describe.

Let us take for the sake of the better comprehension of the complex pattern of the molar teeth, the incisor or front tooth represented in longitudinal section. Try to imagine what would be seen if we took the finger of a kid glove, filled it with plaster of Paris, and before it set hard pushed in the tip. We should thus have the kid which had been outside before the process, inside after it, and cut down longitudinally it would look very like our section of a tooth. We should see, passing from without inwards, first kid, next a thick body of plaster of Paris, and next to this, kid, and then the space or tube, made by pushing the finger tip in; and so it is with the tooth before us, first enamel, next a thick body of dentine or ivory, and next enamel, bounded on the inside by a cavity. Look at the same tooth in transverse section and we see a ring of enamel, then a broad ring of dentine; and then another ring of enamel enclosing an empty space. When the tooth wears down, the "mark" is eradicated, and we see the conditions as represented by the other figure on the diagram. The tube in the tooth of a young horse gets filled with *débris* of food, and indicates according to its depth the age of the creature. This is what is known to horse-dealers as "the mark," and dishonest dealers often drill a hole into the teeth of an old horse and fill it with dirt; but this fraud could only deceive a novice in the trade, as there would be no ring of enamel intervening between the tube and the dentine.

Multiply these conditions with the molar tooth, and fill up the interspaces between the pillars or cusps and ridges with cementum, and you can easily perceive how the complex pattern of the surface is produced. The teeth are constantly

growing to make good the surface wear, but are only what are called "semi-persistent." We will refer to this again when dealing with the teeth of Rodents.

I have spent some time on this matter, because the complexity of pattern of the molar teeth is used as a means of classifying species and genera, and is of very great importance to odontologists.

Before leaving the horse let me refer to the "diastema" where the bit goes. The great convenience of this interspace has led ignorant people to jump to the conclusion that the horse was specially designed for the use of man; but unfortunately for this theory the Hipparion, which is the horses' remote ancestor and existed ages before man, possessed the same interspace.

The next great class are the Carnivora or flesh feeders, though many of them also eat vegetable food; like some bears, and *vice versa* many herbivorous quadrupeds eat flesh, like the pig; and according as the creature's habits of feeding depart from the purely carnivorous diet, so do the teeth and jaws depart from the typical carnivorous structure.

As a general statement we may say that the characters that distinguish a purely flesh diet are: the small size of the incisors as compared with the canines, and their arrangement in a straight line across the jaws; the large size, deep implantation, and wide separation from one another of the canines, the reduction in number of the molar series, those that remain being without broad crushing surfaces, in place of which a sharp pointed form prevails.

If you will please look at our diagram of the skull of a purely carnivorous creature, the tiger, it being taken as the type form, you will find a very arched and shortened head; huge zygomatic arches (very small in herbivorous creatures) for the attachment of the powerful "masseter" muscles; very deep glenoid cavities and condyles, lengthened in a lateral direction, and teeth marked by being of a highly "sectorial" or cutting character, and much reduced in number from the typical mammalian dentition of 44. There is no play allowed by the deep glenoid cavity for mastication either forwards or backwards or from side to side, only an adaptation for the cutting and prehensile conditions observed in the teeth. Observe the strong pointed cruel canine tooth, so terribly adapted to the prehension of living prey, the deep zygomatic arch protecting the eyes from injury by branches of trees when the creature is making its fatal spring, and suitable for attachment of powerful muscles; and the molar teeth—what could

be better adapted for crushing a bone or lacerating flesh. Try and fancy a horse's molar tooth in the tiger's mouth. How useless for its peculiar mode of life. In the skeleton of the tiger we find the most marvellous and perfect combination of lightness and strength.

We find in the dog-like carnivora an approach towards more omnivorous characters as in the hog, and in the bears a still nearer approach.

To particular teeth in both jaws the name "carnassial" has been given (in the upper jaw the fourth premolar, and in the lower the first molar), characterised by its sectorial or cutting form. This is highly differentiated in the "cat tribe" less specialised in the dog tribe, and amongst the bears the sectorial condition has become altered into a more rounded and tubercular form. The large canine tooth of the felidae is also a sexual weapon, but I shall refer to this subject later on.

The next great class I have to refer to approaches at both ends towards both the herbivora and the carnivora; it is named from the peculiarity of the incisor teeth which are adapted for gnawing. They are called Rodents or gnawers, and their incisors (centrals) grow from persistent pulps, *i.e.*, pulps or formative organs which never cease elaborating fresh tooth substance throughout the creature's life-time. The horse's molars do not continue to grow throughout the whole life of the creature, but persist for some considerable time, and are thus called "semi-persistent" as I indicated before. The Rodent's molars as well as the incisors grow from persistent pulps. In pattern their surfaces are very complex and highly suitable for crushing such substances as woody fibres, and whatever in fact would require gnawing by the incisors, as will be seen by the diagram. Observe the transverse ridges of enamel, and see how well adapted they are for their work.

The jaws of this class as would be expected from my remarks on correlation of growth, are also specialized to suit the customary aliment. We see by the diagram a strongly arched skull and jaws, but yet of a heavier build than the carnivorous, and deep glenoid cavity and condyle, whose long axis is from back to front to allow of the forward and backward movement of gnawing. In many Rodents the anterior face of enamel on the large scalpiiform incisors is stained of a deep orange or salmon colour. These large gnawing incisors, which are kept constantly sharpened by wear from the direction in which they meet one another, are exceedingly

powerful. A rat will gnaw through water-pipes in which it has heard water bubbling, and a beaver will fell a considerable sized tree.

With this brief explanation of the typical characteristics of these three well specialised classes, which I hope may have been made clear enough to enable you to follow me in what I have to say next, I will proceed to advert to some of the special differentiations of teeth for definite purposes, and here let me say that we shall get much valuable assistance from the really well executed diagrams Mr. T. Caldwell Jones has been good enough to produce for me.

In referring to this subject, I intend to make a classification of my own, and not mind sticking closely to text-book classes, as I think I can make the matter more comprehensible by referring to the functional conditions of the individual teeth.

I may say that with a very few exceptions, as for instance the upper carnassial tooth of the "Felidae" which is a premolar, and one or two other examples, the specialisation of teeth takes place: 1, In the incisors; 2, in the canines, and 3, in the molars; and of each of these I hope to give one or two well-marked examples.

We find in the incisor series specialisation of either the central or lateral incisors, either in one or both jaws, by unusual lengthening or by absence in a functional condition, altogether of one or both, or of all the incisors in one jaw, or even by extreme lengthening of one single incisor on the one side of the mouth.

Thus in the Edentata, which comprise the sloths and armadillos, whose teeth are what are called "Homodont," *i.e.*, similar in structure throughout the series, there being no specialisation into canines, molars, &c., but are all of a simple pattern, we find in some complete absence of front teeth, as in the *Mutica* or "South-American Ant-eater," in which the elongated jaws can hardly open at all, the mouth being a small slit at the end of the elongated muzzle; or the *Manis* or "Scaly Ant-eater," and none of the order possess central incisors.

This peculiarity is in keeping with the creatures' mode of life. Their food being ants and other insects, they procure their prey by protruding an enormously long tongue, which is covered with viscid saliva, to which the insects stick, and by the retraction of the tongue are brought within the bite of the back teeth by which they are masticated.

Amongst the Cetacea, whose teeth are also of the

“Homodont” order, we find some wonderful specialisations of the teeth; and confining myself for the present to those of the incisor series, I will take as an example the “Narwal.”

By the diagram you will perceive there is an enormously developed tusk on one side of the upper jaw, and on the other side one of the same form, but very rudimentary. These are the only teeth the creature possesses.

In the female they are small, about eight inches, and never come through the bone at all; but remain enclosed within its substance in a merely rudimentary condition; but in the male one of them (and in some very rare instances both) continues to grow till it has attained the enormous length of ten or twelve feet, and a diameter of three or four inches at its base.

This presents a well-marked instance of a sexual weapon developed in the incisor series, rather a rare occurrence, as generally it is the canine which is the object of sexual selection. This enormous tusk (generally, or rather nearly always, the left one) is quite straight, but is marked by spiral grooves winding from right to left; and it is a curious fact that in those specimens whose tusks have both attained functional proportions, the grooves wind in the same direction. The spiral form is that which affords the maximum strength and elasticity.

I shall have more to say with reference to the Cetacea later on when describing the “Baleen or Whalebone Whale.” At present we will continue to consider the differentiation of the incisor teeth.

The Elephant and his primæval ancestors, the Mammoth, Dinotherium, Megatherium, and Mastodon offer marked instances of this.

In the Elephants it is the upper incisors, and they are lateral incisors which are differentiated, and it is in the male that they attain to their maximum development. Another instance of sexual selection, though in the female also they are no mean weapons. They are used for rooting up trees and shrubs, &c., to get at the herbage on top branches which they cannot reach with their trunks. In the African Elephant the tusks attain a greater length than in its Indian cousin.

The molar teeth of these creatures offer some very interesting points for consideration, which will be referred to in the order I have adopted for description.

The Hippopotamus has well specialised front teeth, which

assume a very conical and canine-form appearance. Their use is for rooting up the herbage, &c., from the bottom of rivers, they being amphibious in their habits. It is in the canine teeth however we find their sexual differentiation as in their near relatives, the hogs.

As I do not intend to give any special description of the teeth of another near relative of the hog, viz., the rhinoceros, let me say in case someone may get a false notion, that the rhinoceros "Tusk" is not a tusk or tooth at all, but a horn, or rather an excrescence of the tough skin of the forehead.

Amongst the Ungulata we find some peculiar arrangements of the incisor teeth.

Taking the horse as the type form, we find amongst the Ruminants a somewhat similar form of teeth and jaw; but in the upper jaw there is a complete absence of front teeth as in the cow or sheep.

I have referred at some length in an earlier part of my paper to the wonderful adjustment of means to an end there is to be found in the Herbivorous quadrupeds; I have also described somewhat minutely the Horse's incisors, so this must suffice for the differentiations observed in the incisor series.

We next come to the differentiations of the canine teeth, and although these are distinctly developed as sexual weapons in the males, Nature, with her usual economy of means, utilizes them frequently for other purposes.

Take for instance the tusks of the Wild Boar, which are enormously developed in some species, *e.g.*, the "Sus Babirussa," which though only in itself of a smaller size than the domestic pig, has canines in both jaws of enormous proportion. They are generally in the adult male as much as eight or ten inches in length. Their use, though developed in the male as a sexual weapon, is at present a matter of conjecture. Doubtless they are used for uprooting bulbs and other vegetable food, and some naturalists believe that they are also specialized as a protection to the eyes when rooting amongst the tangled undergrowth of the forest. Continue upwards the canine teeth of the common wild boar represented in the Plate with a considerable backward and inward curve in the upper ones, and backwards and outwards in the lower, and you will form some idea of this creature's wonderful oral equipments.

Another interesting form in the Suidae is the "Phacochoerus" or Wart Hog, but its canines do not attain such proportions as in the *Sus Babirussa*. It however, has an inte-

resting specialization in the molar series to which I hope to have time to advert in its place.

The Horse possesses canine teeth of somewhat well developed proportions. In the Mare they are absent, and in the gelding are stunted and indeed sometimes never erupt.

In the Deer tribe there are some deeply interesting correlations between the canine teeth and the horns or antlers, which demonstrate beyond a doubt the importance of sexual differentiation in its bearings on the hypothesis of evolution.

In one species the "Musk Deer" or "*Moschus Moschiferus*," there are no horns at all, and in the male the canine teeth grow to enormous proportions, otherwise it is very similar in formation of skull and jaw to the other Ruminants, such as the domestic cow.

In another species the Indian Muntjac (*Cervulus*) there are very small horns, and well developed canine teeth, and yet again there are others, such as Swinhoe's Water Deer and Mitchie's Deer which are hornless, but possess well developed canines. Of course I am referring distinctly to the males only.

Now this is the more singular, because the absence of canine teeth is a very general characteristic of the Ruminants, both of the hollow horned species, such as the Cow or Antelope, and of the solid horned such as the Deer. The Camel also has well developed canine teeth.

It may here be advisable to dispose of the question of the differences in oral structures between the Anthropoid Apes and Monkeys, and Man.

Please look at the diagram for a moment of a man's upper jaw and that of a male Gorilla. Observe the enormous canine teeth of the former; again you will perceive sexual weapons, for the female has only comparatively very meagre ones; notice the square arrangement of the row of incisor teeth, and their canine form pattern, and also the large diastema in front of the canine, and again the well marked ridges and cusps of the molars; and compare it with the rounded jaws and less pronounced cusps, and absence of a diastema in the human species—what a vast apparent difference; and yet when we regard the respective jaws critically we find the differences are more those of degree than of kind.

Passing on to the molar series we find some very singular and unique specializations. Instance the enormous molar the last of the series in the Wart-hog. This tooth is double the size of those in front, and has a great number of cusps. It

has many analogies to the molar of the Elephant to which I now propose to refer.

I have already referred to the Elephant's tusk, or lateral incisor tooth; its molars also are quite unique. The molars of the African species are larger than those of its Indian brother; the tubercles or cusps are fewer in number in the African and are joined to one another by enamel; whereas in the Indian species, each ridge seems distinct, and in reality they are; each of the lozenge shaped ridges is as it were a distinct tooth composed of dentine and enamel, and they are all bound together into one immense compound tooth by cementum. Now singular as this arrangement is there is another peculiarity about the Elephant's molars which attains in no other living mammal, though its remote ancestor the Mastodon had the same peculiarity in some of the molar series, but not in all.

The germs of the teeth instead of developing in the substance of the jaw, and then erupting vertically, develop in the back portion, and as they develop migrate forwards, and being worn down in front, as they gradually wear away and eventually disappear, their place is taken by the next in turn. Thus we find one and a half or a portion of another molar in each jaw (of course on each side also) in functional condition at one time. The deciduous molars are displaced in a similar fashion by the permanent set. If a young Elephant be killed and its jaws examined, it will be found there are a number of "toothlets," if I may be permitted to coin a word, lying loosely in the substance of the bone in a cavity, waiting their turn to assume their coat of mail (the investment of cementum) and march forward to the fray to take the place of their fellows already sacrificed in the battle for life. The peculiar semi-circular form of the jaw enables this to be brought about. In the Mastodon, the eruption of the teeth is of a mixed kind; some of the molars erupting vertically, and some as in the Elephant succeeding from behind. He who runs may read in this a significant fact in evolution.

One more, and very singular specimen of differentiation of oral structures, and I must bring this paper, already too long I fear for your patience, and yet all too short for the vastness of the subject, to a close.

In the ordinary "Baleen or Whalebone Whale," we find a perfectly unique arrangement for the prehension and retention of prey. Who would think to look at a piece of whalebone that it is in reality a part of a tooth.

Strange as it may seem, it is a fact. Analogous in chemical constituents to "chitine" rather than dentine, each fibre develops from a vascular and persistent pulp, and erupts in the same way as a tooth. Our diagram will help to explain the manner in which it comes into use, and performs its functions.

I will describe the structure in Mr. Tomes's words, *vide* "Dental Anatomy." "From the upper jaw of an adult Whalebone Whale, there hang down a series of plates of Baleen, placed transversely to the axis of the mouth, but not exactly at right angles of it.

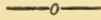
"The principal plates do not extend across the whole width of the palate, but its median portion is occupied by subsidiary smaller plates. The whalebone plates are frayed out at their edges, so as to be fringed with stiff hairs, and their frayed edges collectively form a concave roof to the mouth, against which the huge tongue fits, so as to sweep from the fringes whatever they may have entangled. The Whale in feeding takes in enormous mouthfuls of water containing marine mollusca; this is strained through the Baleen plates, which retain the Peropods and other small creatures, while the water is expelled. Each plate consists of two dense but rather brittle laminae, which inclose between them a tissue composed of bodies analogous to hairs. By the process of wear the brittle containing laminae break away, leaving projecting from the edge the more elastic central tissue, in the form of stiff hairs."

And now, Ladies and Gentlemen, I hope I have not too severely taxed your patience, and also that my remarks may tend to show that lessons elevating to the mind may be learned even from the study of teeth or "dry bones."

In my next paper on this subject, which will be the last of the series of three sections, I hope to deal with the deciduous teeth at greater length, and show some of the histological characters of the various tissues.

THE SEA URCHIN.

BY MR. W. SHARP.



AMONG the many marvels of animal and vegetable life which abound around our coasts, and their name is "legion," there is none which better deserves, or will more amply repay careful study than the lowly creature which forms the subject of this paper, the Echinus or Sea Urchin, as it is popularly called. (In Guernsey, *héricion*). Life in any of its myriad forms is wonderful, and whether we belong to the old school and believe in a "separate creation," or to the more modern one of "evolutionists," we cannot fail to behold the Great Master Mind over-ruling and guiding all, and we feel compelled to exclaim with the poet,

"The hand that made them is Divine."

The marvellous structure of the Sea Urchin has always excited the warmest admiration of naturalists. "It is," as one says, "a piece of workmanship so exquisite, so far beyond all human art, so visibly demonstrating sovereign skill and boundless wisdom, that a sense of awe creeps over the mind as we proceed with all humility to contemplate so great a miracle." ¹

Let us glance for a moment at the living Urchin before we proceed to examine in detail its marvellous structure. It presents itself to our view as a globular, oval, or heart-shaped body bearing on its surface innumerable spines, generally of a greenish or purple hue, and all brightly glistening, as the light is reflected from their ridges and furrows. These spines are seen to be capable of moving in every direction, and independently of each other, for each works on an "universal joint." They serve at once as a protection, and as organs of locomotion, though in this latter respect they hold quite a secondary place, for by means of its *sucker feet*, rather than

1. Rymer Jones.

its spines, the creature is enabled to move from place to place. Using a pocket lens, we may also see attached to the spines and scattered over the surface of the creature, curiously-shaped appendages, which for years have been a great puzzle to naturalists. These are the *pedicellariæ*, but of these and the sucker feet more anon.

Let us now turn our attention to the "test," or as it is inaccurately called, the shell of the creature, as we see it divested of the spines. It is in reality the limey *skeleton* of the animal, and not an outer coat of armour like the shell of crab or lobster. It is not made in one solid piece, but formed of numerous pentagonal plates (over 600 in a single test) composed chiefly of carbonate of lime, which the animal has the power of secreting from the sea-water where it is held in solution. These plates are fitted together with the most marvellous accuracy, and over the whole surface, and between each several plate is stretched a thin film of living flesh, so fine and colourless, indeed, that the microscope alone reveals its presence. And herein is a marvel indeed! The Echinus when it reaches the last stage of its development assumes the shape it retains through life. Hence the same skeleton encloses the young as the aged urchin, for, of course, it does not shed its skeleton as the lobster does its shell. Gradually the limey particles are secreted and deposited along the edges and surface of the many plates in a determinate manner, and with the utmost regularity. They grow with the creature's growth and strengthen with its strength, and still the same shape is preserved that was first improved upon it. The whole case or shell consists of five zones or segments, in which are double rows of pentagonal plates perforated with double rows of pores, and between these five other zones of about twice the breadth. The former are generally called *Ambulacra* (L. *ambulacrum*, a walk), being fancifully considered to resemble the walks of a garden. The surface of the plates in the larger zones and also those between the perforated ones is studded with warts or tubercles of different sizes arranged in rows from pole to pole. The upper part of each tubercle looks like a highly polished billiard ball. To this polished portion the spine is attached, the base of the latter being hollowed out to receive it, and thus we have a perfect "ball and socket" arrangement. The character of the spines varies much in different species; in some they are fine and silky, in others stout and club-like, in some straight and rigid, in others curved and flexible. The growth of the spines is curious, and may aptly be compared to that of an exogenous

tree. Sections of them form exquisitely beautiful microscopic objects.

Holding up the empty "test" to the light, we can plainly see the numerous minute holes of which we have spoken, all arranged in a symmetrical pattern.

Through these, in the living animal, are protruded those wonderful organs, the sucker feet or ambulacral feet, which enable it to attach itself firmly to any substance, and are also its chief organs of locomotion; and further even to right itself if placed, so to speak, on its back. Those near the mouth are also said to perform the additional function of seizing prey and dragging it to the mouth of the Echinus. No less than 3,840 of these ambulacral suckers have been counted in a single individual. And now for their mode of working. Within the "test" are certain canals passing along like meridian lines immediately below the rows of pores. At the base of each pair of pores is a small bag filled with salt water. At the will of the animal this is forced into the suckers, and these can thus be protruded far beyond the spines. When the muscles of the bag relax, the pressure is removed, the water flows back from the tube foot, and it contracts. The end of each sucker is strengthened by a calcareous disc or rosette of the most delicate network—a "thing of beauty" under the microscope.

Now, a word or two about these curious objects, the *Pedicellariæ*, which look like parasitic polyps (as indeed they were at one time thought to be) attached to the spines. These minute organs consist of a sort of forceps, having three blades or jaws, the inner edge of which is provided with irregularly shaped teeth. These calcareous nippers are attached by a long flexible stalk to the Echinus, and they are seen constantly waving about, and the jaws opening and closing. Their power of "holding on" is amazing, and thus they are eminently fitted for seizing hold of seaweed, &c., till the sucker feet have time to attach themselves. Indeed Professor Romanes, who has experimented largely with Echini, considers this the chief function of the *Pedicellariæ*. Even when separated from the living animal they continue their "grasping" habit for some time.

Turning now to the mouth of the Sea Urchin, we find in the true Echini that the mouth is in the centre of the lower surface, and is armed with teeth. In the heart urchins the mouth is eccentric and edentulous. The teeth resemble those of the Rodents in form, and continue to grow throughout the animal's life. They are five in number, and very hard. The

whole dental apparatus, consisting of thirty pieces, forms a sort of pentagonal pyramid, and is known by the fanciful name of "Aristotle's Lantern."

Before leaving the Sea Urchin, we must notice the remarkable fact that in every geological epoch from the Silurian downward, remains of Echinoderms are to be found, though the species increase in number as we approach the present epoch. Now they are distributed over a very large area of the earth's surface, and at various ocean depths. During the voyage of the *Challenger* specimens were dredged from a depth of over 2,000 fathoms.

With a list of the urchins found in our own seas—and for which in its complete form I am indebted to Mr. J. Sinel, of Jersey,—I will bring this imperfect sketch to a close, with a hope, however, that with all its faults, I may have succeeded in interesting some at least in this humble but wonderful creature, on the structure of which it has been well said, the skill of the Great Architect is seen not less than in the building up of the universe.

Echinus sphaera (Common Egg Urchin), common throughout the Channel Isles, both the type and varieties. Var., *E. melo*, *E. ventricosus*.

E. miliaris (Purple-tipped Egg Urchin), common throughout Channel and Channel Isles.

E. flemingii, rare in Channel, Herm, Jethou and Jersey.

E. lividus, or *E. purpureus*, Herm, Guernsey and Sark (not Jersey).

E. brevispinosus, or *E. esculentus*, or *Sphaerechinus granularis*, rare in Channel, frequent in Sark, and not very rare in Jersey.

Spatangids :—

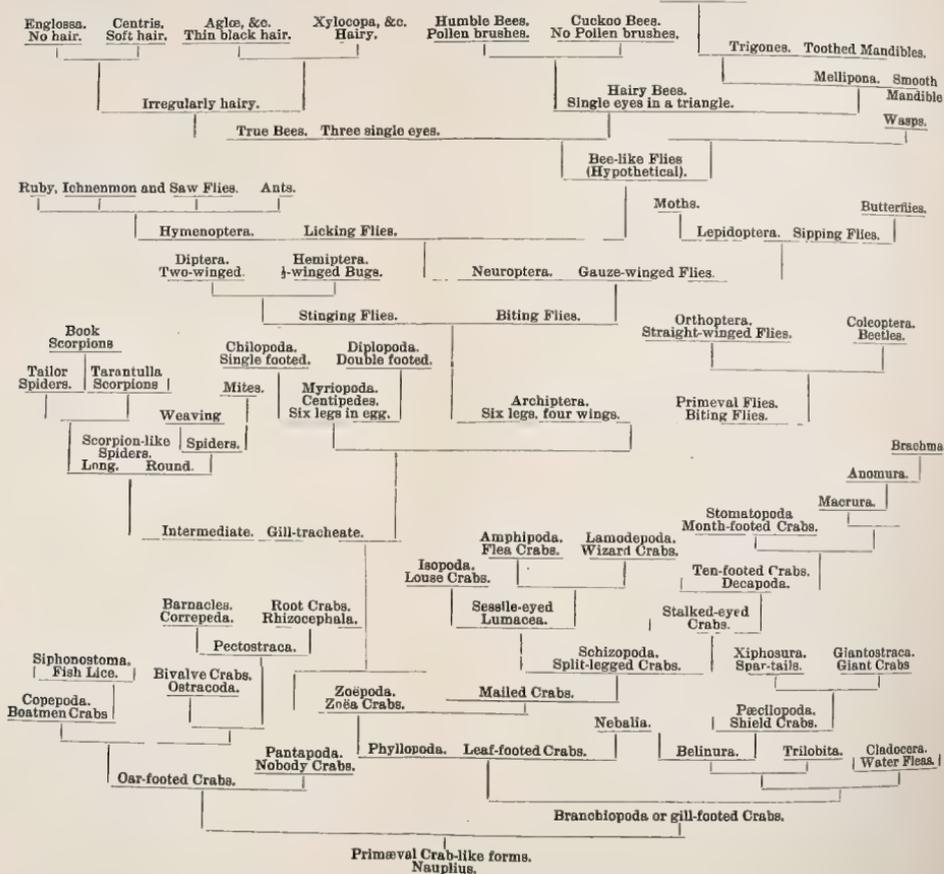
Echinocyamus pusillus, Herm, and Guernsey. Not very common.

Spatangus purpureus, fine at Herm, and in Great Russell, Guernsey, and rare in Jersey.

Echinocardium, Herm, off Sark. Not common.

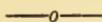
THE EVOLUTION OF THE HONEY BEE.

HONEY BEES



THE EVOLUTION OF THE BEE.

BY MR. A. COLLENETTE, F.C.S.



THE Bee is classed among the Insects (*Insecta*), which form with the Centipedes (*Myriopoda*), Spiders (*Arachnida*), and Crabs (*Crustacea*), a division distinguished from all other living beings by several peculiarities common to all these, one of which—the possession of jointed feet—has given the name to the division, which is termed Arthropoda. Another family likeness is the segmented division of the body; though this, the whole division possesses in common with the Ringed-worm (*Annelida*), and allied families.

The facts depended on to prove the Evolution of Insects, by such naturalists as Huxley, Haeckel, Lubbock, and Gegenbaur, are the development inside the egg and outside the egg, in the larval forms, in the metamorphoses, and in the structure of the complete insect. Such facts I shall call your attention to as far as is possible in the time at my disposal.

Beginning at the bottom of the tree before you, which is chiefly taken from Haeckel pedigrees, we find the first important stage is that termed Nauplius. All Crustaceans form, after leaving the egg, a Nauplius which differs in shape in different animals; but in all essentials the Nauplius stage is common to all the Crustaceans. A further stage of development met with in all true crabs and shell-fish is that termed the Zoëa stage, to reach which the young has to develop from the egg through the Nauplius stage, through Gill-footed (*Branchiopoda*) and leaf-footed (*Phyllopora*) branches. The gills have developed and increased their leaf-like expansions until they have become true gills. These stages are taken to represent the evolution of early forms—that is, that the Nauplius and the Zoëa and their variations were at one time the final forms, and that as the various organs became perfected and divided by being applied to different uses in the economy of the creature, so have the future forms been evolved. This Zoëa form is an important portion of the

pedigree, for it links insects to crabs. The forms placed below the Zoëa branch do not pass through the Zoëa stage while those above do, or at least they show some modification of the stage.

Before leaving the crabs let me draw attention to the method of growth which is common to both crabs and insects. I mean that of forming a hard skin or protection and getting out of it when increasing in size or when changing in form. This peculiarity would alone show an affinity between these apparently dissimilar forms. This necessity comes to insects by inheritance, while many of their peculiar forms result from adaptation. Leaving the Zoëa stage we come to intermediate forms which link the Spiders (*Arachnida*) to the Myriopoda and Hexapoda, or to the orders of numerous legs and those of six legs. These forms, still faintly visible in insect larval development, consisted of head with feelers, thorax with three pairs of legs, and with both gills and air-tubes. The centipedes, though possessing a number of legs, really possess in the egg but three pairs and afterward develop the remainder by a species of budding. But leaving these we find that a portion of the forms possessing gills took to using them for different purposes; some remained outside the body and ceased to be used as air-tubes, but were used to propel and support the weight of the insect when leaving one pond for another and thus in time became wings. The fact that in the perfect insect only, do wings appear, and that with few exceptions, reproduction is also a function of the perfect insect explains the cause of wings developing from branchiate gills.

But we must not suppose that the same cause produced the same effect on all known winged insects. The common larval forms, and their remarkable likeness, proves that there must have been a common parental form which led to the different forms now known. These probably were of some aquatic-fly form possessing six legs and four wings, and biting jaws not very different from those of the crabs, scorpions, and spiders. Having now traced out the evolution as far as the fly, the remainder is comparatively easy.

Great differences of form between the different kinds of caterpillars and grubs exist and need explanation here, as the ordinary observer is apt to attach too much importance to such differences. The different habits of feeding and the natural selection constantly going on have caused those grubs which were exposed to outside influences to change with their surroundings, and have, owing to the double influence of

inheritance and adaptation caused the various forms and colours of the grubs to be produced. The flies under the influence of the same causes have also varied, and the result is that the insects are as numerous in their species as all the vertebrates put together. The tree shows the chief modifications which I shall follow as regards those branches leading to the Bees.

From the Biting Flies, which by a side branch give rise to the Orthoptera (such as the Grasshopper) and Coleoptera (Beetles), two changes are noticed. The mouth is modified so as to produce the Stinging Flies, and the wings are so altered that two separate orders of Stinging Flies exist, viz., the Two-winged (*Diptera*) and the Half-winged Flies (*Hemiptera*).

By another branch variation we get the Gauze Wings (*Neuroptera*), which divide into the Licking Flies with membranous wings (*Hymenoptera*), and the Sipping Flies with scaled wings (*Lepidoptera*). The Licking Flies again vary into two branches, one of which throws off the Ruby Flies, Ichneumon Flies, Saw Flies and Ants; the other probably gave rise to Bee-like Flies, forms which though not now existing, must have preceded Bees. We have now come to variations which depend more upon external appearance, minute structural differences and habits of life; and these would take a far greater time to name than I have to spare, I must content myself with naming the few forms we are to discuss to-night.

The Bee-like Flies must be supposed to have given rise to true Bees and to Wasps. The true Bees vary in their hairyness, as well as in their mouth organs and other parts. Some are without hair either on every part or on special parts of their bodies, and others vary more in the colour of the hair and in the shape of the body than in any important detail. The points which differentiate the Bees from each other must be left unnoticed. I content myself with having traced the insect through its evolution as far as such evolution is known. It will no doubt be found that some of the branches of this tree are out of place when more light has been thrown on evolution; but any such change will not interfere with the general outlines or with the correctness of the leading deductions from the known facts.

REASON, INSTINCT, AND REFLEX ACTION ;
THEIR MUTUAL RELATIONS, AND THEIR PLACE IN EVOLUTION.

BY MR. FREDERICK ROSE, L.D.S., R.C.S., ENG.

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The great hypothesis of evolution which has revolutionised modern thought, not only in Physical but in Social Science, is regarded from four leading standpoints. 1st, there are those (and their numbers are diminishing rapidly) who "will have none of it," and cling to the old belief in special creations for each species and genus, &c. These are, however, for the most part, people who take no special interest in Science, or the deductions drawn from the discoveries of Science; and therefore are not likely to be members of a Society like ours.

To them I have nothing to say; but will address my remarks to those who hold one or other of the three remaining views of the subject.

The second class are those who will grant the evolution of all the lower animals from still lower forms; but claim no kinship with them themselves; and I grant at the outset of my discussion that these people have considerable ground for their belief, inasmuch as the "Missing Link" has not yet been found. My paper will afford ample scope for our friends of this school of thought to criticise and discuss.

The third class of thinkers are those who follow Professor Wallace's lines, which, put briefly, are that in the far off past, when a Chaos became a Cosmos, and the fiery heat of the earth cooled down, leaving a quiet and cool corner of the universe wherein the seed of life might germinate, a number of vital germs commenced their existences, and went on developing in predestined lines, *e.g.*, one would develop through various lower worms into a fish; another into a mammal, and finally another into a man. Much may be said, viewed in the light of our present very imperfect knowledge, for this school of thought; but, I think, in the main, they will

be in accord with the fourth and last class of thinkers as regards our present subject. These are they who believe that one vital germ settled on this earth, and from that all the various classes of plants and animals gradually evolved by natural selection, man included. Mind you, not that man descended from a monkey, as ignorant people charge Darwin with postulating—for he is the leader of this school of thought—but that man, monkeys, fish, plants, and all created beings which have possessed the vital spark, have gradually been evolved from the same original germ.

This is the line of thought I take up in my paper of this evening, and I purpose trying to collate and serve up to you in a condensed form thoughts that have tossed about in my brain for years in a disorderly sort of way. Perchance I may be fortunate enough to put the subject in a different light from that in which you have been accustomed to view it, though I cannot hope there will be much originality in my remarks.

It is a law of physiology, which, I think, none will dispute, that "function begets structure," and conversely that "structure determines function." They act and re-act one on the other; therefore, it is a certainty that when we examine, let us say the fin of a fish, the wing of a fowl, the leg and paw of a cat, the arm and hand of a monkey or a man, we know that in exactly the same ratio as they differ in structure and complexity, so will the acts they perform differ in number and complexity. So with the brain and the nervous system. In proportion as the higher nerve centres are developed in structure, so will the functions they determine be developed in structure.

Thus, at each end of a long series of structural and functional changes we find creatures so different, that, had we not proof of their relationship by knowing the various forms that go to make up the links in the chain, we should at once say, as did the naturalists of a former age, "these creatures cannot be related," and we should fall back on special acts of creation to account for them; and if we were at the time discussing the mental faculties, we should as certainly draw a hard and fast line between Reason and Instinct, and Instinct and Reflex Action, and pronounce their differences as being those of kind and not merely of degree.

Now, the school of thinkers to which I profess as a very humble follower to belong, maintain that these apparent differences in kind, nay real differences in kind now, that we see amongst created beings are produced from an accumula-

tion of differences in degree, acting through natural selection in the vast eras of time that Science proves to have elapsed since the earth was fit for the reception of life; and that just as in the physical so in the psychical realm in the struggle for existence any slight variation from the parent forms that gave its possessor an advantage over its fellows, and would tend, from the same cause, by re-action, to go on developing would leave its impress on the progeny; and by correlation of growth taking place in other organs, in time a totally different looking creature would be evolved. Bear in mind, however, that a great controlling force would be exerted by that powerful factor in evolution, "tendency to revert to a former type."

The influence of environment also must not be forgotten as one of the factors at work to produce modifications of structure and function.

Thus, just as it has been ascertained, that the differences between a nebula, a sun and a planet; between ice, steam, and water; between the hoof of a horse and the paw of a cat; between the fishes' air-bladder and gills, and a man's lungs, are merely differences in degree produced by natural selection; so surely are the simple reflex actions performed by the jelly-fish, the instructive actions performed by the bird, and highly rational and complex acts and thoughts emanating from a Shakespeare, a Sir Frederick Leighton, or a Herbert Spencer, merely accumulated differences in degree resulting in a vast difference in kind.

Just here let us take a brief glance at our diagram, and notice where the seats of the various psychical acts lie in the nervous system of a human being; and as we dwell on the differences in their anatomical features, I will endeavour to give concise definitions of the functions they perform as expounded by modern scientists.

Professor Romanes' definitions are, I think, accepted in the main as most nearly exact; but while I accept his definitions, I cannot help thinking in spite of Romanes' disagreement that the famous hypothesis of Descartes' "Animal Automatism," now rather tabooed by men of Science, will account for many acts now classed as conscious or instructive.

I now will quote Professor Romanes' own words. "*Reflex Action* is non-mental neuro-muscular adjustment, due to the inherited mechanism of the nervous system, which is formed to respond to particular and often-recurring stimuli, by giving rise to particular movements of an adaptive though not of an intentional kind."

To make these various definitions of Romanes' clear as we go along, I will just notice familiar examples.

A man who has sustained an injury to the upper portions of the spinal cord will often perform acts with his lower limbs that seem like conscious movements, so will a man in his sleep. Tickle his feet and he will withdraw them, though his brain takes no cognisance either of the stimulus or its re-action. Cut off a pike's head, and put a hot iron to the severed end of the spinal cord at the neck, and he will flap his tail. Remove a frog's cerebrum, and then put him on a slate or board, gradually tilted towards the perpendicular, and he will crawl up, and right over the edge, to sustain his balance, so showing his power of muscular adjustment; but remove his cerebellum, and his power ceases; and yet if a drop of nitric acid be put on his back, he will try and stroke it off with his feet, because the spinal cord which supplies the limbs with powers of motion and sensation is still capable of re-action and stimuli.

The act is, however, unconscious, and only automic and reflex re-action to stimuli. The lower creatures, *e.g.*, a sea anemone, or a snail, are limited to this class of actions, for the nerve centres are of a very rudimentary description; and, I doubt much, if a worm, no matter how he may wriggle, is conscious of pain when he is pulled over the hook of the angler. We see here function and structure in equal degrees very simple, and limited in scope.

Returning to our definitions, Professor Romanes says: "*Instinct* is reflex action, into which is imported the element of consciousness. The term is therefore a generic one, comprising all those faculties of mind which are concerned in conscious and adaptive action, antecedent to individual experience without necessary knowledge of the relation between means employed and ends attained, but similarly performed under similar and frequently recurring circumstances by all the individuals for the same species."

We must all be able at once to think of hundreds of familiar examples of this. I will mention one or two that occur to my mind. The storing up by certain species of hymenopterous insects in the cell wherein they have deposited an egg, food for the future grub; and further stinging it in such a spot as to paralyse it without killing it, if it be a living creature that is desired as food, so as to prevent the evil consequences of putrefaction if it should die. The gathering of chicks under a hen's wings when in presence of a threatened danger, or the suckling of the newly-born infant.

To continue our definitions: "Reason or intelligence is the faculty which is concerned in the intentional adjustment of means to ends. It therefore implies the conscious knowledge of the relation between means employed and ends attained, and may be exercised in adaptation to circumstances novel alike to the experience of the individual and to that of the species."

The seat of this faculty is the cerebrum, or great brain; and in proportion to the intelligence of the individual do we find the size of this organ; or, to put it more accurately, do we find the quantity of grey matter and the size of brain surface? This latter increase may be attained by increase in number and depth of the convolutions on the surface of the brain. The convolutions of the brain of a Herbert Spencer, or a Tennyson, are much deeper and more complex than those of the brain of an aboriginal Australian; the brain of the latter, however, excels in this respect, though not to the same extent, that of a gorilla; so between the gorilla and the dog, the dog and the rabbit, and so down the scale of organised beings, until we find not only smoothness of surface and contraction in proportion relatively of large to lesser brain, but a gradual diminution, till the only representative of this important organ is a mere spot in comparison with the aggregate of the other cerebral substance; as in the turtle for instance, going further down it gradually diminishes till we get to creatures that do not possess any. Our diagram will illustrate my meaning. All those portions of the cerebro-neural axis that are concerned in the physical life of the creature and the preservation of the species are well developed, while the part concerned in the psychical is a mere foreshadowing as compared to its purely brute inheritance. Thus, retracing our steps and ascending the scale of creation, we find there is a time in the life history of organised beings when, 1st, purely reflex actions begin to be complicated by others wherein consciousness plays an important part, and there is simultaneously a proportionate structural addition; and 2nd, when a power of co-ordinate thought is accompanied by an addition superimposed to the already existing cerebral structures. It is in this same power of co-ordinate thought, and his "potential power to progress" in it that man stands out from the other primates a landmark in Evolution, the most wonderful product of causal effects, "the roof and crown of things." With the advent of man as man, when psychical development came to relegate physical to a less important position, when brain substance acquired the power to progress

by means of its own interest inherent, a new order of things was established, and philosophers now believe they see something of the end to which these wonderful evolutionary processes have been tending.

Henceforth psychical power rules the world; brute force loses its value as the world becomes more reasoning and civilised, and now survival of the fittest does not necessarily demand the extinction of those physically weak. In the future, man steps in and modifies Nature's work in natural selection, by selection in accordance with his needs. Henceforth brains, not body; soul, not brute force and brute instinct, rules created beings. Where will it end? one asks, and the soul cries out for "more light." When humanity began to evolve a new chapter in the history of the universe opened. Henceforth the end of Evolution is not genesis of species, but increase in civilisation. And yet grand as the human soul is, wonderful as the potentialities of his brain, his difference in kind from the brutes is but the accumulation of differences in degree by natural selection.

Along with the first dawning of consciousness we find an extension of the period of infancy, and as we ascend in the scale of creation we find that the new-born animal remains helpless, and dependent on its parents for a longer period. This lengthening of the period of infancy which is required to develop structures too complex for the prenatal period to afford time; moreover, requiring for their complete development to bring out the power of adjusting means to ends, is a most important landmark in Evolution.

The helplessness of the offspring calling forth help from the parents re-acts on them, and impulses, emotions, passions, and all the social instincts are stimulated.

Natural selection preserves that family which has best learned the lesson that "union is strength"; a step higher we find aggregations of individuals forming into colonies. The power for good in this first dawning of acts not purely selfish is immense. With increase in the demand for these acts, increase in size and complexity of the structures involved will result, for "function begets structure"; until at last like the first rays of luminosity from the rising sun, a faint spark of conscience is visible, and from the demands of social acts a code of right and wrong is established. The circle extends from the family to the clan, from the clan to the state, and finally, let us hope, it will embrace all humanity.

Thus we see the importance of the lengthening of the period of dependence in the young animal in Evolution.

Now, to see how this is all brought about, we must advert briefly to the various functions of the different parts of the brain.

The spinal marrow with its extension into the skull, the *medulla oblongata* is concerned in all those acts that are of a purely reflex character, such as the beating of the heart, prehension and digestion of food, &c., &c., necessary to its existence as a living organism. The very lowest of the animal kingdom possess these functions in common with man and the higher animals, and it is shared by embryos in their earliest stages. These acts are automatic, and take place immediately the stimulus is received.

The next two series of actions, which require for their fulfilment the cerebellum and cerebrum, though the messages to fulfil them are not received direct from the outside world, are governed by them. All these acts require a period of delay or tension from the receipt of the impression to the determination of the consequent movement. This implies consciousness. Diminish this period of tension, and there is a consequent diminution in the vividness of the consciousness. Take the various acts performed by a trained mechanic. While he is an apprentice he must bind the whole of his thoughts to the task in hand, and he is consequently slow in his muscular adjustments, till the time comes when his saw, plane or file, works automatically, while he converses on other subjects. Conscious acts become reflex.

"Consciousness" implies perpetual discrimination, or the recognition of likenesses and differences, and this is impossible unless impressions persist long enough to be compared with one another.

It is the surplus of molecular disturbance remaining in the cerebellum and cerebrum, and reflected back and forth among the cells and fibres of these higher nerve centres, that affords the physical condition for the manifestation of consciousness.

Thus we see the cerebrum and cerebellum are the store-houses of experiences.

The cerebellum is concerned in the accomplishment of co-ordinate muscular adjustments, the cerebrum in forming rational ideas.

It is in the direction of increase of cerebral surface that Evolution is tending.

And now, ladies and gentlemen, I must bring my paper to a close. I am aware that my case must receive from you the verdict of the Scotch courts of law "not proven." Even

had I the power and ability to write volumes on the subject, the verdict must be the same, for some of the greatest minds of the age are in constant conflict on this very theme. To me it is one of intense interest, and like many a person who is unlearned in the book of Euclid, he can *feel* that the proposition is true, so I *feel* with regard to the proposition before us.

We cannot and probably never will be able to tell whence came the first germ or germs of life; when, or in what creature, or how, the first dawn of consciousness arose, or whither or to what heights the potentialities of man may carry him; yet, to suppose with the materialist that with this life all is over seems to be illogical.

"Conservation of energy" is an acknowledged fact. The thoughtful mind then asks, "is it probable that all this vital energy is as nought, and will vanish at death like the extinguishing of a candle"?

I cannot believe it. To my mind Evolution affords logical reason for a larger hope than man has yet possessed. I wait patiently as Tennyson puts it in very beautiful language, and hope some day to look "behind the veil."

A VISIT TO JETHOU.

JUNE 25TH, 1890.

(Read before the Society by Mr. G. T. DERRICK, July 8th, 1890).

The Midsummer holiday offered a favourable opportunity for examining one of the outlying islands of the bailiwick, and as a visit had already been paid to Herm at about the same season, it was decided that Jethou should this time receive the attention of the Society. Mr. Austin Lee was good enough to give permission to the members to go over the island, and the *Rescue* was specially chartered for the occasion. Although some were deterred from joining the excursion by the idea that there was nothing of sufficient importance there to repay a visit, and the foggy weather on the morning of the 25th of June frightened others, yet above forty members and friends started on board the *Rescue* at 11.30 a.m. The weather was improving, but the fog had not lifted sufficiently to make it safe to attempt to thread the intricacies of the Percée, so our captain steered direct for the bold cliffs on the south-west of the island, and after a short run, the announcement, "There is the island, Sir," made the passengers look ahead, to see a most interesting, peculiar, and picturesque spectacle: the rocky outline of the cliffs appeared as the side of a snow-covered mountain or an iceberg looming through the fog.

A few minutes later, the anchor was let drop, and preparations made for landing. A favourable spot having been selected, the whole party was put ashore at the base of the cliff, then having climbed to the track encircling the island, each one proceeded to pass the time according to his own inclination.

On the occasion of our visit, the lifting of the fog produced specially interesting effects. From the high level, shortly after landing, the top of Berhon Tower and the Vale

Windmill were the only objects visible towards Guernsey, yet the coast of Herm, with an approaching Great Western packet, were perfectly clear. A very pretty picture was presented on the coast of Sark, when the cliffs under the Coupée, with a small circle of beautifully blue water at the base, were seen encircled by the white fog: the coast of France, at the time, was perfectly clear.

Jethou is an islet due east of St. Peter-Port harbour, distant about three miles: it lies to the south of Herm, and a little west of the central line of that island, from which it is separated by the navigable channel called the Percée. In shape it is a truncated cone, the circle of its base measuring one mile, width three-quarters of a mile, and the elevation 268 feet, is greater than that of Herm. It rises abruptly everywhere, but especially so on the south. On the north-west it is connected, at low water, by a rough beach with a rock called Crevichon, and on the south-east is a smaller mass Fauconnière, not quite joined at low water. South of it, but separated by a navigable channel, extend the rocks called the Ferriers. The sides of the island rise too steeply to be capable of profitable cultivation; though the soil, except on the cliffs, is deep enough to support a plentiful crop of fern and other herbage, with a close undergrowth of smaller plants.

On the south-east, opposite Fauconnière, the slope has been cleared and formed into terraces, but these are no longer planted. A small plateau, on the summit, is ploughed, and at the time of our visit, was planted with corn, potatoes, &c. The houses, three in number (one in ruins), are on the north side, towards Crevichon and Herm, where a rough beach is somewhat sheltered by the former island, and is, on that account, the usual landing place. A number of trees have been planted near the houses, but they are very stunted; a small orchard, however, appeared in fair condition.

From specimens collected by Mr. A. Collenette, the rock is evidently a syenite: in some parts in a state of disintegration, in others a compact solid rock; having a peculiar fracture, resulting in the frequent occurrence of tabular masses often resting upon smaller pieces, and bearing a close resemblance to the so-called Druids' altars; two notable examples of this occurred above our landing place, near which also rose an immense block of solid rock about 25 feet in height, by about 12 feet broad and thick, supported by about a third of the width of its base, but kept from falling by having a slight inclination landward. The process of

disintegration can be seen all round the coast, but the absence of springs and water-courses prevents its being very rapid. On the S.E., opposite Fauconnière, is a capital rival of the Creux Terrible in Sark, well worthy of examination. On the plateau, heads of rock rise through the soil, and it appears as though one or two masses had been placed near these in such a position as to resemble a Druidical circle.

Every visitor must have noticed the difference in the vegetation on the different parts of the island. On the south side, ground ivy (*Nepeta glechoma*), almost covered the ground wherever there was sufficient soil, spreading under the bracken; yet in places, particularly on the S.E., sea stork's bill (*Erodium maritimum*), mostly of minute growth covered large patches. On the north side, primroses were the characteristic plant, there must have been a splendid show in the spring. *Erythraea centaurium* and *Teucrium scorodonia* were abundant, on these a-side, thrift (*Armeria maritima*), and sea campion were plentiful, but there was a remarkable absence of samphire. The crevices of the rocks were well supplied with *Asplenium lanceolatum* and *nigrum*. *A. maritimum* was plentiful among the lower rocks. Near the houses a coarser vegetation prevailed, burdock (*Arctium lappa*) was abundant.

From the paper read by Mr. E. D. Marquand, it will be seen that during the few hours spent on the island, 135 species of flowering plants and 7 ferns were found on Jethou; and on Crevichon 32 plants and 6 ferns.

Rabbits are very numerous, so numerous indeed that they have to be supplied with food in winter. A good many blind worms or slow worms (*Anguis fragilis*) were seen; Mr. Luff captured one which, since it has been in his possession has cast its skin, the after portion of it coming off in one piece. Insect life did not appear abundant, though the cinnabar moth was common.

After the tide had receded, a large party passed over to Crevichon, ascending to the beacon. Here quarrying has been carried on, and many worked stones were lying about. That period of active life on the rock may account for the increased number of plants now found there compared with those seen by Professor Babington at his visit. Two capital echoes were noticed during the day. The best was from Crevichon, the sounds being repeated from Jethou, and various points in Herm; the other on Jethou opposite Fauconnière repeating six sounds. Though there is no hotel on the island, the people in charge supplied hot or cold water

to those wishing it, so that visitors were able to have a cup of tea with the refreshment they had provided.

About five o'clock, the company re-embarked reluctantly; for the weather had become beautifully clear, and there were many spots to which, had there been time, further attention might profitably have been given. The captain was good enough to make the tour of Jethou in returning, and thus added to the pleasures of a most enjoyable excursion.

Mr. Luff gives the following particulars of the insects noticed on this occasion:—

BUTTERFLIES.

Pieris brassicæ (Large Garden White), one specimen captured.

Pieris rapæ (Small Garden White), one specimen captured.

Epinephele ianira (Meadow Brown), one specimen captured.

Cænonympha pamphilus (Small Heath), common.

Lycæna argiolus (Holly Blue), several flying and sporting over the tops of the apple trees.

Lycæna ægon (Silver Studded Blue), one.

NOTE.—On June 14th, 1860; at very much the same season Rev. F. A. Walker visited Jethou; he records only one species of butterfly as taken there, viz. :—

Cænonympha pamphilus.

The occurrence of this butterfly in Jethou as well as in Herm is interesting, as the species does not occur in Guernsey.

MOTHS.

The only species taken were:—

Euchelia jacobæ (the Cinnabar), which was extremely abundant and in fine condition.

Camptogramma bilineata (Yellow Shell), one specimen, and one specimen of *Phlogophora meticulosa* (Angle-shades Moth), on Crevichon.

Three species of *Tinea*, or small moths were taken, but are, as yet, undetermined. Also nine species of *Coleoptera* (Beetles), and three species of Bees, of which two belonged to the genus *Bombus* (Humble Bees).

THE FLORA OF JETHOU.

BY MR. E. D. MARQUAND.

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To look at on the map Jethou appears a very tiny affair indeed, for it hardly measures half a mile in any direction, but when once you have effected a landing (not always an easy matter, by the way), and scrambling up the slippery cliff-side, start off with the determination of seeing every nook and corner of the island within the space of a few hours, you gradually become impressed with the fact that Jethou is very much bigger than it looks; and still more powerfully does this conviction take hold of you if you should happen to be botanising, and all the while labouring under the painful endeavour to get through a maximum of work in a minimum of time.

A noticeable feature about Jethou, from a botanical point of view, is that the great bulk of the vegetation consists of comparatively few species; very much fewer than an equal area of similar country in Guernsey, for instance; whilst the entire absence of many plants growing more or less plentifully at Herm, only a few hundred yards off, is very remarkable. Without knowing anything of their relative positions, any botanist would at once affirm that Jethou is a piece of Herm, and not a fragment of Guernsey; in fact, its flora resembles that of the former island so very closely, that it is difficult to account for the non-existence of plants which, having a knowledge of Herm, one would reasonably expect to find. I am not, of course, speaking of plants for which no suitable habitat exists—the absence of anything like a rivulet or a pool, or even a marshy spot, accounts for the want of many Herm species, and the same remark applies to plants peculiar to commons and sandy seashores, which are not represented in Jethou.

Professor C. C. Babington in his *Primitivæ Floræ Sarnicæ* enumerates 113 flowering plants and two ferns as indigenous to Jethou; but this number is by no means exhaustive, since on the day our Society visited the Island (June 25th) my own

collecting (assisted by Mr. Derrick, to whom I am indebted for several plants which did not occur to me) amounted to 135 species, of which no less than 56 are additional records, whilst 36 of those noted by Babington were not observed. I have distinguished these latter in the following list by an *. As far as at present ascertained, therefore, the Flora of Jethou consists of 164 phanerogams and 7 ferns.

By a happy stroke of good fortune the tide allowed us to visit Crévichon as a finale to the day's enjoyment, and I made the best use I could of the available half-hour or so, to catalogue the vegetation of this curious beacon-crowned islet. On the rock midway along the causeway grows *Juncus acutus*, the only spot in which I saw the plant all day, and it would indeed be curious should that prove to be its only habitat. I found 32 phanerogams and six ferns growing on Crévichon, that "conical rocky mound," the number of ferns being rather surprising. The flora of Crévichon is quite interesting enough to deserve the separate enumeration which I have accorded to it; but I should state that all these species I have included in the Jethou list, although I failed to find two or three of them in the larger island; there can be very little doubt however that they do occur there.

All the plants of Jethou I have seen in Guernsey with one exception: *Myosotis Balbisiana*, an exceedingly rare species known only in one spot in England, and also in one only on the north-western coast of France. It resembles a rather large form of *M. versicolor*, except that the flowers are of a deep golden yellow, and never become blue. It is certainly the great floral prize of Jethou, and should be carefully preserved, especially as it was not plentiful where I found it.

Two or three plants deserve special notice as being abundant in Jethou as well as in Herm, whilst rare in Guernsey. *Nepeta glechoma* grows very luxuriantly and in profusion all over the island. *Erodium maritimum* abounds on the higher part of Jethou, by the fields, and also low down on the northern slope. *Veronica officinalis* is fairly common in all parts of the island. *Papaver somniferum* occurs plentifully, but rather small in size, at the northern end, mostly in the little cultivated plots. *Symphytum officinale* grows in abundance on the slope close to the path leading down towards Crévichon, not far from the cottage, and has every appearance of being truly wild. I have inserted *Phalaris canariensis* with some hesitation; I saw but one specimen, close to the cottage; it had perhaps grown from scattered bird-seed.

The species of *Rubus* I take from Prof. Babington's list; they were not in flower, so I did not bring away specimens. I was astonished to observe the size of many of the trees, especially Spanish chestnuts and sycamores, some of them being of considerable age, and of finer growth than would be expected on such a wind-swept island. I insert the trees in the list, although the majority have certainly been planted.

The appended list will hardly give an accurate general idea of the native vegetation of Jethou, for the reason that a number of those which figure, such as, for example, *Bellis perennis*, *Plantago coronopus*, *Senecio sylvaticus*, and other abundant species, are extremely scarce here, and require a careful search to see at all. Hence it would seem that in the grim struggle for life many plants, which still occur in profusion on the cliff sides of Guernsey, are being slowly but surely crowded out of existence in Jethou by their stronger and more numerous neighbours. In this little island we can perceive the gradual change which is taking place in the vegetation of all countries, great and small, and the slow extinction of species by purely natural means, apart altogether from human agency. It is quite likely that in a couple of centuries many of the wild plants now rare in Jethou will have vanished altogether, and their place will be taken, not by new colonists, but by the old established and firmly rooted denizens of the soil.

Notwithstanding what I have said about the islands differing *inter se*, it is clear that Herm and Jethou botanically form part of Guernsey. Alderney would, I imagine, show a much closer relation to the adjacent French coast; whilst Jersey would in all probability approximate to France far more nearly than does the Sarnian group. Of the exact position of Sark I am in doubt, having no personal acquaintance with its flora, but I should expect to find there French types unrepresented in this island.

The more attentively the flora of Guernsey is studied, the more apparent becomes the fact that it is much less French in its character than is commonly supposed. Certain it is that since the period when Guernsey—the oldest island relatively—became separated from the mainland, a vast alteration has taken place in the phanerogamic vegetation of the opposite coast. Happily we have abundant and trustworthy information upon the exact distribution of species on the land nearest the Channel Islands. Two excellent French works are available. One, De Brébisson's "Flore de la Normandie," which has now reached its fifth edition, deals

with the region extending from beyond Dieppe on the north-east down to the angle near St. Malo on the south, and stretching inland from fifty to a hundred miles; the other, Lloyd's "Flore de l'Ouest de la France," now in its third edition, takes in the country from the point where the other terminates near St. Malo, and includes the whole north-western corner of France down to the middle of the Bay of Biscay. These two *Floras* are held in the highest estimation by continental botanists for completeness and accuracy, so that we have every requisite information upon the plants of France within a hundred miles and more of the Channel Islands. The exhaustive English *Floras* of the various southern counties furnish similar evidence as regards our national mainland, and the only wonder is that our own little archipelago should have been left down to the present day almost entirely unnoticed, for since Professor Babington published his excellent *Flora* more than half a century ago, no one, so far as I can learn, has undertaken any systematic work on the subject.

I could have wished to say something upon the curious problems which confront one in a critical study of our Guernsey plants, and the singular anomalies which present themselves, but it would lead me beyond the limits of this paper; and therefore I will reserve my remarks for some future occasion.

My belief is that it is impossible to over-estimate the value of carefully and accurately recording the Fauna and Flora of these islands. Viewed merely as so many square miles of land they are perhaps insignificant; but regarded as the silent historians of the past, their importance is beyond measure. To quote the words of an eminent living English botanist: "What we have to do is to work patiently in recording all we can in sincerity and truth, so that when the pages shall be full, others may read them, and read them in fuller light."

Ranunculus repens.
 „ bulbosus.
 „ acris.*
 Papaver somniferum.
 Fumaria officinalis.*
 Cakile maritima.
 Sinapis arvensis.
 Sisymbrium officinale.
 Cardamine hirsuta.
 Arabis thaliana.

Cochlearea danica.
 Capsella bursa pastoris.
 Lepidium Smithii.*
 Reseda luteola.
 Polygala oxyptera.*
 Viola sylvatica.
 Silene maritima.
 Lychnis dioica.*
 Cerastium glomeratum.
 „ triviale.

Cerastium tetrandrum.*
Stellaria media.
Sagina ciliata.
 " *procumbens*.
 " *apetala*.*
 " *subulata*.
Spargula arvensis.
Lepigonum rupestre.
Polycarpon tetraphyllum.
Hypericum humifusum.
 " *pulchrum*.*
Malva sylvestris.
 " *rotundifolia*.*
Lavatera arborea.*
Geranium molle.
Erodium cicutarium.
 " *maritimum*.
Linum angustifolium.*
Acer pseudoplatanus.
Ulex europæus.
Medicago maculata.
 " *lupulina*.*
Trifolium repens.
 " *pratense*.*
 " *glomeratum*.
 " *minus*.
Lotus corniculatus.
 " *major*.
 " *hispidus*.
 " *angustissimus*.*
Ornithopus perpusillus.
Vicia angustifolia.
Prunus spinosa.*
Alchemilla arvensis.
Potentilla tormentilla.
Rubus discolor.
 " *villicaulis*.
Cratægus oxyacantha.
Sedum anglicum.
Cotyledon umbilicus.
Heracleum sphondylium.
Daucus carota.*
 " *maritimus*.*
Conium maculatum.
Crithmum maritimum.*
Hedera helix.*
Sambucus nigra.
Lonicera periclymenum.
Galium saxatile.
 " *aparine*.

Sherardia arvensis.
Carduus tenuiflorus.
 " *arvensis*.
 " *lanceolatus*.
 " *palustris*.
Carlina vulgaris.
Lapsana communis.*
Arctium minus.
Senecio sylvaticus.
 " *vulgaris*.*
 " *Jacobæa*.
Filago germanica.*
Bellis perennis.
Hypochaeris radicata.
 " *glabra*.*
Taraxacum officinale.*
Leontodon hirtus.
 " *hispidus*.
Crepis virens.*
Sonchus asper.
 " *oleraceus*.*
Jasione montana.
Erica cinerea.
Erythræa centaurium.
Fraxinus excelsior.
Convolvulus arvensis.
Solanum dulcamara.
Digitalis purpurea.
Linaria elatine.*
Veronica arvensis.
 " *officinalis*.
 " *chamædryis*.
 " *polita*.*
Euphrasia officinalis.
Bartsia viscosa.
Nepeta glechoma.
Prunella vulgaris.
Lamium purpureum.
Teucrium scorodonia.
Myosotis versicolor.
 " *Balbisiana*.
Lycopsis arvensis.
Symphytum officinale.
Primula vulgaris.
Anagallis arvensis.
Armeria maritima.
Plantago lanceolata.
 " *coronopus*.
 " *major*.*
Chenopodium album.

Chenopodium murale.
Atriplex patula.
Rumex conglomeratus.
 „ *pulcher*.
 „ *obtusifolius*.*
 „ *crispus*.
 „ *acetosa*.
 „ *acetosella*.
Polygonum aviculare.
Euphorbia portlandica.
 „ *peplus*.*
 „ *amygdaloides*.*
Urtica urens.
 „ *dioica*.
Ulmus suberosa.
Quercus robur.
Castanea vulgaris.
Populus nigra.
Salix cinerea.
Zostera marina.
Iris fœtidissimus.
Ruscus aculeatus.
Scilla nutans.
Luzula campestris.
Juncus acutus.
 „ *capitatus*.

Carex arenaria.
Anthoxanthum odoratum.
Phalaris canariensis.
Agrostis alba.
 „ *vulgaris*.*
Aira caryophyllea.
 „ *præcox*.*
Holcus lanatus.
Poa annua.
 „ *pratensis*.
 „ *trivialis*.
Dactylis glomerata.
Cynosurus cristatus.*
Festuca sciuroides.
 „ *ovina*.
 „ *rubra*.
Brachypodium sylvaticum.
Lolium perenne.
Pteris aquilina.
Asplenium lanceolatum.
 „ *adiantum nigrum*.
 „ *marinum*.
Lastræa filix mas.
Athyrium filix fœmina.*
Polypodium vulgare.

FLORA OF CRÉVICHON.

Cakile maritima.
Viola sylvatica.
Silene maritima.
Sagina procumbens.
Ulex europæus.
Lotus corniculatus.
 „ *hispidus*.
Vicia angustifolia.
Rubus sp.
Sedum anglicum.
Cotyledon umbilicus.
Conium maculatum.*
Sambucus nigra.*
Lonicera periclymenum.
Hedera helix.*
Carduus lanceolatus.
Carlina vulgaris.
Arctium minus.
Leontodon hirtus.
 „ *hispidus*.
Sonchus asper.
Erythræa centaurium.
Solanum dulcamara.

Nepeta glechoma.
Teucrium scorodonia.
Myosotis versicolor.
Anagallis arvensis.
Armeria maritima.
Rumex crispus.
Atriplex patula.*
Euphorbia portlandica.
 „ *amygdaloides*.*
Urtica dioica.*
Iris fœtidissima.
Ruscus aculeatus.
Scilla nutans.
Juncus acutus.
Dactylis glomerata.
Holcus lanatus.*
Pteris aquilina.
Asplenium lanceolatum.
 „ *nigrum*.
 „ *marinum*.
Lastræa filix mas.
Polypodium vulgare.

THE HEMIPTERA-HETEROPTERA OF GUERNSEY.

BY MR. W. A. LUFF.

—o—

THE order of insects comprising the *Hemiptera* vary very considerably in structure and appearance and are classed in two sub-orders or sections.

The first of these, containing the insects named in my list, is called *Hemiptera-Heteroptera*; the second is the *Hemiptera-Homoptera* and includes the *Cicadas*, frog-hoppers, grass-flies, aphides or plant-lice, and scale-insects.

The *Hemiptera-Heteroptera* are distinguished from the *Coleoptera* or beetles, to which they bear a superficial resemblance, by their mouth organs, which consist of a long tube containing several lancets, for piercing the plants and animals, on the juices of which they feed. This tube is tucked away under the head and breast when not in use. Their forewings have the upper part coriaceous or horny and the lower portion membranous and more or less transparent, and crossed over each other at the apex. The hindwings which are folded up underneath the forewings are membranous.

These insects do not undergo a complete metamorphosis like the *Coleoptera* and *Lepidoptera* but have a similar appearance and are active in all the stages of their existence, except that when they reach the final or imago state they usually acquire wings. Some few species, however, of which the bed-bug is an example, are wingless.

The *Heteroptera* are readily divided into two sections. The first section, named *Gymnocerata* includes the land-bugs and the *Hydrometrina*, or those which run on the surface of the water.

The *Geodromica*, or land-bugs, are nearly all plant feeders, and many species are of remarkable beauty; indeed, some of the exotic species cannot be surpassed for splendour of colouring. Our Guernsey species occur most numerously on the southern cliff coast, and include several fine species which are not known at all in England, whilst others are very rare there.

The *Hydrometrina* are few in number, and are able to walk or run on the surface of ditches and pools of stagnant water with as much facility as if it were solid ground. The surface of their bodies is protected from the wetting action of the water as perfectly as if varnished. One of our commonest species is *Hydrometra stagnorum*, which is occasionally abundant, resting on stones and walking on the water.

Amongst this family is included a curious little species named *Aëpophilus bonnairei*, which is to be found on our coast on rocks and under stones and shingle at about low-water mark. It was taken in Jersey by Mr. J. Sinel in 1882, and on enquiry he found that only one instance of its occurrence had been recorded before, from the island of Rhé in the Bay of Biscay in 1879. Mr. E. D. Marquand subsequently took specimens on the coast of West Cornwall and also in Guernsey, and I have had the good fortune to capture one specimen this autumn. This species is destitute of wings, and the puzzle is how respiration is carried on when the tide covers the locality where it occurs. Dr. Kœhler, a French naturalist of some note, is of opinion that it is able to suspend the function of respiration entirely during submergence. For fuller particulars and magnified figures of this remarkable insect, I must refer you to Mr. J. Sinel's paper in *Science Gossip* for March, 1886, and Mr. E. D. Marquand's paper in the same journal for January, 1887.

The second section is called *Cryptocerata*, and all the species live in the water; they include the water-boatmen or boat-flies (*Notonecta* and *Corixa*) which are very abundant in ponds and ditches. These insects swim back downwards and propel themselves along by using their two long hind legs as oars.

The Water Scorpions, so called from the peculiarity of their appearance, although they have no affinity with Scorpions proper, crawl about the mud at the bottom of ponds and are very blood-thirsty and voracious. In tropical countries where species occur of very large dimensions, their attacks are by no means confined to the larvæ of aquatic insects, but frogs and other animals are seized and devoured by these formidable insects.

The *Hemiptera* of this island long ago attracted my attention from the beauty of their colouring and markings and the peculiar shape of many of the species.

I have lost no opportunity of securing all the specimens that came in my way and have succeeded in getting together more than sixty species. Finding that several of my captures

were not described in "*Douglas and Scott's British Hemiptera*," and being unable to determine obscure species without a collection for comparison, I applied for assistance to Mr. Edward Saunders, F.L.S., one of the best authorities on the order in England, and he very kindly examined and named nearly the whole of the specimens.

In presenting the list I feel that it is far from complete, and I hope from time to time to add notices of additional captures.

Eurygaster maura, Lin. One specimen taken.

Geotomus punctulatus, Cost. Not uncommon under stones on the cliffs in autumn. It is very rare in England.

Sciocoris cursitans, Fab. Common in sandy places on the coast, and also on the cliffs in June and July.

Aëlia acuminata, Lin. Taken commonly by sweeping on the cliffs near the Gouffre in May and June.

Peribalus vernalis, Wolff. Have taken one specimen only, and it is extremely rare in England.

Carpocoris fuscipina, Boh. Very common on the cliffs throughout the summer and autumn.

Carpocoris baccarum, Lin. Common.

Piezodorus incarnatus, Germ. Common.

Strachia oleracea, Linn. Both the red and white spotted forms can be taken commonly by sweeping on the cliffs in June and July.

Strachia ornata, Lin. One specimen only taken of this beautiful species near Petit Port Bay. It does not occur at all in Great Britain.

Brachypelta aterrima, Foerst. Not uncommon on furze bushes and crawling up dry paths on the cliffs in July and August. It is a large species almost entirely of a black colour. This conspicuous species has not been found in England.

Jalla dumosa, Lin. Two specimens taken many years ago; it is very rare in England.

Acanthosoma hæmorrhoidale, Lin. Not uncommon.

Syromastes marginatus, Lin. Very common.

Verlusia rhombea, Lin. I have taken four specimens.

Coreus denticulatus, Scop. Not common. June and July.

Alydus calcaratus, Lin. Several under stones. Vale parish. July.

Stenocephalus agilis, Scop. Common.

Therapha hyoscyami, Lin. A very pretty red and black species, not common with us, but I have taken it abundantly in Jersey. July and August.

Lygæus punctato-guttatus, Fab. This pretty little red and black species is not found anywhere in England, but with us they are very abundant at the roots of foxglove on the cliffs in spring, summer and autumn; they are gregarious, and follow each other along a track like ants. They may be observed on sunshiny days in January and February. By stirring the soil at the roots of foxglove the immature forms of all sizes may be

seen in great abundance during July. When about half grown they are entirely of a bright red colour.

Lygæosoma reticulatum, H. S. Not found in England; common on our cliffs.

Ischnorhynchus geminatus, Fieb. Taken commonly by sweeping amongst heather on the cliffs in June and July.

Henestaris laticeps, Curt. Common in sandy places on the coast.

Heterogaster urticæ, Fab. One specimen.

Rhyparochromus dilatatus, H. S. Two specimens.

Rhyparochromus chiragra, Fab. Two specimens; also one of the variety *sabulicola*.

Ischnocoris angustulus, Boh. One specimen taken on Vale coast July, 1872.

Macrodema micropterum, Curt. One specimen with wings developed, very rare in this state.

Plinthisus brevipennis, Latr. One specimen taken on L'Ancrese Common in August.

Stygnus arenarius, Fieb. Common amongst heather on the cliffs.

Aphanus Rolandri, Lin. Two specimens taken many years ago at the Foulon. Very scarce in England.

Aphanus lynceus, Fab. One.

Aphanus quadratus, Fab. One of our commonest species.

Dieuches luscus, Fab. I have taken several specimens of this rare British species.

Emblethis verbasci, Fab. Several specimens taken at the Gouffre cliffs in June.

Drymus sylvaticus, Fab. One.

Scolopostethus decoratus, Hahn. One specimen taken at Fermain Bay in September.

Pyrhocoris apterus, Lin. Two specimens taken of this local species.

Monanthia cardui, Lin. Common on thistles on the cliffs in September.

Hydrometra stagnorum, Lin. Occasionally abundant under stones in stream at Saints' Bay in the spring; also on surface of ponds on L'Ancrese Common and elsewhere.

Velia currens, Fab. Common in spring and autumn in ponds at Grande Marc, Vazon. I have never taken the winged form.

Aëpophilus bonnairei, Sign. Several specimens of this curious species were taken by Mr. Marquand at low-water mark on our south coast, and I captured a single specimen in the same locality on September 28th.

Gerris thoracica, Schum. Common.

Nabis lativentris, Boh. Not rare.

Nabis rugosus, Linn. One.

Cimex lectularius, Lin. Common in some houses in town, scarcely to be found in the country parishes.

Lycocoris campestris, Fall. One.

Anthocoris nemorum, Lin. Two or three by sweeping.

Miris lævigatus, Lin. Very abundant.

Megaloceræa ruficornis, Fourc. One.

Phytocoris tiliæ, Fab. Several specimens.

Phytocoris varipes, Boh. Not common.

Calocoris bipunctatus, Fab. Common.

Oncognathus binotatus, Fab. Very abundant.

Lygus pratensis, Fab. Taken in great abundance by sweeping flowers on the cliffs in autumn.

Lygus pabulinus, Lin. Not uncommon.

Heteroptera merioptera, Scop (?) Several specimens taken by sweeping borders of fields.

Nepa cinerea, Lin. Not common.

Ranatra linearis, Lin. Rare.

Notonecta glauca. Very abundant in most ponds. I have taken the variety *Maculata* also, but not so commonly as the type.

Corixa geoffroyi, Leach. Very abundant in ponds on L'Anresse
Common.

Corixa atomaria, Illig. Very common.

Corixa mæsta, Fieb. I have taken one specimen.

SUBMARINE AIR-BREATHING ANIMALS.

BY MR. JOSEPH SINEL.

—o—

ON the coast of Jersey and, doubtless, upon that of the neighbouring islands as well, there is a little section of the fauna which has not received the attention it deserves. I allude to air-breathing forms living in the littoral zone, and where some of them must exist in a state of submergence for the greater part of their time.

In our fresh water ponds, ditches and brooks, we have, of course, a large number of air-breathing forms—*Coleoptera* *Arachnida*—and a host of insect larvæ; but in all of these the provision for the maintenance of respiration is obvious, either by apparatus for the storage of air—the stock renewable by a visit to the surface, or by lengthened breathing organs reaching the surface while the animal is submerged; but in the forms, or in *most* of them, which I am about to enumerate, there is no appearance of any such arrangement, nor even the power of moving fairly through water or rising to the surface.

The best known and longest on record of these are the little marine beetles; these are represented on our shores by the following:—

Aëpus Robinii.

Macrallymma brevipenne.

Cillenum laterale.

Tachys seutellaris.

It is remarkable that the commonest of the beetles, *Aëpus fulvescens* or "*A. maritimus*" is not represented upon the coast of Jersey. I cannot speak with certainty of the other islands; but that the supposed rarer form, *A. Robinii*, is exceedingly common.

In the bi-monthly *Journal de l'anatomie et de la physiologie* (Paris) I am credited with having found *A. fulvescens* in Jersey; but this has crept in in error, all my specimens being of one species, viz., *A. Robinii*.

As there is close resemblance between these, I may be pardoned for pointing out a simple method of identification for which I am indebted to M. A. Fauvel, the president of the Entomological Society of Paris. *A. Robinii* has two little dot-like elevations on each of its elytra; *A. fulvescens* has several rows of these arranged longitudinally.

A. Robinii is broader near the posterior end than in the middle; *A. fulvescens* has parallel sides.

There are many species of *Coleoptera* found under decaying weeds, and under stones upon the sea shore which may be occasionally submerged; but these are identical with land species, and do not come under the term of marine.

Of more interest than the foregoing is the marine Hemipterous insect *Æpophilus Bonnaireii*. This was first discovered by Mr. F. Smith on the Cornish coast, and his specimen was for some years in the British Museum, without name or date of capture. It was again found on the coast of the Island of Rhé, in the Bay of Biscay, by Bonnaire, and described by Signoret in the annals of the Entomological Society of Paris, 1879.

I had found numerous examples of this insect upon the shores of Jersey long prior to this date, viz., about 1867 or 1868, and had sent specimens to various entomologists with no result as regards identification. In 1884 when collecting on this shore with Dr. Kœhler, I had the good fortune to come upon a colony of them, when they were at once recognised by Dr. Kœhler, and some twenty specimens secured. It was then figured and described by him in his "*Faune Marine des Isles Anglo-Normandes*."

The *Arachnida* are well represented on these shores. Of the *Acari* it is possible that we have all recorded species; but as they are very numerous and difficult of identification, I will pass them over. Some of them—*Eupalus*, *Rhyncolophus*, *Bdella*, &c., living near high water mark and only submerged for a few hours daily, are possibly familiar to every one who has walked among the rocks, being conspicuous by their bright scarlet or orange colour.

Others, e.g., the *Halacaridæ*, live from low water level to a depth of twenty or thirty fathoms. All these are exceedingly common.

Of true *spiders* I have found but one example, and the only one I understand recorded from these latitudes. This I sent to the British Museum in 1887. I have unfortunately mislaid the information I received thence respecting it.

I obtained this specimen in a coralline pool at extreme low water in St. Clement's Bay, Jersey. It was about three millimetres long, of a pale buff colour, and had formed a little silken tube in a tuft of coralline.

In the month of September, 1889, I was a little startled by having brought to me by my son, who had been collecting amphipods, a little marine *Pseudo-scorpion*, which he had found among marine crustacea and annelida in a rock crevice in Samares Bay. I at once repaired to the spot and was successful in obtaining another, and subsequently six more examples. I sent one of these to Professor Darcy Thompson, of Dundee, who placed it on record in *Nature*, and in December I received a copy of the *Journal de Biologie du Nord de la France*, with figures and description of the same form, from specimens found by Professor Moniez at Portel, near Boulogne-sur-Mer, on the very same date as I had observed it in Jersey. It is recorded as *Obisium littorale*, Moniez. One of these specimens is already in the Guernsey Museum, and I have pleasure in now asking the acceptance of a larger example of the same species.

An allied form, but differing in some important particulars, had previously been recorded; this had been found on the west coast of England by M. Prideaux, and described by Leach.

Of six recorded species of *Collembola* in the littoral zone, I have so far found but one on the coast of Jersey; this is *Anurida maritima*. This Podurid exists in great profusion. It is not an uncommon experience to find on breaking off a slab of rock, where the conditions are favourable, patches of them resembling a piece of black velvet six or seven inches across, and containing some thousands of specimens.

These occupy a zone just below the high tide level where they are only submerged for a brief period each tide.

Finally there are two strictly marine *Myriapods*, viz., *Geophilus submarinus*, *Var egregia*, discovered in Samares Bay by myself in 1888, and described under the above name from the same specimens by Professor Letzel, of Vienna.

What appears to be the *Geophilus maritimus* of Leach was found here by M. Fauvel a week or two ago. This form had previously been recorded from Denmark, France, and one or two places in England.

The whole of these animals, except some of the *Arachnids*, occupy the same kind of situation, viz., crevices of rocks where the clefts of "cleavage" are somewhat open and loosely packed with sand and gravel, and range from ordinary high

water mark to (in the case of *Æpophilus* and *Geophilus*) low tide level. I have also found *Æpophilus* at large among the sponges and clusters of compound ascidians in caves at extreme low spring tide level.

The question of how respiration is carried on, or what peculiarity of organisation admits of its *suspension* during submergence, is a point of much interest.

In *Anurida*, however, it is not difficult of solution. The close furry coats of these little animals retain sufficient air, no doubt, for consumption during their brief submergence, and it is possible that under the elytra the *Coleoptera* take in a sufficient supply, but in *Obisium*, the *Arachnids*, *Æpophilus* and *Geophilus*, the case is otherwise, the few scattered hairs on these would not hold the globules, nor when they are examined in a phial of sea-water under the lens is there any appearance of a storage of air. *Æpophilus*, I have already said, has been found in situations where it would have no access to air more than six or eight times in a year, *e.g.*, the lower Guilot cave by Dr. Kœhler, caves in the "Dog's Nest," and the "Grande Hazette" rocks at the limit of a 38 foot tide by myself. It is, therefore, evident that storage would be useless for such long periods.

It is the opinion of M. G. Pouchet, who has made many experiments on this subject, that their respiration can be *suspended*, for he finds that even such insects as the Cockchafer are not killed by so long an immersion as ninety-six hours, but then we have to deal with some forms that as far as we can see never have access to the atmosphere at all, *viz.*, the deep-water *Acaris*, numbers of which can be seen on every scrap of weed and zoophyte brought up by the trawl from twenty-five to thirty fathoms deep on this coast.

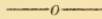
The question which now arises is, "Is it not possible that there are some other means of oxygenation than those we are familiar with?"

I would be glad to find that some of the members of this Society with more leisure than I, unfortunately, am possessed of, had taken up this interesting question.

P.S.—In enumerating the marine air-breathing forms, I have not thought fit to include the larvæ of dipterous and other insects of which some four or five are known to me as *marine*, for these are mostly taken on the tow net upon the surface, and offer no problem as to their facilities for respiration.

LOCAL WITCHCRAFT.

BY MR. DENYS CORBET.



THE first time I recollect hearing about witchcraft was in my native parish, the Vale, when a boy. There witches abounded, according to general report, though I do not now recollect of anyone in particular having been bewitched. That such cases were numerous, however, appeared certain from the fact of there being at the Annevilles, in the western part of the parish, an old *unbewitcher*, named Lainé, who had a tremendous practice. These unbewitchers seem at all times to have been superior to the witches themselves, for, while they were never suspected of bewitching people, at least to my knowledge, yet they had credit for being able to baffle and render harmless all the witches' tricks, and to reveal to their victims the names of their tormentors, and frequently throw them on a bed of sickness in their turn. As a rule anyone who was considered uglier or cleverer than his neighbours, or who seemed to get on better, was reputed a witch or wizard. I could name several such whom I have known personally.

While living in town, which I did for about twelve years before finally settling in the country, I heard little about witches or witchcraft. I, however, heard speak a good deal about fortune-telling and *unbewitching*. Indeed, the two arts were generally supposed to be combined. To this day, it appears, that there are still a few individuals who are making if not a fortune, at least a comfortable living, by working upon the credulity of the ignorant. A respectable tradesman of this town informed me, not long ago, that he has actually one of these gentry, a woman, for his neighbour and customer, and that it is astonishing to see the number of persons, chiefly from the country, who are seen almost daily going to consult her. They carry her butter, milk, eggs, and in fact, every kind of farm produce, besides money, in order to propitiate her, and get her to take the witches' spells off themselves, their families, or their cattle.

Allow me to relate a little of my own experience with regard to witchcraft. When first I lived at the Forest, I was in very delicate health, which I still futher unwittingly aggravated by going to live in a damp house. A woman, who saw me daily looking worse and worse, in spite of the doctor's remedies, gravely told my wife, in quite a confidential manner, that she was sure I was bewitched, and recommended her to try to persuade me to go to a certain old woman, an *unbewitcher*, near the King's Mills, and tell her my case. As drowning men will catch at straws, I decided to go, more out of curiosity than otherwise, for I was as far from believing in witchcraft as I am now. Having told the old woman my case, she, of course, told me at once that I was bewitched; but, strange to say, she would not, or could not, tell me who the witch was. She gave me a pint and a half bottle full of a liquid of her own preparing, with directions how to take it. I found it to be a decoction of herbs in a bottle of cider or something like it. Needless to say I did not take it. On returning home I found that my officious neighbour had been there, and had persuaded my wife to put two or three sprigs of broom under the mattress of the bed, assuring her that while I slept upon them the witch would have no power upon me. Having heard this I went to bed, though not before having removed the sticks in question from the bed and thrown them out of window. Well, as it is a long road that has no turning, in spite of having rejected both the unbewitcher's, and the greatest part of the doctor's drugs, I gradually got better. One day, when pretty well recovered, the neighbour in question came in, and began to congratulate me upon my recovery, observing that it was quite clear I should never have got better, but for the unbewitcher's drugs and her own broom-sticks. I heard her to the end, and then, getting up from my chair, I went to a cupboard, whence I brought out the drugs in question, untouched, telling her at the same time that if she wished to see the broom-sticks she might come out with me and I would show them to her in the corner where I had thrown them the very night they were put under the bed. Needless to say, she never said another word to me about witchcraft after that.

I will now relate one more case of pretended witchcraft which has quite lately come under my own observation, and which will show that it is not only among the ignorant, or, I should say, the uneducated, that this art—if art it is—gains credit. A young man of my acquaintance, who had successively served as pupil-teacher, assistant master, and lastly master, in

one or two of our country schools, recently fell ill, after having been in more or less delicate health for a long time, and was obliged to give up his place. Having consulted several doctors one after the other, without great beneficial result, he was at last led to believe certain persons who told him that he was bewitched. By their advice he went to consult an old woman at the Câtel who professes to *unbewitch* people. Of course she did not hesitate in confirming him in his belief, even naming the person who was the author of the spell, for which piece of information he had to pay her the sum of £3, which he could ill afford. Shortly after his having begun to take this person's remedies, I was told by a relation of the young man, with whom he lived, that he had found himself all at once better, and would shortly be completely recovered. Time passed, and I often inquired how he was. At first they said he was getting on fine. A little later he was recovering but slowly, and finally they were forced to own that he was no better. Before this result, however, and while they still had some faith in the unbewitcher's skill, a kind of plague broke out in the family. They all at once, so they said, found themselves swarming with vermin. Down they trudged, two or three of them on foot, to the arch-witch, a distance of some half-dozen miles. I met them myself as they were returning, and learnt from them the whole of the affair. The arch-witch, of course, promised them instant relief, and gave them some remedies, for all of which they had to pay her £2 more, thus extorting from them altogether the sum of £5. It is to be hoped that they have found out by this time that plenty of water and general cleanliness, for which they would have had nothing to pay, would have worked a greater miracle than all the unbewitcher's prescriptions and incantations.

In conclusion, ladies and gentlemen, allow me to read a short extract from a volume of poetry in the Guernsey French dialect, published by me some two or three years ago. It begins by a general description of what was generally believed in our country parishes concerning witchcraft a very few years ago, if it is not still so now, and proceeds to enumerate some of the principal tricks and spells played by the pretended witches, and some of the remedies used to detect and cure them. Finally, it concludes by relating another case of pretended witchcraft which was gravely related to me by a respectable farmer of St. Peter-in-the-Wood, just before the time this publication was made, and in which he was the principal person concerned.

Le v'chin : mais ch'n'est pouit d'compliment 1
 Chu que j'vais leus contair, vraiment :
 Ch'est qu'ichîn-d'vânt les gens du pâie,
 Tout en soignànt bien à leus g'nâie,
 Et en étànt, dame, adret piaeux,
 Etaient, j'ai oui, superstitiaeux ;
 Et créyaient, quâsi tous à taille
 Es sorchiers, et aut' peste itaille ;
 Et qu'n'y-avait presque pouit d'maison
 Qui n'aeut s'n-ogre ou sen hap'talon ; 10
 Ou bien sa fâie et sen barboue,
 Ou d'auter guiâbllerie à coue,
 A cônes, à grins, ou pîds fourquis,
 Sans pâlair d'vaisins malbâtis ;
 Qui houlaient sort ou chànce enn'mie,
 Accidents, mort ou maladie
 Sus les ch'vauux, bestiâs, ou guedots,
 Les p'tits pousshins et les pirots ;
 Et qu'empouâsounnaient tout d'vermine,
 Gens, vitaille', et harde' en fermine ; 20
 Si bien qu'i n'y-avait jamais d'fin
 Es conjurâtions, au lamîn,
 Pas pus qu'à tous l's-amas d'bouidries,
 D'sâles r'mièdes, d'désorchell'ries,
 D'perière' en rond du faeu d'blànc sapp,
 Pour faire avau l'flû d'valaïr, zouapp !
 Ou bien entraïr par les séreures,
 Ou par craque ou pertu d'aisseures,
 La drôlesse ou bien l'malvârîn
 Qui causait tout l'fichu batîn, 20
 Sous forme d'pie, d'blànc rat ou d'ratte,
 D'corbin, d'guenon, d'ner cat ou d'catte,
 D'caoud' souaris, d'cahouette ou d'cahan,
 Au puànt fumé d'herbe d'ahan ;
 Ou d'la rôtie, ou des tisaïnes
 D'orviaux, d'colimâchons ou d'raïnes ;
 D'cœur de belette, ou d'caou-d'souaris,
 Graillis, étuvaïs, fricasshis.
 Et pîs à quând dans la cuisine,
 Sus l'drain v'nait s'mourtraïr la vermine, 30
 Ah ! d'mândouïs s'il' taient sièvus d'près
 Atou la baguionnette ou l'flais,
 Pôkeur, arme, ou fourque—ch'tait latte,
 Auv l'agio l'prumier à la patte—
 Et s'il' taient bientôt enfilais
 Emacllis, meurdris, masshacrais
 Conter le dôssier d'la chim'naïe,
 Par les pus squiters de la g'nâie.

S'nou creit qu'jusqu'ichîn j'n ai prônai
 Qu'ôlure ou rànt imaginaï, 50
 Nou s'trompe adret, j'vou-a-en assure,
 Je n'dis, simplement, qu'chu qu'à ch't-heure
 Nou vient m'racontair qui s'faisait
 Sus l'pâie, ichîn d'vânt, s'i n's'y fait

Acouare au béni temps qui s'passe ;
 J'entends terjoûs parmi la classe
 La pus ignorante, il est vrai
 Mais qui n'est pouit terjoûs, ma fé,
 Seit la pus basse ou la pus paure :

Acouare un cas d'avant l'sujet ellore.

60

N'y-a pouit bien d's-àns qu'un bouan fermier
 S'avantait qu'sous forme d'épervier,
 I' v'nait de d'valair la carouagne
 Qui mettait sa famille à houagne ;
 Qu'ensorchelaît tout sen bestias,
 Et qu'empestaît se-s-endrets d'rats ;
 Qu'amaigrissaît ses ch'vauks dans s'n-aître ;
 Qu'empêchaît se-s-avers de creître ;
 Faisait ses récoltes copair !
 Ses vaques s'quer on s'déj'nêraîr ;
 Pourrir sen miel au fond d'ses ruques ;
 Mouarîr ses pouasshîns dans leus cruques,
 D'auv acouans un amas d'ahans,
 Si bien qu'sen fait s'n-allait ès tchens ;
 Et qu'au tout pus daeux-treis annâies
 D'itai tripo se s'raient passâies,
 D'avant qu'de l'vê finir sen saba
 A l'âsile ou dans l'hopita !

70

“ A vint,” s't-i, “ bûliànt d'la chim'nâie,
 D'avant la respectable assemblâie
 De tous mes vaîsîns et m's-amis,
 Tous respectable' et tous bien mis,
 Et v'nus d'un bouan mille à la ronde.”
 Vère, et, il ajoûti, “ que l'monde
 Le creie ou pouit, ch'est vraîment, vrai,
 J'vis l'tout d'mes daeux iers, et je l'cré ;
 Et pis, de tout chùnchin la preuve :
 Ch'est qu'après tout' chutt' longue épreuve,
 L'mauvais sort est brâment r'levai,
 Et qu'drain'ment tout a prospéraî ;
 Tandis que d'avant tout en bînguouême
 Allait, dret d'arbour, à l'âchême.”

80

90

Là d'sus, j'répounis au vaîsîn
 Qu'étaît v'nu m'contaîr tout chùnchin ;
 “ Que l'sort aît què, et qu'i se r'leve
 Il est vrai, vaîsîn, v'là d'la preuve
 A convaincre, à chu qu'nou crérait,
 Les pus têtus ; pourtant, nou-fait !
 Caêr, pour qu'ànt à mé, d'avant qu'de l'creire,
 J'vou l'dis, vaîsîn, je l'verrai faire.”

100

[The following literal translation of the above verses has been kindly furnished by the author, for the convenience of those readers who take an interest in philological curiosities of this character, and are not sufficiently conversant with the Franco-Norman dialect of Guernsey, to be able to read it with facility:—]

So here goes : but it is no compliment
 That I am about to tell them, indeed :

1

It is that, formerly, our country people,
 While minding their families well,
 And being, in fact, exceedingly pious,
 Were, I have heard, very superstitious ;
 And believed, almost one and all,
 In witches and other such like pests ;
 And that there was scarcely a house
 Without its ogre or its hobgoblin ; 10
 Or else its fairy and its scare,
 Or other devilry with tail,
 With horns, or claws, or cloven feet.
 To say nothing of ill-shaped neighbours
 Who threw spells, bearers of ill-luck,
 Accidents, death or sicknesses
 On the horses, cattle or pigs,
 Or on the little chickens, and ducklings ;
 Poisoning everything with vermin,
 People, victuals, and the clothing in drawers ; 20
 So that there never was an end
 To the conjurations and the gossip,
 Any more than to all the boilings,
 The dirty remedies, and the unbewitchings,
 The prayers around the white-deal fire
 To bring down the chimney, swoop !
 Or to cause to enter by the key-holes,
 Or the cracks or holes in the partitions,
 The sybil or the mischief-maker
 Which caused all this confounded fuss, 30
 In the shape of a magpie, a white he or she-rat
 A crow, a monkey, or a black he or she-cat,
 Or of a bat, of a jackdaw or of an owl,
 To the stinking fumes of the (*ahan*) grass ;
 Or of the roastings, or the stewings
 Of snakes, or slow-worms, snails or frogs ;
 Or the heart of a weasel or of a bat
 Broiled at the fire, or stewed, or fried.
 And then when in the kitchen
 At last the vermin showed itself, 40
 Oh ! do you ask if it were closely followed
 With the bayonet or with the flail
 The poker, the gun or a fork ? Or if it was struck
 With whatever thing came first to hand ;
 And if it were quickly run through,
 Smashed, bruised or otherwise massacred
 Against the back-part of the chimney,
 By the sprightliest of the gang ?

If you think I have hitherto only prated
 Mere lies or imaginary croaking, 50
 You are much mistaken. I assure you,
 I say, simply, that which even now
 Is told me as having been done
 In the country, formerly ; if not done there
 Still in the blessed time that is passing ;
 I, of course, mean among that class—

The most ignorant, it is true—
But which is not always, on my faith,
Either the lowest or the poorest.

One case more before closing the subject :—

60

Not many years ago a good farmer
Boasted that, in the shape of a hawk,
He had just brought down the carrion
Which set his family by the ears ;
Which was bewitching all his cattle
And pestering all his rooms with rats ;
Making his horses grow lean in his stable,
And preventing his pigs from growing ;
Which had caused his crops to die off, or
His cows to dry or degenerate ;
Had rotted his honey in his hives,
And made his chickens die in their shells ;
With still a great many more mishaps ;
So that his property was going to the dogs ;
And that, at best, but two or three years
Of such goings-on would have passed
Before seeing him ending his worry
In the Asylum or the Hospital !

70

“ She came,” said he, “ howling from the chimney,
Before the honourable company
Of all my neighbours and my friends,
All respectable and well dressed,
And come from a good mile round.”
“ Yes,” and he added “ let the world
Believe it or not, it is really true,
I saw it with my two eyes, and believe it ;
And then, of all this here is the proof :
It is that, after all this long trial,
The wicked spell is happily taken off,
And that, of late, all with me has prospered ;
While before that everything away
Was going, inside out and at random.”

80

90

Upon that, I answered the neighbour
Who had come to tell me all this :
“ That the spell had fallen, and is taken off,
It is true, neighbour, there is proof
To convince—at least one would think so—
The most stubborn ; nevertheless, no !
For, as for me, before I believe it,
I tell you, neighbour, I’ll see it done.”

100

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SOCIETY OF NATURAL SCIENCE

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→⇒· *LIST OF OFFICERS, 1891-92.* ·⇐←

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MR. E. D. MARQUAND.

MR. C. DE LA MARE.

MR. J. L. PITTS.

MR. G. T. DERRICK.

MR. F. ROSE.

❧ LIST OF MEMBERS. ❧



- | | |
|---|--|
| Mr. F. M. Allès, Bon Air. | Mr. J. D. Jenkins, Mansell Street. |
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| Miss Best, Ruettes Brayes. | Mr. S. Le Cocq, Saumarez Street. |
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| Mr. F. Carey, Grange. | Mr. E. D. Marquand, Fermain House. |
| Mr. J. J. Carey, F.R.G.S., Ronceval. | Mr. A. Mourant, Rozel Terrace. |
| Miss B. Carré, Cameron Place. | Mr. J. Mourant, jun., Rozel Terrace. |
| Mr. A. Collenette, F.M.S., Le Héchet. | Sir E. MacCulloch, F.S.A., Le Pollet. |
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| Miss M. B. Collings, Clifton. | Mr. J. B. Nickolls, Grange. |
| Mr. W. M. Cooper, St. Martin's. | Mr. J. S. Paint, Arcade. |
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Canichers. |
| Mr. H. Crousaz, De Beauvoir Terrace. | Mr. Z. Roberts, St. Andrew's. |
| Mr. H. Cumber, Rue Poudreuse. | Mr. F. Rose, F.D.S., Vauvert. |
| Miss Dawber, Ruettes Brayes. | Mrs. Rose, Vauvert. |
| Mr. G. T. Derrick, Valnord. | Mr. T. C. Royle, Arcade. |
| Mr. C. De La Mare, Mount Durand. | Mr. W. Sharp, Granville House. |
| Mr. Espinasson, Hauteville. | Mr. R. L. Spencer, Esplanade. |
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| Mr. F. B. Guerin, High Street. | Mr. J. Whitehead, F.R.G.S., Royal
Hotel. |
| Miss Guille, Union Street. | Rev. J. Woodhouse, Hauteville. |
| Mr. T. Guille, Montauban. | |
| Miss Heppel, Ladies' College. | |
| Mr. A. Hewitt, Allez Street. | |
| Mrs. S. G. Hugo, Allez Street. | |
| Mr. A. Humphreys, Stanley Road. | |

TRANSACTIONS OF THE SOCIETY.



Monthly Meeting held on November 17th, 1890, Mr. E. D. Marquand in the chair.

There was a very fair attendance of members, and five visitors. The minutes of the last meeting having been read and confirmed, the Rev. Joseph Woodhouse was elected member of the Society.

Mr. Luff exhibited living specimens of the Furze Mite (*Tetranychus ulicis* or *Acarus coccineus*), and read a description of the insect, which lives gregariously in large colonies upon furze. It occurs frequently on the cliffs of this island.

Mr. F. Rose then read an interesting paper on "Some notable Oral Equipments of the Vertebrata. Part II., Mammalia." This he illustrated with a large number of admirably executed diagrams. An interesting discussion followed the reading of the paper, which will be found on page 48 of the present volume.

Monthly Meeting held on December 15th, 1890, Mr. John Whitehead, President, in the chair.

It had been intended to devote the evening to an exhibition of specimens thrown upon the screen by means of the oxyhydrogen projecting microscope, but, unfortunately, through the delay of the Railway Company, the supply of oxygen gas had not arrived.

The disappointment, however, was not seriously felt, for the evening was spent very pleasantly in a discussion upon the exuviation of the crustacea, or the manner in which crabs, lobsters, &c., cast their shells on the occasions of their successive stages of growth. The question was ably opened by Mr. A. Collenette, F.C.A., who supported the ordinary theory of the perfect withdrawal of the crustacean from its old shell. He was followed by Mr. Rose, surgeon-dentist,

who, on the contrary, inclined to the germ theory of the reproduction of the various limbs and organs at the time of the shell-casting. Several members took part in the conversation which ensued, and Mr. J. Linwood Pitts gave an interesting description of the manner in which on one occasion he was fortunate enough to see a crab cast its shell while he was watching it, and which, in his opinion, bore out Mr. Collenette's theory. This experience was the more valuable, because it appears that there are scarcely any recorded instances in which naturalists have observed this change of shell actually taking place. At the same time many of the members considered that Mr. Rose's germ theory might throw considerable light upon the reproduction by crustaceans of limbs accidentally lost, even if it were untenable as an explanation of the way in which the natural change of the whole shell takes place on certain periodical occasions.

Heartly votes of thanks to Mr. Collenette and Mr. Rose brought the proceedings to a close.

Monthly Meeting held on January 15th, 1891.

The members of this Society, together with a few invited friends, spent an exceedingly pleasant evening, at their room in the Guille-Allès Library, the re-union being devoted to an exhibition of microscopic slides, accompanied by brief descriptions. The slides were projected upon a screen, by means of a powerful oxyhydrogen microscope, the objects comprising preparations of marine fauna, insects, botanical specimens, minerals, &c. Messrs. Marquand, Collenette, Luff, Nickolls, and Derrick, kindly described the various objects as they were thrown upon the screen, and the whole was a great success. The best thanks of all present are certainly due to these gentlemen who so skilfully organised the exhibition, and provided such an instructive entertainment.

Monthly Meeting held on February 20th, 1891, Mr. Adolphus Collenette in the chair.

There was a very fair attendance of members and visitors. The minutes of the last meeting having been read, Mrs. Spong was unanimously elected member of the Society.

Mr. Luff then read a note on the capture of an extremely rare moth—*Caradrina ambigua*—by Mr. Hodges, on the

22nd September last, at Delancey. A specimen of a curious plant—*Xanthium spinosum*—occasionally found on ballast heaps in various parts of England, was next exhibited. The specimen in question was found by Mr. Derrick in September last on the ballast heap near Bordeaux Harbour, and identified by Mr. Marquand.

But the main business of the evening was "A chat about lichens," by Mr. E. D. Marquand, who for fourteen years has made these one of his special studies. He dealt first with the term *lichen* which has no common English equivalent. Lichens are the most generally diffused class of terrestrial plants on the face of the globe, and are the pioneers of all other plant life. They occur from the Equator to the Poles, and from sea-level to the summits of the highest mountains; but only where the air is pure and circulating; they are essentially creatures of light and clear atmosphere, as fungi are of dampness and shade. Many species are cosmopolitan, though the majority are peculiar to certain regions, such as mountains or the sea coast. All their nutrition is derived from the atmosphere; their growth is exceedingly slow; and their duration of life is remarkable, extending sometimes to several centuries. Lichens are closely allied to fungi, and both pass gradually into the algæ through certain genera which stand on the border line, viz., *Collema*, *Lichina*, *Nostoc*, &c. Mr. Marquand then fully described and illustrated on the black-board the structure of a lichen thallus and its mode of fructification—and roughly outlined the system of classification. As a lichenologist of many years' experience he would commend the subject to all who are in search of a fascinating winter study. The lichen-flora of Guernsey is a particularly interesting one, the maritime saxicolous species being especially well represented. Most of the difficulties connected with the study exist only on the threshold, and will speedily be overcome by steady perseverance and determination.

A large number of representative specimens were exhibited, and examined by members at the close of the lecture, which had been thoroughly enjoyed by all present.

Monthly Meeting held on March 26th, 1891, Mr. E. D. Marquand in the chair.

The minutes of the last meeting having been read, the Chairman exhibited a specimen of *Atypus Sulzeri*, one of

the rarest of British Spiders, and the only British representative of the tropical Trap-door Spiders. The specimen in question was captured by Mr. Marquand early in March in Fermain Valley.

Mr. W. M. Cooper, of St. Martin's, was proposed for election as member of the Society.

A point of discussion was raised as to whether the Hedgehog is an animal indigenous to Guernsey. Evidence was forthcoming that it was known in Guernsey more than fifty years ago, but that they are far more numerous now than formerly in spite of the relentless war waged upon them by ignorant and superstitious country people who have yet to learn that the *hérisson* is the farmer's friend.

No formal paper having been prepared for this meeting, Mr. Collenette kindly supplied matter for consideration by stating his views on the "Formation of the Valleys of the Island." A very animated discussion of the question followed, and several interesting points were raised in connection with the ancient configuration of the island. When the hour for closing had arrived the subject was still under consideration. Mr. Collenette proposes to treat this subject more fully on a future occasion.

*Monthly Meeting held 14th April, 1891, Mr. J. Whitehead,
President, in the chair.*

There was a large attendance of members and visitors. Mr. W. M. Cooper was elected a member of the Society.

Mr. Derrick read a paper on "The Clays, and other superficial deposits of Guernsey," which will be found printed in full in the following pages.

Some interesting remarks by the geological members followed the reading of this paper.

Mr. E. D. Marquand then followed with a paper on "The Flora of Guernsey, compared with that of West Cornwall." Taking his own finds as a basis for calculation, the author pointed out how Guernsey, with a little over 600 flowering plants and 18 ferns, stood almost exactly midway numerically between the western half of the county of Cornwall (with 788 flowering plants and 25 ferns), and the Scilly Isles (with 435 flowering plants and 16 ferns). Moreover the flora of Guernsey seemed in many respects to approach that of western Cornwall more nearly than any other part of the kingdom, and yet was quite distinct. A number of quite common Cornish plants are absent in Guernsey, and of these many were specified,

and then Mr. Marquand proceeded to enumerate, with short remarks on each (1) Rare British plants, indigenous both to Guernsey and West Cornwall. (2) Plants, rare in England, and not found in West Cornwall or Scilly, but indigenous to Guernsey. (3) Plants peculiar to the Channel Islands, or Guernsey in particular, but not represented in any other part of the United Kingdom, though most of them occur on the neighbouring coast of France.

Votes of thanks to Mr. Derrick and Mr. Marquand brought a very enjoyable meeting to a close.

Monthly Meeting held on May 12th, 1891, Mr. J. Whitehead, President, in the chair.

The minutes of the last meeting having been read, approved, and signed, the President remarked that he had received a communication from Rev. E. Hill who has again visited Sark for geological investigations. This gentleman promised to supply a paper directly to the Society at some future time. Mr. Sharp also read a letter from the Rev. Hill thanking him for specimens of "Long grain" forwarded to him at his request.

Mr. Luff exhibited two specimens of the larva of the Goat Moth (*Cossus ligniperda*), remarking that the insect remains in the larva and pupa stage about three years, being very destructive to the trees of the island.

Mr. Philip L. M. Nicolle then read an interesting paper on "The Common Cuckoo (*Cuculus canorus*)," of which the following is an abstract:—According to the author's observations, this bird generally makes its appearance in Guernsey towards the end of April, leaving again in August. Occasionally it had been seen as early as the second week in April. The call note, which seems to be peculiar to the male bird, is apparently much affected by the state of the weather, being softened by a south-west wind. A full description was given by Mr. Nicolle of the European cuckoo and its habits as compared with its American relative, which builds a nest and rears its own young. The experience of continental ornithologists was quoted to show that the egg of the common cuckoo agrees more or less in colour with those among which it is laid, and Mr. Nicolle said he favoured the opinion which some hold that the cuckoo often lays her egg upon the ground and afterwards carries it in her bill to some convenient nest—as he had himself seen this done some two years ago

near Sausmarez Manor, at the Câtel. "The bird took the egg up in her beak and flew with it to a small white thorn bush, where after some searching I discovered a hedge-sparrow's nest containing the newly deposited egg. It differed only in being slightly larger and of a duller colour than those already in the nest."

Owing to a press of other matter the discussion of this paper was postponed till the next meeting.

Mr. T. C. Royle made the following suggestive remarks on the subject of "The Glandular Hairs of Plants." He called attention to a recent article by Mr. Weyman in *Science Gossip* on viscosity in *Stellaria aquatica* (Water mouse-ear chick-weed) putting forward the view that viscosity (which is usually accompanied by glandular pubescence), has been developed in plants generally as a protection against drought by preventing the undue evaporation of moisture from their stems, &c., by the heat of the sun. He agreed with the author that the subject of viscosity had been somewhat neglected, but said that it was unsafe to decide from such narrow premises, and that glandular, hairy, and viscid species must be studied as a group in order to come to any satisfactory conclusion, and as an illustration submitted the following considerations, which might, possibly, after further investigation lead to a different conclusion from that given above.

The theory of development implies that species vary with the changes in their environment, and when they so vary and new species are developed, the parent species must linger on growing side by side with its descendants, in many cases for a very long period, before becoming finally extinct. We must, therefore, have with us now many species which have long ago passed through their highest stage of development, and are now slowly dying out.

In our British flora we find glandular hairs in a highly specialised form only in the *Droseras* (Sundews). In this insectivorous genus they take the form of long glass-like prehensile hairs which fringe the leaves, and when an unlucky insect alights on the sticky surface of the latter, slowly bend over and hold it there, pressing it into the leaf until it is finally absorbed and assimilated by the plant. In *S. aquatica* they occur in the much simpler form of short hairs each tipped with a spherical gland.

Plants with glandular hairs are not, as a rule, dominant species. *S. aquatica* itself occupies a place apparently between two thriving and ubiquitous genera, *Cerastium* and

Stellaria. Formerly it was included in the first, recently it has been placed in the latter; the change indicates its affinities with both. *Stellaria* is a glabrous genus; in *Cerastium*, although, as a rule, pubescent and sometimes viscid, the species are rarely glandular. *S. aquatica*, although not rare, is a very local and by no means common plant.

It may be at some former period under conditions of greater warmth and humidity, and consequent greater plenty of insect life, that our plants generally may have been much more insectivorous in habit than they are now, and that in *S. aquatica* and other similar forms, the glandular hairs may be but the remains aborted from disuse of more highly specialised organs. This, however, is but a speculation, and only by long and patient investigation can we hope to know their real origin.

Evolution must be local as well as general. Given certain conditions in any given area, the same effects should result from changes in those conditions (however local the change may be) as would result were those conditions general throughout the world. The study of organisms locally must therefore present a convenient means of attaining a better knowledge of the workings of evolution through change of environment, and for this purpose our common wild plants seem to offer from their frequent occurrence and fixity of position, greater facilities for study and observation than do the various divisions of the animal kingdom or the minute forms and organs of the Cryptogamia.

Mr. Nicolle and Mr. Royle were heartily thanked for their interesting and suggestive papers.

Monthly Meeting held on June 9th, 1891, Mr. J. Whitehead, President, in the chair.

The President exhibited four volumes of Algæ, and a number of specimens of Polyzoa, recently presented to the Museum by Miss Gore, of Brighton, through Mrs. St. John Gore, of this island. Mr. T. C. Royle exhibited a new British Moss (*Cinclidotus riparius*), found last year by Mr. Weyman in the river Teme, near Ludlow. Mr. Marquand gave some interesting information respecting it. Mr. C. De La Mare exhibited a specimen of a plastic blue clay from Delancey. Mr. E. D. Marquand exhibited specimens of two beetles, recently captured by him, viz., *Cleonus sulcirostris*, taken at Ronceval, and *Copris lunaris*, taken at Torteval. Mr. Luff mentioned that he had taken both species at different times,

and about a dozen of the latter on Whit-Monday at L'Ancrese.

Supplementing Mr. Philip Nicolle's paper read at the previous meeting, Mr. A. Collenette now contributed a short and concise, but very suggestive paper on "The Cuckoo, as illustrating the processes of Natural Selection." In this he held that cuckoos originally had ordinary bird habits, flew in pairs, nested on the ground, and brought up more than one nestling. The first cause of a change was probably scarcity of food which, in the presence of some conditions, would have tended to lengthen the interval between the laying of the eggs, and to have developed the nestling's habit of throwing out of the nest the second or other nestlings. The habit of the young bird has been acquired under stringent conditions, for its bony structure and infantile peculiarities result from a long struggle for existence, during which only those birds which were able to overcome other nestlings newly hatched would survive. The character of the food gives the same indications. The cuckoo eats hairy caterpillars. No doubt it took to them when other kinds were scarce, and at last grew to prefer them. The cuckoo lays its egg on the ground, but usually lifts the egg in its mouth and carries it to a convenient nest. This points to the same scarcity of food as the prevailing cause of the change of habits; if not satisfied with the place where the egg was laid, it had to fly in search of a good feeding ground before hatching it out. This in its turn led to choice of nests of birds which were feeding on the same ground, and to a strengthening of the nestling's habits. Natural selection would then act powerfully in developing the present peculiarities of the bird, which would adhere to those nests by preference, which had formed its habits; thus different birds would produce different eggs in consequence of the gradual selection of eggs near in colour and size to those of the chosen foster parent. The supposition is, therefore, that colour and size of eggs, as well as the nest chosen, has descended from generation to generation on the side of the mother. This is strengthened by observation, it being believed that the same bird lays in succession the same variety of egg and uses the same nest. The natural result of the selection going on will be that in time the variations will accumulate in several branching lines, and will produce a number of distinct species.

The discussion which followed the reading of the paper was of great interest, and teemed with anecdotes about the bird and its habits, some of which were valuable because of

their being observed by the speakers in the island. The effect of natural selection and surroundings in modifying and changing animal forms was fully discussed, the cuckoo's case being a very valuable example owing to its peculiarities being so evidently out of keeping with its present condition of life. In spite of what is known, the discussion left the impression on the minds of the meeting that very much more is required to be ascertained before the past and future of the cuckoo could be considered fairly well understood. The discussion answered the end of drawing the attention of the members interested in this subject to the need of working up the bird's habits, and of testing the truth of recorded facts by personal observation.

Among the many interesting facts adduced was one by Mr. A. Burgess, which seems very important:—A cuckoo's egg was found by him in a lark's nest in Les Terres field. The hay in the field was cut, except a patch around the nest. A day or two afterwards two eggs—the cuckoo's and a lark's—were hatched. Soon, however, the young lark and the unhatched eggs were thrown out of the nest by the young cuckoo. The old lark tended the young cuckoo for two or three days and then deserted it. The old cuckoo next took it in charge, and was seen on two or three occasions feeding the young one, and teaching it to fly. Eventually it flew away with its mother and disappeared.

*Monthly Meeting held July 14th, 1891, Mr. J. Whitehead,
President, in the chair.*

The minutes of the last meeting having been read and signed, the Rev. D. Cann was proposed for election at the next meeting. The Secretary then referred to the out-door meetings of the Society on June 16th and July 7th.

Mr. De La Mare exhibited specimens of bones lately uncovered near the Cromlech at L'Ancrese. The Secretary read a note from Rev. F. E. Lowe announcing the capture (apparently for the first time in Guernsey) of the moth, *E. fasciaria*; also that he had bred a good specimen of the Noctua, *H. hispidus*, from a pupa taken at Pleinmont.

Mr. F. Rose mentioned a case of gross superstition and belief in Witchcraft in the island, which led to a man's dismissal from an employ in which he had faithfully served twenty years, because he had, according to the witch consulted put a spell upon his master's cattle, &c.

Mr. E. D. Marquand then in his usual lucid style gave a short address on the "Wings of Insects." He prefaced his remarks by defining an insect in its scientific sense, because many small creatures usually and conveniently grouped under that name in common conversation are not true insects at all. This vast class is divided into a number of *orders*, based upon the character of the wings, which are normally four in number, transparent, membranous, and netted with veins. In the Hymenoptera (bees, wasps, ichneumon-flies, &c.), we find this normal condition in its highest perfection, and no better typical example can be selected, as regards the wing-system, than a common hive bee. From this type the other orders deviate. In the Coleoptera (beetles) the anterior pair of wings is hard, horny and opaque, serving as a sheath and protection for the inferior pair, which are used for flight. In the Lepidoptera (butterflies and moths) all the wings are densely clothed with microscopic scales arranged in various patterns of exquisite beauty, whilst in the Diptera (two-winged flies) the anterior pair alone are developed, the others being replaced by two minute appendages, the exact function of which is not clearly known. Mr. Marquand went on to describe with blackboard sketches the wing-characters of the Neuroptera (Dragon flies), Hemiptera (field bugs), Trichoptera (caddis flies), and other orders of insects, concluding with some special remarks upon the forms which are always destitute of wings, not only the abnormal apterous species which occur in all orders, but those constituting an extensive group by themselves, most of which are parasitical on the higher vertebrates.

A paper on "The Evolution of Insects' Wings" was read by Mr. A. Collenette, F.C.S., of which the following is an abstract:—

The first indication of a wing is visible, according to *Landois* in the caterpillar, one day after its exit from the egg. From that period of its life the wing is gradually developed. The third and fourth segments bear the wings. These segments have their stigmata suppressed. The reason is that wings are modified tracheate-gills. The varieties of breathing organs in the Arthropoda were described, especial attention being given to the Branchiopoda and Phylopoda. From the known forms of these modifications the reasoning of the paper was drawn, viz., that wings are modified breathing organs. The possible mode of evolution was traced, using the "Mayflies" as examples of intermediate forms between gill-footed and tracheate-breathers, these flies being the lineal

descendants of the partly evolved winged insects. The cause of the changes indicated, which have a profound bearing on insect metamorphoses, was the gradual and progressive development due to the occasional use of gill-tracheæ as aids to locomotion in air, from the surface of one pond to another during the mature stages of the then aquatic insects during the pairing time.

Monthly Meeting held August 11th, 1891, Mr. A. Collenette in the chair.

The minutes of the last meeting having been read and signed, the Rev. D. Cann was unanimously elected member of the Society.

Mr. Luff exhibited a specimen of a foreign beetle caught at his shop in the Bordage. It is supposed to have been introduced among foreign timber.

The Hon. Sec. then read a short but important paper by Rev. E. Hill, F.G.S., on "Mica Trap Dykes in the Channel Islands." An unanimous vote of thanks was passed to the author for this interesting contribution which will be found printed at length in the following pages.

Mr. Cooper contributed a number of remarks culled from various sources upon the habits and peculiarities of the Cuckoo, elucidating many points which had not been dealt with in the papers recently read before the Society. The various theories and opinions brought forward by different observers served to show that much has yet to be learnt respecting the economy of this curious bird. The members were much indebted to Mr. Cooper for his interesting paper.

Monthly Meeting held September 22nd, 1891, Mr. W. M. Cooper in the chair.

The minutes of the last meeting having been read, approved and signed, Mr. Luff exhibited two specimens of the Convolvulus Hawk Moth (*Sphinx Convolvuli*) which is plentiful this year. Last year no captures were recorded here.

Mr. Collenette, on behalf of Colonel Collings, exhibited two fragments of pottery, a number of flint chips, and a fragment of bone of a whale found by this latter gentleman in the ancient rubble bank behind the running targets at Grandes Rocques. Colonel Collings has also found two fire holes in the bank of the Albecq Road cutting.

Mr. E. D. Marquand next contributed a most valuable paper on "The Flowering Plants of Guernsey." It embodies the result of the author's researches during the past three years, and records nothing but what he has personally observed and noted. It is the first complete list of flowering plants of the island since Professor Babington's, published fifty years ago. Mr. Marquand supplemented his paper (which is printed in the following pages) with some very interesting statistics, tending to show the richness of the phanerogamic flora of Guernsey as compared size for size with (*a*) the whole of Great Britain, (*b*) the county of Hampshire, including the Isle of Wight, and (*c*) the district comprised in a radius of twelve miles from Plymouth. The proportion of rare plants to the entire number recorded was also worked out, as well as the relative number of representatives in each of the eight or nine leading orders. At the close of the paper a very hearty vote of thanks was accorded to Mr. Marquand, the paper being considered by far the most valuable one contributed since the foundation of the Society nine years ago.

Annual Meeting held October 30th, 1891.

The chair was taken by Mr. E. D. Marquand, in the absence of the President and Vice-President through indisposition.

The following Report of the Council was read by the Honorary Secretary, Mr. W. Sharp:—

"The Council, in presenting you the 9th Annual Report, have much pleasure in recording that the increased interest in the work of the Society shown last year has been continued during the one just closed. Indoor meetings have been held regularly every month, and have been, as a rule, well attended. Valuable and interesting papers have been read, and the useful information therein contained has served to keep alive the interest in such matters as it is the special object of the Society to deal with. The formation of a Geological section has given an impetus to the study of that branch of our work, and the amount done during the past few summer months augurs well for the future. A detailed account of the doings of this section will be presented you by the energetic Secretary of the section.

"Though no excursion out of the island has been held this year, a new departure has been made in the shape of a weekly out-door meeting (when the weather permitted) during the summer months. These have proved a great success, and

a source of pleasure and profit to those taking part in them. It is hoped that these agreeable excursions will be resumed next summer, and that a still larger number of members and friends will avail themselves of these opportunities of studying nature in the field. These re-unions afford an excellent opportunity for beginners to take up in the most agreeable and practical way the study of Natural History. Among the districts thus worked are Spur Point and neighbourhood, the coast from Vale Castle to Fort Doyle, Mont Cuet, the coast near Fort Le Marchant, Cobo and Grandes Rocques, L'Islet, &c.

“The transactions of the Society have again been published, and the volume is one of which the Society may justly be proud. The expense, however, of the undertaking is a heavy one for our limited resources, and this is an additional reason for wishing to see recruits to our ranks. The number of members remains the same, for while five new names have been added to the roll, we have lost five, one by death, and four have left the island. In conclusion, it is our pleasing duty to thank Messrs. Guille and Allès for the free use of the room in which our meetings are held.”

WILLIAM SHARP, Hon. Sec.

The Hon. Treasurer then read a statement of the finances of the Society, these accounts having been audited by Messrs. Le Cocq and Cooper.

The following Report of the Geological section was read by the Secretary of the section, Mr. Collenette:—

First Annual Report of the Geological Section of the Guernsey Society of Natural Science.

THE Geological section of this Society commenced its work on the 28th of April, 1891, when the first meeting, since its formation, was held.

The section has held two indoor meetings, has taken part in ten outdoor excursions, and has also had one excursion of its own.

The members have also been active in their individual capacities, and more work may be expected of the section next year than it has succeeded in doing this, for much material for future work has been noted.

WELLS.

The sinking of two wells first claimed attention.

1.—*On Mr. Elliott's property in the Grange.*

This well was sunk to a depth of 85 feet before water was reached. The section shows little else but decomposed and

semi-decomposed gneiss. Quartz veins and gneiss, with a large proportion of quartz, were met with, but otherwise there was nothing unexpected in this well. The gneiss is compact and of a red colour, its crystals are small. In connection with this well it may be mentioned that the well in Union Street is also 80 feet deep.

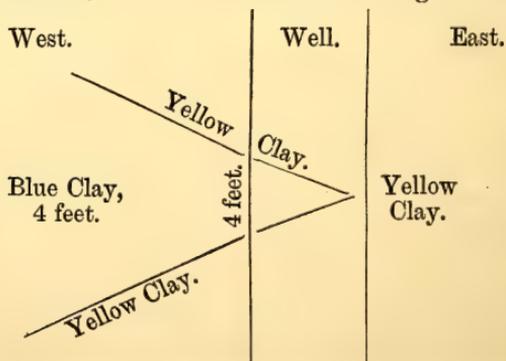
2.—*On Mr. Bougourd's property at "Gipps Land,"
St. Sampson's.*

This well is situate nearly halfway between "Spur Point" and "Les Monts" quarry, and its section shows that the land in which it has been cut is in part the result of the deposition of sand, clay and rubble from the higher levels on the west. Solid rock was found at a depth of 19½ feet, and occurred in massive pieces with crevices, four of which gave water.

The following is a section of the well:—

West side.	Depth.	East side.	Progressive depth.
Good earth	1-2 feet.	Loamy earth.....	2 feet.
* Souille	1 foot 3 in.	White clay	3 feet.
Yellow clay with an- gular stones	8 feet.	Yellow clay, with angular stones ... }	13 feet.
Blue clay.....	4 ft. thinning to nothing.	Yellow clay	17 feet.
Yellow clay	2 feet.	do. do.	19 feet.
Rock		Rock	19½ feet.

This well section seems to point to the fact that the angular stones result from the decay of the rock, and that they are not far from their original position. The yellow clay is no doubt the result of the decay carried to a further stage. The blue clay, however, thinned out to nothing on the east side, thus existed, in the section as a wedge as here drawn.



* Souille, a local term used by well-diggers. In the present instance the layer was little but an earthy clay.

This would seem to place the origin of the blue clay some distance off on the west side from whence it was, evidently, washed. The yellow clay seems to have originated in the decomposition of the rock in its immediate neighbourhood, and to have been water-borne for a short distance. Not far from this well, and to the north-east, there exists ten feet of the same yellow clay under two feet of soil.

CLAY DEPOSITS.

A searching enquiry into the nature and extent of the clay deposits has been commenced, but so far only a small portion of the work has been accomplished.

1.—The account just given of the well in “Gipps Land” proves that an important deposit of clay exists in the hollows between the outcrops of rock in the neighbourhood of “Spur Point.” This, in the places mentioned, varies in depth between 10 and 19 feet, and points to a period of undisturbed deposit under conditions which are non-existent at present.

2.—*Clay Deposits at the Vrangue Brickfield.*

These deposits occur on the north-west slope of Mont Arrivé Hill; they have been exploited in two distinct places. The old pit further south and higher up the hill has been measured and levelled. The newer one at the lower level inside the angle formed by the junction of the two roads has not yet been carried very far; the base of the clay has not been reached. Up to the present the more plastic clay has been dug, it appears to have been washed in among and around numerous angular stones which have apparently fallen from the rock mass. The outcrop of the rock on which the battery stood (at the side of the hill on the east, on the edge of the cliff overlooking the Bouët) was probably the source of that part of the deposit.

In the old pit the workings have been carried deep into the disintegrated rock which itself yields a large proportion of clay. Indeed, the bricks now being manufactured are made of a mixture of this decaying clayey rock with a portion of the more plastic clay from the new pit. Superimposed on the decaying rock in the upper pit and underlying the clay is a band of sand which will be referred to under the heading “Sand.”

3.—*Delancey Hill.*

The opening of the soil on the north-west of Delancey Hill, for the purpose of obtaining water for greenhouse supply,

afforded an opportunity of viewing an important deposit of blue clay. The clay is fairly free from sand, and is at least 14 feet thick, but layers of sand are found interspersed. It appears to be on the same level as clay deposits which exist right across the higher levels of the Braye du Valle, and on the west side of the Capelles, but this connection, though probable, has not yet been proved.

4.—*Grande Mare.*

Clay, blue in colour, and somewhat tenacious, has been exposed during excavations for greenhouses in the above-named district. This was viewed during an excursion, but it was noted simply owing to want of time.

SAND.

1.—On reference to the drawing and plan of the Vrangue Brickfield, it will be seen that the sand layer exposed to view is a mere remnant of the original deposit.

At its north end it is 2 feet 3 inches thick, at the south 1 foot 10 inches, where the workings turn westward, and along this face the sand rapidly thins out, disappearing at a distance of about 12 feet from the angle. Along the north and south face it is thinnest at C., being there about 1 foot 4 inches deep. One or two rounded flint pebbles were found at the base of this deposit.

2.—*Sand Dunes.*

Sand dunes have been recorded in the following places as existing over sea-washed rocks of ancient date:—

a. At L'Islet, where the blown sand is found covering sea-worn rocks 15 feet above high water mark, and 300 feet from the present high water mark. (See plan and photograph 1.*)

b. At L'Islet, near Rouse, the same conditions exist. (see photograph 2.*)

c. Along the Rouse and Ronceval coasts, but well inland, where they not only cover sea worn rock, but old walls.

The detailed examination of these spots has proved more than could be undertaken, but enough has been noticed during the excursions to prove that a large amount of interesting and valuable work is ready to be undertaken next season.

* The photographs and plans are in the possession of the Secretary.

ANCIENT OR RAISED BEACHES.

It is felt that this portion of the work is assuming a much more important aspect than was at first anticipated. As the details are worked out and fresh deposits discovered the importance of the investigation increases. This investigation is found to be the more important when it is considered that these beaches are in most cases on the sea margin, and suffering constant erosion, which, within a short period, must diminish the number of patches and thus render the recovery of the older sea-line more difficult.

The following deposits of rolled beach stones have been examined, but they form but a small proportion of the existing patches.

No. 1.—Barker's (tunnel) Quarry.

An interesting deposit has been viewed in Barker's (tunnel) Quarry at the back of the second tower. On the south side the quarry section shows a deposit of some 4 feet in thickness and about 20 yards in length, and is flanked by rubble and blown sand (see drawing.) It has not been levelled, but may be considered to be some feet above high water spring tides. It is some 50 yards inland from the second tower. The deposit must have thinned out towards the north, and have been bounded on that side by the out-crop of rock now being quarried. The question arises whether this out-crop and its hilly area was united with Delancey Hill at the date of the submergence giving rise to the beach deposit in question.

No. 2.—Spur Point.

In a disused quarry at Spur Point a good section exists showing sea-worn rocks, large sea-worn stones, and rolled stones. The beach deposit, as will be seen by the drawing and plan, is about 100 feet from the present high-water mark. It is 40 feet long and 10 feet deep. A smaller deposit exists on the other side of the quarry (marked D on the plan) which proves that the deposit originally extended as far as that point in a westerly direction. This deposit was evidently a small one, and rested against the out-crop of rock which was then under the direct action of the sea, but on the change of level leading to the retirement of the sea has become covered over with sand, rubble and earth, until again exposed by the opening of the quarry. The mean height of this deposit above high water mark is 10 feet, but it varies between 8 and 12 feet. (See photograph No. 3 and plan).

No. 3.—Fort Le Marchant.

Between Spur Point and Fort Le Marchant several deposits have been noted, though not yet carefully and critically examined. At Fort Le Marchant a very good section is exposed (see photograph). The deposit is a very large one, extending across the promontory in front of the Fort, and is covered by blown sand, which, in some places, is many feet thick. The best section is to be found on the north-east face, where it rests immediately behind the top of the present beach. The rolled stones are imbedded in a consolidated sand, and the deposit presents the appearance, though it has not the hardness, of a conglomerate. At its face it is 5 feet deep, and over 200 feet long. It extends below its junction with the recent beach, and evidently rests on sea-worn rocks of its own date, such rock being visible here and there (see photograph No. 4) where the denudation and erosion permit.

No. 4.—Mont Cuet.

The quarries at Mont Cuet (see photographs No. 5 and 6), the coast around that promontory as well as the sea coast along L'Ancrese Bay have been visited, and found to contain deposits too numerous to be examined in detail. These exist, practically, in all the quarry cuttings on the land side as well as the sea side, thus showing Mont Cuet as an island at the date of the beaches.

No. 5.—Quarry at L'Islet.

This has been referred to under the heading "Sand." The quarry shows that the sea beat against the rocks (see photograph No. 1), and deposited rolled stones as a beach around them and into their crevices. After the retirement of the sea, sand blew over and covered the whole as an immense dune which has been opened for quarrying.

No. 6.—2nd Quarry at L'Islet.

This quarry shows the same order. First a floor of beach on the side of (2nd) a mass of sea-worn rocks covered over by a (3rd) deposit of sand. The quarry shows this as a section (see photograph No. 2).

No. 7.—Ronceval.

Beach deposits and pockets of rolled stones have been viewed in many places around the Ronceval Hill, but not examined in detail (see photograph of lane hedge at Noirmont, No. 7).

No. 8.—Rocque Maingy.

A deposit of small extent, but apparently high level, has been found in the quarry below this rock. The heads of the rocks here are decidedly water-worn. This spot will be levelled next season.

No. 9.—The Coasts of Port Soif.

The coast line at Port Soif has been found to contain large deposits of ancient beach at a higher level than the present one. The cart road leading to a quarry has enabled the beach to be traced to the centre of the promontory (see plan and photographs Nos. 8 and 9). The deposit underlies the whole of the isthmus. At the bank's edge the section shows 1 foot 6 inches of loamy earth, 2 feet 6 inches of large and small angular stones, and 2 feet of clay overlying the beach deposit.

No. 10.—Grandes Rocques.

Here the same conditions and the same deposits are continued, the whole of the isthmus uniting the Grandes Rocques to the land is composed of sand, rubble, and ancient beach. The latter is to be traced in many rocky spots (see photographs Nos. 10, 11 and 12) even on the outlying islets.

No. 11.—Cobo.

The existence of beach deposits in several spots around Albecq and in Albecq cutting, as well as below the Cobo Hotel, has been noted. In these patches the rolled stones rest directly on water-worn rocks, and are covered by several feet of decomposed rock rubble (see photograph 13).

No. 12.—Hommet and Grande Mare.

The promontory at Hommet contains many patches of rolled stones (see photographs) at the same elevation, apparently, as those previously described. These have only been viewed, the levels and measurements have still to be taken. In a field at Grande Mare, near the rivulet, a sandy deposit, some 100 yards inside the present beach, contains a deposit of rolled stones about one foot deep. The deposit is about one-third of the distance from high water mark to the deposit of clay spoken of under the heading "Clay." Between the two spots the land is largely covered by sand, and is very flat (see photographs Nos. 15, 16 and 17). Associated with the sand and clay peat has been noted.

No. 13.—Le Crocq and Richmond.

The beaches at these places are most important, and demand a careful survey, as they are suffering rapid loss from the erosive action of the sea. One section is particularly interesting, being evidently the land edge of a deposit of large rolled stones which has formed part of an ancient storm beach. These districts abound with interesting patches, which, unfortunately, have not been levelled or measured yet (see photographs Nos. 18, 19 and 20).

No. 14.—Divette Bay, near Jerbourg.

A strip of beach stones of small size lies on a bed of rock, and is covered by a cliff which is fully described later on (see photographs Nos. 21 and 22, plan and section). The Society has already observed ancient beaches at Lihou, and has now to connect them with Richmond in order to obtain a fairly continuous line of ancient beach from that islet around the Vale to Spur Point and Barker's Quarry. Many patches distinct from these described are known to individual members, and stand to be viewed by the Society as soon as time will permit.

MICA TRAP.

The attention of the Society has lately been drawn to the subject of mica trap dykes and their importance by a paper supplied by the Rev. E. Hill, F.G.S., and the following examples of these interesting intrusions have so far been noticed.

No. 1.—Fort La Crocq and Richmond.

A good out-crop of this trap is visible just below the small fort, running down the rocks in a north-east direction. It is about two feet wide and is not cut, during its visible portion, by any vein (see photograph No. 19). On the south-west of Richmond a similar dyke was found; it has the appearance of being a continuation of the same, but this requires confirmation.

No. 2.—Hommet.

A similar dyke to the last described has been observed on the east side of this fort.

No. 3.—Grandes Rocques.

This dyke is one foot wide. Its bearing is 10° south of east. It weathers green first, then red.

No. 4.—Port Soif.

This, a similar dyke, runs in a north-east direction, or more exactly 75° east of north.

No. 5.—Albecq Cutting.

A thin dyke or vein runs through the red granite on the land side of this cutting. Its dimensions are, roughly, 6 inches wide and 8 to 10 inches high. Its bearings have not been noted.

CLIFF-HEAD.

Measurements and photographs of Nos. 21 and 22 of a cliff-head section at Divette Bay (under the Doyle monument on the east side), have also been taken. This section, which is a natural one, was caused by the sea clearing away a rubble bank, or continuation of the cliff-head, which bank, resting on a rock bed, formed a promontory. The rock bed is strewn with pieces of rock of the same sizes and characters as those now existing in the lower portion of the cliff-head section. These apparently sank into their present places on the removal of the supporting rubble. There is more than a passing interest in this cliff-head owing to the rubble being over an ancient or raised beach (No. 14), and this head proves the following order of occurrence:—

1st.—A sea shore extending further inland by some yards than the present cliff.

2nd.—A deposit of beach stones on a rocky bed 5 to 7 feet above high water mark of considerable extent (see drawing and plan).

3rd.—An extensive destruction of overhanging rock with a large deposit of various sized stones (many quite large) of angular shapes, and but little weathered.

4th.—A filling up of all interstices with clay, decayed rock and rubble.

5th.—The erosion by the sea of the promontory thus formed leaving the present remnant as now seen.

The measurements (see plan) are as follows:—

a. Rock floor 165 feet long and 40 feet wide, with loose rocky masses and stones resting where deposited, 1 to 5 feet above high water mark.

b. Rubble section 22 feet high consisting of 1 foot of clay and mould at the top.

4 feet of clay.

5 feet of rubble.

11 feet of sandy clay with large angular detached stones.

1 foot of rolled beach stones.

Base sea-washed rock.

These are approximate measures only.

The cuttings in roads have been watched, but nothing of noteworthy nature has been reported. At the Canichers, near Clifton Terrace, during the laying of a drain, the ground was found to rest over paving-stones which were 8 feet below the present level. That was made ground evidently filled in during an improvement.

The Geological section in tendering this report feels that the information given is very incomplete and fragmentary, and hopes that more useful work will be done in the future, the members being now prepared with various apparatus for the more thorough measurement and observation needed.

This over, and a hearty vote of thanks having been accorded to Mr. W. M. Cooper for the admirably prepared sketches and plans of various quarries, cuttings, raised beaches, &c., examined and reported on by the Geological section, the election of officers for the ensuing year was proceeded with. Mr. Whitehead was re-elected President, Mr. F. M. Allès, Vice-President, Mr. W. Sharp, Hon. Secretary, and Mr. W. A. Luff, Hon. Treasurer. The following gentlemen were elected to form the Council:—Messrs. Collenette, Derrick, De La Mare, Pitts, Marquand, and Rose.

Mr. Luff then read an interesting and valuable paper on the Neuroptera of Guernsey, an order of insects including the lace-wing flies, dragon flies and caddis flies. Carefully mounted and named specimens illustrated the paper; among them were several examples of a caddis fly (*Philopotamus insularis*) peculiar to Guernsey. This important list, the first that has yet been made out for this island, will be found printed in full in the following pages.

Votes of thanks to the Treasurer and Secretary for their services during the past year, and to Mr. Luff for his paper, brought the meeting to a close.

THE FLORA OF GUERNSEY.

BY MR. E. D. MARQUAND.

DURING the past three years I have devoted special attention to the indigenous flora of Guernsey, with a view to ascertain as far as possible the exact range of each species in the island. I will not trouble you now with the result of my investigations on the mosses, lichens and other cryptogams, as I hope later on to prepare for the Society a paper on the subject. On this occasion I shall simply deal with the flowering plants.

Since the publication, as far back as the year 1839, of Professor C. Cardale Babington's little *Flora of the Channel Islands (Primitivæ Floræ Sarnicæ)* no properly authenticated list of Guernsey plants has appeared; nor, so far as I am aware, have any material additions been published—which is somewhat surprising, considering the number of capable botanists who have resided in the island, and visited it from time to time, during the last fifty years. This little *Flora* has long been out of print; second-hand copies are scarce and becoming more and more difficult to procure; a handy reference list therefore of the phanerogams of Guernsey seems very much needed by resident workers as well as visitors;—hence the present paper. It is simply a summary of my own notes made during the years 1889, 1890 and 1891, and is entirely restricted to plants which I have myself seen growing in the localities mentioned.

Small as Guernsey is (the area being about 25 square miles) its peculiar situation and its distance from the mainland render the flora particularly interesting to the student; whilst from a mere collector's point of view few spots of equal size in the south of England surpass it; it is a perfect nest of rarities. The entire absence of a number of quite common English plants, and the extreme rarity of many others, is a very remarkable feature, and one which it is not easy to account for, since in most cases the same species are more or less abundant on the French coast. And then again many non-British plants which belong to the northwest of France

are altogether unknown here, although one might reasonably expect to find traces of their existence.

These facts appear to me very suggestive in studying the general distribution of plants from given centres, and also highly important as corroborative of geological evidence, which goes to show that all the members of this little archipelago were not contemporaneous in their origin as islands, but that Guernsey was separated from the mainland at a very much earlier period than any of the others.

Out of a total of some 540 flowering plants recorded for Guernsey by Professor Babington in the work above mentioned, there are about forty species which I have not as yet been able to find. Some of these, it is very certain, are now extinct, owing to drainage and general improvement of waste land during the last half century; just as at the present time extensive building and quarrying are threatening the existence of many of the rarest plants. But a few of the records are beyond all doubt erroneous; the error perhaps arising in some cases from the confusion of local names which, with slight variations, are common to both Jersey and Guernsey. The former is considerably the larger of the two islands, and possesses in consequence a richer and more varied flora.

In the present list 663 species are enumerated, viz., 636 flowering plants, 18 ferns, and 9 fern-allies; of these about 130 species are not recorded for Guernsey by Professor Babington. The terms rare, common, &c., which will be found immediately following the name of each plant denote its comparative frequency throughout the island taken as a whole, so far as my observations have gone. This being merely a preliminary list to form a basis for working upon, I shall be glad to be informed of any additional species which may be found here, as well as any new habitats for the less common plants. Supplementary lists can then be published from time to time as required.

In order to avoid constant repetition I have used Roman numerals to designate the ten parishes into which the island is divided, taking them in the following order:—

- | | |
|--------------------|----------------------------|
| I.—St. Peter-Port. | VI.—St. Peter-in-the-Wood. |
| II.—St. Andrew's. | VII.—St. Saviour's. |
| III.—St. Martin's. | VIII.—Câtel. |
| IV.—Forest. | IX.—Vale. |
| V.—Torteval. | X.—St. Sampson's. |

St. Andrew's (II.) is the only one having no seaboard. The southern half of the island (comprising III., IV., V., and part

of VI.) consists of a high table-land attaining an elevation of between 300 and 400 feet; it is intersected by deep valleys, and abuts on the sea in precipitous rocky cliffs. The north and north-western portions lie low, scarcely rising above sea level, and include more or less extensive sandy and marshy tracts. Hence the vegetation differs considerably in the high and low districts. There are no woods or copses in the island, though trees are fairly plentiful. Streamlets are numerous, but salt marshes and pools are now few and small. Grande Mare is the last relic of what must have been once a large expanse of marsh and bog; at present it is little more than an acre in extent, but from a botanist's point of view this is perhaps the most interesting acre of ground in the island.

The following fifteen plants are among the most noteworthy in the Sarnian flora, since they do not occur in Britain proper:—

Brassica cheiranthus.	Orchis laxiflora.
Sinapis incana.	Lagurus ovatus.
Viola nana.	Cynosurus echinatus.
Silene quinquevulnera.	Bromus maximus.
Lavatera sylvestris.	Gymnogramme leptophylla.
Gnaphalium luteo-album.	Ophioglossum lusitanicum.
Centaurea aspera.	Isoetes Hystrix.
Cicendia pusilla.	

My best thanks are due to Miss Dawber and to Mr. G. Derrick for pointing out to me the habitats of several local rarities; and I am also indebted to my friends, Messrs. H. and J. Groves, for kindly identifying my Guernsey gatherings of characeæ.

It may be well to mention in conclusion that as I am collecting materials for the publication of a complete "Flora of Guernsey," cryptogamic as well as phanerogamic, any information bearing on the subject or any useful notes or references will be most thankfully received by me, and carefully acknowledged in the proper place.

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- Ranunculus trichophyllus**, *Chaix*. Common in pools about Grandes Rocques and Cobo.
- R. peltatus**, *Schrank*. In several pools on L'Anresse Common (mostly the var. *truncatus*).
- R. hederaceus**, *L.* Rare. Noted in IV., V., IX. and X.
- R. Flammula**, *L.* Common in wet places. Var. *pseudo-reptans*. Old quarry at L'Islet.
- R. acris**, *L.* Very common.
- R. repens**, *L.* Very common.
- R. bulbosus**, *L.* Very common.

- R. hirsutus**, *Curt.* Frequent, especially in corn-fields; common in the south.
- R. parviflorus**, *L.* Rare. Field near Noirmont Mill (IX.), plentiful.
- R. Ficaria**, *L.* Very common.
- Delphinium Ajae**, *Reich.* One plant on the quarry heap near the Vale Castle in 1889. One on Vazon Green in 1891.
- Papaver somniferum**, *L.* Very rare. Corn-field near the Vale pond, two or three plants in 1889. Several plants in a corn-field opposite Grandes Maisons (X.) in 1890.
- P. Rhoas**, *L.* Common. Var. *strigosum*. Rare. Rocquaine Bay, towards L'Erée Hotel, in good quantity.
- P. dubium**, *L.* Rather common in IX. and X., and on the coast as far as Vazon; rare elsewhere.
- P. hybridum**, *L.* Rare. Near the Déhus Cromlech (IX). Cult. field at Mont Saint. Corn-field at Clos au Comte (VIII.)
- Glaucium luteum**, *Scop.* Frequent on the north and northwest coast, but rather local; abundant on the shingle at L'Erée.
- Chelidonium majus**, *L.* Rather rare. Occurs in all districts, mostly near houses.
- Fumaria confusa**, *Jord.* Very common.
- F. officinalis**, *L.* Rare. Cult. fields at Mont Saint. Pleinmont. By Ozanne's Tower. Bordeaux, sparingly.
- Matthiola sinuata**, *R.Br.* Rare. On the sandhills near the sea. Rouse Tower (IX.) Portinifer. Rocquaine Bay.
- Cheiranthus Cheiri**, *L.* Rare. Walls at Havelet, Vauvert, and other places in I.
- Nasturtium officinale**, *R.Br.* Common by streamlets and in wet places.
- Barbarea præcox**, *R.Br.* Rare. Noted in I., IV., VII. and IX., always sparingly.
- Arabis hirsuta**, *R.Br.* Rare. L'Anresse Common, western side. In sandy fields near Grandes Rocques.
- Cardamine pratensis**, *L.* Common.
- C. hirsuta**, *L.* Very common.
- C. flexuosa**, *With.* Rare. Moulin Huet and Petit Bot valleys. Valley below Calais (III.)
- Alyssum incanum**, *L.* Very rare. A single plant at Bordeaux in 1889.
- A. maritimum**, *L.* Rare. Chiefly on walls. Well Road and Vauvert (I.) Prével (VIII.) Near Clarence Battery. Cliffs above Fort Bay. Near Hermitage (L'Anresse).
- Draba verna**, *L.* Local and rare. Vazon Green. Grandes Rocques. Portinifer. Vale Castle Hill.
- Cochlearia danica**, *L.* Rather common.
- C. Armoracia**, *L.* Near Grandes Rocques. Cliffs above Fort Bay. In other places a more evident escape from cultivation.
- Sisymbrium Thalianum**, *Gaud.* Very common.
- S. officinale**, *Scop.* Frequent; common in IX. and X.
- S. alliaria**, *Scop.* Rare. Occurs in all districts.
- Erysimum cheiranthoides**, *L.* Three plants sprang up spontaneously in my garden in 1891.
- Brassica Rapa**, *L.* Roadside, Carrefour-au-Lièvre (I.)
- B. cheiranthus**, *Vill.* Very rare. Quarry heap near Vale Castle, a few plants.

- B. nigra**, *Koch.* Very rare. Cliffs above Fort Bay.
- Sinapis arvensis**, *L.* Frequent.
- S. alba**, *L.* Rare. Quarry heap near Vale Castle. Corn-field at Naftiaux (II.)
- S. incana**, *L.* Rare. West side of L'Ancrese Bay. Quarry heap near Vale Castle.
- Diplotaxis tenuifolia**, *DC.* Locally common on the north and north-western coast. Abundant on Vazon Green.
- D. muralis**, *DC.* Rather common in sandy cult. fields in the north and north-west. Rare in the south.
- Capsella Bursa-pastoris**, *Mœnch.* Common.
- Senebiera didyma**, *Pers.* Common.
- S. coronopus**, *Poir.* Generally distributed, but rather rare.
- Lepidium latifolium**, *L.* Rare; plentiful where it occurs. Approach to Cobo. Western end of Vazon Green. Les Goubais (IX.)
- L. ruderale**, *L.* Very rare. Quarry heap near Vale Castle, and roadside beyond, sparingly.
- L. sativum**, *L.* Very rare. On the shore at the south side of Grand Havre.
- L. Smithii**, *Hook.* Rather common.
- L. Draba**, *L.* Rare. North side of Bordeaux Harbour. Hedge-bank beyond Les Videclins (VIII.) Coast north of Richmond Hill. Lane by Les Hunguets (II.)
- Thlaspi arvense**, *L.* In cult. fields, rare. Noted in II., VI., VII., IX. and X.
- Teesdalia nudicaulis**, *R.Br.* On the cliffs from Fermain to Petit Bot, frequent. Talbots Valley, a few specimens.
- Crambe maritima**, *L.* Very rare. Portinifer, in fair quantity. Lihou Island, one plant.
- Cakile maritima**, *Scop.* All along the coast from Rocquaine to Belgrave Bay, but not very common.
- Raphanus Raphanistrum**, *L.* Frequent in VIII., IX. and X.
- R. maritimus**, *Sm.* Common all round the coast.
- Reseda Luteola**, *L.* Rather common on the north and north-west coast; much less so in the south.
- Viola Riviniana**, *Reich.* Very common.
- V. Reichenbachiana**, *Bor.* Moulin Huet Valley, scarce.
- V. tricolor**, *L.* Very rare. Lane near Les Annevilles (VII.)
- V. arvensis**, *Murr.* Common in cult. fields.
- V. nana**, *DC.* Rare. On the sandhills near the Great Cromlech, L'Ancrese. All round Rousse Martello Tower.
- Polygala vulgaris**, *L.* This species with the next, taken as an aggregate, is quite common. Fairly typical *eu-vulgaris* is occasionally to be met with, but the great bulk of the forms can scarcely be assigned with confidence to either.
- P. oxyptera**, *Reich.* Very common at Pleinmont. Petit Bot cliffs. Corbière. L'Erée. Not quite typical, the capsule being usually shorter though broader than the wings.
- Frankenia lævis**, *L.* Very rare. In two sandy fields at Grandes Rocques (the locality indicated to me by Mr. Derrick). I believe I am correct in naming this plant, but I have not seen it in flower. It was found in the island, however, by Professor Babington.
- Saponaria officinalis**, *L.* Overrunning a low hedge in the lane from Cobo to Ozanne's Tower; probably an old garden escape.

- Silene inflata**, *Sm.* Very rare. Quarry heap near the Vale Castle, a few plants.
- S. maritima**, *With.* Common all round the coast, and occasionally on banks inland.
- S. conica**, *L.* Locally common on the sandhills from Vazon to Bordeaux.
- S. anglica**, *L.* Rather common in cult. fields. Plentiful but dwarf on the cliffs near Mont Herault (VI.) Var. *rosea*. Vale Castle Hill, and near La Miellette (IX.) Hybrids between this species and the next are not uncommon in IX. and X.
- S. quinquevulnera**, *L.* Rare. Vale Castle Hill. South end of Grand Havre. Coast west of Vale Church.
- [**S. nutans**, *L.* Occurs abundantly on the south-western side of Herm, but has not, I believe, been found in Guernsey].
- Lychnis vespertina**, *Sibth.* Very rare. Near Icart, near Vale Castle, and near Sohier (IX.), in each case a single plant only.
- L. diurna**, *Sibth.* Very common.
- L. Flos-cuculi**, *L.* Common in wet meadows.
- L. Githago**, *Lam.* Rare; though noted for nearly all districts in corn-fields.
- Cerastium tetrandrum**, *Curt.* Very common on the coast.
- C. semidecandrum**, *L.* Vazon Green. Near Rousse Martello Tower.
- C. glomerata**, *Thwill.* Common.
- C. triviale**, *Link.* Very common.
- Mcenchia erecta**, *Sm.* Rather common all round the coast; more rare inland.
- Stellaria media**, *Cyr.* Very common. Var. *Borœana*. Road-side, King's Mills.
- S. uliginosa**, *Murr.* Common by rivulets and springs.
- Arenaria serpyllifolia**, *L.* Frequent in the north and north-west.
- A. peploides**, *L.* Common on the shore of the lowlands.
- Sagina maritima**, *Don.* Frequent near the sea in all parts.
- S. apetala**, *L.* Very common.
- S. ciliata**, *Fr.* In many places in IX. and X. Pleinmont.
- S. procumbens**, *L.* Common.
- S. subulata**, *Presl.* Rather common all round the coast.
- S. nodosa**, *E. Mey.* On sandy flats from Vazon to Fort Doyle, local but not rare.
- Spergula arvensis**, *L.* Common in cult. fields. A curious dwarf prostrate variety occurs on the cliffs of III. in dry, exposed places. It flowers in April. The seeds show it to belong to this species.
- Lepigonum rubrum**, *Fr.* Frequent in dry places, especially near the sea, and in old quarries.
- L. salinum**, *Fr.* Rare. Bordeaux, in a small marsh on the north side. Brackish pool at Pulias. Marshy field near Ivy Castle.
- L. rupestre**, *Kindb.* Common on rocks and banks all round the coast, as well as a little inland.
- Polycarpon tetraphyllum**, *L.* Common in waste and cult. ground, road-sides, and on the shore.
- Montia fontana**, *L.* Rather common on the southern cliffs. Near Fort Doyle. Var. *rivularis*. Near the Trinity Houses (V.) Lane by Le Marais (VII).
- Tamarix gallica**, *L.* Common in the maritime districts of VI., VII., VIII., IX. and X.; much used in marking the boundaries of fields. As a tree it often attains a large size.

- Hypericum Androsæmum**, *L.* Very rare. I have found it in VI. and VII., but only as an evident escape from cultivation. Perhaps truly indigenous in a copse near King's Mills, where it occurs sparingly.
- H. perforatum**, *L.* Common, especially in the middle of the island.
- H. tetrapterum**, *Fr.* Common in wet places.
- H. humifusum**, *L.* Frequent.
- H. linarifolium**, *Vahl.* Very rare. In a hedge between Les Eperons and Les Blicqs (II.) Hybrids between this species and the last occur on the cliffs from Jerbourg to Moulin Huet.
- H. pulchrum**, *L.* Frequent.
- H. elodes**, *Huds.* Common in most of the cliff streams on the south coast. Grande Mare. Marsh at the eastern end of L'Ancrese.
- Lavatera arborea**, *L.* Frequent in IX. and X., often in old quarries, extending westward to Rocquaine. Plentiful at Perelle and L'Erée. Occasional in the south.
- L. sylvestris**, *Brot.* Very rare. Two or three plants between Vale Castle and Bordeaux.
- Malva moschata**, *L.* Very rare. Hougue des Quartiers (X.)
- M. sylvestris**, *L.* Common.
- M. rotundifolia**, *L.* Frequent; common in IX. and X.
- Tilia intermedia**, *DC.* Planted in many parts of the island, but chiefly in I., and the surrounding districts.
- Radiola millegrana**, *Sm.* Rather common all round the coast.
- Linum catharticum**, *L.* Rare, except about Grandes Rocques, and the western side of L'Ancrese.
- L. angustifolium**, *Huds.* Frequent.
- Geranium striatum**, *L.* Rare. St. Helena (II.) Near Le Vauriof (III.) Casrouge (IV.) Les Buttes (VII.)
- G. molle**, *L.* Very common.
- G. rotundifolium**, *L.* Very rare. A few plants at base of the quarry heap by Vale Castle.
- G. dissectum**, *L.* Common.
- G. columbinum**, *L.* Very rare. In a hedge near Ronceval, for about a dozen yards.
- G. Robertianum**, *L.* Rather common. Var. *modestum*. Noted in several stations in VIII., IX., and X.
- Erodium cicutarium**, *L'Herit.* Common, especially near the sea.
- E. moschatum**, *L'Herit.* Frequent in all parts.
- E. maritimum**, *L'Herit.* Very rare. Fort Doyle and L'Ancrese Bay, sparingly. Eastern side of Lihou Island. This plant is plentiful both at Herm and Jethou.
- Oxalis corniculata**, *L.* Rare. Coutanchez. St. Helena. Graie (VI.) Near Sausmarez (VIII.) Between Les Annevilles (VII.) and Mont Saint. Always in small quantity.
- Ilex Aquifolium**, *L.* Common; mostly planted.
- Euonymus europæus**, *L.* Very rare. Two or three bushes in a hedge near Les Eperons (II.)
- Acer pseudo-platanus**, *L.* Common.
- A. campestre**, *L.* Very rare. One tree in a walled enclosure at La Ramée (I.) Seems to have been more plentiful formerly as Babington notes it as "frequent in hedges."
- Ulex europæus**, *L.* Very common.

- U. Gallii**, *Planch.* Frequent in many parts of the south coast. Cobo. Mont Varouf Valley (VII.)
- Sarothamnus scoparius**, *Link.* Generally distributed, but rather rare. Var. *prostratus*. Abundant on the top of the cliffs at Les Thielles and to the north of Pleinmont Point.
- Ononis arvensis**, *L.* Very common on the coast; inland in many places. A form with terminal spines occurs very sparingly near Rouse Tower.
- O. reclinata**, *L.* Very rare. In one spot on L'Ancrese Common. Shown me by Miss Dawber.
- Trigonella ornithopodioides**, *DC.* Not uncommon in many parts of L'Ancrese. Grand Havre. —
- Medicago sativa**, *L.* Frequent as an escape in IX. and X., where it is much grown as fodder.
- M. lupulina**, *L.* Rather common.
- M. denticulata**, *Willd.* Rare. Mont Saint. Richmond Hill. Vazon Green. Moulin Huet. Several places in IX.
- M. apiculata**, *Willd.* Rare. Grosse Hougue (X.) Cult. fields at L'Erée. Rue des Bergers (VIII.) Quarry heap near Vale Castle.
- M. maculata**, *Sibth.* Rather common, especially in IX. and X.
- Melilotus alba**, *Lam.* Very rare. One plant at Paradis (X.) in 1890. The late Mr. J. Nicolle sent me in the same year a fresh specimen found near Ozanne's Mill (III.)
- M. officinalis**, *Willd.* Very rare. On the shore below the Vale Castle, intermixed with *M. arvensis*.
- M. arvensis**, *Willd.* Rare. With the last; also in a field near the old "Sporting Club," and on the Vale Castle quarry heap.
- Trifolium subterraneum**, *L.* Rather common.
- T. pratense**, *L.* Common.
- T. maritimum**, *Huds.* Rare, but abundant where it occurs in meadows. Rue des Bergers (VIII.) Hougue du Pommier (IX.) Vale Road. Camp du Roi (IX.), and near Noirmont Mill.
- T. arvense**, *L.* Frequent all round the coast.
- T. striatum**, *L.* Rather common. Var. *erectum*. In an old quarry near Ronceval. Close to Sommeilleuse Watch House. Near Jerbourg Barracks.
- T. scabrum**, *L.* Rather common, especially in the low districts, but occurs also like the last, on the cliffs.
- T. glomeratum**, *L.* Frequent in dry places.
- T. suffocatum**, *L.* Very rare. L'Ancrese Common.
- T. repens**, *L.* Very common.
- T. fragiferum**, *L.* Many stations in IX. and X. Cobo. Portinfer. Grande Mare.
- T. resupinatum**, *L.* Very rare. One small patch on the Vale Castle Hill.
- T. procumbens**, *L.* Common, especially near the sea.
- T. minus**, *Sm.* Very common.
- T. filiforme**, *L.* Frequent.
- Anthyllis vulneraria**, *L.* Very rare. One small patch near the Vale Castle.
- Lotus corniculatus**, *L.* Very common.
- L. major**, *Scop.* Rather common.
- L. angustissimus**, *L.* Rather rare, though in some places plentiful. Flowers about a fortnight earlier than the next, with which it often grows.

- L. hispidus**, *Desf.* Much commoner than the last, both inland and on the coast.
- Ornithopus perpusillus**, *L.* Rather common.
- O. ebracteatus**, *Brot.* Rare. Occurs in many parts of L'Ancrese, but never in any quantity. Flowers in May and again in August.
- Vicia hirsuta**, *Koch.* Frequent.
- V. tetrasperma**, *Moench.* Rare. Noted for stations in II., III., V., VII., IX. and X.
- V. eracca**, *L.* Frequent in the north and north-west; very rare in the south.
- V. sepium**, *L.* Very local and rare. Cliffs from Fermain Bay to St. Martin's Point, frequent. Copse near King's Mills, and roadside adjacent.
- V. lutea**, *L.* Very rare. Road-side at L'Erée, in small quantity.
- V. sativa**, *L.* Frequent; an escape from cultivation.
- V. angustifolia**, *Roth.* Common. A dwarf form occurs in dry places which is likely to be mistaken for the next species. *Var. Bobartii.* Very rare. Bordeaux Harbour, sparingly.
- V. lathyroides**, *L.* Rare. West side of L'Ancrese. Around Rousse Martello Tower. Western end of Vazon Green.
- V. bithynica**, *L.* Very rare. One or two plants on the quarry heap near Vale Castle.
- Lathyrus pratensis**, *L.* Very rare. In a hedge between Hougue du Pommier and Les Goubais (IX).
- L. latifolius**, *L.* Naturalised on a hedge at Grande Mare, where it must have existed for a considerable period.
- Prunus communis**, *Huds.* Very common. The form *fruticans* occurs in many parts of the island.
- P. insititia**, *L.* Several trees in descending to the little cove under Doyle's Monument.
- P. cerasus**, *L.* Several stations in II. and VIII.
- Spiræa ulmaria**, *L.* Very rare, and probably not native. Below St. Saviour's Church, in a neglected enclosure.
- Rubus discolor**, *W. and N.* Frequent.
- R. thyrsoideus**, *Wimm.* Near Hougue du Pommier (IX.)
- R. hystrix**, *Weihe.* Between Petit Bot and the Forest Church.
- R. cæsius**, *L.* Near St. Peter's Church. Near Le Marais (VIII.)
- Geum urbanum**, *L.* Generally distributed, but not common.
- Potentilla fragariastrum**, *Ehr.* Common.
- P. Tormentilla**, *Neck.* Very common.
- P. procumbens**, *Sibth.* Several stations in II.
- P. reptans**, *L.* Occasional in the lower parts of VII. and VIII. Rather common in IX. and X.
- P. anserina**, *L.* Rather common.
- Comarum palustre**, *L.* Rare. In several parts of Grande Mare.
- Alchemilla arvensis**, *Lam.* Common.
- Agrimonia odorata**, *Mill.* Several stations in III., VI. and VIII. Scarcely typical, but always lemon scented.
- Poterium sanguisorba**, *L.* Plentiful on the western half of L'Ancrese Common.
- Rosa spinosissima**, *L.* Frequent from Grandes Rocques to L'Ancrese.
- R. canina**, *L.* Generally distributed, but rare; nearly always solitary bushes, seldom flowering. All our plants seem to belong to *var. dumalis*.

- Pyrus Malus**, *L.* Common on the cliffs between Fermain and St. Martin's Point (var. *mitis*). Less commonly on other parts of the cliffs of III. and IV. Rare inland.
- Mespilus germanica**, *L.* Rare. Noted in several places in I., III., IV. and VIII.
- Crataegus oxyacantha**, *L.* Very common. I have only seen here the form *monogyna*.
- Saxifraga tridaetylites**, *L.* Rare. In a few places on the sandhills from Vazon to Portinfer.
- Chrysosplenium oppositifolium**, *L.* Frequent in the south on moist banks.
- Tillæa muscosa**, *L.* Rare. St. Martin's cliffs in several places. Les Thielles and above Creux Mahié. Various parts of L'Anresse.
- Cotyledon umbilicus**, *L.* Very common on stony banks, old walls, and thatched roofs.
- Sedum album**, *L.* Very rare. Cobo. Near La Turquie (IX.) Naftiaux (II.)
- S. anglicum**, *Huds.* Very common in dry places.
- S. acre**, *L.* Common on the north and north-west coast.
- S. reflexum**, *L.* Rare. Les Goubais (IX.) Les Rouvets (IX.) Near Cobo Castle.
- S. Forsterianum**, *Sm.* Rare. Between St. Andrew's Church and Talbots Valley. Naftiaux (II.) Near Le Chêne (IV.)
- Sempervivum tectorum**, *L.* Very rare. Villette (III.) Near L'Echelle Mill, Talbots Valley. Near Richmond Hotel.
- Myriophyllum alterniflorum**, *DC.* Rare. Several stations noted in IX. and X.
- Callitriche vernalis**, *Koch.* Frequent.
- C. stagnalis**, *Scop.* Common; often growing on wet mud.
- C. hamulata**, *Kutz.* Very rare. A slender and beautiful form occurs in a deep quarry pool at Mont Cuet.
- C. obtusangula**, *Le Gall.* Rare. Ditch on the lane side at Grande Mare. Meadow drain at Les Goubais (IX.) Ditches near Ivy Castle.
- C. truncata**, *Guss.* Very rare. Stream at Grande Mare.
- Lythrum salicaria**, *L.* Rare. Foote's Lane, Lower Rohais, and fields adjacent. Marshy fields between Ivy Castle and Baubigny.
- Pepelis Portula**, *L.* Rare. Pool by Fort Doyle. Marsh towards Fort Le Marchant.
- Epilobium hirsutum**, *L.* Frequent in ditches and wet corners of fields.
- E. parviflorum**, *Schreb.* Rather common in the valleys and by cliff rivulets in the south; less frequent in the north. Grande Mare. Talbots Valley.
- E. montanum**, *L.* Frequent in the south.
- E. lanceolatum**, *Seb. and Maur.* Rather common in parts of I., II. and VIII.
- E. tetragonum**, *L.* Rare. Several habitats noted in IX.
- E. obscurum**, *Schreb.* Very common.
- E. palustre**, *L.* Very rare. Lane at Grande Mare, sparingly.
- Oenothera odorata**, *Jacq.* On the sandhills by Rouse Tower, and in small fields near Les Mielles, and L'Anresse Lodge.
- Circæa lutetiana**, *L.* A weed in many gardens in I., II. and III. Occurs also in IX. and X.
- Hydrocotyle vulgaris**, *L.* Frequent in marshy places.

- Eryngium maritimum**, *L.* Rather common on the north and north-west coast.
- Conium maculatum**, *L.* Rather rare, but occurs in all districts, more frequently in IX. and X.
- Smyrniolus olusatrum**, *L.* Rather common.
- Bupleurum aristatum**, *Bartl.* Rare. Several parts of L'Ancrese. Portinifer.
- Apium graveolens**, *L.* Rather common in marshy places near the sea.
- A. nodiflorum**, *Reich.* Very common on stream sides.
- A. inundatum**, *Reich.* Rare. Pool near Fort Doyle. Marshy spot towards Fort Le Marchant.
- Petroselinum sativum**, *Hoffm.* Very common at Perelle and L'Erée. Less so in the maritime parts of VIII., IX. and X.
- Ægopodium podagraria**, *L.* Rare, but abundant where it occurs. Gron (VII.), and between there and St. Saviour's Church. Casrouge Valley (IV.) St. Andrew's Churchyard. Les Prevosts (VII.) King's Mills.
- Bunium flexuosum**, *Fr.* Rare. A few stations in II. and III.
- Scandix Pecten-Veneris**, *L.* Very rare. Grand Havre, a plant or two. Near the Vale Castle, one plant.
- Anthriscus vulgaris**, *Pers.* Frequent near the sea in the north and north-west. Common about L'Erée and Richmond.
- Fœniculum officinale**, *All.* Rather common in the low-lying sandy districts; less so in the south.
- Crithmum maritimum**, *L.* Common all round the coast.
- Ænanthe Lachenalii**, *Gmel.* Rare. Between Albecq and Vazon in a marshy part among rushes. Field near Grandes Rocques.
- Æ. crocata**, *L.* Very common in wet places.
- Æthusa cynapium**, *L.* Generally distributed, but rather rare.
- Pastinaca sativa**, *L.* Frequent.
- Heracleum sphondylium**, *L.* Very common.
- Daucus carota**, *L.* Rather common inland.
- D. gummifer**, *Lam.* Very common all round the coast. Intermediates between these two species occur which it is not easy to assign to either.
- Caucalis anthriscus**, *Huds.* Frequent.
- C. nodosa**, *Scop.* Rather rare, and nearly always close to the sea. Vazon to L'Ancrese. Coast of III.
- Hedera helix**, *L.* Very common. In July, 1890, I measured the main trunk of an aged specimen, which still flourishes on Ivy Castle, and to which doubtless the Castle owes its name, and found it, at one foot above the ground, clear of branches, two feet four inches in circumference.
- Sambucus nigra**, *L.* Rather common.
- S. Ebulus**, *L.* Rare. Lane at Paradis (IX.) La Tourelle (VI.) Near Le Gélé (VIII.)
- Lonicera Periclymenum**, *L.* Common.
- Galium verum**, *L.* Common on the coast from Rocquaine to Bordeaux.
- G. mollugo**, *L.* Common.
- G. saxatile**, *L.* Very rare. L'Ancrese, near Fort Doyle.
- G. palustre**, *L.* Frequent in wet places.
- G. aparine**, *L.* Rather common.
- Sherardia arvensis**, *L.* Very common.
- Centranthus ruber**, *DC.* On walls. Occasional in all districts.

- Valerianella olitoria**, *Moench.* Occurs in all districts, but much less abundantly than the next species, with which it often grows.
- V. carinata**, *Lois.* Very common.
- Dipsacus sylvestris**, *L.* Rare. Saints' Bay. Cliffs at Petit Port. Le Graie (VI.) Cobo Bay. Near Vale Castle.
- Knautia arvensis**, *L.* Rare. Chemin Le Roi (IV.) Lane between Sommeilleuse and Variouf (IV.) Lane near Les Eperons, and between Huriaux and Naftiaux (II.) Var. *integrifolia*. Lane near Caudré Mill (VI.)
- Eupatorium cannabinum**, *L.* Common in damp places.
- Bellis perennis**, *L.* Very common.
- Erigeron acre**, *L.* Very rare. A few plants in a sandy field at Grandes Rocques.
- E. mucronatum.** Naturalised on walls. Vauvert. Petites Fontaines. Rohais. Carrefour-au-Lièvre, and on the wall adjoining the boundary stream, just below (all in I.)
- Filago germanica**, *L.* Rather rare. Noted for stations in III., V., VI., VII. and VIII.
- F. minima**, *Fr.* Frequent on the cliffs of III. and IV., and at L'Ancrese.
- Gnaphalium uliginosum**, *L.* Rather common.
- G. luteo-album**, *L.* Rare. In old quarries and waste ground in IX. and X., sparingly. In great profusion in a cult. field near the Hermitage (IX.), in 1891.
- Inula Helenium**, *L.* Rare; in old farm gardens, probably a relic of medicinal culture. A few stations in VI., and near Les Goubais (IX.)
- I. crithmoides**, *L.* Rare. On rocks above highwater mark. Miellette (IX.) Pezeries (V.) Base of cliffs near Petit Port.
- Pulicaria dysenterica**, *Gært.* Common.
- Achillea millefolium**, *Linn.* Very common.
- Anthemis Cotula**, *L.* Rather common in cult. fields in the south and west.
- A. arvensis**, *L.* Not common. Noted in III., IV. and VI.
- A. nobilis**, *L.* Rather common, especially near the sea.
- Chrysanthemum segetum**, *L.* Rare, but often abundant where it occurs. Noted in III., IV., V., VI., IX., and X.
- C. leucanthemum**, *L.* Common.
- Matricaria Parthenium**, *L.* Talbots Valley, a few plants; garden out-cast.
- M. inodora**, *L.* Rather common; especially near the sea.
- M. chamomilla**, *L.* Frequent, especially in the north and north-west.
- Tanacetum vulgare**, *L.* Rare. Noted in II., III., IV., VI., and IX.
- Artemisia absinthium**, *L.* Rare. Pulias coast. Near Rouse Tower. Near Vale Castle. Very few plants in each case.
- A. vulgaris**, *L.* Rather rare. Frequent in IX. and X.
- Tussilago Farfara**, *L.* Rare. Cobo. Quarry heap near Vale Castle.
- Petasites fragrans**, *Presl.* Frequent. Flowering freely in winter, and from the scent of the blossoms commonly known as the Wild Heliotrope.
- Senecio vulgaris**, *L.* Very common. Var. *radiatus*. Rare. Scattered plants from Rocquaine to Perelle. Near Rouse Tower. Vazon Green western end.
- S. sylvaticus**, *L.* Common, especially near the sea.
- S. erucifolius**, *L.* Very rare. A single plant on the shingle at L'Erée.
- S. Jacobæa**, *L.* Very common.

- S. aquaticus**, *Huds.* Rare. Pont Vaillant (IX.) Lane near Les Arguillers (IX.) Marshy fields near Ivy Castle.
- Carlina vulgaris**, *L.* Rare. St. Martin's cliffs, occasional. L'Ancrese towards Fort Le Marchant, frequent.
- Arenetum minus**, *Schk.* Occasional in all districts.
- Carduus nutans**, *L.* Frequent on St. Martin's cliffs. Occasional on the coast from Rocquaine to L'Ancrese.
- C. tenuiflorus**, *Curt.* North and north-west coast, rather rare.
- C. lanceolatus**, *L.* Common.
- C. palustris**, *L.* Common.
- C. arvensis**, *Curt.* Common.
- Centaurea nigra**, *L.* Very common. The rayed form (*C. pratensis*, *Thuill.*, which is often mistaken for var. *decipiens*) occurs near Grandes Rocques, at several places in IX. and X., and also at Rocquaine.
- C. Cyanus**, *L.* Very rare. Cult. field near Vale Road, one plant. Cult. field at Hougue Guilmine (IX.) one or two plants.
- C. aspera**, *L.* Very rare and local. Eastern side of Vazon Green.
- Cichorium Intybus**, *L.* Very rare. Pont Vaillant, one plant on the road-side. Vazon Green, three scattered plants. One in a clover field at L'Islet.
- Lapsana communis**, *L.* Common.
- Helminthia echioides**, *L.* Very rare, except in IX. and X., where it occurs in several stations.
- Crepis virens**, *L.* Very common.
- C. biennis**, *L.* Very rare. In a hedge near the Fair Field (VIII.) This locality was indicated to me by Miss Dawber.
- Hieracium Pilosella**, *L.* Not common, though widely distributed. Var. *Peleterianum*. Frequent on the southern cliffs.
- H. umbellatum**, *L.* Rare. Occurs plentifully in several parts of IX., both on the coast and inland. A fine form with stems four feet high occurs on a small heath near Ruettes Brayes; shown me by Miss Dawber.
- Hypochaeris glabra**, *L.* Apparently very rare. Jerbourg cliffs, sparingly.
- H. radicata**, *L.* Very common.
- Leontodon hirtus**, *L.* Very common all round the coast.
- L. hispidus**, *L.* Rather common.
- L. autumnalis**, *L.* Rather common.
- Taraxacum officinale**, *Web.* Generally distributed, but not very common. Var. *erythrospermum*. Frequent on the coast from Grandes Rocques to Grand Havre.
- Sonchus oleraceus**, *L.* Common.
- S. asper**, *Hoffm.* Rather common.
- S. arvensis**, *L.* Frequent in cult. fields; occasional on the seashore.
- Jasione montana**, *L.* Very common.
- Calluna vulgaris**, *Sal.* Rather common on the coast.
- Erica cinerea**, *L.* Common near the sea; inland occasionally.
- Pyrola rotundifolia**, *L.* Very rare. Grande Mare.
- Statice occidentalis**, *Lloyd.* Very rare. Jerbourg, at the foot of the cliffs, in one spot.
- Armeria maritima**, *Willd.* Very common on the coast.
- Primula vulgaris**, *Huds.* Very common.
- Lysimachia Nummularia**, *L.* Very rare. Lane behind Friquet Chapel. Meadow between Grande Mare and Vazon.

- Glaux maritima**, *L.* Common in brackish marshes in VIII., IX., and X. Lihou Island. Base of the cliffs, Petit Port.
- Anagallis arvensis**, *L.* Very common. The form with salmon flowers is frequent near the sea; flesh-coloured flowers occur, but less often.
- A. tenella**, *L.* Common in marshy places.
- Centoneulus minimus**, *L.* Not common. About Fort Doyle. Mont Cuet. L'Islet. Cobo Castle Hill. Petit Bot Valley.
- Samolus Valerandi**, *L.* Frequent in wet places.
- Fraxinus excelsior**, *L.* Common.
- Ligustrum vulgare**, *L.* Rather rare; common on cliffs of III.
- Vinea major**, *L.* Naturalised on the cliffs at Moulin Huet, and above Fort Bay.
- Erythræa Centaurium**, *Pers.* Common.
- E. pulchella**, *Fr.* Rare. Marshy ground at Albecq. Shore near Fort Houmet. Marshy field near Ivy Castle.
- Cicendia filiformis**, *Reich.* Rare. L'Anresse Common, in several places. Cobo Castle Hill.
- C. pusilla**, *Griesb.* Very rare. In one spot at the northern end of L'Anresse.
- Cynoglossum officinale**, *L.* Rare. Near Grandes Rocques Barracks, and in a few places between there and L'Anresse Bay. Lihou Island.
- Symphytum officinale**, *L.* Rare. Near St. Peter's Arsenal. Les Padins (VII.) Lane near Hougue Fouque (VII.) Quarry heap by Vale Castle.
- Borago officinalis**, *L.* Occasional in the south; more frequent in the north.
- Lycopsis arvensis**, *L.* Frequent in the low-lying sandy districts; rare elsewhere.
- Myosotis cæspitosa**, *Schultz.* Rare. Grande Mare and neighbourhood. Ditches between Ivy Castle and Baubigny.
- M. repens**, *Don.* Frequent in watery places in the south.
- M. arvensis**, *Hoffm.* Rather common in cult. ground and road-sides.
- M. collina**, *Hoffm.* Common on dry banks.
- M. versicolor**, *Reich.* Common. With the last, but flowers later.
- [**M. Balbisiana**, *Jord.* I found this species at Jethou in 1890, but it has not yet been discovered in Guernsey.]
- Lithospermum officinale**, *L.* Rare. Near Grandes Rocques. Lane between Grande Mare and Vazon. Field corner near Cobo.
- L. arvense**, *L.* Very rare. A few plants in a cult. field near the Vale Road.
- Echium vulgare**, *L.* Rare. L'Erée. Coast near Vale Church. Ville au Roi.
- E. plantagineum**, *L.* Very rare. Coast near the Vale Church, one plant.
- Convolvulus sepium**, *L.* Common; often a very troublesome weed in gardens. A striking and beautiful variety, having the flowers banded with bright pink, occurs abundantly in a marshy hollow to the west of St. Saviour's Church; and also in hedges between Ivy Castle and Baubigny.
- C. soldanella**, *L.* Frequent on the shore from Rocquaine to L'Anresse.
- C. arvensis**, *L.* Very common.
- Cuscuta epithimum**, *Murr.* Frequent on the southern cliffs; more rare elsewhere. Parasitical chiefly on Furze, but I have seen it, though rarely, on Thyme, Wood Sage, and Bird's-foot Trefoil.
- Solanum dulcamara**, *L.* Not uncommon. Var. *marinum*. Frequent on the coast.

- S. nigrum**, *L.* Common in the low-lying districts; less frequent in the south.
- Lycium barbarum**, *L.* Waste corner near the Vale Church; an escape from a neighbouring garden.
- Hyoseyamus niger**, *L.* Very rare. Three dispersed plants on L'Ancrese in 1890. One in another spot in 1891.
- Verbascum Thapsus**, *L.* Rather rare; but occurs in all districts.
- V. nigrum**, *L.* Very rare. Near St. Andrew's Church, two plants, belonging to the var. *tomentosum*.
- V. virgatum**, *With.* Very rare. Lane near Les Arguillers (IX.), about twenty plants.
- Linaria Cymbalaria**, *Mill.* On walls and in old quarries here and there in almost all parts.
- L. elatine**, *Mill.* Frequent in cult. fields and gardens.
- L. repens**, *Mill.* Very rare. Near Vale Castle, in one spot.
- L. vulgaris**, *Mill.* Rather common.
- Antirrhinum majus**, *L.* Not uncommon on walls in all districts.
- A. orontium**, *L.* Frequent in cult. fields, chiefly in the south.
- Scrophularia aquatica**, *L.* Common in moist places and stream sides.
- S. nodosa**, *L.* Rare. Mostly in the central districts.
- S. Scorodonia**, *L.* Frequent.
- Sibthorpia europæa**, *L.* Very rare. Valley between St. Peter's Arsenal and Rocquaine. Valley below Le Becquet (III.)
- Digitalis purpurea**, *L.* Rather common.
- Veronica hederifolia**, *L.* Very common.
- V. polita**, *Fr.* Frequent.
- V. agrestis**, *L.* Common. The flowers are usually white or faintly tinged with pink. Blue flowers are much less frequent.
- V. Buxbaumii**, *Ten.* Very common in fields and gardens.
- V. arvensis**, *L.* Very common.
- V. serpyllifolia**, *L.* Frequent; rather common in VI. and VII.
- V. officinalis**, *L.* Rare. Noted in II., III., IV., and IX., but always in small quantity.
- V. Chamædrys**, *L.* Very common.
- V. Anagallis**, *L.* Very rare. Two plants in the marshy corner of a meadow near Hougue du Pommier (IX.)
- V. Beccabunga**, *L.* Rather common in watery places in the south.
- Euphrasia officinalis**, *L.* Common, especially on the coast.
- Bartsia Odontites**, *Huds.* Rather common. Both the vars. *serotina* and *verna* occur, the former being the most frequent.
- B. viscosa**, *L.* Frequent in wet meadows and marshy places.
- Pedicularis sylvatica**, *L.* Rather common in wet places.
- Rhinanthus Crista-galli**, *L.* Rare, but abundant where it occurs. Noted in III., VIII., and IX.
- Orobanche Hederæ**, *Duby.* On Ivy. Generally distributed; rather common in IX. and X.
- O. minor**, *Sm.* On Leguminosæ. Rather rare generally, but frequent about Cobo and Grandes Rocques. One specimen at Jerbourg grew on *Plantago coronopus*.
- O. amethystea**, *Thwill.* On wild carrot. Rare. Bon Repos Valley. Pleinmont in two or three places.

- Verbena officinalis**, *L.* Rather rare; frequent in IX. and X.
- Mentha rotundifolia**, *L.* Common by the cliff streams of III. and IV.
- M. sylvestris**, *L.* Rare. Western side of Mont Cuet. Saints' Bay Valley, scarce.
- M. Piperita**, *Huds.* Very rare. Les Marchais (VI.); probably planted there.
- M. hirsuta**, *L.* Common in wet places.
- M. arvensis**, *L.* Rare. Noted in III. and VII.
- M. Pulegium**, *L.* Very rare. All round a pool on the western side of L'Anresse. Shown me by Mr. Derrick.
- Lycopus europæus**, *L.* Rare. Grande Mare. Marshes behind Ivy Castle. Claire Mare (VI.) Near St. Andrew's Church. Cobo.
- Thymus Serpyllum**, *Fr.* Very common on the coast.
- Calamintha Nepeta**, *Clairv.* Very rare. Route des Hougues, near the round tower (VII.)
- C. officinalis**, *Mench.* Very rare. Waste corner at Bordeaux, several plants.
- Salvia Verbenaca**, *L.* Frequent in the low sandy districts. Moulin Huet. Petit Bot.
- S. clandestina**, *L.* Very rare. Vazon.
- Nepeta Glechoma**, *Benth.* Rather rare. Noted in various stations in III., IV., VII., VIII. and IX. On the cliffs occasionally in good quantity.
- Scutellaria galericulata**, *L.* Very rare. Eastern side of Perelle Bay. Ditches behind Ivy Castle.
- S. minor**, *L.* Very rare. Cliffs between Petit Bot and Icart. Locality indicated to me by Miss Dawber.
- Prunella vulgaris**, *L.* Rather common.
- Marrubium vulgare**, *L.* Rare. Several stations in IX. Cliffs between Icart and Petit Bot.
- Stachys palustris**, *L.* Frequent.
- S. ambigua**, *Sm.* In I., II., VI. and VII., I have found plants which seem to belong here.
- S. sylvatica**, *L.* Rather common.
- S. arvensis**, *L.* Common.
- Leonurus Cardiaca**, *L.* Rare, and usually only single plants. Noted in VI., VII., VIII. and IX.
- Lamium amplexicaule**, *L.* Rare in the south; more frequent in the low-lying districts.
- L. incisum**, *Willd.* Very rare. Talbots Valley. Near Vale Pond, scarce.
- L. purpureum**, *L.* Rather common.
- Ballota nigra**, *L.* Rather common in the north and north-west; rare in the south.
- Teucrium Scorodonia**, *L.* Very common.
- Ajuga reptans**, *L.* Frequent; common on the cliffs.
- Plantago major**, *L.* Common.
- P. lanceolata**, *L.* Very common.
- P. maritima**, *L.* Frequent on some parts of the south coast; rare in the north.
- P. Coronopus**, *L.* Very common.
- Herniaria glabra**, *L.* Rather common on the coast from Vazon to Fort Doyle. Var. *subciliata*. Several parts of L'Anresse. Pulias Point.

- H. ciliata*, *Bab.* Very rare. One small patch near Grandes Rocques.
- Chenopodium polyspermum*, *L.* Frequent in cult. fields.
- C. Vulvaria*, *L.* Rare. Occasional all along the coast from Rocquaine to L'Anresse.
- C. album*, *L.* Common.
- C. ficifolium*, *Sm.* Plentiful in cultivated sandy fields near Grandes Rocques.
- C. murale*, *L.* Frequent, especially in the north and north-west.
- C. rubrum*, *L.* Rare. Richmond. Albecq. Near Grandes Rocques Barracks.
- Beta maritima*, *L.* Common on the coast; very rare inland.
- Atriplex littoralis*, *L.* L'Erée Bay.
- A. patula*, *L.* Common.
- A. erecta*, *Huds.* Quarry heap near Vale Castle.
- A. angustifolia*, *Sm.* Frequent in all districts.
- A. deltoidea*, *Bab.* Rather common all along the north and north-western coast.
- A. Babingtonii*, *Woods.* Common on sandy shores.
- A. portulacoides*, *L.* L'Erée Bay.
- Salicornia herbacea*, *L.* Frequent in brackish marshes in the north.
- Suaeda maritima*, *Dum.* Often with the last, but less common.
- Salsola Kali*, *L.* Rare. Occasional on the coast of IX. Rocquaine Bay. Houmet Point.
- Polygonum Convolvulus*, *L.* Very common.
- P. aviculare*, *L.* Very common. Var. *littorale*. Occasional on the north-west coast.
- P. Raii*, *Bab.* Rare. Rocquaine Bay. Grandes Rocques. Cobo. Western shore of L'Anresse.
- P. maritimum*, *L.* Very rare. Rocquaine Bay, one plant.
- P. Hydropiper*, *L.* Rare. Noted in II., III., IV. and IX.
- P. mite*, *Schrank.* Very rare. Road-side at Les Caches (VII.)
- P. Persicaria*, *L.* Common.
- P. lapathifolium*, *L.* Rather rare. Stations noted in VI., VII., VIII., IX. and X.
- P. maculatum*, *Dyer & Trim.* Rare. L'Erée Bay.
- P. amphibium*, *L.* Rare. Mill-pond below St. Peter's Church. Pool on eastern side of L'Anresse. Grande Mare stream. Pool near Albecq. Var. *terrestre*. Rocques Barrées (IX.) Near Rocque Maingy (IX.)
- Fagopyrum esculentum*, *Moench.* Occasional on road-sides and near houses from scattered poultry food.
- Rumex conglomeratus*, *Murr.* Common.
- R. rupestris*, *Le Gall.* Very rare. Grand Port (V.)
- R. sanguineus*, *L.* Frequent in all districts. Var. *Viridis*. Noted in II. and VIII.
- R. pulcher*, *L.* Common.
- R. obtusifolius*, *L.* Rather common.
- R. crispus*, *L.* Frequent.
- R. Hydrolapathum*, *Huds.* Rare. Perelle. Near Rocque Maingy (IX.) Ditches behind Ivy Castle. Near the Hermitage (IX.)
- R. acetosa*, *L.* Very common.
- R. acetosella*, *L.* Very common.

- Euphorbia Helioscopia**, *L.* Rather common in cult. ground.
- E. amygdaloides**, *L.* Common on the cliffs of III. and IV. Rare elsewhere. Noted in VI., VII. and IX.
- E. paralias**, *L.* In many parts of the sandy shore from Rocquaine to L'Anresse.
- E. portlandica**, *L.* Common on the cliffs and all round the coast.
- E. peplus**, *L.* Common.
- E. exigua**, *L.* Frequent in the south.
- Mercurialis annua**, *L.* Very common in cult. ground.
- Ulmus montana**, *Sm.* Frequent.
- U. campestris**, *Sm.* Common. Var. *suberosa*. Common.
- Humulus lupulus**, *L.* Rather rare. Noted in nearly all districts.
- Urtica dioica**, *L.* Very common.
- U. urens**, *L.* Frequent in IX. and X. More rare in the south and west.
- Parietaria officinalis**, *L.* Frequent.
- Betula alba**, *L.* Very rare. Near Sausmarez (VIII.) Near Ronceval. Planted.
- Alnus glutinosa**, *L.* Rare. Moat of Ivy Castle. Banks of stream which crosses the Vale Road. Back of Sausmarez Manor (III.)
- Quercus Robur**, *L.* Frequent in all parts (var. *pedunculata*).
- Castanea sativa**, *Mill.* Rare; mostly, if not always, planted.
- Fagus sylvatica**, *L.* Not common; but rather fine trees occur in many parts of the island.
- Salix fragilis**, *L.* Dosdanes (VIII). Rebouquets (IV.)
- S. alba**, var. **vitellina**, *L.* Not uncommon in III. and IV.
- S. viminalis**, *L.* Several places in III. and IV.
- S. Smithiana**, *Willd.* Near King's Mills.
- S. cinerea**, *L.* Common.
- S. repens**, *L.* Grande Mare.
- Populus alba**, *L.* Frequent in many parts.
- P. canescens**, *Sm.* Lower part of La Ramée (I.)
- P. tremula**, *L.* Rather rare. Noted in III., IV., V., VII. and VIII.
- P. nigra**, *L.* Frequent.
- Pinus sylvestris**, *L.* In many parts of the island.
- P. Pinaster**, *Ait.* Here and there in all parts. More frequent than the last.
- Listera ovata**, *R.Br.* Very rare. Grande Mare.
- Spiranthes autumnalis**, *Rich.* Rather common near the sea, especially in the north and north-west.
- S. æstivalis**, *Rich.* Very rare. Grande Mare, in good quantity.
- Epipactis palustris**, *Crantz.* Very rare, and always dwarf. Grande Mare. Field near Grandes Rocques.
- Orchis morio**, *L.* Very rare. Near the Watch House at Pleinmont, scattered over an area thirty yards square.
- O. mascula**, *L.* Rather rare; and seldom in any quantity. Noted in III., VII., VIII. and IX.
- O. laxiflora**, *Lam.* Frequent in wet meadows in all districts; abundant in the lowlands towards Vazon.
- O. latifolia**, *L.* Frequent in moist meadows in VII., VIII., and IX.
- O. maculata**, *L.* Common. Occasionally, about Grande Mare, with deep purple flowers.

- Ophrys apifera**, *Huds.* Very rare. Sparingly in sandy fields on both sides of the road at Portinifer, but nearly extinct owing to building.
- Iris foetidissima**, *L.* Generally distributed, but rather rare.
- I. Pseudacorus**, *L.* Common in marshy meadows and wet places.
- Trichonema Columnæ**, *Seb.* Common all round the coast; abundant on the cliffs.
- Ruscus aculeatus**, *L.* Rare, except on the cliffs of III. Noted also in IV., VII., VIII., IX., and X.
- Asparagus officinalis**, *L.* Very rare. Two plants on the sandhills by Rouse Tower.
- Allium Ampeloprasum**, *L.* Truly wild in two places on the cliffs at Fort George, where it occurs in abundance.
- A. vineale**, *L.* Very rare. Banks of the stream at Vazon, two plants (var. *compactum*).
- A. triquetrum**, *L.* Common in roadside hedges throughout the island.
- Scilla autumnalis**, *L.* Frequent all round the coast; common in the north and north-west.
- S. nutans**, *Sm.* Very common.
- Juncus bufonius**, *L.* Very common in muddy ditches and by road-sides.
- J. compressus**, *Jacq.* Rare. Pulias. Claire Mare (VI.) Mont Cuet. Cobo.
- J. Gerardi**, *Lois.* More frequent than the last, which sometimes grows with it. Noted in III., V., VIII., IX., and X.
- J. effusus**, *L.* Very common in moist places.
- J. conglomeratus**, *L.* Rare. Foote's Lane, Rohais. Pont Vaillant (IX.) Talbots Valley.
- J. maritimus**, *L.* Rare. Cobo. Grandes Rocques. Bordeaux. On the shore at Bec du Nez (III.) and Petit Port.
- J. acutus**, *L.* Rare, except from Vazon to Pulias, where it occurs plentifully. Near the Vale Pond.
- J. supinus**, *Mæneh.* Rare. Quarry pool at L'Islet.
- J. lamprocarpus**, *Ehr.* Very common.
- J. acutiflorus**, *Ehr.* Common.
- J. capitatus**, *Weigel.* Rare. Cliffs of III. and IV. L'Ancrese Common. Grows in small scattered patches.
- Luzula sylvatica**, *Bich.* Apparently confined to the cliffs between Fermain Bay and St. Martin's Point, where it occurs in abundance.
- L. multiflora**, *Lej.* Common. Var. *congesta*. Rather common in the south.
- L. campestris**, *DC.* Common, especially in the south.
- Sparganium ramosum**, *Curt.* Rare. Grande Mare, in ditches. Old Mill-pond near St. Andrew's Church. Streamside near Mont Saint. Petit Bot Valley. Ditches behind Ivy Castle.
- Arum maculatum**, *L.* Common in the south.
- A. italicum**, *Mill.* Rare. Near Cobo Church. Rue des Bergers (VIII.) King's Mills. The leaves appear earlier, but the flowers later, than the last species.
- Lemna minor**, *L.* Very common in pools and ditches.
- L. polyrrhiza**, *L.* Very rare. Quarry pool at Spur Point (X.) Ditches behind Ivy Castle.
- Alisma Plantago**, *L.* Rare, except in IX. and X., where it is frequent. Grande Mare. King's Mills mill-pond.

- A. ranunculoides**, *L.* Rare. Grande Mare. In two pools near Fort Doyle. Marshy spot at L'Islet.
- Triglochin palustre**, *L.* Very rare. Grande Mare.
- T. maritimum**, *L.* Rare. Brackish pool at Puliàs. Vale pond.
- Potamogeton polygonifolius**, *Pour.* Pools at Grande Mare. East side of L'Ancrese.
- P. plantagineus**, *Ducroz.* Rare. Quarry pool at L'Islet.
- P. crispus**, *L.* Rather common in streams and meadow drains in IX. and X. Grande Mare stream. King's Mills mill-pond.
- Ruppia maritima**, *L.* Very rare. Pool at Mare de Carteret (VIII.)
- Zannichellia palustris**, *L.* Rare. In several pools in IX. Mill-pond below St. Peter's Church.
- Zostera marina**, *L.* Common on sandy shores.
- Cyperus longus**, *L.* Common in moist meadows.
- Eleocharis palustris**, *R.Br.* Common.
- E. multicaulis**, *Sm.* Frequent.
- Scirpus pauciflorus**, *Light.* Rare. Grande Mare. Cliffs near Corbière.
- S. Savii**, *Sab.* Frequent (var. *monostachys*).
- S. setaceus**, *L.* Rather more common than the last.
- S. Tabernæmontani**, *Gmel.* Rare. Grande Mare. Albecq. Vazon.
- S. maritimus**, *L.* Frequent in brackish ditches throughout the lowlands.
- Eriophorum polystachion**, *L.* Rare. Grande Mare. Boggy spot at eastern end of L'Ancrese.
- Schoenus nigricans**, *L.* Rare. Cobo. Albecq. Grandes Rocques. Grande Mare.
- Carex pulicaris**, *L.* Very rare. Grande Mare, plentifully.
- C. arenaria**, *L.* Very common on the coast of the low districts.
- C. paniculata**, *L.* Rare. Cliff streamlet near Petit Bot. Norgiots Valley (II.) Bessières (I.)
- C. vulpina**, *L.* Common.
- C. muricata**, *L.* Common.
- C. divulsa**, *Good.* Very rare. Foote's Lane (Rohais).
- C. stellulata**, *Good.* Rare. Grande Mare, and meadows adjacent. Talbots Valley. Fermain cliffs.
- C. remota**, *L.* Rare. Grande Mare. Meadows between Coutanchez and Baubigny. Bessières (I.) Pont Vaillant (IX.) Stream near Mont Saint.
- C. axillaris**, *Good.* Very rare. Foote's Lane (Rohais) and near Pont Vaillant (IX.); in both cases very sparingly.
- C. ovalis**, *Good.* Rare, and always in small quantity. Noted in III., IV., VI., and IX.
- C. vulgaris**, *Fr.* Rare. Meadows behind the Forest School. Claire Mare (VI.)
- C. glauca**, *Murr.* Frequent in marshy spots on the southern cliffs. Cobo. Grandes Rocques. Grande Mare.
- C. pilulifera**, *L.* Rather rare, and mostly in the south.
- C. præcox**, *Jacq.* Rather common.
- C. panicea**, *L.* Rare. Grand Mare. Fields near Grandes Rocques. Cliff valleys in IV.
- C. pendula**, *Huds.* Very rare. Several plants at base of the cliffs below Fort George.
- C. distans**, *L.* Frequent in marshy places near the sea in the lowlands. Base of the cliffs of III. in a few places.

- C. punctata**, *Gaud.* Very rare. Grande Mare. Cliff stream towards Icart, scarce.
- C. extensa**, *Good.* Rare. Vale pond. Marshy field at Cobo. Base of cliffs near Petit Port.
- C. flava**, *L.* Rather common on the southern cliffs. Grande Mare and meadows adjacent. Eastern side of L'Anresse. Var. *lepidocarpa*. Wet meadows at Claire Mare (VI.)
- C. hirta**, *L.* Rare. Noted in I., II., VII., VIII. and IX.
- C. riparia**, *Curt.* Rare. Wet meadows, Rue des Bergers (VIII.), plentifully. Near Rocque Maingy (IX.)
- C. vesicaria**, *L.* Very rare. Lane side at Grande Mare.
- Phalaris canariensis**, *L.* Occasional near houses, springing up from scattered bird seed. Appears native in sandy places about L'Erée, Perelle, and Richmond.
- Anthoxanthum odoratum**, *L.* Very common.
- Alopecurus geniculatus**, *L.* Common in marshy places.
- A. pratensis**, *L.* Rather rare, and mostly in fodder fields. Noted in II., III., IV., VII., VIII. and IX.
- Phleum pratense**, *L.* Very rare. Road-side near the Vale Church, sparingly.
- P. arenarium**, *L.* Frequent on the sandy coast from L'Erée to L'Anresse.
- Mibora minima**, *Desv.* Rare. St. Martin's Cliffs. Vazon to Grandes Rocques. Begins to flower as early as the middle of February.
- Agrostis alba**, *L.* Common. Var. *stolonifera*. Common.
- A. vulgaris**, *With.* Rather common.
- Polypogon monspeliensis**, *Desf.* Very rare. One or two roots on the quarry heap near Vale Castle.
- Calamagrostis epigeios**, *Roth.* Very rare. Old quarry at Les Gigands (IX.)
- Gastridium lendigerum**, *Gaud.* Very rare. Road-side near Torteval Church. Lane behind Le Douit (VI.) Corn-field near Hougue Fouque (VII.) In each case a single plant only.
- Ammophila arenaria**, *Host.* On the north-west coast, local.
- Lagurus ovatus**, *L.* Common on the north and north-west coast.
- Aira caryophyllea**, *L.* Very common.
- A. præcox**, *L.* Rather rare; occurs in all districts.
- Holeus mollis**, *L.* Generally distributed, but much less frequent than the next species.
- H. lanatus**, *L.* Very common.
- Avena fatua**, *L.* Rare. Videclins Road (II.) in a corn-field. Road-side near Les Hèches (VI.)
- Arrhenatherum avenaceum**, *Beauv.* Common.
- Cynodon dactylon**, *Pers.* Very local. Eastern side of Vazon Green, abundant.
- Triodia decumbens**, *Beauv.* Rather common.
- Phragmites communis**, *Trin.* Common in wet places.
- Cynosurus cristatus**, *L.* Very common.
- C. echinatus**, *L.* Rare; plentiful where it occurs. Vale Castle Hill. Paradis (IX.) Portelette (V.)
- Koeleria cristata**, *Pers.* Rare. Here and there on the coast from Vazon to L'Anresse.
- Molinia cœrulea**, *Mench.* Rare. Grande Mare. In a few places between Lower Rohais and Friquet Chapel. Corbière cliffs, sparingly.

- Dactylis glomerata**, *L.* Very common.
- Briza maxima**, *L.* Naturalised on a rocky prominence beyond the King's Mills, where it grows in plenty; also among furze on the cliff-side between the Gouffre and Corbière.
- B. minor**, *L.* Rather rare; more frequent in VI. and VII.
- Poa annua**, *L.* Very common.
- P. pratensis**, *L.* Very common.
- P. trivialis**, *L.* Common.
- Glyceria fluitans**, *R.Br.* Common in ditches and wet places.
- G. declinata**, *Towns.* Lane behind St. Helena.
- Sclerochloa maritima**, *Lindl.* Rare. Banks of a brackish drain near Cobo.
- S. distans**, *Bab.* Rare. In a small marsh at Bordeaux.
- S. rigida**, *Link.* Rare. Occasional about L'Erée.
- S. loliacea**, *Woods.* Common, especially near the sea.
- Festuca uniglumis**, *Soland.* Common on several parts of the coast from Rocquaine to L'Anresse.
- F. myurus**, *L.* Rare. Grosse Hougue (X.) Near Vale Castle.
- F. sciuroides**, *Roth.* Very common.
- F. ovina**, *L.* Very common on the southern cliffs.
- F. rubra**, *L.* Common, especially on the coast. Var. *arenaria*. Bordeaux. Lane behind St. Appoline Chapel (VII.)
- F. pratensis**, *Huds.* Wet places. Petit Bot cliffs. Meadow at Sausmarez (VIII.) Hougue du Pommier (IX.)
- F. arundinacea**, *Schreb.* Meadow near Bordeaux. Frequent about Grande Mare. Marshy fields, Cobo.
- Bromus madritensis**, *L.* Very rare. Quarry heap near Vale Castle. Var. *rigidus*. Frequent in the neighbourhood of Richmond. Lane above Les Rouvets (VII.)
- B. maximus**, *Desf.* Very rare. Near Vale Castle, a few plants.
- B. sterilis**, *L.* Very common.
- B. commutatus**, *Schrad.* Rare. Noted in IV., VII. and VIII.
- B. mollis**, *L.* Very common.
- Brachypodium sylvaticum**, *Roem.* Very common.
- Lolium perenne**, *L.* Very common.
- L. italicum**, *Braun.* Frequent.
- Triticum repens**, *Beauv.* Common. Var. *barbatum*. Not uncommon on the coast from Rocquaine to Bordeaux.
- T. pungens**, *Roem.* Rare. Lane at Bordeaux.
- T. junceum**, *Beauv.* Frequent all along the north and north-west coast.
- Hordeum murinum**, *L.* Common.
- H. maritimum**, *With.* Very rare. Road-side at L'Erée, rather plentiful. A few plants on the quarry heap near Vale Castle.

FILICES.

- Pteris aquilina**, *L.* Very common.
- Lomaria Spicant**, *Desv.* Generally distributed, but not common.
- Asplenium lanceolatum**, *Huds.* Common.
- A. adiantum-nigrum**, *L.* Common.
- A. marinum**, *L.* Frequent all round the coast, but chiefly in the south.

- A. Trichomanes**, *L.* Rare. Noted in I., III., VIII. and X.
- A. Ruta-muraria**, *L.* Rare generally, but more frequent in IX. and X.
Grows on all the country churches or church-yard walls, except V.
- Athyrium Filix-fœmina**, *Roth.* Common.
- Ceterach officinarum**, *Willd.* Very rare. Noted in VI., VIII. and X.
- Scolopendrium vulgare**, *Sym.* Very common.
- Polystichum angulare**, *Presl.* Rare. Noted in II. and III.
- Lastræa Filix-mas**, *Presl.* Rather common.
- L. dilatata**, *Presl.* Rare. Noted in II., IV., VI., VII. and VIII., but always sparingly.
- Polypodium vulgare**, *L.* Common.
- Gymnogramme leptophylla**, *Desv.* Very rare. Only known in the one habitat in VII., where it was discovered by Mr. Derrick in 1877.
- Osmunda regalis**, *L.* Very rare, and now almost extinct. Still exists wild, though very sparingly, in VI., VII. and VIII.
- Ophioglossum vulgatum**, *L.* Rare. In several fields near the cliffs between Corbière and Creux Mahié. In moist meadows at Grandes Rocques, Cobo, and Vazon. Var. *polyphyllum*. Very rare. L'Ancrese Common.
- O. lusitanicum**, *L.* On the southern cliffs. In III. I have noted sixteen stations for this fern between Petit Port and Petit Bot; one station only in IV., and I have failed to find any trace of it to the westward of the Gouffre.

EQUISETACEÆ.

- Equisetum arvense**, *L.* Frequent.
- E. palustre**, *L.* Grande Mare and neighbourhood. Petit Bot. Var. *poly-stachion*. Grande Mare Lane, scarce.
- E. limosum**, *Sm.* Wet meadow, King's Mills. Meadows adjoining Grande Mare.

SELAGINELLACEÆ.

- Isoetes Hystrix**, *Dur.* In several parts of L'Ancrese Common. Our form is the var. *subinermis*.

CHARACEÆ.

- Chara fragilis**, *Desv.* Grande Mare. Pool near Fort Doyle. Var. *barbata*. Grande Mare. Var. *capillacea*. Quarry pool at the eastern side of L'Ancrese.
- C. aspera**, *Willd.* Grande Mare. Var. *subinermis*. Grande Mare.
- C. baltica**, *Bruz.* Var. *affinis*. Grande Mare.
- C. vulgaris**, *L.* Pool near Fort Doyle. Var. *papillata*. Road-side pool on the eastern side of L'Ancrese.
- Nitella translucens**, *Ag.* Ditches behind Ivy Castle.

ON MICA TRAP DYKES IN THE CHANNEL ISLANDS

BY REV. E. HILL, F.G.S.

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THOUGH the main outlines of Channel Islands geology have now been sketched out, much, very much remains to be done before the picture can be called in any degree complete. There are many interesting lines of investigation which may be entered upon and followed out; many mines which promise rich returns to a persevering and intelligent worker. One of these is the study of the dykes and smaller igneous intrusions, especially in regard to their ages, relative and actual. In this communication I only propose to invite the attention of members of the Society to one small group of these rocks.

This is the group of those which are known as the Mica Traps. They are interesting from their rarity, for in England they are plentiful only in one single district, that round Sedbergh and Kendal; they occur sparingly in a few other regions, but in most districts are entirely unknown. But they have a higher interest from the circumstance that while the majority of the Channel Island rocks are of ages both remote and uncertain, these are of a much later age, and one which is approximately known. Their age is approximately known from the researches of Dr. Barrois, who has been conducting the geological survey of Brittany, which is their home and centre. It can hardly be doubted that the island Mica Traps are connected with the vast and numerous masses on the neighbouring mainland. There they are found penetrating all formations down to the older members of the Carboniferous Series, but not any newer formations. Dr. Barrois accordingly concludes that they belong to the later part of the Carboniferous period.

I need not enter into their exact constitution or offer technical definitions and descriptions. Suffice it to say that they are usually rather fine-grained, soft, easily decomposed rocks, characterised by the distribution throughout their mass

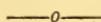
of small glittering flakes of Mica. They occur as dykes which never exceed a few feet in thickness, and are sometimes to be measured only by inches. Several have been already described. In Jersey there is one at the Creux de Vis, which I have seen, and M. Noury gives a list of others under the name of Porphyrite Micacée. In Alderney one may be found at the north end of the Mannez Quarry; in Jethou a small one on its eastern side; but in Herm I have not found any yet. In my paper on Sark is mentioned the fine one which occurs in Port du Moulin, whence come the large reddish blocks which lie in the north-east corner of the bay. But there are others besides. In the spring of this year Professor Bonney, F.R.S., and myself, were engaged in a re-examination of the rocks of Sark, and in the course of this discovered several more of these peculiar rocks. One in Saignie Bay runs up the cliff a few yards to the north of the path. Another has hitherto escaped notice, though situated in so frequented a locality as the entrance to the Gouliot Caves. It intersects the cliff between the two northern openings, and probably crosses the roof of the "Chimney." Blocks of it lie on the floor, and on the shore at the mouth of the "Main Cave." A singular rock which appears to have affinity with the group forms a dyke near high water mark in the bay below the cottages called Frégondée, the innermost recess of Havre Gosselin. Yet another Mica Trap occurs on the western shore somewhere just below the Coupée. A single day in Guernsey added one more to our list. This occurs in a cleft of the rocks at Point Norman, close to the quarry, but rather on its southern side. Here a rather reddish-brown dyke about 4 feet thick runs down to the sea, which upon examination proved to be also a decomposed Mica Trap.

This considerable addition to the number known renders it probable that there may be various others of this peculiar group to be found on the shores of Guernsey, and I venture to suggest them as an interesting subject for search. They are not difficult to recognise. The surface is almost invariably reddish-brown and soft. Any rusty-looking rock easily scratched with a knife should be subjected to further examination. If on being broken the thin glittering flakes of Mica are seen scattered through its mass, it belongs to the group in question. If the pieces at first discovered be only detached blocks, a search for the parent rock should be made. A memorandum of the position of each dyke should be made with sufficient completeness to secure its certain and easy rediscovery.

The investigation may possibly lead to valuable scientific results. I have already mentioned that the majority of the rocks of these islands are of immense geological antiquity. But in England there have been many outflows of igneous matter down even to tertiary times. At present there is no evidence of any such action in Guernsey or Jersey posterior to the carboniferous age. But if any dyke could be discovered which should traverse or pierce one of these Mica Traps it must be itself of Post-Carboniferous age, and would afford an evidence of a later disturbance. And thus it becomes of much interest to discover, enumerate, and closely examine all these Mica Trap dykes of the Channel Islands.

A LIST OF THE NEUROPTERA INHABITING THE ISLAND OF GUERNSEY.

BY MR. W. A. LUFF.



THE Neuroptera or nerve-winged insects comprise several families differing very considerably from each other in structure and habit.

They include the Dragon-flies, Lace-winged flies, Caddis-flies, Ant Lions and the Termites or White Ants.

Of the two last-named we have no representative in Guernsey or in England.

The Dragon-flies are perhaps the best known, from their large size, richness of colouring, and the rapidity of their flight.

The larger species are popularly called Horse-stingers, although they have no sting, and are quite harmless to cattle. They have four very beautiful wings, remarkable for the number of reticulations or network spaces, with which they are covered.

The members of the family Calopterydæ have more than 1,500 of these spaces on each wing. The body is usually long and slender, and often adorned with metallic colours. The two large compound eyes occupy almost the whole surface of the head, and are most beautiful objects when viewed under the microscope. As many as 10,000 facets or lenses have been counted in each of the eyes of one species of Dragon-fly.

The earlier stages of Dragon-flies are passed in the water of stagnant ponds and ditches. The larvæ are extremely voracious, killing and eating any insect that they meet with in the water. To enable them to capture their prey they have a very curious modification of the mouth, consisting of an elongation of the lower lip or labium. This apparatus is hinged and folded up under the head, and has a pair of jaws or pincers attached to the end. They swim slowly within

striking distance of their unsuspecting prey, and suddenly dart out this curious organ, almost invariably capturing the insect and conveying it to the mouth.

We have eleven species of Dragon-flies in Guernsey, the largest being *Anax formosus*; it is also one of the commonest, and a very formidable creature it looks as it flies swiftly along after its victims.

The palm of beauty amongst our island insects must be conceded to *Calopteryx Virgo* with its splendid metallic coloured body and wings. Another handsome species is *Libellula quadrimaculata*. I have seen only one specimen, which was captured in St. Peter-Port Harbour. It is one of the migrating species (often observed on the Continent and in America in prodigious swarms, sometimes taking many hours to pass a given spot), and may be only a visitor to our shores.

The Lace-winged flies are extremely delicate and beautiful insects; some such as *Chrysopa* are of a beautiful green colour, with light gauzy wings and bright golden eyes; others, as the *Hemerobæ*, have iridescent wings, reflecting all the colours of the rainbow.

In the larva state the Lace-wing flies play a very important part in feeding on and keeping in check the numerous Aphides or plant lice, and should be known and protected by every gardener.

A very curious insect is *Panorpa communis*, two specimens of which have been taken in Guernsey. It is common enough in England where it is popularly known as the Scorpion fly, from having an appendage to its body very much resembling the sting of a scorpion.

The May-flies or *Epheméridæ* proceed from larvæ living in water. They have a very short existence in the perfect state, having no means of taking food, and being of so fragile a nature. I have never observed our Guernsey species in any numbers, but in England and on the Continent they sometimes appear in immense swarms.

The *Psocidæ* are small insects living gregariously amongst lichens on trunks of trees, old walls, &c. In July of this year I noticed some thousands of specimens of a *Psocus* on a brick wall about eight feet square in Mansell Street; they were huddled up close together on the lines of mortar between the bricks. The insect is *Psocus quadrimaculatus*, and is not reckoned at all common. Mr. McLachlan records the occurrence of the same species, in September, 1890, at Dunster, in North Somerset, in great numbers on a stone wall.

The Book-louse is a wingless species belonging to this family. It is sometimes called the Death Watch from its habit of making a ticking sound. It is very destructive to collections of insects and plants.

The *Trichoptera* or Caddis-flies have been ranked as a separate order by some writers on Entomology; they are, however, included in the Neuroptera in a catalogue of the British species published by the Entomological Society of London in 1870. In the larval stage they live under water, some species only in stagnant ponds and ditches, others only in rapid streams. These larvæ being very soft-bodied, construct tubular cases of various materials, such as bits of stick, shells, seeds, small stones and grains of sand, and dwell in them. The perfect insects very much resemble moths, and are often mistaken for them. Twenty-one species have been taken in Guernsey, one of which is peculiar to the island.

This species was first recorded in Mr. R. McLachlan's splendid "Monographic revision and synopsis of the Trichoptera of the European Fauna," from which I quote the following description and notes on the species:—

"*Philopotamus insularis* (n. sp.)

"Agreeing entirely with *P. Montanus* in the colour of the antennæ, neuration of the wings, &c., and apparently without the slightest difference in the anal parts of the male, but differing totally in the colour and marking of the wings. The anterior wings are dull pale yellow (caused by a yellow pubescence on a nearly hyaline membrane) transversely reticulated with greyish fuscous, and with a few larger fuscous spots, whereof one at the arculus is much larger and more conspicuous than the others, the costal and apical margins somewhat regularly spotted with fuscous, fringes wholly yellow, neuration slightly fuscous. Posterior wings, pale smoky fuscous, pterostigma conspicuously yellow, the apical margin is yellow, festooned inwardly, fringes wholly yellow, neuration fuscous. Expanse 20-25 m. m."

"Some years ago I noticed a single female example of this among a few insects collected by the late Francis Walker in Guernsey. Its appearance was so remarkable as to induce me to write to Mr. Luff, an entomologist resident in the island, describing the insect, and he has had the kindness to send me nearly thirty specimens, which do not vary in any way. He says he finds the species only in one locality—a small rapid stream at Saints' Bay, and that no other species of the genus occurs in the island. I have not been able to

ascertain whether it occurs in the neighbouring island of Jersey, or on the opposite coast of France.

"In general form and structure this so precisely agrees with *Montanus* that I fail to find any differences, but its peculiar colour and markings are so constant as to fully entitle it to rank as distinct.

"It may be that we have here a well-marked instance of the power of long isolation to produce a form worthy of being considered specifically distinct."

In Supplement, Part 2, page 71, of the same work, Mr. McLachlan remarks:—"I have succeeded in obtaining a *Philopotamus* from Jersey, for purposes of comparison with the distinct form from Guernsey that I named *Ph. insularis* (page 384). Mr. W. A. Luff made an excursion to Jersey, and found a species at a stream near Plemont Point in that island. I can only regard these as *montanus*. They have the golden yellow of the anterior wings more extended than is usual in continental examples, but not more so than is often the case in others from Britain; and they do not show an approach towards the Guernsey *insularis*, which thus maintains its insular distinctness."*

I also quote the following extract from "Wallace's Island Life," under the heading "Trichoptera peculiar to the British Isles":—

"*Philopotamus insularis* (? a variety of *P. montanus*.)

"This can hardly be termed a British species or variety, because, so far as at present known, it is peculiar to the island of Guernsey. It agrees structurally with *P. montanus*, a species found both in Britain and on the Continent, but it differs in its strikingly yellow colour, and less pronounced markings. All the specimens from Guernsey are alike, and resident entomologists assured Mr. McLachlan that no other kind is known. Strange to say some examples from Jersey differ considerably, resembling the common European and British form. Even should this peculiar variety be at some future time found on the Continent, it would still be a remarkable fact that the form of insect inhabiting two small islands only twenty miles apart should constantly differ, but as Jersey is between Guernsey and the coast, it seems just possible that the more insular conditions, and perhaps some peculiarity of the soil and water in the former island have really led to the production or preservation of a well-marked variety of insect."

* *P. insularis* has recently been recorded from Sark (see *The Entomologist's Monthly Magazine*, March, 1892, page 74).

I have to thank Mr. R. McLachlan, F.R.S., who is the greatest British authority on the order, for his kindness in examining and naming nearly the whole of the insects in the following list:—

PSEUDO NEUROPTERA.

PSOCIDÆ.

- Clothilla pulsatoria**, *L.* Common amongst old books and papers.
Atropos divinatoria, *Müll.* Of occasional occurrence.
Psocus variegatus, *Fab.* One specimen.
P. bifasciatus, *Latr.* Not uncommon on old walls from July to September.
P. quadrimaculatus, *Latr.* Saw hundreds of specimens on a brick wall a few yards square in Mansell Street during July, 1891. They were grouped together on the lines of mortar between the bricks.
Cæcilius pedicularius, *L.* Beaten from hawthorn bushes at Vazon in October.
C. flavidus, *Steph.* Abundant in September and October.
C. obsoletus, *Steph.* Two beaten from fir trees, October 18th, 1891.
C. Dalii, *McLach.* Not uncommon.
Stenopsocus cruciatus, *L.* Taken by Mr. R. McLachlan.
Elipsocus Westwoodii, *McLach.* One beaten from fir, October 18th, 1891.
Peripsocus phæopterus, *Steph.* Taken by Mr. R. McLachlan in 1891.

PERLIDÆ.

- Neumora nitida**, *Pict.* Not uncommon.
N. variegata, *Oliv.* Taken by Mr. F. V. Theobald in 1890.

EPHEMERIDÆ.

- Cloëon dipterum**, *L.* Common.
Baëtis rhodani, *Pict.* I have taken several.

ODONATA (Dragon flies.)

- Sympetrum striolatum**, *Charp.* I have taken one specimen at the Grande Mare, Vazon.
S. flaveolum, *L.* Have taken several, Grande Mare and L'Ancrese Common.
L. scoticum, *Donov.* One taken near the Chêne, Forest, by Mr. F. V. Theobald, in 1890.
Libellula quadrimaculata, *L.* One specimen captured by Mr. Spencer, jun., in St. Peter-Port Harbour, and brought to me alive.
Orthetrum cærulescens, *Fab.* Two specimens taken at the Grande Mare.
Cordulegaster annulatus, *Latr.* Not common.
Anax formosus, *Lind.* Of common occurrence, Grande Mare and L'Ancrese.
Æschna mixta, *Latr.* Two specimens taken in Guernsey. One in Sark.
Æ. cyæna, *Müll.* One female, L'Ancrese Common, captured by Mr. F. V. Theobald.
Brachytron pratense, *Müll.* One male captured in Guernsey by the late Dr. Mauger many years ago.
Calopteryx Virgo, *L.* Abundant on the border of the stream running through the Talbot's Valley. I have not see it elsewhere in Guernsey. Mr. McLachlan informs me that these examples are not like the ordinary English form, but belong to the "race méridionale" of De Selys, found in central and southern France.

Pyrrhosoma minium, *Harris*. Very abundant at the Grande Mare, Vazon.

Isehnura elegans, *Lind*. Not uncommon.

Agrion pulchellum, *Lind*. Common at the Grande Mare.

A. puella, *L*. One male.

NEUROPTERA-PLANIPENNIA.

Micromus variegatus, *Fab*. Common.

M. paganus, *L*. One specimen.

Hemerobius limbatus, *Wesm*. Common.

H. orotypus, *Wallengr*. Taken by Mr. R. McLachan in September, 1891.

H. nervosus, *Fab*. Not common.

Chrysopa flavifrons, *Brau*. Not common.

C. septempunctata, *Wesm*. Common.

C. perla, *L*. Taken in 1890 at the Gouffre by Mr. F. V. Theobald.

Panorpa communis (Scorpion fly). I have only taken one specimen in Guernsey, and Mr. Theobald took one at the Chêne, Forest.

TRICHOPTERA (Caddis flies.)

Phryganea grandis, *L*. One taken at the Vale Quarry by Mr. F. V. Theobald in 1890.

Limnophilus flavicornis, *Fab*. One specimen taken in 1891 at L'Anresse.

L. marmoratus, *Curt*. Two at the Grande Mare on October 11th, 1891.

L. lunatus, *Curt*. Taken by the late Dr. Mauger, also at the Vale Quarry by Mr. F. V. Theobald.

L. centralis, *Curt*. One at a stream near the Grande Mare.

L. affinis, *Curtis*. Taken by the late Dr. Mauger.

L. hirsutus, *Pict*. Not uncommon.

Stenophylax concentricus (*Zett.*), *McLach*. I have taken three specimens.

Halesus radiatus, *Curt*. Taken by the late Dr. Mauger.

Sericostoma personatum, *Spence*. Not common.

Goëra flavipes, *Curt*. One.

Silo pallipes, *Fab*. Common at Saints' Bay, Le Gouffre, and Petit Bot Bay.

Beræa maurus, *Curt*. Very abundant in small streams on south coast.

Dipletrona felix, *McLach*. Common at Saints' Bay, Petit Bot, and Le Gouffre.

Philopotamus insularis, *McLach*. Abundant in spring and autumn in small rapid streams on our southern cliff coast.

Wormaldia occipitalis, *Pict*. Abundant.

Plectrocnemia conspersa, *Curt*. Saints' and Petit Bot Bays.

P. geniculata, *McLach*. Not common, south coast.

Tinodes assimilis, *McLach*. Common at Saints' Bay.

Rhyacophila septentrionis, *McLach*. Common at Saints' Bay, Petit Bot, and the Gouffre.

Agapetus fuscipes, *Curt*. Not uncommon.

GUERNSEY

SOCIETY OF NATURAL SCIENCE

AND

LOCAL RESEARCH.

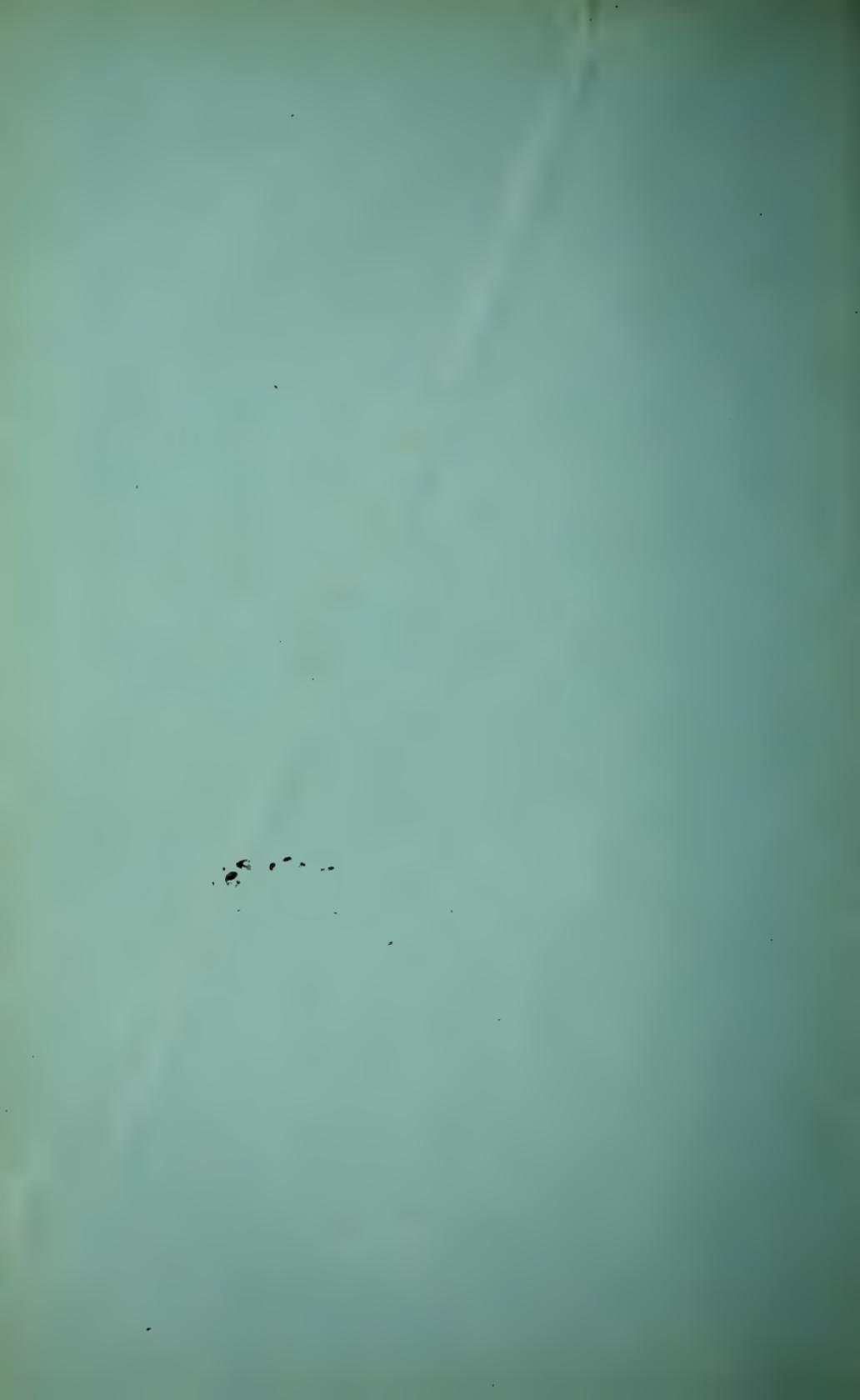
REPORT AND TRANSACTIONS

1892.

Guernsey :

PRINTED BY THOMAS MAUGER BICHARD,
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MR. T. C. ROYLE.

→≡ **LIST OF MEMBERS.** ≡←



- | | |
|--|---|
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St. Martin's. |
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| Miss B. Carré, 2, Cameron Place. | Mr. J. S. Paint, Arcade. |
| Mr. E. A. Carré, 2, Cameron Place. | Miss E. R. Paint, King's Road. |
| Mr. W. C. Carré, Valnord. | Mr. T. W. Palmer, Bordage. |
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| Mrs. A. Collenette, Hauteville. | Mr. A. C. Quick, Church Square. |
| Colonel Collings, Eaton Place. | Mr. Z. Robert, Mauxmarquis. |
| Miss M. B. Collings, Clifton. | Mr. F. Rose, F.D.S., Vauvert. |
| Miss R. Cole, Canichers. | Mrs. Rose, Vauvert. |
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Road. |
| Mr. G. Derrick, Valnord. | Brigade - Surgeon Thornhill, A.B.,
M.B., T.C.D., Grange. |
| Mr. C. De La Mare, Mount Durand. | Miss Tupper, Candie. |
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| Mrs. Havilland Durand, Moulin Huet
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| Mr. S. G. Hugo, Allez Street. | |
| Mr. J. W. Jones, Arcade. | |
| Mr. Sausmarez Le Cocq, Saumarez
Street. | |
| Mr. T. Le Pelley, Beaucamp, Castel. | |

TRANSACTIONS OF THE SOCIETY.



Monthly Meeting held on November 18th, 1891, Mr. E. D. Marquand in the chair.

The minutes of the last meeting having been read and confirmed, Mr. Z. Robert exhibited specimens of various granites, &c., from l'Ancrese, one specimen being of particular interest, as it contained a mass of gneiss embedded in the granite. The specimens were presented by the exhibitor to the museum.

The Chairman announced that the monthly meetings would in future be held on the second Wednesday of each month, and that that day might be regarded as fixed for both the winter and summer sessions. He also stated that in order to increase the usefulness of the Society and to bring a larger number of members into active work, the Council had decided to form further sections after the plan of the Geological Section, which had proved so successful since its establishment early in the year. These would be as follows, the gentlemen whose names were appended having consented to act as secretaries: Botany, Mr. T. C. Royle; Entomology, Mr. W. A. Luff; and Folk Lore, Mr. J. L. Pitts.

The main business of the evening was a general discussion on "Flowers and their origin," and in order to ensure a methodical treatment of the subject it had been arranged that different points should be dealt with by various members. Mr. Royle described the structure of flowers generally, with their variations; Mr. Marquand showed the effects of locality and the result of climatic influences; Mr. Rose dealt with the interesting topic of insect fertilisation; Mr. Sharp read extracts bearing on the effects of culture on flowers; and Mr. Collenette treated the subject from a geological point of view. On all these points, and on others which were afterwards introduced, a great deal of valuable information was elicited, and a general desire was expressed that from time to time other subjects might be dealt with in a similar instructive manner.

Monthly Meeting held on December 9th, 1891, Mr. E. D. Marquand in the chair.

The usual formal business having been disposed of the following twelve ladies and gentlemen were unanimously elected members of the Society: Miss Tupper, Dr. J. Aikman, Colonel W. Bell, C.B., Dr. M. MacCulloch, Surgeon-Major G. Ryan, Major-General Standen, Brigade-Surgeon T. A. Thornhill, and Messrs. T. M. Bichard, Julius Carey, William Carey, E. A. Carré, and W. Stranger.

Mr. Lesbirel presented to the Society through Mr. Collenette a stone "muller" which he recently found at Le Bourg, Forest, near the site of a former cromlech. Mr. Luff communicated some notes on the occurrence of the Guernsey Tiger Moth (*Callimorpha hera*) in Devonshire; and also read an account of the introduction into Guernsey of the rare land shell *Helix pisana*, which is now to be found in immense numbers at Vazon. It has become thoroughly naturalised, and but for the record of its intentional introduction would certainly be considered native.

Mr. A. Collenette read some interesting notes upon the method of fertilisation by a small fly of the Birthwort (*Aristolochia clematis*) a foreign plant occasionally found in England near old ruins. The very complex and ingenious means by which cross-fertilisation is effected in this small and inconspicuous flower was lucidly explained by Mr. Collenette, who further illustrated it by means of a couple of well-drawn diagrams, showing enlarged sections of the flower and the automatic action of its organs. A very interesting discussion ensued.

Mr. W. Sharp handed in a short list of Guernsey proverbs as a contribution to the newly-established Folk Lore Section, and this led to some remarks upon local proverbial expressions, several further examples of which were quoted by the members present.

Monthly Meeting held on January 13th, 1892, Mr. G. Derrick in the chair.

The minutes of the last meeting having been read and signed, Messrs. J. W. Jones and H. B. Tourtel were unanimously elected members of the Society.

Mr. W. A. Luff read from the last issued *Entomologist's Monthly Magazine* some notes by Mr. R. McLachlan on insects belonging to the order *Neuroptera* taken by him in the Channel Islands during a recent visit.

A curious parti-coloured lobster, recently caught by Mr. F. Rich and presented to the Museum by Mr. Trott, was placed on the table and attracted much attention. It had been skilfully set up by Mr. Puttock, the caretaker of the Guille-Allès Institution.

Mr. Denys Corbet read a paper on "Guernsey Superstitions, Omens, Signs and Warnings," in which he cited and explained many curious examples of insular belief which had come under his own knowledge. The substance of this paper will be found in the following pages. Mr. Corbet also exhibited a fine specimen of the old-fashioned *crossé*, or cresset lamp (the old Scotch *crusie*, from which the Guernsey name is evidently derived) which was formerly in common use in the country parishes. Also an old flint and steel box, for procuring a light, and sketches of the *vilain* or stand for the cresset lamps.

Monthly Meeting held on February 10th, 1892, Mr. J. Whitehead, President, in the chair.

The minutes of the last meeting having been duly read and signed, Colonel J. G. Cloëte and Mr. A. C. Quick were unanimously elected members of the Society.

Mr. W. A. Luff exhibited specimens of the Winter Moth (*Cheimatobia brumata*) which this winter had been very plentiful in the island, though usually a rather scarce insect. The female of this moth is remarkable by possessing only the rudiments of wings, which are quite useless for the purpose of flight.

Under the title of "A Glance at the Rocks of Alderney," Mr. C. De La Mare gave an account of a visit recently made by him to that island, and exhibited a collection of geological specimens to illustrate his remarks; and a diagram prepared by the lecturer to show the correlation of the Channel Islands' rocks with those of France and England further elucidated the subject. Mr. De La Mare's paper will be found in full in the following pages. A discussion followed the reading of the paper and the geologists present expressed their views upon the conclusions at which Mr. De La Mare had arrived, and their appreciation of the lucid and interesting manner in which he had dealt with a difficult subject.

Monthly Meeting held on March 9th, 1892, Mr. G. Derrick in the chair.

After the usual formal business had been disposed of a paper was read by Mr. E. D. Marquand, entitled "The Language of Ants," of which the following is the substance:—

Language, in the sense here employed, may be held to mean any manner of expressing thought, and therefore language implied mind. Wherever we find animal life we find inseparably connected with it certain phenomena which indicate the existence of mind—very dim, very obscure, it may be even inappreciable to our perception—but, nevertheless, existent. If we make a scale of the animal kingdom based on its physical organisation, and also another scale of the animal kingdom based on its psychological powers, we shall find the two scales extremely divergent. In the one, immediately below man, we have the anthropoid apes, but in the other we must make a tremendous downward leap, and passing by the whole of the vertebrates as well as the higher Invertebrata, we must, in order to find the closest approach to man, go to the ant. This at least is the opinion of Lubbock, who probably knows more about the habits and faculties of these insects than any man living. He expressly declares his opinion that ants “have a fair claim to rank next to man in the scale of intelligence.” Darwin said “the brain of an ant is one of the most marvellous atoms of matter in the world, perhaps more so than the brain of a man,” and it is well known that an ant’s brain is larger and more complex than that of any other insect. After some further remarks to render the subject clear, the lecturer proceeded to give a digest of a number of experiments made by Lubbock and conducted with extreme care, all of which tended to demonstrate beyond question that ants are capable of communicating with and conveying information to each other. Then came the difficult question, *how* they do so? Through what channel do the thoughts of one ant pass into the brain of another? At present it was a matter of conjecture and it seemed as if the problem could never be solved by practical test, but Mr. Marquand’s opinion was that the antennæ were the organs of communication. The precise function of the antennæ we do not know, and probably never shall, for Mr. Marquand held them to be the organs of a sense of which we have no analogue in the human race, and of which we can form no conception whatever. Unfortunately conclusive experiments in this direction are impossible because the amputation of the antennæ is instantaneously followed by an extraordinary change in the living insect; it becomes paralysed, ceases to eat or engage in any kind of labour, can no longer find its way or recognise its companions, it remains quiescent and almost motionless, and so lingers on until death intervenes.

In the course of the pleasant and animated discussion which followed many views were expressed as to the function of the antennæ, and instances were given tending to show that they could not be the organs of any sense known to us.

Monthly Meeting held April 6th, 1892, Mr. J. Whitehead, President, in the chair.

The minutes of the last meeting having been read and approved, Miss D. Fox and Mr. Theo. Le Pelley were unanimously elected members of the Society.

Mr. W. A. Luff exhibited several specimens of the larvæ of the Guernsey Tiger Moth (*Callimorpha hera*) bred by Mrs. Boley, and also some small beetles bred from lentils purchased in this town.

A paper was read by Mr. F. Rose, entitled "The Structure and Functions of the Antennæ of Insects," explaining that he intended it to be a sequel to the paper read at the last meeting, when this subject was touched upon. The lecturer described minutely the exceedingly delicate and elaborate structure of the antennæ, and by numerous quotations as well as from his own personal observations he showed the very important part which these appendages play in regard to sensation and perception; some of the phenomena exhibited by insects cannot be explained satisfactorily or accounted for by any of the senses known to us, as for example, what is known to collectors of *Lepidoptera* as "sembling," where a female moth enclosed in a box immediately on her emergence from the chrysalis would attract the male moths even though the box were shut up in the cupboard of a closed room. Mr. Rose illustrated his remarks by sketches on the blackboard.

Mr. Marquand said he believed that in addition to the ordinary senses of hearing, seeing, smelling, touching, &c., as we understand them, insects are also endowed with another and as yet undefined sense, which not only exceeds in range and intensity, but is also different in kind from anything that man or the larger animals possess.

Mr. Collenette could not in any way accept this theory of a distinct and undiscovered sense. He saw no need for it at all. He believed that the quickening and intensifying of the ordinary senses with which we are familiar was quite sufficient to account for and explain all the phenomena of insect life that had yet been observed.

Many other members engaged in the discussion of this interesting subject, among them being a visitor, Mr. A. O.

Walker, F.L.S., of Colwyn Bay, who had lately been dredging on these coasts.

—

*Monthly Meeting held May 11th, 1892, Mr. J. Whitehead,
President, in the chair.*

The minutes of the last meeting having been read and signed, Mrs. H. Durand and Miss E. R. Paint were unanimously elected members of the Society.

Mr. W. A. Luff exhibited two specimens of *Tettix subulata*, the smallest British grasshopper, captured by him at Saints Bay. It is a rare insect in this island.

Extracts were read from a paper by the Rev. E. Hill, recently read by him before the Geological Society on "The Gneisses and Hornblende Schists of Sark."

The question of continuing during the coming summer the weekly excursions which had been started last year was brought up, and it was proposed to improve on last year's plan by making out a programme for the whole season, giving dates, hour and place of starting, route and principal objects of interest, and having it printed and distributed to members. It would be a great convenience to those who could not attend every week, as they could then choose out beforehand the excursions they preferred and arrange accordingly. No excursion would be postponed; if the weather were unfavorable it would simply drop out of the list for that year. This proposal was carefully discussed, and ultimately a sub-committee was appointed to carry it out.

—

*Monthly Meeting held on June 8th, 1892, Mr. E. D.
Marquand in the chair.*

After the usual formal business had been disposed of, Mr. A. Collenette exhibited specimens of dressed Alderney stone (sandstone and diorite) kindly lent by Mr. N. Lihou, of Alderney. Mr. Z. Robert exhibited specimens of stone from Jersey.

Mr. W. A. Luff exhibited a specimen of *Cidaria corylata*, captured in the mill-stream in the Talbots Valley, on the occasion of the recent excursion. It is of particular interest as it is an addition to the list of Guernsey moths.

Mr. Marquand exhibited some fine fresh water shells, taken on the same occasion in the mill-pond; the most interesting were *Limnæa peregra*, var. *inflata*, and *L. palustris*.

An account of the two weekly excursions which had taken place was then given by each of the sectional Secre-

taries, and all the interesting finds duly noted. The gist of these and similar monthly records will be embodied in the annual sectional reports.

A promised paper not having arrived, Mr. E. D. Marquand filled up the evening with some extempore remarks (illustrated by black-board sketches) on the "Sexual Scales of Butterflies." These peculiar scales, he said, were to be found only on the male insects, and it was very curious that they occurred only in certain families of Butterflies, such as those containing the Garden White, the Meadow Brown, the Blues, and a few others; in other families nothing of the kind was found. The scales assumed various shapes in different species, being often tufted or plumose, or in the case of the Blue Butterflies, shaped like a battledore; but in all cases they were very unlike the common scales with which they seem to be promiscuously mixed without pattern or symmetrical order. There is every reason to believe that they merely serve the purpose of ornament.

Monthly Meeting held on July 13th, 1892, Mr. J. Whitehead, President, in the chair.

The minutes of the last meeting having been read and confirmed, Mr. T. W. Palmer was unanimously elected a member.

Since the last meeting five weekly excursions of the Society had taken place in accordance with the programme, and interesting accounts of the various finds and objects of interest were given by the sectional Secretaries; this, with the discussion which followed at various points, pleasantly occupied the whole evening.

Monthly Meeting held on August 24th, 1892, Mr. G. Derrick in the chair.

After the preliminary business the following gentlemen were elected members: Captain Carteret Carey, and Messrs. William Carré, H. J. Morgan and E. Allen.

Mr. E. D. Marquand exhibited a number of Land Shells recently collected in Alderney by Mr. W. A. Luff. They consisted of the following species and varieties: *Helix aspersa* (type and var. *tenuior*), *H. nemoralis* (vars. *libellula*, *rubella*, *minor*, and *roseozonata*), *H. virgata* (type and vars. *leucozona*, *albicans*, *minor*, and one or two unnamed), *H. pisana*, *H. hispida* (all the specimens belonging to var. *conica*), *Bulimus acutus* (type and vars. *strigata* and *bizona*), *Zonites draparnaldi*, *Balea perversa*, *Pupa umbilicata*, *Succinea*

elegans and *S. putris*. This was the first list of Alderney shells made out by any member of the Society, and it was hoped that others visiting that island would endeavour to add to it.

Mr. Luff stated that during his short stay in Alderney he had collected a number of insects, some of them of much interest, but as they had not yet all been determined he would defer any remarks upon them to a future meeting.

The sectional Secretaries then made their usual reports as to the result of the weekly excursions held during the past month. The number of persons joining in these outings seems to increase week by week, and several visitors to the island interested in natural history have from time to time availed themselves of the privilege of attending them.

Special Meeting held on August 31st, 1892, Mr. E. D. Marquand in the chair.

A press of matter at the last monthly meeting having unavoidably crowded out Mr. A. Collenette's paper on "The Raised Beaches and Cliff Heads of Guernsey," it was decided to devote a special evening to it. The paper, which was illustrated by several excellent diagrams and coloured maps, embodied the result of Mr. Collenette's investigations during many years, and the conclusions at which he had arrived. It will be found printed at length in the following pages.

Messrs. D. Mollet and B. H. G. Le Febvre were elected members of the Society.

Monthly Meeting held on September 21st, 1892, Mr. T. Gwille, Vice-President, in the chair.

The formal business of the evening being disposed of, Mr. W. A. Luff exhibited the eggs, caterpillars and chrysalids of the Clouded Yellow Butterfly (*Colias Edusa*), which had been reared by Mrs. Boley, who captured the butterfly (which has been plentiful this year) on the 11th of August; the eggs were laid the following day, and the earliest hatched on the 19th and turned to pupæ on the 14th September. Mr. Luff also exhibited a full grown larva of the Death's Head Moth and a specimen of the Convolvulus Hawk Moth, captured in the town recently.

The usual reports of the results of the weekly excursions were made by the sectional Secretaries, from which it appeared that good work had been done and new species added to the lists.

Mr. E. D. Marquand then read a paper on the "Mosses, Hepaticæ and Lichens of Guernsey," to which he added some remarks on the best methods of collecting and preserving these plants and the most serviceable books to be used in studying them. Mr. Marquand's paper and list of species will be found in the following pages.

Tenth Annual Meeting of the Society, held on October 26th, 1892, Mr. E. D. Marquand in the chair.

The minutes of the last meeting having been duly read and signed, Mr. W. A. Luff read a paper on the "Cicadidæ of Guernsey," with lists of species, and also a list of the additions made during the year to the *Hemiptera Heteroptera* of the island. These papers (which are printed in these pages) were illustrated by Mr. Luff's collections of these insects, neatly mounted and carefully classified.

Mr. W. Sharp, Hon. Secretary of the Society, then read the following Report of the Council:—

"The Society has this year completed the first decade of its existence, which closes with the year of good and useful work. The in-door meetings have been on the whole well attended, and have been characterised by a more active interest on the part of the members than those of previous years. The original papers read, though small in number, are extremely valuable, containing as they do the result of much careful research as well as useful information, for the guidance of future workers in the same field. The weekly out-door meetings during the summer months, inaugurated last year, have been carried on this season on a more extended scale. We have gone further afield, and in addition to members, large numbers of friends and visitors to the island have availed themselves of the advantages thus offered, so that the issue of a printed programme of these excursions has proved a decided success. Accounts of these excursions have been published each week in one or more of the local papers, and thus the Society and its work has been constantly kept before the notice of the public. The districts visited were Bordeaux, Talbot's Valley, Bec du Nez, Bon Repos, Richmond, Fort Doyle, Grantz Mill, Ivy Castle, Moie Point, Perelle Bay, Vale Mill, Grande Rocque, St. Martin's Point, and Grande Mare. Abundant work still remains to be done in these as well as other parts of the island. The work of the Geological, Botanical and Entomological sections will be detailed in their respective reports presently to be read to you. We are

pleased to say there has been during the year a substantial increase in the roll of members, twenty-six having been elected since the last annual meeting. The number now on our list is seventy-six. The Transactions for the year 1891 have been published and issued to members, and Mr. E. D. Marquand's valuable paper on the "Flowering Plants of Guernsey" has also been reprinted in separate form. Of the latter, which is much appreciated by both English and Continental botanists, a considerable number of copies have been sold. Our best thanks are due to Messrs. Guille and Allès for their kindness in freely placing at our disposal the room in which our meetings are held. During the year the Society has received and is grateful for the Report of the Smithsonian Institution for 1889, the Report of the National Museum (U.S.A.) for 1889, and the Transactions of the Penzance Natural History and Antiquarian Society for 1891-2."

WILLIAM SHARP, Hon. Sec.

Mr. W. A. Luff, Hon. Treasurer, then read a financial statement, from which it appeared that there was a balance in hand of £1 11s. 10½d.

The Secretaries of the various sections next read their respective reports as printed below:—

REPORT OF THE BOTANICAL SECTION.

At a meeting held in November of last year, the Committee of this Society decided to establish a Botanical Section, and did me the honour of appointing me its secretary. Accordingly, at the opening of the botanical season, after due consultation with those members of the Society interested in the subject, I called the first meeting of the Section, which was held on May 4th. At this meeting the question of our further proceedings was discussed, and it was decided that the most immediately urgent and important work to be undertaken was the formation of a Reference Collection of Guernsey Plants, properly dried, mounted and catalogued, for the use of the Society, and to form the starting point for further investigations and enquiry on the subject of our local Flora, and a sub-committee was appointed to carry out the details. As a result of this action a commencement has been made in the work, and by the contributions of individual members and the collections made by the Section during the excursions of this summer, 362 species have been got together and dried, and are now ready to be mounted, this latter work being usually done in the winter. The work of the Section has been much

lightened by the publication in the last volume of the Society's Transactions, as well as in a separate form, of the list of Flowering Plants and their allies compiled by Mr. E. D. Marquand. While fully recognising the value of previous lists and papers on the subject by Mr. Derrick and by Mr. Marquand himself, which have appeared in our Transactions, we may say that we have now for the first time since the formation of the Society a list compiled by a competent botanist from personal investigation, which furnishes a complete record of the plants known to have occurred recently in the Island up to the date of its publication.

As a result of the publication of this list, the Section has been enabled, by discoveries made during the fourteen excursions made by the Society, at all of which it has been represented, and by the finds of individual members, to add the names of twenty-six plants to the Flora. A list of these is appended to this report, and will form the supplementary list of additions for the year to Mr. Marquand's Flora.

Turning now to the actual field work done at the Society's excursions. This has mainly consisted in the collection of a considerable proportion of the 362 species before referred to, and in the discovery of six of the plants enumerated in the list of additions. The Section has also been able on several occasions to afford assistance to visitors joining the excursions in their search for specimens. Finally, several cases of suspected variation from the type in certain species have been noted and partly investigated; such investigations, however, require a long time—in some cases years—to carry out, and the Section is not at present in a position to lay them before the Society.

A further important contribution to local botanical research is the list of Mosses, Hepaticæ and Lichens, presented by Mr. Marquand at our September meeting, in which 142 Mosses, 38 Hepaticæ and 243 Lichens are enumerated. This list will, it is hoped, do for Cryptogamic what his list of last year has done for Phanerogamic Botany.

LIST OF ADDITIONS IN 1892.

- Ranunculus baudotii**, *Godr.* Marshy field behind Ivy Castle (J. Groves and E. D. Marquand).
- Ran. sceleratus**, *L.* Vale Road, sparingly (Miss Dawber). Marshy field behind Ivy Castle, several plants (E. D. Marquand).
- Nasturtium sylvestre**, *R. Br.* Braye Road, east of the Vale Road, plentiful on the roadside (E. D. Marquand). Melrose Estate, and rubbish heap near Ivy Castle (G. E. Derrick).
- Barbarea vulgaris**, *R. Br.* Villette (III.), one plant (Miss Dawber).

- Lepidium campestre**, *R. Br.* Roadside near Bordeaux, one plant (T. C. Royle and Miss Dawber).
- Stellaria graminea**, *L.* On a heath at Ruettes Brayes (Miss Dawber). Close to Ozanne's Mill (E. D. Marquand).
- Malva borealis**, *Wallm.* A single plant in the corner of a pasture field near Brookdale Nursery, Vale (E. D. Marquand).
- Ulex nanus**, *Forster.* A small bush, Salines Road (E. D. Marquand).
- Fragaria vesca**, *L.* In a hedge near Les Vallées (VIII.), extending over about twenty yards (G. E. Derrick, who has known the plant in this station for many years).
- Rosa micrantha**, *Sm.* Road down to Fermain Bay (E. D. M.)
- Lythrum Hyssopifolia**, *L.* Lane-side from Braye Road going towards Noirmont (Rue à Chiens), in abundance for a few yards (E. D. M.)
- Eryngium campestre**, *L.* Seashore at Bordeaux, a single plant (Miss Dawber and E. D. M.)
- Ammi majus**, *L.* Cultivated field near La Turquie (IX.), a single plant, in 1888 (Miss Dawber).
- Valerianella dentata**, *Poll.* Plentiful in Miss Dawber's garden in 1888.
- Aster tripolium**, *L.* Vale Pond, sparingly (Miss D.)
- Inula conyza**, *D.C.* On a wall between Carrefour au Lièvre and Sausmarez (III.), about half-a-dozen plants (E. D. M.)
- Xanthium spinosum**, *L.* A single plant, on the quarry heap by the Vale Castle in 1890 (G. E. Derrick).
- Menyanthes trifoliata**, *L.* Wet corner of a field at Cobo (Miss Dawber, shown to her by Miss Naftel).
- Verbascum pulverulentum**, *Vill.* In an old quarry, Les Mielles, at La Rochelle, l'Ancrese, one plant (E. D. M. and T. C. Royle).
- Origanum vulgare**, *L.* On the wall of St. Martin's Churchyard, sparingly (E. D. M.)
- Corylus avellana**, *L.* Copse at Moulin de Haut (VIII.) and in the valley west of St. Saviour's Church, in both cases certainly indigenous (E. D. M.)
- Narcissus biflorus**, *Curtis.* A single clump in a meadow between Grande Mare and Vazon (Miss Dawber). Waste corner above the road at Fort George (Miss D. and E. D. M.)
- Ornithogalum umbellatum**, *L.* Marshy field at Cobo, one root, and in an old quarry behind Noirmont House (IX.), in some quantity (E. D. M.) In the last station probably a garden outcast.
- Setaria glauca**, *Beauv.* Cultivated field near Grand Havre, one plant (E. D. Marquand and W. F. Miller).
- Avena strigosa**, *Schreb.* Roadside near the Vale Road Nurseries (E. D. Marquand).
- Lepturus filiformis**, *Trin.* In plenty in a wet field at Claire Mare, Perelle (E. D. Marquand, Miss Dawber and T. C. Royle).
- Chara vulgaris**, *v. Longibracteata* *Kuetz.* Small roadside pool at Cobo (Miss Dawber and E. D. Marquand). This variety is new to our Flora.

T. C. ROYLE, Sec. Bot. Sect.

REPORT OF THE ENTOMOLOGICAL SECTION.

This section has been represented at most of the excursions of the Society during the season, and although few additions have been made to the Society's list other than in the order *Hemiptera*, many interesting observations were

recorded. *Colias Edusa*, the Clouded Yellow butterfly, has been extremely abundant in Guernsey, and two specimens of its more aristocratic relation, *Colias Hyale*, were taken near Cobo.

Several specimens of *Edusa* were seen by Mr. Marquand in Guernsey, as early as May 28th and 30th. Several were also noticed in Sark on May 25th. Others were seen by the members of the Society during an excursion to Talbot's Valley, on June 7th, and one captured, which proved to be a female in fair condition; another, also a female, was captured near the Gouffre on June 12th.

No doubt as a result of eggs laid by these early specimens, *Edusa* was most abundant during August, especially in the lucerne and clover fields near our southern and western coasts, and on the occasion of a visit paid to the neighbouring island of Alderney by a member of the section, August 4th to 11th, they were found in even greater abundance swarming all over that island.

The most notable capture of this species was made by a lady member of the section, Mrs. Boley, who took two specimens of the beautiful variety of the female, named *Helice*, which is extremely rare in Guernsey. These were taken near Moulin Huet Bay on August 11th. By placing her captures on pieces of the food plant, lucerne, she induced one to lay eggs, which hatched out shortly afterwards and were skilfully reared to maturity. Several males and two females emerged on September 27th and October 1st. The males were of the ordinary type, but all the females were the variety *Helice*.

The only other account I can find of the eggs of *Helice* being reared is in the *Entomologist* for 1878, page 53, in which Mr. Edward Fitch, in a long article on *Colias Edusa*, says, "I learn from Mr. Meek, that Mr. Gates, of Brighton, bred a male *Edusa* from eggs laid by *Helice*. From eight to ten eggs only one reached the pupa state." It is interesting therefore to note that all the females reared by Mrs. Boley were *Helice*, like the mother, thus proving it to be a permanent variety. The Red Admiral (*Pyrameis Atalanta*) and the Painted Lady (*Pyrameis Cardui*) have also been very abundant.

A member of our Society, the Rev. F. E. Lowe, has recorded the capture of a specimen of that rare British butterfly, the Long-tailed Blue (*Lampides Bœtica*).

The last recorded specimen was taken three or four years ago by Mr. Spencer, jun., near Fort George, previous to which the late Miss Renouf, an ardent entomologist, took one in a garden in Burnt Lane in 1872, and eight in the same locality in 1859.

Amongst the moths, one specimen, a geometer *Cidaria corylata*, has been added to the Guernsey list. It was found floating on the mill stream near Talbot's Valley during the excursion of June 7th.

The splendid Convolvulus Hawk Moth (*Sphinx Convolvuli*) has again put in an appearance. The first record is September 7th, when a specimen was taken resting in a yard in Pedvin Street, and another on the same date taken in George Street. These were in beautiful fresh condition. Several other specimens were taken during September.

A full-grown larva of *Acherontia Atropos*, the Death's Head Moth, was found in a potato patch and exhibited before the Society. It has since gone down into the earth, and it is hoped next season will emerge as a perfect insect.

The Guernsey Tiger (*Callimorpha Hera*) was seen during the excursion to King's Mills on July 12th. This is the earliest record of its appearance in the perfect state, except when reared from the egg in-doors.

Several fine varieties of the Burnet Moth (*Zygæna Trifolii*), having the centre spots on the upper wings joined together, were taken at the Gouffre.

Miss Boley discovered a new station for the pretty little Green Forester (*Ino Statices*) on Tuesday, June 21st, at Bon Repos. This is one of our most local moths, known to occur only on three other spots on our southern cliff coast.

During the excursion to Perelle Bay on August 2nd, the little islet of La Chapelle Dom Hue was visited, and resulted in the discovery of an Hemipterous insect not yet on the list, *Nabis major*. It was in the greatest profusion under stones all over the place. By the sides of these stones were also a great number of the tubular webs of *Atypus sulzeri*, one of the rarest of the British spiders, first recorded as a Guernsey species by Mr. Marquand, who captured a male specimen at Fermain Bay early in March of last year. No males were seen on this occasion, but several females were lying in wait at the bottom of their long tubes.

On August 16th a new habitat for the rare and curious non-British Hemipteron (*Brachypelta aterrima*) was found on the coast near Grande Rocque; hitherto they had only occurred singly, crawling up the cliff paths and settled on the furze blossom on the southern coast. Here they were evidently at home, both the larval forms and perfect insects being in profusion, burrowing into sand near the edges of, and under loose stones.

A great number of additions to the list of Hemiptera have been made which will be recorded elsewhere in these Transactions.

Numerous specimens of Coleoptera and Hymenoptera have been captured and will afford many hours' pleasurable occupation in making out the names during the coming winter.

W. A. LUFF, Sec. Ent. Sect.

REPORT OF THE FOLKLORE SECTION.

The report which I have to offer in regard to the year's work of the Folklore Section is very brief. But although there is little to record in the way of completed investigation, yet the section has been by no means barren of results. Through the kindness of several members we have been able to note various customs and superstitions, the details of which will be useful for future comparison. Mr. Denys Corbet contributed on January 13th, 1892, a paper upon "Guernsey Superstitions—Omens, Signs and Warnings," the substance of which will appear further on. I also compiled and had printed a brief tabulation of the main branches into which folklore may be divided, which I distributed to the members of the Society, in the hope that it would prove helpful and suggestive in their investigations of the subject, which I am glad to find it already has been. In conclusion I may say that I shall be greatly obliged if members will kindly note and report to me any superstitions, ancient customs, omens, spells, social or ceremonial observances, folk-tales, old proverbs, &c., which may come under their notice in the island, so that a proper record of them may be made.

J. LINWOOD PITTS, Sec. Folklore Sect.

REPORT OF THE GEOLOGICAL SECTION.

The section has taken part in fifteen excursions during the year, and its members have succeeded in doing a fair amount of independent work. The results are set forth under the usual sub-heads, and though not of a startling nature, may be considered a desirable addition to our knowledge.

CLAY DEPOSITS.

1.—*Vale, north of the Mill.*

On the north side of the Vale Mill Hill a deposit of some importance exists. The Society has had an opportunity of viewing two openings made during the excavations of wells.

In one, in a field called "Bantée," the clay was quite 30 feet in depth and rested on blue diorite rock. It contained a number of loose pieces of angular stones and had no appearance of stratification. This deposit thins down to 10 feet at the site of the second well, which is situate about 100 yards to the N.N.E. of the first.

2.—*Mare de Carteret.*

Through the kindness of Lord De Saumarez the Society has been enabled to view the excavations in progress at the Mare de Carteret, and have found the following sections:—

At the upper portion of the "Mare":—

8in. sandy soil.
8in. discoloured sand.
2ft. of peat.

In this peat was found an arrangement of stones which appeared to have formed a wall.

Below the peat, yellow clay.

In the centre of the cutting:—

6 inches of grey sand.....	15·37 feet.
6 " of white sand.	
2 " of black sand.....	13·04 feet.
12 " of peat	12·04 feet.
Below, clay.	

The elevation of these deposits above mean sea level as given, refer to the bottom of each layer named.

3.—*Grande Mare.*

On the rise of the hill on the land side S.W. of Grande Mare, on both sides of the main road from King's Mills, a deposit of yellow clay has been found. It overlies a portion of the rubble head.

4.—*Fauxquets Lane.*

A little above the house of the same name a deposit of yellow clay rests in a hollow. The deposit has been traced to the Forest Road (see No. 8).

5 and 6.—*Richmond and Perrelle.*

Along the coast section clay has been noted overlying rubble and raised beach.

7.—*Gouffre.*

Yellow clay of the same character as the preceding has been found here, overlying rubble.

8.—*Forest Road.*

Along the Forest Road an extensive deposit of yellow clay has been noted. A well recently sunk on Mr. Heaume's property at Les Pièces has exposed a section in which 13 feet of compact clay is visible. Some appearances of irregular stratification (not necessarily indicating aqueous deposition) are here exhibited.

9.—*East Coast. (a) St. Martin's Point.*

The cliff deposits at St. Martin's Point have been carefully examined. The cliff is a composite one, consisting of clay and rubble in distinct bands in the following order:—
 (a) A rubble band of some feet in depth resting on a thin layer of raised beach. (b) Above this rubble is the chief deposit of clay. It is yellow in colour, plastic, and very impermeable to water. (c) A badly defined, but nevertheless, distinct rubble band, followed by (d) a lesser clay deposit in which rolled pebbles have been found (see fol. Trans. 18). The layer (b) is, in the neighbourhood of the battery at St. Martin's point, found to contain peculiar layers of tufa. The formation of tufa is fairly extensive, being found along the coast from 50 yards south of the battery to some 50 to 60 yards north of it. This tufa consists of clay permeated by water containing lime and silica in solution, and though soft where unexposed to the air, is hard on the face of the cliff, from which it projects and forms nodules arranged in layers which may be traced by the eye, this arrangement being doubtless due to the impermeability of the underlying bands of clay. As the mass below the tufa is undermined by the action of the sea, the projecting tufa bands drop to the beach. These nodules may be found abundantly at the foot of the cliffs, having dropped from the aforesaid layers. This formation is found between 8 and 30 feet above the base of the cliff, at intervals. Shells have been found in the tufa, but their nature has not yet been ascertained.

(b) *Bec-du-Nez.* (c) *Divette.* (d) *Fermain.*

The same formations as above described have been traced along these coasts, but the tufa is nowhere so well exhibited nor so plentiful as at St. Martin's Point.

RAISED BEACHES.

The details of the portions of the raised beaches noted during the year are here given in the order in which they were viewed:—

1.—*Bordeaux.*

A rubble and beach deposit was traced, on the 31st of May, around the east face of Monts Quarry, on the north side of the harbour. The section is well defined and forms part of an ancient deposit of rolled beach stones which rested on the side of the Hougue, and has since received the wash of *débris*, which, having filled up the interstices, finds itself now a part of the beach deposit. Evidence exists that a beach, presumably an ancient portion of the present beach, extends 100 yards (about) inland from the present sea margin along the centre of the harbour.

2.—*Bec-du-Nez.*

A raised beach of about one foot in depth is seen in section on the south side of the battery of Bec-du-Nez. A very small remnant of the same formation was found on the north side of the battery, but it was evidently the last remaining piece, for on June 14th, when it was removed, a search was made all along the rock platform beyond the boat station without seeing any of the rolled stones known to have been embedded beneath this portion of the cliff. It belongs to the 25 feet level.

3.—*Richmond.*

The raised beaches seen here are extensive and in all respects of the same character as those already described in last year's report as existing along the north-west coast. The deposit extends all along the coast line around the promontory, being lost at each end at the termination of the walls of the bays Vazon and Perrelle. This raised beach, on the W. of the promontory, is overlaid by rubble head, and that by clay, the whole being capped by a layer of about one foot of sand and pebbles, which appear to form part of the modern beach, notwithstanding its elevation and the removal of the slope up which these pebbles must have reached their present position by subsequent action of the sea. It belongs to the 25 feet level.

4.—*Hommet Paradis.*

This Hommet is practically an out-crop of rock with its margin and hollows filled in with raised and hardened beach, on which rubble has fallen. These formations are rapidly disappearing under the action of the sea. It belongs to the 25 feet level.

5.—*Perrelle.*

The coast deposit of beach is here continued and is in many places to be seen to advantage, owing to the new road.

having been cut through the deposit. The chief interest for the Society, however, rests in the fact that here inland deposits have been discovered. The quarry opened recently, and in use to obtain stone for the road, has two deposits, in the form of pockets, on the sea side of the out-crop. These are much above the level of the coast deposits. More important still is a deposit exposed in a field at the Rouvets, and which we have reason to think is extensive. This is at a totally different level, and above the raised beach of the coast, which belongs to the 25 feet level.

6.—*La Moye, Vale.*

A small but good patch of raised beach exists in La Moye Lane, on the side of an out-crop of rock (sea washed). The elevation is 55·22 feet.

7.—*Paradise Quarry.*

On the south-east side of this quarry, and down the slope of the Hougue to the south-east, the heading contains numerous rolled stones, which appear to have fallen with the head from a higher level. These appearances are strengthened by the discovery of an unusually large number of rolled stones in the fields south of the Hougue in the direction of the cromlech, and also by pockets and portions of raised beaches in

8.—*Le Huray Quarry.*

Elevation, 64·96 feet.

9.—*La Miellette Quarry.*

Elevation, 54·87 feet, where a portion of the floor is composed of raised beach.

10.—*Jerbourg.*

The upper portion of the clay and rubble of this promontory contains rolled stones, not in the form of raised beaches, but distributed in the clay and rubble. There may be no importance in this fact, but it is noted for future study.

11.—*Roquer, Grande Mare.*

On the sides of this quarry there are several well-defined patches of raised beach so hardened as to be almost a conglomerate. These patches must soon disappear in the working of the quarry. They are much above the elevation of the coast raised beaches.

RUBBLE HEAD.

Rubble head has now been traced over a large portion of the area of the island. It needs no description beyond that

found in the report in the transactions of last year under the heading Divette. It is formed of loose angular stones and rock *débris*.

The following deposits were noted during the excursions of the Society:—

- 1.—*Bordeaux Harbour* and *Hommets*.
- 2.—*Talbots Road, Groignet*, and lanes between Talbots Road and Castel Road.
- 3.—*King's Mills, Grantez* and *Fauxquets*.
- 4.—*Bec-du-Nez, St. Martin's Point, Jerbourg* and *East Coast*.
- 5.—Lanes near and around *Calais*.
- 6.—*Bon Repos, Corbière* and *Moie Point*.
- 7.—*Richmond, Perrelle* and *Roquier*.
- 8.—*La Moye, Vale*, and neighbouring *Hougues*.

MICA TRAP.

1.—*Putron*.

Below Mr. Ozanne's property, in the face of the rock, a mica trap dyke of some 30 yards in length and 1 foot in width, is visible. The general direction is S.S.W.-N.N.E., and it dips towards the W.N.W.

2.—*St. Martin's Point*.

Eighteen inches wide, situate in the cave in the gully below and to the north of the battery, its direction is S.S.W.-N.N.E.

3.—*Long Port, Vazon*.

A wide dyke exists here; in many places it was estimated by the Section as being fully 6 feet wide. It is redder than usual in colour. It divides into two branches, one of which is but 1 foot in width. Its bearings are E.S.E.-W.N.W.

ROCKS.

The Section has not had many opportunities to observe and determine rocks, owing to its attention having been largely given to the superficial deposits. The points are here recorded briefly for future reference.

1.—*Talbots Road*.

A wide vein of blue diorite is visible in two places, and its junction with the gneiss of the district is exposed in the lower quarry.

2.—*Bon Repos.*

An important out-crop of "long grain" diorite is visible here; the crystals are large, and the stone appears to be somewhat open-grained. Some portions of the rock are fine grained and dark in colour, the fallen masses on the beach appearing black where wet with the sea wash.

There are intrusive veins of yellow quartz, which cut both the gneiss and the diorite. A study of this bay would repay the Society.

3.—*Long Port, Vazon.*

Rock.—A red granite with large felspar crystals, and glassy quartz exists on the side of the mica trap dyke.

4.—*Perrelle.*

Light-coloured, open-grained diorite, with a dyke of close-grained blue diorite cutting it, marks the quarry here.

Several intrusions of the close-grained diorite are found on the shore.

At Domhue the gneiss is granitoid, with many intrusions of diorite. The latter varies much in colour and gives to the rocks in the neighbourhood a very interesting series of modifications.

5.—*Ivy Castle Quarries.*

Main rock.—Blue diorite with red granite veins occurring occasionally.

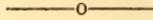
A. COLLENETTE, Sec. Geo. Sect.

The election of officers and council for the ensuing year was then proceeded with, the result being as follows:—President, Mr. E. D. Marquand; Hon. Secretary, Mr. W. Sharp; Hon. Treasurer, Mr. W. A. Luff. Committee: Messrs. A. Collenette, G. T. Derrick, C. G. De La Mare, J. L. Pitts, J. Le M. Bougourd, and T. C. Royle.

Votes of thanks to the retiring President, Mr. J. Whitehead, and to the Hon. Secretary and Hon. Treasurer, for their valuable services during the past year, brought the meeting to a close.

THE MOSSES, HEPATICÆ AND LICHENS OF GUERNSEY.

BY MR. E. D. MARQUAND.



TWELVE months ago, in presenting you the list of the Flowering Plants of Guernsey, which has since been published in the Transactions of this Society, I intimated my intention of following it up with a series of papers on the Cryptogamic Flora of the island. In part fulfilment of that promise I have to-day to lay before you the result of three or four winters' work among the Mosses, Hepaticæ and Lichens; and although the lists which follow have no pretensions to absolute completeness, they plainly show that Guernsey presents a rich and fertile field which will abundantly repay a diligent and careful scrutiny.

Here again among the cryptogams, as among the flowering plants, we find the same conspicuous absence of many common and generally distributed species; quite a number of mosses and lichens which abound in precisely similar parts of Devonshire and Cornwall appear to be entirely unknown in Guernsey. To whatever cause this may be attributed, it adds a peculiar interest to the Sarnian Flora, whilst at the same time rendering it all the more necessary that the work of recording the plants of the island, with their local range and distribution, should be conducted with the utmost care, especially in the case of minute or obscure species. Several undoubted additions which I have in hand at the present time cannot now be included in these lists, as their identification is uncertain, owing to the amount of collected material being small or in poor condition.

The only published list of Guernsey mosses, as far as I know, is that contained in Ansted's "Channel Islands," which was printed thirty years ago. It is a bare catalogue of names, alphabetically arranged, and is unfortunately very imperfect and misleading. Quite twenty mosses of general occurrence throughout this island are omitted from the list altogether, while on the other hand several species are included which I feel tolerably certain were never collected in Guernsey. It is not my business to criticise the list of Jersey mosses given in the same work, but I may just point out that if,

before printing the combined list of Channel Island species, the editor had taken the trouble to ascertain that his contributors employed different systems of nomenclature, and that consequently in numerous cases the same moss is designated under two names, he would have avoided the absurdity of cataloguing mere synonyms, and then counting them as distinct species.

The bryologist will find plenty of occupation and much to interest him in Guernsey, for in this mild, moist climate of course mosses abound, and some species fruit here which are rarely seen fertile in England. Old walls, rocks and roadside boulders are very productive, but tree-trunks as a general rule are barren, at any rate as regards variety. Hedgebanks, old disused quarries and sandy commons like l'Ancrese, furnish some excellent things; and so also deep sheltered valleys and streamsides. Grande Mare, which looks so promising, will prove a sore disappointment to those accustomed to the prolific sphagnum-bogs of the south-west of England. It is as poor in mosses as it is rich in flowering plants. Three or four species are abundant enough there, like *Aulacomnion palustre*, *Hypnum cuspidatum* and *H. stellatum*, but a host of species peculiar to peat bogs and wet heaths are absent; even the beautiful genus *Sphagnum* is but meagrely represented and will soon have disappeared from our Flora if the regrettable project of draining the marsh is carried on much further.

The great bulk of the mosses occurring in this island are of course lowland forms, and yet we find among them a few which are strictly sub-alpine in their range, although the highest elevation here hardly reaches 400 feet. This probably points back to a period when the altitude of the land greatly exceeded what we know at present; at any rate the occurrence of such mosses as *Bryum alpinum*, *Grimmia leucophæa* and a few others is remarkable, and carries with it a history which may some day be unravelled. But besides these there are several other rare and interesting species to be found in Guernsey, the two best being *Fissidens rivularis* and *Trichostomum lutescens*. Both these are recent additions to the British list, and the last named moss has hitherto been found only at Killarney. For the determination of these and many other critical species I am indebted to my friend Mr. Henry Boswell, M.A., of Oxford; during his visit to me last summer he kindly went through the whole of my gatherings and cleared up satisfactorily a number of doubtful and very puzzling forms.

With regard to the relation which the Sarnian Moss-Flora bears to that of the British Isles, it may be stated that the mosses now recorded comprise as nearly as possible one-fourth, and the *Hepaticæ* one-fifth, of the entire number known to be indigenous to Britain.

The names in the following list are for the most part those used in the *London Catalogue*, second edition, and I have inserted in brackets the names given in Braithwaite's *British Moss-Flora* wherever they differ materially. This may be useful, as until the publication of a synonymic index it is not always an easy matter to find a familiar species in Dr. Braithwaite's classical work.

Three mosses will be found in the list which I have not myself seen, viz.: *Fissidens exilis*, *Hypnum molluscum* and *Bryum mildeanum*. They were collected in Guernsey by a French bryologist, Mons. J. Cardot, in September, 1885, and recorded by him in the *Revue Bryologique* for 1887, in a paper entitled, *Mousses récoltées dans les Îles de Jersey et de Guernesey*.

The *Hepaticæ*, or Scale Mosses and Liverworts, are so constantly associated with the true mosses in habitat, that it is impossible to take up the study of one group without making the acquaintance of the other. There are, however, difficulties in the way of their systematic study, one of which is the want of a good modern English monograph, after the plan of Wilson's *Bryologia Britannica*. At present recourse must be had to foreign works in various languages, and to scattered English papers and pamphlets, and this of course does not tend to simplify matters.

Although the list of Guernsey *Hepaticæ* is not a lengthy one, it includes two species that well deserve special mention. The first is *Cephalozia Turneri*, a microscopic species, which I had the good fortune to discover in the early part of this year on the cliffs above Fermain Bay. With the exception of a single habitat in Sussex and one in Wales, this little plant has hitherto been supposed to be confined to Ireland, where it is recorded for a few stations in the south. It is one of the most minute of all hepatics, necessitating some patient search and the free use of the lens for its detection among the tiny mosses with which it grows. The second rarity is *Lophocolea spicata*, also an Irish species, restricted in Great Britain to a single habitat, and that at the western extremity of Cornwall. In one of our moss-hunting rambles Mr. Boswell and I lighted upon it in a shady lane at the Forest, and since then I have found it both at St. Andrew's and St. Saviour's, so that

possibly it may not be uncommon in this island. The occurrence of these two essentially Irish hepatics in Guernsey is of great interest and is moreover very suggestive. There are still a good many species which I have every reason to believe will be found here, although up to the present my search for them has been fruitless; but then in the matter of *Hepaticæ* it cannot be said that he who runs may read, and only by assiduous investigation of every likely nook and cranny can we hope to bring to light these tiny gems of plant life. No record of the *Hepaticæ* of Guernsey has ever been published.

That the Lichen-Flora of this island is a rich and varied one will be evident by a glance at the following list, which comprises considerably more than one-fifth of the entire number of species (exclusive of varieties and forms) recorded for the whole of the United Kingdom. Saxicolous species of course predominate, especially such as are peculiar to maritime districts; whilst those which grow on wood, whether trees or dry timber, are much less strongly represented. It is however to be noted, that many lichens which are normally lignicolous, are to be found here growing on rocks. Abundant employment for hammer and chisel will be found among the stupendous rock-masses and scattered boulders which beautify our southern coast, for generally speaking it is impossible to lay one's hand on the exposed face of a rock without covering a lichen; but many of the stones are excessively hard, and will frequently put the temper of both the collector and his chisel to a severe test.

And here I would impress upon the young student the imperative necessity of testing, both chemically and microscopically, every specimen he collects before placing it in his herbarium. It is an utter waste of time to attempt to identify a *Lecidea* or a *Lecanora* by external characters alone; even for a practised hand it is seldom safe, and I have known experienced lichenologists make most grievous blunders through this hasty and careless method of jumping at conclusions. Some of the foliaceous species, again, are so exactly similar as to be indistinguishable except by the employment of chemical re-agents; whilst in an enormous and unwieldy genus like *Lecidea*, comprising as it does some 400 British species, the very first step towards identification is an examination of the spores.

In order to render this paper as complete as possible, I have inserted in the list a number of species not as yet detected by me, but recorded for Guernsey in Leighton's *Lichen Flora of Great Britain, Ireland and the Channel*

Islands (third edition, 1879) the most recent and reliable text book on the subject. They are given chiefly on the authority of two well-known eminent lichenologists, the late Rev. T. Salwey and Mr. Charles Lorbalestier, of Jersey.

For convenience of reference, I may state that the number of species (excluding named varieties) enumerated in this paper is as follows: Mosses, 142; Hepaticæ, 38; and Lichens, 243.

As I intimated at the outset, the present lists are not put forward as in any way exhaustive; they must simply be regarded as the groundwork for more extended operations—as guide-posts, indicating how much or how little is known—and, I would fain hope, as incentives to others to go into the field and labour.

MOSES.

- Sphagnum acutifolium**, *Ehr.* Very rare. Grande Mare, scattered patches in an area a few yards square.
- Gymnostomum microstomum**, *Hedw.* (*Mollia microstoma*, B.M.F.) Gouffre, Vazon, L'Ancrese Common.
- Weissia controversa**, *Hedw.* (*Mollia viridula*, B.M.F.) Common on earthy banks and hedges.
- W. mucronata**, *Bruch.* (*Mollia rutilans*, B.M.F.) Pleinmont Point.
- Dicranella heteromalla**, *Hedw.* Frequent on shady banks.
- Dicranum scoparium**, *L.* Common. Var. *orthophyllum*. On the southern cliffs, here and there.
- D. majus**, *Turn.* Cliffs, between Fermain and St. Martin's Point, in many places. Mont Varouf Valley (VII.)
- Campylopus brevipilus**, *B. & S.* Les Pezeries (V.) On rocks.
- C. introflexus**, *Brid.* Frequent on the southern cliffs. L'Ancrese Common.
- C. flexuosus**, *Brid.* L'Ancrese Common.
- C. subulatus**, *Sch.* Pleinmont Point.
- C. fragilis**, *B. & S.* Frequent in dry, heathy places.
- C. pyriformis**, *Brid.* On a decaying stump in the copse at Moulin de Haut, King's Mills.
- Leucobryum glaucum**, *L.* Cliffs above Fermain Bay in plenty. Eastern end of L'Ancrese, locally common.
- Pleuroidium nitidum**, *Hedw.* (*P. axillare*, B.M.F.) Upper end of Talbot's Valley.
- P. subulatum**, *L.* Frequent on bare earthy banks.
- Phaseum cuspidatum**, *Schreb.* (*P. acaulon*, B.M.F.) Generally distributed and not uncommon.
- Pottia truncata**, *L.* (*P. truncatula*, B.M.F.) Common in fallow fields and banks.
- P. intermedia**, *Turn.* Generally distributed and rather common.
- P. Wilsoni**, *Hook.* Hedgebank near Les Capelles.
- P. littoralis**, *Mitt.* Bordeaux. Les Capelles.
- P. asperula**, *Mitt.* Petit Port.

- P. Heimii**, *Hedw.* On a stone in a hedge at Cobo.
- Didymodon rubellus**, *B. & S.* (*Barbula rubella*, B.M.F.) L'Ancrese Common. Near Torteval Church. Braye Road, near Les Capelles.
- D. luridus**, *Horns.* (*Barbula lurida*, B.M.F.) On a wall in Water Lane at the Couture. Bank at L'Aumône (VIII.) Roadside near Torteval Church.
- Ditrichum flexicaule**, *Schw.* Les Pezeries (V.) On rocks.
- Trichostomum tophaceum**, *Brid.* (*Barbula brevifolia*, B.M.F.) On rocks above high water mark, Petit Port. Roadside below Les Ozouëts (I) Near Les Capelles.
- T. mutabile**, *Bruch.* (*Mollia brachydontia*, B.M.F.) Common on hedge-banks and old walls. Var. *cophocarpa*. Fermain Bay. Petit Bôt Water Lane.
- T. lutescens**, *Lind.* (*Braith. Moss. Fl. p. 246.*) Rock crevices at Petit Port.
- T. flavo-virens**, *Bruch.* (*Mollia flavo-virens*, B.M.F.) Frequent all round the coast on banks, sand-hills and rock crevices close to the sea.
- T. littorale**, *Mitt.* (*Mollia littorale*, B.M.F.) Rather common throughout the island on old walls and banks.
- Barbula ambigua**, *B. & S.* (*Tortula ericæfolia*, B.M.F.) On wall tops, Corbière. Les Sages (VI.)
- B. atrovirens**, *Sm.* (*Desmatodon nervosus*, Hook) On the ground near the sea. Saints Bay Valley. Fermain Point. Les Pezeries (V.)
- B. muralis**, *L.* Very common.
- B. unguiculata**, *Dill.* Frequent throughout the island.
- B. cylindrica**, *Tayl.* Rather common on roadside walls and banks.
- B. vinealis**, *Brid.* (*B. cylindrica*, var. *b.B.M.F.*) On walls; generally distributed and common.
- B. Hornschuchiana**, *Sch.* On the cliffs near the Gouffre.
- B. revoluta**, *Schw.* Common on old walls.
- B. convoluta**, *Hedw.* On the ground in an old quarry towards Fort Le Marchant. Wall by the Trinity Houses, Rocquaine. Bank at Mont Saint (VII.)
- B. commutata**, *Jur.* (*B. convoluta*, var. *Sardoa*, B.M.F.) On the ground in an old quarry at Paradis.
- B. squarrosa**, *Brid.* (*Pleurochæte squarrosa*, B.M.F.) Frequent on the cliffs. Common at L'Ancrese. Rare inland.
- B. lævipila**, *Brid.* On trees, rocks and stones; generally distributed.
- B. montana**, *Nees.* On walls and roadside rocks. Saints Bay Valley. Beaucamps (VIII.) Vale Road.
- B. ruralis**, *L.* Common on the sand-hills of the lowlands.
- Ceratodon purpurens**, *L.* Very common.
- Grimmia maritima**, *Turn.* In rock crevices above high water mark all round the coast.
- G. pulvinata**, *Dill.* Frequent on rocks and boulders, sometimes on walls.
- G. trichophylla**, *Grev.* On rocks and boulders, generally distributed. Very common on the cliffs.
- G. leucophæa**, *Grev.* (*G. campestris*, B.M.F.) Frequent on the southern cliffs. Fruiting abundantly on a rock at Petit Bôt.
- Rhacomitrium heterostichum**, *Hedw.* Var. *B.* (*Grimmia affinis*, B.M.F.) Petit Port cliffs. Descent to Saints Bay.
- Ptychomitrium polyphyllum**, *Dicks.* (*Glyphomitrium polyphyllum*, B.M.F.) Very rare. On an old wall at Petit Bôt.

- Zygodon viridissimus**, *Dicks.* Generally distributed and common; oftener on walls than on trees. Var. *rupestris*. Couture Water Lane. Foote's Lane, Rohais.
- Z. Stirtoni**, (Braith. Moss Fl. Vol. II. p. 60). Wall at Portelette, Rocquaine.
- Ulota phyllantha**, *Brid.* (*Weissia phyllantha*, B.M.F.) Frequent throughout the island, both on rocks and trees.
- Orthotrichum affine**, *Schrad.* On trees, here and there, but generally small; rarely on stones.
- O. tenellum**, *Bruch.* On a tree on the road towards Icart.
- O. diaphanum**, *Schrad.* Generally distributed; equally common on stones as on trees.
- O. pulchellum**, *Sm.* Rare. Vauxbelets Valley, on a tree trunk.
- Psychomitrium pyriforme**, *L.* Not common.
- Entosthodon ericetorum**, *Bals.* (*Funaria obtusa*, B.M.F.) Occasional on the southern cliffs. Near Fort Doyle.
- Funaria hygrometrica**, *L.* Frequent; often abundant on the cliffs where the furze has been burnt.
- Bartramia pomiformis**, *L.* Rather common in hedge-banks between stones.
- Philonotis fontana**, *L.* Very rare. Moulin Huet and Petit Bôt Valleys, sparingly.
- Leptobryum pyriforme**, *L.* Abundant in flowerpots in my greenhouse.
- Bryum pendulum**, *Hornsch.* On the sand-hills at Albecq.
- B. murale**, *Wils.* On walls. Sausmarez (VIII.) Near Cobo Church. Vazon.
- B. atropurpureum**, *W. & M.* (*B. bicolor*, B.M.F.) On walls; generally distributed and more common than the last.
- B. Mildeanum**, *Juratz.* "Baie du Gouffre" (Cardot.)
- B. alpinum**, *L.* Rare. Icart Point.
- B. cæspiticium**, *L.* Not uncommon; on the cliffs, sand-hills, old walls, and sometimes on thatched roofs.
- B. argenteum**, *L.* Rather rare, and mostly in poor condition.
- B. capillare**, *L.* Common.
- B. pseudotriquetrum**, *Hedw.* In marshy places. Southern cliffs. Small bog near Fort Le Marchant.
- Mnium undulatum**, *Hedw.* Not common. Petit Bôt Water Lane. Le Moulin (VI.) Amongst grass in the Valley west of St. Saviour's Church.
- M. rostratum**, *L.* Bank near Doyle's Monument; a curious barren form with entire leaves.
- M. hornum**, *L.* Very common.
- M. punctatum**, *Hedw.* Very rare. Le Moulin (VI.) sparingly.
- Aulacomnion palustre**, *L.* Grande Mare, plentifully, but seems confined to this locality.
- Atrichum undulatum**, *L.* (*Catharina undulata*, B.M.F.) Frequent.
- Pogonatum nanum**, *Neck.* (*Polytrichum subrotundum*, B.M.F.) Generally distributed, but less common than the next species.
- P. aloides**, *Hedw.* Frequent on gravelly banks.
- Polytrichum formosum**, *Hedw.* (*P. attenuatum*, B.M.F.) Generally distributed and not uncommon.
- P. piliferum**, *Schreb.* Southern cliffs; frequent.
- P. juniperinum**, *Willd.* Frequent.
- Fissidens bryoides**, *Hedw.* Very common.
- F. exilis**, *Hedw.* Moulin Huet (Cardot.)

- F. Curnowii**, *Mitt.* (Braith. Moss Fl., p. 83.) Streamside, upper end of Talbots Valley.
- F. viridulus**, *Wils.* Jerbourg.
- F. rivularis**, *Spruce.* (Braith. Moss Fl., p. 84.) Sides of a little waterfall between the Gouffre and the Corbière, plentiful; fruiting freely in October.
- F. adiantoides**, *Hedw.* In marshy places, frequent; fruiting freely. Occurs also in dry places on the cliffs and at L'Ancrese.
- F. taxifolius**, *L.* Saints Bay. Moulin Huet.
- Cryphæa heteromalla**, *Hedw.* On trees, rare, and in poor condition. Moulin de Haut (VIII.) Effards (VIII.) Les Prevosts (VII.)
- Leptodon Smithii**, *Dicks.* On a boulder in a shady lane near Les Marais (IX.) It is very unusual to find this moss growing on stone.
- Neckera complanata**, *L.* Frequent on shaded boulders in all parts of the island.
- Homalia trichomanoides**, *Schreb.* Moulin Huet Valley, on a tree trunk.
- Pterygophyllum lucens**, *Sm.* Not uncommon on streamsides, fruiting freely.
- Thuidium tamariscinum**, *Hedw.* Common.
- Pterogonium gracile**, *Dill.* Saints Bay Valley. L'Ancrese Common towards the great cromlech.
- Thamnum alopecurum**, *L.* Frequent on moist banks and boulders.
- Pylaisia polyantha**, *Schreb.* On a stone in the valley below Ozanne's Mill.
- Isothecium myurum**, *Poll.* Rather frequent on shady banks and boulders.
- Homalothecium sericeum**, *L.* The most abundant of our pleurocarpous mosses, growing on trees, boulders, walls and thatched roofs.
- Camptothecium lutescens**, *Huds.* Common on the sand-hills on the north-west coast.
- Scleropodium illecebrum**, *Schw.* Common throughout the island on exposed banks and on the ground. In fruit sparingly by Doyle's Monument.
- Brachythecium glareosum**, *B. & S.* A small creeping form occurs here and there on cliff paths and dry stony places.
- B. albicans**, *Neck.* Frequent on the cliffs and L'Ancrese Common.
- B. rutabulum**, *L.* Very common.
- B. rivulare**, *B. & S.* Valley between the Forest Church and Petit Bôt.
- B. plumosum**, *Swartz.* Frequent on streamside stones.
- Eurhynchium myosuroides**, *L.* Common on rocks, trees and boulders.
- E. circinatum**, *Brid.* Frequent on old walls; also on L'Ancrese Common. I once found it on a tree trunk at La Bouvée, near Doyle's Monument.
- E. striatum**, *Schreb.* Common in hedge-banks.
- E. crassinervium**, *Tayl.* Moulin Huet water lane.
- E. piliferum**, *Schreb.* In grassy places and hedge-banks; generally distributed but not common.
- E. speciosum**, *Brid.* Waterfall at the Gouffre, and in another towards the Corbière, in fruit.
- E. Swartzii**, *Turn.* Moulin Huet water lane. Saints Bay Valley.
- E. prælongum**, *Dill.* Very common.
- E. pumilum**, *Wils.* Not uncommon in moist, shady places and streamsides, sometimes fruiting freely.
- E. Teesdalii**, *Sm.* On dripping perpendicular rocks in a cave near low water mark at Petit Port, fruiting abundantly.

- Rhynchostegium tenellum**, *Dicks.* Old sea wall above Fermain Bay. On stones in valley below Ozanne's Mill, sparingly.
- R. confertum**, *Dicks.* Very common.
- R. megapolitanum**, *Bland.* Talbots Valley.
- R. ruseifolium**, *Neck.* Common. Var. *atlanticum.* Waterfall at the Gouffre. Echelle Mill, Talbots Valley.
- Plagiothecium denticulatum**, *L.* Frequent.
- P. Borrepianum**, *Spruce.* (*H. elegans*, *Wils. Bry. Brit.*) Banks at Moulin de Haut (VIII.) Near St. Saviour's Church. Shady place close to Doyle's Monument.
- P. sylvaticum**, *L.* Calais Valley (III.) Hollow lane at Les Messuriers (IV.)
- Amblystegium serpens**, *L.* Generally distributed and rather common.
- A. irriguum**, *Wils.* On stones under the drip of water mills, &c. Echelle Mill, Talbots Valley. Petit Bôt.
- A. riparium**, *L.* Water Lane, Mont Saint. Wet grassy places behind Ivy Castle. Var. *longifolium*, Grande Mare.
- Hypnum filicinum**, *L.* Common in cliff rivulets and marshes, and near springs.
- H. cupressiforme**, *L.* Very common and variable. Var. *lacunosum*, frequent.
- H. resupinatum**, *Wils.* Very common on rocks, trees and boulders.
- H. molluscum**, *Hedw.* Moulin Huet (Cardot).
- H. stellatum**, *Schreb.* Marshy place on the cliffs between Icart and Petit Bôt. Small bog at eastern end of L'Anresse. Grande Mare, plentifully.
- H. cuspidatum**, *L.* Very common in marshy places and wet corners of fields.
- H. purum**, *L.* Very common.
- Hylocomium splendens**, *Dill.* Very rare. Furze croft at Moulin de Haut (VIII.)
- H. brevirostre**, *Ehr.* Rare. Fermain cliffs, in fruit. Cliffs above Bec du Nez.
- H. squarrosum**, *L.* Not uncommon in moist grassy places.
- H. loreum**, *L.* Rare. Cliffs between Fermain and St. Martin's Point. Le Moulin (VI.) Furze croft at Moulin de Haut (VIII.)
- H. triquetrum**, *L.* Southern cliffs; not uncommon in bushy places. Fruiting between Fermain and Bec du Nez. Mont Varouf Valley (VII.)

HEPATICÆ.

- Conocephalus conicus**, *L.* Common on streamsides and moist banks.
- Asterella hemisphærica**, *L.* Frequent on hedge-banks in the south.
- Lunularia vulgaris**, *Mich.* Common.
- Riccia glauca**, *L.* Frequent on cliffs and banks in the south.
- Frullania dilatata**, *L.* Very common on trees and boulders.
- F. fragilifolia**, *Tayl.* On rocks on the cliffs, here and there, but not common.
- F. tamarisci**, *L.* On rocks and mossy banks, common. A variety with apiculate leaves occurs on the cliffs between the Gouffre and Corbière.
- Lejeunia minutissima**, *Sm.* On stones and trunks; generally distributed.
- L. serpyllifolia**, *Mich.* On shaded rocks, hedge-stones and trees; frequent.
- Radula complanata**, *L.* Not uncommon in the south on old walls and earthy banks; mostly the var. *propagulifera.*

- Porella lævigata*, *Schr.* Not common. Casrouge (IV.) and the neighbourhood.
- P. platyphylla*, *L.* Occasional throughout the island on banks and boulders.
- P. Thuja*, *Dicks.* Le Moulin (VI.) Jerbourg.
- Bazzania trilobata*, *L.* Very rare. Fermain cliffs.
- Cephalozia divaricata*, *Sm.* Not uncommon in the south on dry banks.
- C. bicuspidata*, *L.* Generally distributed, but not common.
- C. Turneri*, *Hook.* Fermain cliffs, very sparingly on a gravelly bank.
- Lophocolea bidentata*, *L.* Common.
- L. heterophylla*, *Schr.* Common, but less so than the last.
- L. Hookeriana*, *Nees.* In old wells at La Bouvée (III.) and in Saints Bay Valley. Much more fragrant than the other species of this genus.
- L. spicata*, *Tayl.* On shaded stones. Abundant in a hollow lane at Les Messuriers (IV.) Lane near Les Piques (VII.) Norgiots Valley (II.) Les Ozouëts (I.) Valley below Ozanne's Mill.
- Chiloseyphus polyanthos*, *L.* Rather common in streams in all parts of the island.
- Saccogyna viticulosa*, *Mich.* Rather common on banks in the south. Talbots Valley.
- Kantia trichomanis*, *L.* Common.
- K. arguta*, *Nees.* Moulin Huet Valley.
- Scapania compacta*, *Dun.* Common on the cliffs on the earth among the rocks, and occasional in all parts of the island.
- S. nemorosa*, *L.* Very rare. Shaded rocks below Doyle's Monument.
- Diplophyllum albicans*, *L.* Rather common on shady banks.
- Plagiochila asplenioides*, *L.* Occasional in all parts, varying much in size.
- P. spinulosa*, *Dicks.* Frequent on banks in the south, and on the cliffs.
- Jungermannia Genthiana*, *Hubn.* Saints Bay cliffs.
- Alicularia scalaris*, *Schrad.* Occasional on the cliffs.
- Fossombronina pusilla*, *Nees.* Common on banks in all parts.
- Pellia epiphylla*, *L.* Common on shady streamlet banks.
- P. calycina*, *Tayl.* By streamlets and springs in the south.
- Aneura multifida*, *Gray.* Frequent in marshy places.
- Metzgeria furcata*, *L.* Common on trees and shady stones.
- Anthoceros lævis*, *Dill.* Moist banks and stream-sides; frequent.

LICHENS.

- Lichina confinis*, *Ach.* On rocks at high water mark all round the coast.
- L. pygmæa*, *Lightf.* With the last, but much less common. Petit Port. L'Érée.
- Collema pulposum*, *Bernh.* Saints Bay. Base of Doyle's Monument. Beaucamps (VIII.) on a wall.
- C. ceranoides*, *Borr.* Sandy hollows near Albecq.
- C. crispum*, *Huds.* Guernsey, Rev. T. Salwey (Leight. p. 20).
- C. cheileum*, *Ach.* Frequent on old walls.
- C. flaccidum*, *Ach.* Saints Bay, on rocks.
- C. nigrescens*, *Huds.* On old roadside trees; several stations in III. and VII.
- Leptogium lacerum*, *Ach.* Cliffs between Fermain and Bec du Nez. Petit Bôt cliffs.

- L. subtile**, *Schrad.* Guernsey, Rev. T. Salwey (Leight. p. 29.)
- L. plicatile**, *Ach.* Rocquaine Castle. Near Grantez Mill.
- L. palmatum**, *Huds.* Guernsey, Mrs. Collings (Leight. p. 31.)
- L. tremelloides**, *L.* On mossy rocks, Moulin Huet Valley.
- L. muscicolum**, *Sw.* Guernsey, Rev. T. Salwey (Leight. p. 35.)
- Sphærophoron compressum**, *Ach.* Guernsey, Rev. T. Salwey (Leight. p. 48.)
- S. coralloides**, *Pers.* Rare. Jerbourg Head. Corbière.
- Bœomyces rufus**, *Dc.* Guernsey, Rev. T. Salwey (Leight. p. 50.)
- Cladonia endiviæfolia**, *Fr.* Western side of L'Anresse Common.
- C. cervicornis**, *Schær.* Petit Bôt.
- C. aleicornis**, *Flk.* Guernsey, Rev. T. Salwey (Leight. p. 56.)
- C. pyxidata**, *Fr.* Common, and very variable.
- C. gracilis**, *Hoffm.* Var. *Chordalis*, *Ach.* Guernsey, Rev. T. Salwey (Leight. p. 59.)
- C. furcata**, *Hoffm.* Guernsey, Rev. T. Salwey (Leight. p. 60.)
- C. squamosa**, *Hoffm.* Fermain cliffs.
- C. cornucopioides**, *Fr.* Cliffs at Fermain and Jerbourg.
- C. rangiferina**, *Hffm.* Common in dry, heathy places.
- Stereocaulon condensatum**, *Hffm.* Torteval, Mr. Larbalestier (Leight. p. 72.)
- S. nanum**, *Ach.* On the earth in crumbly banks and fissures of rocks; not uncommon in all parts of the island.
- Roccella tinctoria**, *DC.* Guernsey, Mr. Gosselin (Leight. p. 74.)
- R. phycopsis**, *Ach.* Frequent on the southern cliffs and on old walls in IX. and X. L'Érée. Rocquaine Castle.
- R. fuciformis**, *Ach.* On rocks all round the coast; more plentiful than the last.
- Usnea barbata**, *Linn.* Rare. On trees at Les Bordages (VII.) On rocks at Jerbourg and St. Martin's Point. *f. plicata*, *L.* Mossy rocks below Doyle's Monument, sparingly.
- Evernia prunastri**, *L.* Rare. Les Prevosts (VII.) Moulin de Haut (VIII.)
- Ramalina calicaris**, *Hffm.* On trees above Jaonnet cliffs (III.)
- R. farinacea**, *L.* Frequent on trees and bushes in all parts.
- R. fraxinea**, *L.* On old thorns, Jerbourg.
- R. fastigiata**, *Pers.* Rather common, especially on old thorns, occasionally on stones.
- R. polymorpha**, *Ach. f. depressa*, *Cromb.* Guernsey, Rev. T. Salwey (Leight. p. 87.)
- R. pollinaria**, *Ach.* Rather common in many parts of the island on trees; occasionally on rocks and stones.
- R. scopulorum**, *Dicks.* Common all round the coast, often very large and fine. Var. *subfarinacea*, *Nyl.* Jerbourg Head. Var. *incrassata*, *Nyl.* Frequent on the southern cliffs.
- R. cuspidata**, *Ach.* Common on the coast, growing in company with the last, which it much resembles, but is at once distinguished by the different chemical reaction. Var. *crassa*, *Del.* Frequent in the north and north-west.
- R. Curnowii**, *Cromb.* Rare. Jerbourg. Petit Port cliffs. Coast by Fort Houmet.
- Platysma sæpincola**, *Æhr.* Guernsey, Rev. T. Salwey (Leight. p. 95.)

- Nephromium lævigatum**, *Ach.* I have searched in vain for this plant in Guernsey, although Mr. Larbalestier records it (Leight. p. 99) as "common on all the islands."
- N. lusitanicum**, *Schær.* Frequent in the south on rocks and hedge-stones.
- Peltigera canina**, *L.* Generally distributed, but not common, and usually in poor condition.
- P. rufescens**, *Hffm.* Guernsey, Rev. T. Salwey (Leight. p. 103.)
- P. spuria**, *Ach.* Jerbourg. Calais (III.) Road to Saints Bay. Near St. Peter's Rectory.
- P. polydactyla**, *Hffm.* Fermain cliffs. Below Doyle's Monument. Petit Bôt Valley.
- Stictina limbata**, *Sm.* In several places on St. Martin's cliffs, but always sparingly.
- S. fuliginosa**, *Dicks.* Cliffs between Fermain and St. Martin's Point. Jerbourg.
- S. serobiculata**, *Scop.* Rare. Cliffs south of Fermain, very fine.
- Sticta pulmonaria**, *Ach.* Very rare. Tree trunks, Sausmarez (III.)
- S. aurata**, *Ach.* Jerbourg, Mr. Lukis and Mrs. Collings (Leight. p. 112.)
- Ricasolia amplissima**, *Scop.* Jerbourg, Rev. T. Salwey (Leight. p. 113.)
- R. lætevirens**, *Lightf.* On rocks between Fermain and St. Martin's Point. Saints Bay cliffs, sparingly.
- Parmelia caperata**, *L.* Common on trees, rocks and boulders.
- P. olivacea**, *L.* Frequent on rocks on the coast.
- P. physodes**, *L.* Rare. Jerbourg, on rocks, sparingly.
- P. reddenda**, *Stirt.* On tree trunks, generally distributed. It is quite impossible to distinguish this species from *P. Borreri* by external characters; but the reaction is very different.
- P. perlata**, *L.* Common on rocks and trees. Var. *ciliata f. dissectula*. Fermain Bay. Corbière.
- P. tiliacea**, *Ach.* Jerbourg (var. *scortea*, *Ach.*)
- P. Borreri**, *Turn.* Much less frequent than *P. reddenda*. On rocks, Jerbourg. On trees, Effards (VIII.)
- P. fuliginosa**, *Dub.* Rather common on seaside rocks.
- P. perforata**, *Wulf.* On trees and stones in all parts of the island; not rare.
- P. conspersa**, *Ehr.* Common near the sea on rocks, and also on stones in hedges inland. *f. stenophylla*, *Ach.* Southern cliffs. *f. isidiata*, *Anzi.* Mont Cuet. Jerbourg.
- P. sinuosa**, *Sm.* Guernsey, Mr. Larbalestier (Leight. p. 125.)
- P. saxatilis**, *L.* Common on rocks and trees. Var. *omphalodes*, *L.* Frequent on the coast.
- P. lævigata**, *Sm.* Generally distributed and frequent.
- P. Delisei**, *Dub.* Petit Bôt cliffs. Near Fort Le Marchant. Near Les Camps (VIII.)
- Physcia flavicans**, *Sw.* On rocks, rare. Jerbourg. Icart Point. Between Saints Bay and Moulin Huet. Pezeries Point (V.)
- P. chrysothyma**, *L.* Guernsey, Mr. Larbalestier (Leight. p. 131.)
- P. parietina**, *L.* Common. *f. cinerascens*, *Leight.* L'Érée. Near the Hermitage (IX.) Near Les Capelles. *f. terricola*, on a bank at Plaisance (VI.)
- P. ciliaris**, *L.* On a tree near Doyle's Monument. On trees at Sausmarez (III.)

- P. pulverulenta*, Schreb. Vauxbelets Valley, on elms. Les Mourants (VIII.) Wall top near Rouse Martello Tower.
- P. obscura*, Ehr. On trees; Videclins Road (VIII.) Calais Valley (III.)
- P. adglutinata*, Flk. Between Les Blanchés and Doyle's Monument (*f. soreliata*, Nyl.)
- P. leucomela*, L. Jerbourg and S.W. point of Rocquaine Bay, Mr. Lukis (Leight. p. 138.)
- P. speciosa*, Wulf. Jerbourg, frequent. Petit Bôt cliffs. Cliffs below Calais. Rocquaine Castle.
- P. erosa*, Borr. On trees, rocks and walls in many parts of the island.
- P. astroidea*, Clem. On a tree at Les Fallaises (III.) On young trees, Fontenelle Valley (VI.)
- P. stellaris*, L. Rather common. Var. *leptalea*, Ach. On trees above Bec du Nez. Neighbourhood of Gouffre. Var. *tenella*, Scop. Frequent. Var. *casia*, Hffm. On rocks. Jerbourg. L'Anresse Common. Les Camps (VIII.)
- P. aquila*, Ach. Common on rocks and boulders all round the coast.
- Umbilicaria pustulata*, Hffm. Near Petit Bôt, Mr. Lukis (Leight. p. 143.)
- Pannaria rubiginosa*, Thunb. Jerbourg, Mr. Larbalestier (Leight. p. 151.)
- P. pezizoides*, Web. Var. *coronata*, Ach. Plaisance (VI.) Le Graie (VI.) Les Bordages (VII.)
- P. microphylla*, Sw. Jerbourg, Mr. Larbalestier (Leight. p. 152.)
- P. plumbea*, Lightf. Guernsey, Rev. T. Salwey (Leight. p. 154.)
- P. nigra*, Huds. On old wall tops. Fauxquets. Vale Road. Les Camps (VIII.) Often with triseptate spores.
- Amphiloma lanuginosum*, Ach. In several places between Fermain and St. Martin's Point.
- Squamaria crassa*, Huds. Guernsey, Rev. T. Salwey (Leight. p. 157.)
- S. saxicola*, Poll. Eastern side of Vale Castle.
- Placodium murorum*, Hffm. Not uncommon all round the coast and on old walls. *f. lobulatum*, Smrft. Frequent on the coast.
- P. miniatum*, Hffm. On rocks on the seashore. Fort Doyle. Richmond. *f. obliteratum*, Pers. Cove under Doyle's Monument.
- P. callopismum*, Ach. On a ruined brick wall near the rifle butts at Houmet; very scarce.
- P. citrinum*, Ach. On old walls, old posts, and on the earth at the base of hedge-banks; frequent throughout the island.
- P. fulgens*, Sw. North side of Guernsey, Mr. Larbalestier and Miss Lukis (Leight. p. 164.)
- Lecanora vitellina*, Ach. Common. Var. *coruscans*, Ach. Calais road-side wall. Old gate near St. Martin's Church.
- L. candelaria*, Ach. On an old apple tree in my garden. Mont Cuet, on rocks.
- L. glaucocarpa*, Whln. *f. eucarpa*, Nyl. Cove, Guernsey (probably a misprint for Cobo), Mr. Larbalestier (Leight. p. 169.)
- L. squamulosa*, Schrad. Vale Castle Hill. Albecq. Fort Le Marchant.
- L. fuscata*, Schrad. On a wall near Les Vauxbelets.
- L. cinerea*, L. Vale Castle Hill. Icart cliff wall. Jaonnet cliffs.
- L. tartarea*, L. Grandes Rocques Head. Jerbourg. Fort Houmet.
- L. varia*, Ehr. Naftiaux (II.) Rocquaine. Corbière.
- L. atra*, Huds. Common on rocks and boulders; rare on trees.
- L. circinata*, Pers. Guernsey, Rev. T. Salwey (Leight. p. 179.)

- L. polytropa**, *Ehr.* Frequent on the coast.
- L. sulphurea**, *Hffm.* Common on the coast, and on boulders inland.
- L. symmieta**, *Ach.* On an old shed near Fort Le Marchant.
- L. expallens**, *Ach.* On old gate posts. Grande Mare. Jerbourg. Les Falaises (III.)
- L. chlorophæodes**, *Nyl.* Vale Castle, Mr. Larbalestier (Leight. p. 184.)
- L. subfusca**, *L.* Very common. *f. allophana*, *Ach.*, and *f. chlarona*, *Ach.*, Naftiaux (II.) *f. coilocarpa*, *Ach.* Frequent on St. Martin's cliffs.
- L. galactina**, *Ach.* On stones in hedges, and on the earth in crumbly, gravelly banks; common in all parts.
- L. prosehoides**, *Hyl.* Rocks on the seashore, frequent.
- L. Hageni**, *Ach.* On gate posts near Paradis (IX.) and Frie Baton (VII.)
- L. gibbosa**, *Ach.* Frequent on the southern cliffs. Mont Cuet.
- L. badia**, *Ach.* Guernsey, Mr. Larbalestier (Leight. p. 198.)
- L. poliophæa**, *Whln.* Grandes Rocques Head, scarce. Icart cliffs.
- L. parella**, *L.* Very common on trees, rocks and stones. *Var. pallescens.* Les Mourants (VIII.)
- L. glaucoma**, *Hffm.* Common on rocks and hedge-stones.
- L. albella**, *Pers.* Bec du Nez cliffs, on a willow. Fermain Valley, on an old ash tree.
- L. aurantiaca**, *Lightf.* Mont Cuet, on a detached stone in a hedge.
- L. ferruginea**, *Huds.* Very common. *f. saxicola*, *Ach.* Petit Port. *f. festiva*, *Ach.* Frequent on the south coast.
- L. cerina**, *Ehr.* Frequent on trees in all parts.
- L. pyracea**, *Ach.* Mont Saint, on hedge-stones. *Var. ulmicola*, *DC.* On old elms. Les Buttes (VII.) and near Mont Saint.
- L. epixantha**, *Ach.* Vale Castle, Mr. Larbalestier (Leight. p. 213.)
- L. phlogina**, *Ach.* Etiennerie (VII.), on a gate bar.
- L. sophodes**, *Ach.* Frequent on all districts on elm trees. Icart, on stones.
- L. milvina**, *Whln.* Vale Castle, Mr. Larbalestier (Leight. p. 216.)
- L. atrocinerea**, *Dicks.* Fermain. Jerbourg. Icart cliffs.
- L. holophæa**, *Mont.* In crevices of rocks. Southern cliffs. Albecq. Fort Houmet.
- L. erysibe**, *Ach.* Rocquaine Castle. Fort Houmet. Mont Saint. Richmond.
- L. aipopsila**, *Whln. f. maritima*, *Smrft.* Jerbourg, Mr. Larbalestier (Leight. p. 219.)
- L. Ralfsii**, *Salw.* Moulin Huet Bay.
- L. confragosa**, *Ach.* Jerbourg. Petit Port. Jaonnet cliffs.
- L. prosecha**, *Ach.* Rocquaine Castle. Extremely like the much commoner *L. prosehoides* externally, but at once distinguished by the septate spores.
- L. hæmatomma**, *Ehr.* Jerbourg.
- Pertusaria ceuthocarpa**, *Sm.* L'Érée Point.
- P. dealbata**, *Ach.* Jerbourg.
- P. communis**, *DC.* Near Câtel Church. Les Effards (VIII.)
- P. fallax**, *Pers.* Saints Bay.
- P. pustulata**, *Ach.* Fauxquets Valley (VIII.)
- Phlyctis agelæa**, *Ach.* Guernsey, Mr. Larbalestier (Leight. p. 237.)
- Urceolaria scruposa**, *L.* St. Martin's Point. Rocquaine Castle. L'Érée. Wall of Vale Castle.

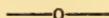
- Lecidea Salweii**, *Borr.* On the earth among rocks. Jaonnet cliffs. Petit Port.
- L. atrorufa**, *Dicks.* Guernsey, Rev. T. Salwey (Leight. p. 242.)
- L. sylvicola**, *Flot.* Below Doyle's Monument.
- L. lucida**, *Ach.* On perpendicular, shady rocks and quarry sides. Petit Bôt Valley. Moulin Huet Valley. Near Les Fauxquets (VIII.)
- L. decolorans**, *Flk.* On the earth among rocks. Jaonnet cliffs. Saints Bay cliffs.
- L. vernalis**, *L.* Guernsey, Mr. Larbalestier (Leight. p. 259.)
- L. quernea**, *Dicks.* Guernsey, Rev. T. Salwey (Leight. p. 264.)
- L. enteroleuca**, *Ach.* Guernsey, Mr. Larbalestier (Leight. p. 264.)
- L. parasema**, *Ach.* Common. Var. *eleochroma*, *Ach.* Common on thorns and young trees. Var. *latypæa*, *Ach.* On rocks. Forest cliffs. St. Briocq Valley (VI.) Jerbourg.
- L. protrusa**, *Fr.* Corbière.
- L. enterochlora**, *Tayl.* Fermain.
- L. uliginosa**, *Schrad.* Guernsey, Mr. Larbalestier (Leight. p. 274.)
- L. coarctata**, *Sm.* Generally distributed. *f. elacista*, *Ach.* Near Grantez Mill. *f. involuta*, *Tayl.* Grantez (VIII.) *f. terrestris.* On a gravelly bank at the south end of the Villiaze Road.
- L. lapicida**, *Fr.* Jerbourg.
- L. rivulosa**, *Ach.* Common on the southern cliffs. Vale Castle. Mont Cuet.
- L. fusco-atra**, *Ach.* Jerbourg (*f. fumosa*, *Ach.*)
- L. Taylori**, *Salw.* On rocks and boulders from Fermain to Jerbourg.
- L. contigua**, *Fr.* Frequent at St. Martin's. *f. limitata*, *Leight.* Frequent on the cliffs. *f. steriza*, *Ach.* Cove below Doyle's Monument.
- L. albocærulescens**, *Wulf.* Cliffs at Portelet (IV.)
- L. confluens**, *Web.* L'Érée Point.
- L. diducens**, *Nyl.* Between Petit Port and Jaonnet. Grandes Rocques. Icart Cliff wall. Var. with polarilocular spores, L'Anresse Common.
- L. canescens**, *Dicks.* Common on trees, rocks and stones, fruiting freely.
- L. stellulata**, *Tayl.* Generally distributed and common.
- L. atroalba**, *Ach.* Moulin Huet Cliffs. Jerbourg. Grandes Rocques Head.
- L. myriocarpa**, *DC.* Rather common. *f. chloropolia*, *Fr.* Mont Saint. Frie Baton (VII.) Paradis. *f. areolata*, *Leight.* Saints Bay.
- L. subdisciformis**, *Leight.* Very common all round the coast. Easily distinguished by the chemical reaction K. yellow then red. Var. *meiosperma.* Corbière.
- L. chalybeia**, *Borr.* Petit Port. Fermain. Portelet Cove (IV.) On a brick wall, Villiaze Road.
- L. applanata**, *Fr.* Several places on St. Martin's Coast. Albecq.
- L. cæruleonigricans**, *Leightf.* Cobo. Mr. Larbalestier (Leight. p. 331.)
- L. biformigera**, *Leight.* L'Érée Point. Moulin Huet Cliffs.
- L. lenticularis**, *Ach.* Occasional on the rocks on the cliffs. Rocquaine Castle. On walls at Vauxbelets. Villiaze Road and L'Érée.
- L. lutea**, *Dicks.* Mont Varouf Valley (VII.) Les Prevosts (VII.)
- L. cyrtella**, *Ach.* On elder trees. Fermain. Petit Port Cliffs. Cliffs above Bec du Nez.
- L. subviridescens**, *Nyl.* Jerbourg. Saints Bay Valley.
- L. incompta**, *Borr.* On an aged elm at Calais (III.)

- L. alboatra**, *Hffm.* Frequent. *f. epipolia*, *Ach.* Not uncommon in all parts of the island. *f. ambigua*, *Ach.* L'Erée Point.
- L. chlorophæa**, *Hepp.* L'Erée Point.
- L. mesoidea**, *Nyl.* Jerbourg.
- L. aromatica**, *Sm.* Common on old walls throughout the island.
- L. abietina**, *Ach.* Guernsey, Mr. Larbalestier (Leight. p. 354).
- L. carneolutea**, *Turn.* On old elms, occasionally on other trees, rarely on ivy stems. Generally distributed.
- L. umbrina**, *Ach.* On rocks, old walls and gate-bars. Not uncommon. At once distinguished by the curious spirally-contorted spores.
- L. milliaria**, *Fr. f. terrestris*, *Fr.* Guernsey, Mr. Larbalestier (Leight. p. 362).
- L. phacodes**, *Korb. f. chlorotica*, *Ach.* On old trees. In several places in VI. and VII. Calais Valley. Sausmarez (VIII.)
- L. sabuletorum**, *Flk.* On old walls among small mosses; frequent. Often in company with *L. aromatica*.
- L. premnea**, *Ach.* Guernsey, Mr. Larbalestier (Leight. p. 365).
- L. carneola**, *Ach.* On trees on the cliffs above Bec du Nez, scarce.
- L. endoleuca**, *Nyl.* On trees, old ivy and furze stems; common.
- L. rubella**, *Ehr.* On elms, generally distributed.
- L. effusa**, *Sm.* Valley below La Fosse (III) on a young elm tree.
- L. geographica**, *L.* Rather common all round the coast.
- L. petræa**, *Wulf.* Common on rocks on the cliffs. L'Ancrese.
- L. concentrica**, *Dav.* Frequent about Petit Bôt. Le Moulin (VI.) Fermain.
- L. cupularis**, *Ehr.* Generally at the base of boulders and rocks, almost concealed by the vegetation. Fermain. Jerbourg. Grandes Rocques.
- L. ochrophora**, *Nyl.* Cliffs above Bec du Nez, on an old elder tree.
- L. Parmeliarum**, *Smrf.* Jerbourg cliffs. Mr. Larbalestier (Leight. 386).
- Opegrapha atra**, *Pers.* Very common. Var. *parallela*, Leight. St. Martin's.
- O. Turneri**, *Leight.* Between Fermain and Bec du Nez, on a young oak.
- O. saxicola**, *Ach.* Very common on stones in hedges, and on rocks. Var. *Chevallieri*, Leight. Spur Point. Albecq. Grantez (VIII.)
- O. saxigena**, *Tayl.* On the perpendicular face of rocks in Moulin Huet Bay.
- O. grumulosa**, *Duf.* On rocks between Fermain and Bec du Nez, scarce.
- O. varia**, *Pers.* Common and very variable. *f. diaphora*, *Ach.* Fermain. Saints Bay.
- O. Cæsarensis**, *Nyl.* Moulin Huet Bay.
- O. vulgata**, *Ach.* Frequent on various trees; occasionally saxicole.
- O. lyncea**, *Sm.* Guernsey, Mr. Larbalestier (Leight. p. 409).
- O. prosodea**, *Ach.* On an old ash tree, Moulin Huet Valley.
- Stigmatidium crassum**, *Dub.* Very common on large tree trunks.
- S. circumscriptum**, *Tayl.* Forms snow-white patches usually on the underside of overhanging rocks. Not uncommon at Jerbourg. Cliffs above Bec du Nez. Eastern side of L'Ancrese.
- S. Hutchinsiae**, *Leight.* Roadside wall, Saints Bay Valley. Old well, Moulin Huet Valley.
- Arthonia punctiformis**, *Ach.* Guernsey, Mr. Larbalestier (Leight. p. 419),
- A. astroidea**, *Ach.* Frequent, usually on young trees.

- A. epipasta**, *Ach.* Petit Port Cliffs, on a crab apple tree.
- A. cinnabarina**, *Wallr.* On trees near St. Andrew's Church. Bec du Nez Cliffs, on old willows.
- A. varians**, *Dav.* Parasitic on the apothecia of *Lecanora glaucoma*; frequent all round the coast.
- Graphis scripta**, *Ach.* Guernsey, Mr. Larbalestier (Leight. p. 428).
- G. dendritica**, *Ach.* Fermain Valley. Mont Varouf (VII.) Near King's Mills. Var. *obtusa*, Leight. Between Villocq and Sausmarez (VIII.)
- G. inusta**, *Ach.* On trees above Bec du Nez. Moulin de Haut (VIII.) *f. simpliciuscula*, Leight. Fermain.
- G. sophistica**, *Nyl.* Bec du Nez Cliffs, on willow and chestnut, sparingly. Valley below Les Issues (VII.) on oak.
- Chiodecton Sarniense**, *Salw.* Jerbourg Head, scarce.
- Normandina pulchella**, *Borr.* On trees, usually growing among *Frullania dilatata*. Les Effards (VIII.), scarce.
- Endocarpon miniatum**, *L.* Petit Bôt Bay. Petit Port Cliffs. Pezeries Point (V.) Var. *complicatum*, Sw. Jerbourg. Saints Bay. Moulin Huet.
- E. fluviatile**, *DC.* Saints Bay, Mr. Larbalestier (Leight. p. 443).
- Verrucaria mucosa**, *Whln.* Petit Port, forming smooth dark olive green patches on hard rocks below high water mark.
- V. halophila**, *Nyl.* Jerbourg, Mr. Larbalestier (Leight. p. 445).
- V. margacea**, *Whln.* On rocks over which water trickles. Saints Bay Valley. Petit Port. L'Erée Point. Var. *æthiobola*, *Whln.* Portelet Cove. Petit Port.
- V. maura**, *Whln.* Common on rocks at high water mark.
- V. mauroides**, *Schær.* Frequent on stones in hedges.
- V. nigrescens**, *Pers.* Portelet Cliffs (IV.)
- V. macrostoma**, *Duf.* Wall of Vale Castle.
- V. viridula**, *Schrad.* Moulin Huet. Mont Saint.
- V. murina**, *Leight.* Jerbourg.
- V. rupestris**, *Schrad.* Fermain. Jerbourg.
- V. gemmata**, *Ach.* Frequent on trees throughout the island.
- V. epidermidis**, *Ach.* Near St. Helena. Upper end of Talbots Valley. Var. *analepta*, *Ach.* Not uncommon.
- V. biformis**, *Borr.* Rather common on tree trunks.
- V. Salweii**, *Leight.* On the old battery at Saints Bay.
- V. chlorotica**, *Ach.* On shaded stones in hedges. Frequent at St. Martin's. Var. *trachona*, *Tayl.* Fermain Cliffs. Var. *carpineæ*, *Schær.* Near the Gouffre.
- V. nitida**, *Weig.* Common, especially on ash trees. Var. *nitidella*, *Flk.* Equally distributed but less common than the type.

THE CICADÆ OR TETTIGIDÆ OF GUERNSEY.

BY MR. W. A. LUFF.



IN a paper read before the Society in 1890, I gave a list of the Hemiptera-Heteroptera of this island, a group forming the first division of the order Hemiptera, insects characterized by a sucking rostrum instead of cutting jaws, and by their undergoing an incomplete metamorphosis.

The insects now under consideration (The Cicadæ) are included in the second division of the Hemiptera, under the title of Hemiptera-Homoptera, and differ from the Heteroptera by the elytra or forewings being membranous and naked, and not overlapping each other at the apex, and the rostrum springing from the posterior portion of the under side of the head, near the base of the fore-legs.

To this group also belong the numerous species of Aphides or greenflies, so destructive to our plants in gardens and greenhouses, and the scale insects, which include such species as the Cochineal insect (*Coccus cacti*), a native of Mexico, the lac insect (*Coccus lacca*), of the East Indies, and the common scale insect (*Coccus adonidum*) so well known in our hot-houses and conservatories. The curious ant's nest species *Ripersia Tomlinii*, recently discovered for the first time at Moulin Huet Bay also belongs to this family.

The Cicadæ of the Tropics are often of a very large size, some of them measuring as much as seven inches across the wings. Many of the species possess an apparatus for the production of a rather sharp and rattling sound, which is sometimes so loud as to be heard at the distance of a mile.

The musical or sounding organs, which exist only in the male, are situated on the sides of the insect, just behind the wings. They consist of drum-like membranes stretched over small cavities; attached to the inside of these are powerful muscles which serve to vibrate the membrane with inconceivable rapidity. The noise is sharp, monotonous and tiresome from its constant repetition.

It is on account of its song that the Cicada has been mentioned so much in the literature of the countries in which it occurs.

Plato, Virgil, Homer, Aristotle, and others make allusion to this insect in their writings, and it has been often figured on the gems and coins of Ancient Greece. Mr. Buckton in his monograph mentions an ancient Roman ornament, representing one of these insects, probably as old as 300 years B.C.

The exotic lantern flies also belong to the Cicadæ. Their name *Fulgora* was given by Burnmeister, as suggestive of the luminous property then popularly believed to reside in the singular horny cases protruding from their thoraces, which have fanciful resemblances to Chinese lanterns.

Although Madame Merian made the statement, "that she could read the print of a Dutch newspaper by the light afforded by one of these insects," no reliable entomologist has confirmed her statement of such a phosphorescence.

A writer, however, in the *Entomologist's Monthly Magazine* (Vol. VIII. page 167) calls attention to a statement made in Perry's "Arcania" (an old book), doubtless on hearsay evidence, that the attendants on travellers in China are in the habit of lighting their way at night by carrying these insects.

The editors of the above magazine hint that "if *Fulgora* be luminous, then it most studiously turns off its 'bull's eye' in the presence of all the modern scientific naturalists who have made a special search for its lamp; and having arrived at this stage of development, we anticipate, that by a process of natural selection, *Fulgora* will eventually lose all luminous powers and attributes, having found no truth (?) in the motto "*ex luce lucellum.*"

We now turn to the species of Cicadæ inhabiting this island; they, in common with those found in Great Britain, are small in size and have none of the musical properties which have made their exotic relatives so famous in song and fable.

We have, however, numerous species, which although small, are very beautiful in colour and markings.

Some are interesting from their grotesque appearance and gait which has earned for them the name of froghoppers; indeed most of these insects have the power of jumping to an extraordinary distance in comparison to their size, and are rather difficult to capture in consequence.

One of the commonest species and which is familiar to nearly everyone is the cuckoo-spit insect.

The larvæ of several of the species, especially of *Philænus spumarius* conceal themselves in a kind of foam which is called cuckoo-spit.

The belief that the cuckoo spits out this moisture is very general in Guernsey. Mr. Buckton says that "Ancient beliefs, with a love of the marvellous mixed with credulity, find exponents in our day. In the author's knowledge a question was raised amongst some friends as to the origin of cuckoo-spit. A wag gravely stated that the bird made itself hoarse by singing his oft repeated note, and that during the fits of silence he relieved his throat in the manner shown on the vegetation around. An otherwise intelligent auditor accepted the explanation as satisfactory, just in the same manner as our forefathers have done."

A tenacious liquid is secreted by the larva through which bubbles of air are rapidly blown. It has been known to blow as many as seventeen bubbles in the course of half-a-minute.

After remaining on the herbage a week or more and serving as a protection to the soft bodied occupant, both from its enemies and the droughts of summer, the frothy mass thickens by evaporation and then it forms a cavity in which the final transformation is effected. An allied species, a native of Madagascar, emits a large quantity of watery fluid which drops from the trees even in the hottest times of the day.

Although this list must be considered very incomplete, still it is the first that has been compiled for any of the Channel Islands.

I am indebted to Mr. James Edwards, F.E.S., the best authority on the order in England, for his great kindness in examining and naming the specimens.

HEMIPTERA-HOMOPTERA.

ISSIDÆ.

Issus coleoptratus, Geoff. Beaten commonly from ivy near Moulin Huet Bay in September and October.

CIXIIDÆ.

Cixius pilosus, Ol. Taken by sweeping low herbage near the coast. Very abundant near Rocquaine Bay on Midsummer Day, 1892.

DELPHACIDÆ.

Libinia vittipennis, J. Sahl. One specimen taken at Saints Bay, June, 1891.

L. leptosoma, Flor. Several taken during May at Saints Bay and the Gouffre.

L. pellucida, Fab. Not uncommon near Saints Bay, May and June.

L. lineata, Perris. Two specimens taken at Torteval, June 24th, 1892.

L. fumipennis. Common near the borders of streams; has not been recorded from Great Britain.

CERCOPIDÆ.

Aphrophora alni, Fall. The largest of our Guernsey Homoptera, and is to be had in abundance by beating low bushes near the coast.

Philænus spumarius, *Lin.* This is the familiar cuckoo-spit insect, which is so abundant all over the island. It is exceedingly variable in colour and markings. I have specimens varying from light yellowish brown to deep black.

P. lineatus, *Lin.* Common in grass fields.

PAROPIIDÆ.

Megophthalmus scanicus, *Fall.* One specimen taken at Moulin Huet Bay by Mr. E. D. Marquand.

BYTHOSCOPIDÆ.

Agallia venosa, *Fall.* Taken commonly by sweeping on the cliffs.

TETTIGONIDÆ.

Euacanthus interruptus, *Lin.* This pretty black and yellow species is not uncommon on the sides of streams at Saints and Petit Bôt Bays. I have taken it also in Alderney.

ACOCEPHALIDÆ.

Accephalus nervosus, *Schr.* Very common.

A. albifrons, *Lin.* Not uncommon under stones; on L'Ancrese Common and near Grande Rocque. Very variable in colour and marking. I have one specimen almost black.

A. histrionicus, *Fab.* This well marked species, which is rare in England, is not uncommon on the sandy coast from Bordeaux Harbour to L'Ancrese Bay. It is to be found at the sides of stones which are embedded in the sand.

Doratura stylata, *Boh.* I have not yet taken this species in Guernsey, but took a single specimen near Longy Bay, Alderney, on August 6th, 1892.

Eupelix cuspidata, *Fab.* One specimen captured at Fermain Bay.

JASSIDÆ.

Athysanus communis, *J. Sahl.* Not uncommon near the coast.

A. obscurellus, *Kbrn.* Several specimens taken on L'Ancrese Common.

A. obsoletus, *Kbrn.* Not uncommon at Grande Rocque. Sept. 8th, 1892.

Deltocephalus sabulicola, *Curt.* I have taken it at Petit Port and Saints Bay in February, June and September.

D. striatus, *Lin.* Common on our southern cliff coast.

D. pulicaris, *Fall.* Common near Cobo. September, 1892.

Thamnotettix dilutior, *Kbrn.* Common in September.

T. plebeja, *Fall.* One specimen taken at St. Andrew's, June, 1892.

T. crocea, *H.S.* Two taken by Mr. E. D. Marquand, March, 1891.

T. attenuata, *Germ.* Not uncommon amongst grasses in the spring.

Limnotettix virescens. Two specimens taken, June, 1891.

Cicadula sexnotata, *Fall.* One taken June 26th, 1892.

TYPHLOCYBIDÆ.

Alebra albostriella, *Fall.* One specimen.

Kybos smaragdulus, *Fall.* Two specimens beaten from willows at Ivy Castle, July 19th, 1892.

Chlorita flavescens, *Fab.* Very abundant in the autumn.

C. viridula, *Fall.* Common in the autumn.

Eupteryx melissæ, *Curt.* Very common in gardens on sage, balm, &c., in spring, summer and autumn.

E. auratus, *Linn.* In company with the preceding species, but not quite so common.

E. concinna, *Germ.* One specimen taken by Mr. E. D. Marquand, at Moulin Huet in 1892.

Typhlocyba tenerrima, *H.S.* Not common.

T. quereus, *Fab.* I have occasionally beaten this pretty little species from oaks in June.

Zygina flammigera, *Geoffr.* One specimen was taken by Mr. E. D. Marquand, March, 1891.

Z. scutellaris, *H.S.* Several taken by sweeping near the cliffs.

PSYLLINA.

Liviidæ.

Livia juncorum, *Latr.* Very abundant on bushes over streams at Saints and Petit Bôt Bays.

In addition to the foregoing a number of Psyllæ occur, but the species have not yet been satisfactorily determined.

ADDITIONS TO THE LIST OF HEMIPTERA-HETEROPTERA OCCURRING IN THE ISLAND OF GUERNSEY.

BY MR. W. A. LUFF.

—o—

I HAVE much pleasure in recording the following additions to the list of Hemiptera-Heteroptera published in the transactions for 1890.

One species, *Heterocordylus parvulus*, Reut., is a great rarity and has never been taken in Great Britain; and several others are very rare and local. The number of species previously recorded was 63. The additions will bring the total up to 107, and I have no doubt that by careful searching many more will yet be discovered.

My best thanks are again due to Mr. E. Saunders, F.L.S., for his kind assistance in identifying my captures.

Odontoscelis fuliginosa, *Lin.* A single specimen taken at the Corbière by Mr. E. D. Marquand in the summer of 1892. It is a rare British species, being found in only three localities on the south coast.

Eysacoris æneus, *Scop.* One specimen taken by sweeping in a damp meadow near Petit Bôt Bay. It is very rare in England.

Pieromerus bidens, *Lin.* One at the Gouffre, September 13th, 1891.

Corizus crassicornis, *Lin.* Very local; not rare on the cliffs near Gouffre in June and July.

Corizus magnicornis, *F.* One specimen taken at the Gouffre, September 13th, 1891.

Metacanthus punctipes, *Germ.* Very common wherever its food plant, *Ononis arvensis*, occurs in August and September.

Nysius thymi, *Wolff.* Common in sandy places on coast, Grande Rocque and L'Anresse. Common, August and September.

Rhyarochromus prætextatus, *H.S.* One specimen on sandy common near Grande Rocque, September 8th, 1891.

Peritrechus geniculatus, *Hahn.* Taken commonly by sweeping on the cliffs at the Gouffre in July and August.

P. nubulis, *Fall.* One specimen captured at Grande Rocque, August 16th, 1892.

P. luniger, *Schill.* Two specimens taken on L'Anresse Common, May 18th, 1891.

Notochilus contractus, *H.S.* One specimen taken by Mr. Marquand in March, 1891. Two others captured at the Gouffre, May 12th, 1892.

Scelopostethus affinis, *Schill.* Common in May and June.

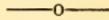
Orthostira parvula, *Fall.* One taken by Mr. E. D. Marquand, September 28th, 1891, on L'Anresse Common.

Dietyonota crassicornis, *Fall.* Several taken under stones on L'Anresse Common in July and August.

- Nabis major**, *Cost.* Exceedingly common under stones on the little islet of Chapelle Dom Hue, near Perelle Bay, on August 2nd, 1892. I have not yet met with it elsewhere.
- Temnosthus pusillus**, *H.S.* One.
- Triphleps minutus**, *Lin.* Several beaten from shallows. Grande Mare, Vazon. September and October.
- Miridius quadrivirigatus**, *Costa.* One specimen, taken on the cliffs, July 28th, 1891. It is a rare and local British insect.
- Plesiocoris rugicollis**, *Fall.* Several specimens taken by sweeping near Ivy Castle, 19th July, 1892.
- Calocoris Chenopodii**, *Fall.* Two specimens taken near Gouffre, July 26th, 1892.
- Lygus pastinacæ**, *Fall.* One taken by Mr. Marquand, May, 1891. Several taken by myself on May 8th, 1892, near Petit Bôt Bay.
- L. cervinus**, *H.S.* One specimen taken May 29th, 1892, on the cliffs near Doyle's Monument.
- Pœciloseytus Gyllenhalii**, *Fall.* One taken by sweeping at the Gouffre, May 12th, 1892.
- Strongylocoris luridus**, *Fall.* Not uncommon. Taken by sweeping on cliffs at Petit Port. July and August.
- Labops saltator**, *Hahn.* Not uncommon. By sweeping grass near the shore at Perelle and Richmond. July and August.
- Campyloneura virgula**, *H.S.* One specimen; at rest on a wall in Mount Durand on October 8th, 1891. One on gate post near Grantez Mill, July 12th, 1892.
- Ætorhinus angulatus**, *Fab.* Two specimens on walls, September 18th and October 13th, 1891.
- Orthotylus Scotti**, *Reut.* One taken by Mr. E. D. Marquand, August 25th, 1891.
- O. viridinervis**, *K.B.* One taken at Ivy Castle, July 19th, 1892.
- O. marginalis**, *Reut.* Several specimens beaten from hedges near Ivy Castle, July 19th, 1892.
- Hypsitylus bicolor**. Two specimens, near Doyle's Monument, July 7th and September 16th, 1892.
- Hetero cordylus parvulus**, *Reut.* I took two specimens of this rare non-British species by sweeping on cliffs near the Gouffre in 1891; and another, also by sweeping on the cliffs near Bon Repos, on June 21st, 1892.
- Macrocoleus Paykullii**, *Fall.* Common near the coast in July and August.
- Psallus ambiguus**, *Fall.* Found one in a spider's web, August 21st, 1891.
- P. lepidus**, *Fieb.* One specimen beaten from an ash tree near Fauxquets, July 12th, 1892.
- P. varians**, *H.S.* Several specimens taken in June and July.
- P. diminutus**, *Kb.* Two beaten from hedges near King's Mills, July 12th, 1892.
- Plagiognathus arbustorum**, *Fab.* Several, by sweeping at the Gouffre, July 26th, 1892.
- Corixa Sahlbergi**, *Fieb.* Common in ponds and ditches at Grande Mare, Vazon.
- C. Linnæi**, *Fieb.* One at Grande Mare, Vazon, April 19th, 1891.
- C. semistriata**, *Fieb.* Several at Grande Mare, Vazon, April 19th, 1891.
- C. Panzeri**, *Fieb.* One specimen, Grande Mare, Vazon.
- C. striata**, *L.* Common; Grande Mare, Vazon, April and May.

GUERNSEY CLAYS.

BY MR. G. DERRICK.



GUERNSEY offers a better field for the mineralogist than for the geologist. Where fossils abound they speedily attract the attention of observant individuals, many young persons become interested in the search for them, and so gradually acquire a taste for geology, which in such districts become a favourite science. Guernsey unfortunately possesses no fossiliferous rocks, and so geology obtains few enthusiastic followers; but those who have devoted themselves to this science have gradually obtained a fairly complete acquaintance with the characteristics of our rocks, and in the article written by the Rev. E. Hill on this subject (see Transactions of Geological Society), we appear to have a reliable account of the variety and disposition of the different rock formations. But in my estimation too little attention has been given to the superficial deposits found in the island. I hope the discussion this evening will draw attention to this subject and lead to the collection of information, which, when laid before some specialists will enable them to give an authoritative idea of the origin and relative ages of these deposits, and perhaps even to show their connection with the tertiary deposits of England and France.

I do not wish on this occasion to open the question of all the superficial deposits, for that would afford matter for many evenings; it would include (1) raised and ancient beaches; (2) peat and the submerged forest; (3) the sand deposits of the north-western coast; (4) the landslips from the cliffs on the south and east coasts; (5) the clays and loams, and (6) the varied soil of the island.

One of the duties devolving upon this Society is to make a list of the various ancient beaches with accurate details of their elevation and composition. The peat has received very little attention, accurate measurement and close examination might lead to the correlation of the different deposits and give an idea of the relative periods of their formation. The deposits are very extensive; peat has been met with not only

at Vazon and Cobo Bays, but also at St. Sampson's and the Town Harbour, at the back of the Rohais and lower Foulon Valley, it probably occurs in many parts of the low-lying lands of the north-west, and a bed of it was pierced in sinking the well for the Waterworks Company at St. Saviour's.

The subject to which I wish more particularly to draw attention this evening is the Guernsey Clays.

The term "Clay" is applied locally to any material which can be used for brick-making. This employment of the term is quite justified by the scientific dictionary, which says: "Economically the term is applied to any finely divided mineral matter, which becomes plastic on being wetted, and retains its shape when moulded or pressed into any particular form."

Its occurrence in Guernsey has long been known and turned to profitable account. Formerly, bricks were made here in such quantities as to be exported, beside supplying the local demand, and pottery (red ware) was made at the Millbrook Brickfield. Latterly, however, the local demand has been greater, some kilns have been demolished, and bricks have been imported from England. The clay is very widely distributed; it is found almost all over the table-land, spreading from Saumarez Manor, in St. Martin's, on the east, to the Forest Church, or even further west, and from that southern line throughout St. Martin's, St. Andrew's, and the Town Parish, to the edge of the high land. It is found in widely scattered localities in the low land, at St. John's, Cobo, Delancey Hill, &c., and it has been worked at the Salt Pans.

The character of the material varies greatly. I shall divide the Guernsey clays into two sections:—

1st—Those found in veins.

2nd—Those forming true superficial deposits.

To the first section belongs Kaolin clay; to the second those clays which have been used for brick-making.

Kaolin clay is not a superficial deposit in Guernsey. The most conspicuous example of it in the bailiwick is at the Coupée, in Sark, where the constant action of the rainfall has carried it down the slope of the cliff and formed a true superficial deposit.

This clay is a direct produce of the disintegration of certain veins in granitic and gneissic rock, and is formed from the felspar which those rocks contain.

In Guernsey it occurs in numerous directions in veins:— It may be seen in considerable quantities in the old clay pit on the north of the Rohais Road. The mass is very impure,

the other ingredients of the rock, quartz, &c., are present in large proportions, but these could be removed by washing, as is done in Devonshire, and good Kaolin clay produced, if it would repay the labour. The section here is intersected and over-arched by veins which follow the habit usual in such situations, to which Mr. De La Mare drew our attention at the Vrangue clay-pit. More striking examples of the same may be seen at the St. Andrew's clay-pit. Here narrow veins rise vertically or nearly so from the lower level, but when approaching the superincumbent clay or surface soil, they bend over to a horizontal direction, generally agreeing with the slope of the surface. These veins are rendered conspicuous by their high colouring, blue or pink. I show specimens from two of them at the St. Andrew's brickfield; the rough Kaolin is from one at the Vrangue; the specimen of prepared Kaolin clay, or pipe-clay, is the material imported from Devonshire for use in the local manufacture of pipes.

On our beaches, bands of clay, or broad veins filled with clay, are rather numerous, the daily action of the tide hastening the process of decay. One such at the Longstore and another at St. Sampson's Harbour are noted, the clay is highly plastic, and when exposed at low tide after a gale is dug by iron founders and others, and is used for stopping furnaces, cracks in ovens, &c.; this kind is locally termed "Butt clay."

2nd.—Clays forming true superficial deposits.

These, as I have said before, are very widely distributed. They cover the disintegrating rock and are nowhere covered by the rock or intersected by the veins, which rise towards the clay and turn off horizontally beneath it. These clays lie in a solid compact layer of varying thickness, they show scarcely any signs of bedding, angular stones can occasionally be obtained from them—these are nearly always irregular and sub-angular pieces of local rocks. At the base of the clay lying on the rock, larger masses of stone of similar character frequently occur. These clays are nearly always of a reddish yellow colour; when fresh dug, especially from some depth, they are sometimes blue, but turn to the normal colour after exposure to the air. They vary in composition, being generally a clayey loam rarely plastic. The more plastic beds can be seen at the Vauquédor clay-pit, at the Naftiaux, at St. Martin's, new brickfield at Cobo (near the Guet), at the back of Delancey Hill, &c. Sometimes the two qualities are found in the same pit, as at the Vrangue, where the clayey loam nearer the surface changes into plastic clay at a greater depth without any definitely marked dividing line. The term

“Plastic Clay” is technically applied to clay of a grey colour, which burns white in the kiln, and is used as a fire-clay; ours therefore cannot be properly called plastic clay. The clayey loam seems to vary from the plastic variety mainly from the large proportion of sand it contains, and even our purest clays when washed are found to contain a good proportion of sand with angular surfaces.

The deposit at the Vrangue is the one which requires most special investigation, for here only are found three superficial deposits overlying each other:—1st, A layer of clayey loam. 2nd, Good clay, so strong as to have to be mixed with other material before being used for brick-making. 3rd, A stratum of sand. The pit has been sunk to a depth of about 20 feet; the thicknesses vary, but may be put down as (in the centre of the pit) 4 feet of loam, 3 feet good clay, 2 feet sand; the rest disintegrating rock worked for gravel, and traversed by numerous veins, some changing into Kaolin.

The sand diminishes towards the south end or higher part of the pit, just disappearing where the works terminate. In one spot it is intersected by a narrow vein of bluish clay, and resting on this I found in the sand the stones exhibited; elsewhere the sand is uniform. I searched well, but could find no signs of shells, and the sand gives no reaction with acids, which it would do if particles of shell were present. The manager of the brickfield showed me two large flint pebbles which he said had been dug out at the base of the sand. We found some at the base of the clay.

We have no means at present of determining how far this sand extends. At Millbrook clay-pit, about 300 yards west, neither sand or good clay is to be seen, clayey loam only. On the other side of the adjoining road, *i.e.*, eastward, the face of the old pit is masked by a wall and cannot be examined. All we know is that the sand extends from south to north about 50 feet, and from east to west about 10 feet. From the south-east corner of the pit it thins out and disappears about 10 feet to the west. The hill slopes downward to the north, and about 200 yards in that direction a new sinking has been made, where good clay, more plastic than any in the old pit, has been found, but it is thickly and irregularly intermixed with large angular fragments of local rock, the whole having a totally different appearance from that in the upper pit; it looks as though it had been washed down with the angular stones from the upper part of the hill.

In most of the pits the change from loam to plastic clay, or from loam or clay to gravel or the decomposing rock

beneath is so gradual, that it leaves the impression that a continuous decay of the rock *in situ* had produced all the present conditions, as though the rock in these spots had consisted almost entirely of quartz and felspar, the infiltration of water had changed the felspar into clay, the freed quartz particles had sunk through it on to the gravel below. Quantities of such fine quartz particles can be seen in the clay in the cutting on the hill-side beyond St. Andrew's brickfield, but they do not form a bed or even lines. In nearly all the pits an irregular line of angular fragments of local rock occurs in the lowest part of the clay; these generally lie on their broader faces.

Clay is formed of the impalpable particles of solid matter which have been carried down by rivers or violent currents. Rapid streams loaded with solid matter on entering the still waters of a lake or the open sea, are checked in their course, and drop, first, the heaviest and largest materials they had been carrying along, fragments of rock, pebbles, &c., then the smaller particles resembling sand would be deposited, and lastly and at a greater distance from the shore, those light impalpable particles which go to form clay.

Guernsey rocks contain all the materials requisite for the formation of clay, so that the beds here may have been formed in lakes or quiet reaches of the sea covering the whole or part of what is now the surface of the island. But clay is found on the highest ground in the island, if then it were deposited in water covering those parts there could be no large extent of land within the present area of the island from which rivers could have come. Are we to suppose then that the deposits were formed when Guernsey was much larger than at present, when perhaps it formed part of land continuous to the continent? This theory seems to me to lack probability, and not to meet all the facts of the case. Preserving our present relative level, and submerging Guernsey to allow the deposit of clay in its highest part, we should have to imagine a river running west from high land in France; how far off this high land would be is a matter of conjecture, but unless the levels have changed there would be so much submerged land to the east of Guernsey that the clayey particles would have been precipitated much further to the eastward; beside, such a river could not still carry in it the stones now embedded in the clays (of which I show specimens); and how comes it that the stones are similar to our local rocks? On the other hand there is special difficulty in accounting for the flints in the Vrangue clay; these must have been swept off a surface where

flints were found. Perhaps this special deposit belongs to a different period from those on the table-land, and may have been formed in a different manner; being on a lower level it is more easy to imagine streams flowing over the higher parts of Guernsey, then perhaps much larger than now, and depositing this clay in a sheltered area of the sea, or large pond. Then the previous deposition of the sand has to be accounted for. I show a sample of the sandy material, and also of the loam, deposited by our present streams, which can be compared with the Vrangue sand, and the clay and loam of the brickfields.

When last visiting the clay-pit behind Nant's farm at St. Andrew's, from which all the good surface material has been removed, I was much struck by a process now going on there. The rock, as usual, is in a very decomposed state, having the appearance of hard plaster on the exposed face, but on applying a knife it can easily be cut away. Some of the decaying veins yet retaining their original shape and position have changed into clay of varying colours, some blue, some yellow. The rainfall acting on the material thus exposed and on masses perhaps designedly thrown down, has formed in the lower corner of the pit a deposit having much the same colour and surface appearance as our ordinary clay. But it is only the thinnest surface which is clay, beneath, particles of various sizes are mixed irregularly.

The idea occurred whether all our deposited clay could have been formed in a somewhat similar manner. A very lengthened period would be required to enable the material to be accumulated to its present depth slowly as the result of the flow of the present rainfall. The clay would have to lie in shallow hollows with banks around them; such conditions cannot now be traced. Vegetation would prevent such a process going on, so that it could only take place if the surface were bare, which would imply a very severe climate, and would agree with the fact that no signs of animal or vegetable life have been discovered in the clays; then again, the stones included in it would be local stones, not having been much rolled or carried far they would still be angular, and so, many of the difficulties of the case would be met.

We have at present scarcely any facts collected bearing upon the age of the formation. It is covered by falls from the higher part of the cliff at Fermain Bay (north side), &c., and members will remember that a deposit of yellow clay was found 20 feet below the present surface in sinking a well at the Truchot, and that it was followed by 2 feet of peaty mould.

On the other hand, a peaty formation overlies hardened beds of clay at the Guet, Cobo; and at Fort Doyle common, on the east side, there is a peaty-clay earth of dark colour and hardened, containing numerous pebbles of local stone and flint, lying above a hard yellow clay, the upper part of which is free from stones, but in the lower part are angular pieces of Guernsey blue stone, and a few pebbles from the same.

The following description of the Continental Löss is so perfectly applicable to our Guernsey clay that I cannot help adding it;—*Geikie's Prehistoric Europe*, pp. 144-5: The Löss very often contains concretions or nodules of irregular form; it is not always an unstratified mass . . . lines of bedding . . . may be traced; intercalated layers and laminæ of sand make their appearance. In some regions it loses its carbonate of lime, becomes more argillaceous and passes into plastic clay; or it may graduate into loam. . . The only character which all these deposits have in common is their extremely fine texture. P. 146: It must not be supposed that the Löss is restricted to valleys; extensive accumulations may be followed . . . over the neighbouring plateaus. P. 152: In the north of France it frequently becomes more or less argillaceous, and even passes into a regular brick-earth.

THE RAISED BEACHES, CLIFF AND RUBBLE HEADS OF GUERNSEY.

BY MR. A. COLLENETTE, F.C.S.

The elevations have been ascertained by levelling from mean sea-level by
JOHN JAMES CAREY, Esq., F.R.G.S.

THE object of this paper is to give an account of the superficial deposits of the island so far noticed by the Society, or by any of its members, such deposits having attracted but little attention on the part of geological authors, who appear to have been satisfied with a passing glance and a rather hasty deduction. The present paper will deal with the matter in a systematic manner, but will necessarily be but introductory, for this field of enquiry may be said to have just been opened, and therefore the information conveyed must necessarily be incomplete. As far as I know there exists no previous account of these deposits, though many authors have alluded to them when writing on such formations in other places. I think I may safely say that the longest notice of these formations as they exist on this island is to be found in a paper read before the Geological Society on January 22, 1851, by R. A. C. Austen, Esq., F.R.S., "On the Superficial Accumulations of the Coasts of the English Channel."

I shall first describe the

RAISED BEACHES.

These are mere patches or remnants not yet destroyed by the rapidly advancing sea, which in many cases has nearly succeeded in sweeping away the deposit, and in one or two cases has succeeded in destroying extensive deposits and removing their very last remnant.

The patches of "raised beaches" exist nearly all around the island, as far as we have levelled them, are found to range between 23 feet and 65 feet above mean sea-level.

The part of the coast which has, so far, yielded no evidence of a raised beach, at any elevation, is the stretch of cliff between Pleinmont and Icart on the south side of the island.

All around the coast, and even well removed inland, we find these evidences of a former sea-level, or possibly it would be more correct to say of former sea-levels. At

ICART POINT

There exists a deposit of shingle in an old cave; this has been described by Mr. Derrick * who believes that the whole cave was filled with pebbles and afterwards cemented into a conglomerate. The same conditions exist at the cave at

MOULIN HUET.

Here we have a cave opening from the beach by a narrow passage which has been produced by the wearing away of a comparatively soft vein in the gneiss. Once inside we find a ledge of rock extending the length of the cave at its back, and standing about three and a half feet above the present shingle floor of the cave. This height varies, for the shingle of the floor is moved about by extreme high tides so as to alter its level from time to time. On the ledge is a similar mass of conglomerate as found in the Icart cave. We may speak of it as being about four feet in thickness on the ledge, but in reality this is but a remnant, for the back, upperside and roof of the cave is plastered over with the cemented beach stones, proving that this cave also has been at one time filled with pebbles. Before passing on to the consideration of other deposits there are a few points to be noticed. First: the present floor is undoubtedly lower by more than three feet than when the deposited pebbles commenced to be attacked. Mr. Carey and I have thoroughly and exhaustively examined the cave, and are led to this conclusion by the following evidence. On the level of the lower portion of the ledge of the cave, the sides of the entrance are worn away by the attrition of the loosened pebbles, but the lines thus produced are not directed downward to the present sea-level, but are horizontal. It follows, therefore, that the lower three feet of the present passage was closed, either when the lowest layer of pebbles was being laid or when the sea commenced, after centuries of rest, to eat away the deposit. Second: The question of the relative order of deposition and erosion is somewhat complicated by the levels found. As stated in the heading of this paper, the levels have been taken by Mr. Carey, and I know, for I have worked with Mr. Carey through many of the levellings that nothing has been taken for granted. The starting place for all the levels but one have been points, the elevations of which have been previously ascertained by Mr. Duquemin, who in his turn has used a mean sea-level, as deduced by Mr. Lister and the engineers of the harbour, as the zero.

* See full description, page 81, Natural Science Transactions for 1889.

Mr. Carey gives the elevation of the ledge deposit in the cave as 24 feet above mean sea-level, consequently the erosion of the sides of the passage must either have been produced by a sea much higher than our present one or by storm waves acting on the deposit from the present level, with the three or four feet of passage below the eroded part closed to their action. But if the latter, the erosion is carried back into past time, a much longer period than most of us would be willing to admit, for the lower sides of the passage show the wear of long periods. Again, if the present sea-level, even assisted by storm waves, had produced the erosion, surely the lines of erosion marked in the solid rock would be obliquely downwards and outwards, but instead of that they are decidedly horizontal and at an elevation of from three to five feet over the present floor of the passage. I cannot pretend to formulate a theory that agrees with all the observed facts, but I think the idea of the cave having been filled from the present passage is disproved by the high level of the conglomerate on the roof, which is some 15 feet above the ledge, in some spots quite 40 feet above the present mean sea-level.

Mr. Carey has taken the trouble to run a series of levels to the top of the spring high tide of the 5th of October, 1891, and found that mark to be 17 feet above the mean sea-level adopted. We have this series of facts to account for:—

- 1.—A deposit of pebbles in a cave extending between 22 and 40 feet above mean sea-level.
- 2.—A well marked and firmly conglomerated portion showing apparently the position of the main deposit, 24 feet above mean sea-level.
- 3.—Present high water mark (spring tides), 17 feet above mean sea-level.
- 4.—A corroded channel, horizontally grooved, 7 feet above high water spring tides.

At the same elevation as the main deposit in the cave is found a number of patches of semi-hardened raised beach along the shores of Moulin Huet. These extend from the foot of the roughly-paved slip to the cave described. This line of beach is irregular and interrupted, but it is evidence of a past beach of somewhat the same type as the present one, but no doubt considerably above it. We may assume that most of these patches are of the same period as the cave deposit.

Such patches are found in two places between Moulin Huet and Petit Port, viz., at the Silver Mine,* and at the base of the serpentine path leading to the smaller bay. These

* See Mr. Derrick's paper previously quoted.

patches are situate in the clefts of rock and all rest on the rock and are covered by cliff-head.

At St. Martin's Point many small patches of beach are found. Usually these exist in pockets, occupying small spaces in the rocks immediately under the cliff-head, and in most cases associated with a rough rock platform extending some yards from the cliff. At the battery which is found here a layer of beach passes right through the cliff, being visible on both sides of the small promontory. Just here also in a gully is a pair of twin caves, the sides and roof of which contain deposits of beach stones. In several places along this portion of the coast small patches occur giving evidence of the former existence of considerable deposits.

Proceeding northwards, traces of raised beach deposits continue until Divette beach is reached, where some well-marked deposits are visible. This portion of the cliff has been described in the transactions and its connection with the cliff-head; later on, however, I shall allude to these formations again.

Crossing Divette Bay, patches are visible under the cliff-head, on which the battery rests at Bec-du-Nez. North of Bec-du-Nez itself a deposit existed up to the date of the Society's excursion to that point on the 14th June, 1892, but when examining the cliff on that date the patch was found to be completely washed away, only a remnant as large as a dinner plate was found detached and waiting its turn to be carried away by the eroding action of the sea.

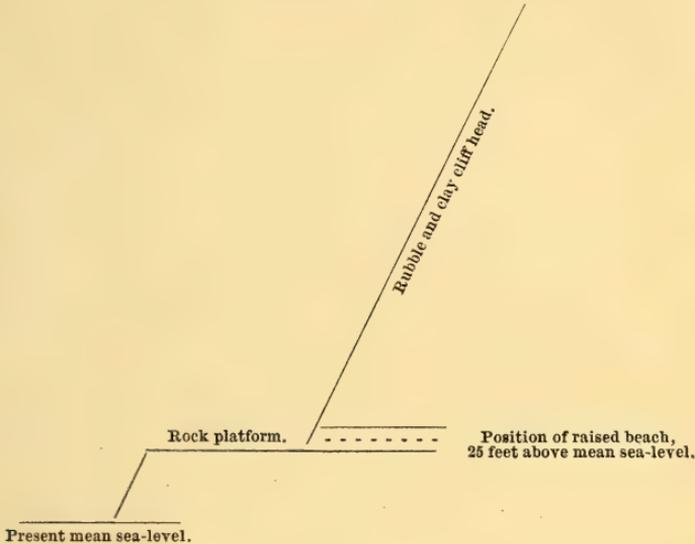
From Bec-du-Nez to Fermain Bay no traces have been found to exist, though, the coast being difficult of access, some may exist without having been seen.

At Fermain Bay, however, we have some very satisfactory portions visible under the cliff section. I am sorry to say that owing to the encroaching sea we must not hope to preserve this evidence of a former sea-level long.

This deposit exists as a line under the cliff head and immediately over the rocks, for some yards north of Fermain Bay Point. Mr. Carey has taken the levels of two portions, one on the east face and one on the south face of this point. These levels are 25.59 and 25.94 respectively. It is evident that this deposit is of the same level as Moulin Huet, and no one can examine the intermediate deposits without believing that these are all of exactly the same elevation. We may therefore say that we have evidence of a series of beaches which at one time extended from Icart Point to Fermain, at an elevation of 25 feet above mean sea-level.

Having enumerated the raised beach deposits of this portion of the coast I shall now describe their surroundings.

FIGURE 1.



DIAGRAMMATIC SECTION OF ROCK PLATFORM, RAISED BEACH AND CLIFF HEAD.

We find that these beach deposits rest directly on a rough rock platform which extends for some distance beneath the cliff in some places (see Fig. 1.), but in others is fully exposed. This rock platform is roughly 50 to 60 feet wide and extends, very much broken by gulleys and interrupted by jutting points, from Petit Bôt to the Vallette. In many places it gives decided evidence of having been ground down to a flat surface by the action of rolling stones and in just such spots exist our best preserved deposits. An exception is found at Bec-du-Nez, for there we have the platform without the beach. We, however, know that the beach did exist and that it has only just lost its very last remnant. Where the platform is well flattened and most marked the beach is found to extend along its top in a thin straight deposit of about 1 foot in depth, very much interrupted with the remains of the protruding rocks in some places, still traceable as a line. Where rock gullies and irregular rock masses exist the beach is more usually found in pockets large and small just where the former sea has rolled them in. In such cases the deposits are higher than on the platforms and evidently result from the action of high tides.

The whole of these raised beach deposits are either completely conglomerated and cemented together or are imbedded in clayey material of the head. The whole series give the impression of great age, and where protected from weathering are capable of being detached in large pieces from which the individual pebbles are with difficulty removed.

On the raised beach, and where it is missing on the rocks themselves, rests the cliff head, to be described later on.

Small patches of similar beach and head deposits I have found at the Bathing Places. Professor Ansted states that there exists a deposit at the Terres. I have, however, found none at the Terres proper, though the remaining mound at the old Gentlemen's Bathing Place contains the rubble associated with the top of the beach and may have shown rolled stones some years ago. The patches I have found are nearer to the Vallette.

A very small pocket existed last year at Castle Cornet. I have not looked for it lately and expect that it may have disappeared. Its presence, however, proves the Castle rock to have possessed a beach of the 25 feet level.

Passing on to the lower parts of the island, I must name a patch of beach found last year at the Arcade. This Mr. Carey proved to have an elevation of about 27 feet. This deposit thinned out and was overlaid by yellow clay.

We may fairly associate it with the same level as the beaches along the rock platform. It rests on gravelly decomposed rock, but no doubt the rock was hard and that the beach was rolled on its surface when in course of formation.

Forty feet below the surface at the upper part of the Truchot there exists 7 feet of rolled stones. The levels justify the belief that this deposit is one of an extensive beach formerly washing the base of the Côtils Hill.

On the north side of Mont Arrivé, in the low ground between the Bouët and Ivy Castle, recent excavations show that there exists, some six feet below the present soil, extensive beach deposits. The levels of the neighbourhood (Hougue a la Perre = 26.00 feet), justify the association of this with the same period as the rock platform and 25 feet beaches.

A well-defined patch has been exposed to view in the "Tunnel" quarry behind the Second Tower. This deposit seems to have been laid from the south side of the local rise at the former base of the Delancey Mount.*

At Spur Point a deposit has been carefully measured by Mr. Cooper. This deposit is 10 feet above high water mark.*

* See page 123, Geological Section Report, 1891.

In the large quarry at Bordeaux Harbour a deposit is found on the sea face of the hougue showing itself in the quarried section. Here it is covered as usual with head. Several quarries in this neighbourhood contain well-marked deposits. These appear somewhat higher than 25 feet, but have not been levelled.

Hommet Paradis has a deposit of the 25 feet level apparently. On the hill south of Paradise quarry there are important beaches. These are as follows:—

In Paradise quarry itself, high up on its south side, a clayey head with rolled stones.

In a lane (la rue Miellette) is a small patch in the side hedge with an elevation of 35·52 feet.

Across a field in the same lane is a "head" containing many rolled stones.

This heading has been traced down the side of the hill to the quarry below, and there it still contains rolled stones, but neither of these patches are true beach deposits; they are really heading of rubble and clay with beach stones imbedded.

In the Grand Miellette quarry is a good deposit at an elevation of 54·87 feet.

In the Le Huray quarry is also a fair deposit at an elevation of 64·96 feet.

At the cromlech, which is just beyond the last named quarry, and in two fields adjoining, there are decided traces of deposits, but they are nearly destroyed by cultivation, which, however, has left a large number of pebbles loosely spread on the cultivated patches. These fields are at about 65 feet elevation.

Behind the newer La Moye house, in La Moye road, is a distinct deposit at an elevation of 55·21 feet.

At Fort Le Marchant is an extensive beach existing right across the promontory, and which is proved to be at an elevation of 24 feet.*

From Fort Le Marchant to Mont Cuet, along the sea face, this beach is more or less continuous, and is found in almost all the quarry cuttings around Mont Cuet at elevations varying between 20 and 30 feet.*

Along the Grand Havre side of L'Anresse the beach is picked up near to the Vale Church. The grave-yard of this church and its surroundings is practically an old beach, for we are told that the graves are partly dug out of shingle, and Mr. Carey has noted several exposed patches around the hill on which the church is built.

* See page 124, Geological Report for 1891.

At L'Islet* many proofs exist of an old beach quite distinct from that produced by the water margin as it existed 100 years ago, and agreeing in level (26·53) with the rock platform beaches of the east coast.

We now approach a very rich part of the island. Ronceval* Hill has beach surrounding it practically and at a comparatively high level. The patches are chiefly found in the exposed quarry cuttings, and vary in elevation between 40 and 50 feet. Opposite this hill and further inland is the noted Capelles beach, which has a mean elevation of 54 feet.

At Noirmont, also well inland, the lanes have been cut down through the beach which here has an average elevation of 55 feet.

Further out towards the sea is a small pocket at Rocque Maingy at the high level of 68·36.*

All along the coast from Port Grat to Pezerie the low level beach is picked up at intervals. These patches are too numerous to be mentioned, and are undoubtedly all associated with the platform period. These deposits are well marked at Port Grat, Port Infer, Port Soif, Grande Rocque, Cobo (near hotel), Albecq, Houmet, Grande Mare, La Crocq, Richmond, Perrelle, Dom Hue, Lihou and Pezerie.*

At Perrelle, however, Mr. Carey has picked up several patches at a higher level, two in a quarry on the coast, and one in a field at Les Rouvets. The latter has an elevation of 75 feet.

These beaches are thus general around the coast, and they naturally, as far as they have been levelled, arrange themselves into two levels, the one a low one, average 25·59 feet; the other a high one, averaging 57·74 feet. Excluding several intermediate levels for reasons to be stated directly, we may say that the lower level ranges between 20 and 30 feet, and the upper one between 40 and 50 feet.

I have excluded two levels from these because, though the rolled pebbles were well *en evidence*, they existed, not as a beach, but as a "head." I therefore consider them to have been derived from the upper level beach and to result in part from its weathering.

It is to be noticed that the levels of the lower beach run remarkably near to each other. This beach is in many places only a foot in thickness, and in no case is it many feet thick. Probably it would average, if measured, about 2 feet in thickness.

* See page 124, Geological Report for 1891.

On the contrary, the levels of the higher beach run much wilder. Out of the twelve portions levelled so far, the range is between 46 feet and 75 feet, and they do not as a rule lie as flat deposits so much as in pockets or dissociated patches.

The Capelles and Rouvets beaches are, however, exceptions; they show both great flatness and extent. The Capelles is at an elevation of 54 feet, and the Rouvets at 75 feet. If we therefore consider them to be separate deposits, we should arrange our deposits into three layers, thus:—

TABLE I.

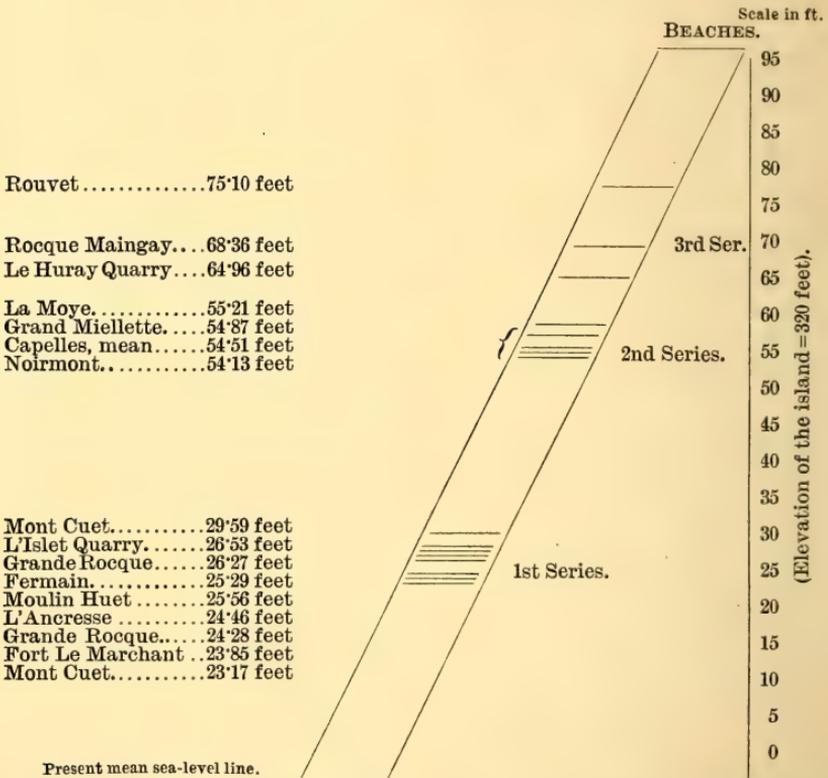
Ascertained levels of the raised beaches and of the pockets of rolled stones arranged in three levels, viz.:—Low, intermediate and high. Mean sea-level = 0·00 feet.

	Low. Feet.	Intermediate. Feet.	High. Feet.
Moulin Huet, inside cave on ledge	25·56		
" outside cave	26·00		
Fermain cliff, south side	25·94		
" east side	25·59		
Lane in La Moye rue			55·21
Lane opposite Omptolle islet.....		32·60	
Grande Miellettes quarry			54·87
La rue Miellette		35·52	
Le Huray quarry			64·96
Capelles quarry			56·66
" 2nd portion			52·45
Grande Maison quarry, Vale			46·12
Houmet (near Henry's house)	26·25		
L'Islet quarry (opposite postman's house).	26·53		
L'Anresse (opposite No. 7 Martello Tower)	24·46		
Fort Le Marchant	23·85		
Mont Cuet, Sabiers quarry	23·17		
" Mr. Bisson's workshop	29·59		
Noirmont (opposite T. Mahy's house)....			53·09
" (lane going S.W.)			54·72
" (centre of cross roads).....			54·64
Rocque Maingay			68·36
Grande Rocque Hotel	24·28		
" Butts	26·05		
" "	26·27		
" "	24·75		
Les Rouvets, Perrelle			75·10
Means	25·59	39·06	57·74

TABLE II.

Low levels	25·59	
Capelles series (2 levels)		54·61
Grande Miellette		54·87

La Moye		55·21
Grande Maison		46·12
Noirmont (3 levels)		54·13
Rouvets series :—		
Rouvets		75·10
Le Huray		64·96
Rocque Maingay		68·36
Means	25·59	51·03 69·47



DIAGRAMMATIC REPRESENTATION OF THE BEACHES ARRANGED ACCORDING TO LEVEL.

With a few exceptions the raised beaches are formed under a cliff-head or under a rubble-head. These heads will be discussed later. As a rule the patches of beach on the south side are purely remains which have been preserved in rock crevasses or in caves, and have been so preserved by having been completely covered by the cliff-head which has formed over them. These patches naturally, owing to the positions in which they have been preserved, are irregular in

elevation, in size and in form, but as you have seen by the tables, they belong to the low series of levels. On the east side there is more irregularity if we take the whole east coast, but we can, by dividing the coast into two parts, viz., from St. Martin's to town, and from town to Fort Doyle, reduce the patches of beach to regular series.

The first division from St. Martin's to town contains the raised beaches, invariably in one condition and in one position. They are all mere patches. They extend in a broken line along the bottom of the cliff, with the cliff-head resting on them. The line which they describe is rarely more than two feet thick, and is in many places but one foot. These appear to be the very last remains of extensive beaches, and to be just on the point of disappearing. In elevation they are undoubtedly of low level agreeing with those of Fermain Bay, the level of which has been ascertained to be 25 feet. They also agree in being, all along the coast, associated with a well marked rock platform.

From town to Fort Doyle each patch seems to deserve special study, for they vary in their conditions.

At the Bouët the beach is a flat one. Its elevation has not been taken because it has not been exposed except in excavations. From what I have heard I believe that it is extensive, with a maximum depth of 8 feet, and to be covered with sand or sandy clay. The association of this covering sand with the cliff and rubble-heads has still to be determined. Several levels have been taken near to this subterranean beach, and from them I judge that it is a low level one, viz. : averaging 25 feet above mean sea level.

At the Tunnel quarry also sand only seems to be associated with the beach. The case is different with the patches extending from Spur Point to Fort Doyle. Here we meet with raised beaches on the land, in the quarries and on the Hommets at an apparent elevation of 25 feet, all covered with a low rubble head, which seems identical with the cliff-heads of the south and east coasts, except in the height, which is wanting, owing to the absence of high ground. Following on the low levels for the moment, we find them more or less associated with rubble-heads all down the west coast, and in some places, such as Port Grat and Port Soif, the foreshore gives ample proof of the former existence of an extensive covering of rubble-head containing stones of comparatively large size. I think, therefore, that we have evidence of the 25 feet level, being fairly regular in elevation, being always succeeded in order by a cliff or rubble-head. It is also asso-

ciated largely with rock platforms, which appear to have been formed by the beaches themselves.

I now wish to show that the same conditions do not exist for the higher levels.

At the Miellette and Le Huray quarries the true rubble-head is wanting, the patches of beach being found with only a very recent covering of fine rubble, which seems to me to be of a different character to the rubble-heads of lower levels. At the Capelles there is no head, the beach being flat and simply covered with blown sand and recent rubble. The same facts apply to Noirmont and La Moye, where the covering seems to be of the nature of blown sand with admixtures of loose rubble and soil of very recent deposition.

At the Rouvets there is more appearance of a head, but it does not satisfy me as being the equivalent of the cliff-heads, and is certainly very different to the rubble-heads found along the Perrelle coast just below.

At all the low levels and at most of the high levels of the low-lying part of the island the patches of beach are directly associated with well preserved and recently exposed sea-washed rocks. These have mostly been covered with sea sand, which in former times covered the rocks and beaches and turned them into high or low hougues. Man and time have exposed the rocks and removed the sand, but enough remains to show that around our north coasts many a secret still remains buried. The sea-washed rock is found at all levels up to 76 feet, as far as ascertained, probably may be found to be of greater elevation when they have been studied.

CLIFF AND RUBBLE-HEAD.*

The formations which I designate "heads" are collections of loose material consisting for the most part of rubble, loose stones, gravelly earth, clay and sand. These rest on the rock in most places, but with a distinct separation. Mere decomposed rock, or rubble *in situ*, which results from such decomposed rock, I am not dealing with to-night.

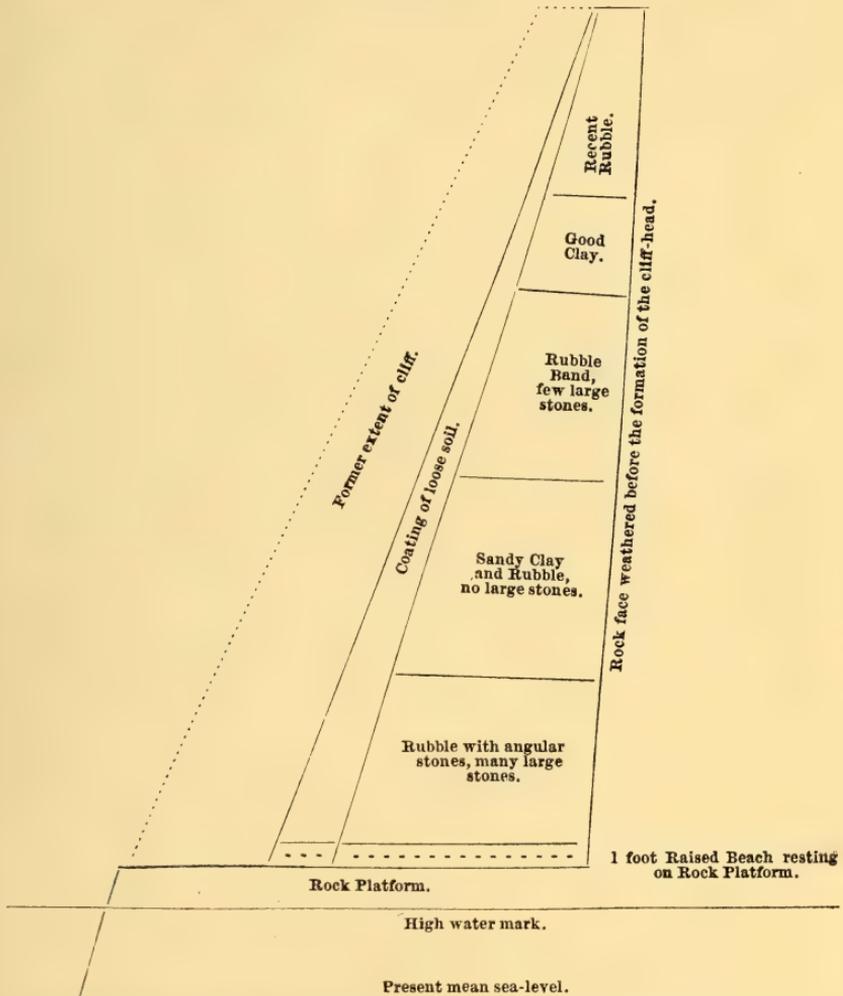
I will admit in starting that it is difficult to distinguish between the upper part of true "heads" and the newer collections. This indecision is, however, only possible with the extremely recent upper layer of the "heads," and cannot in any way affect an argument founded on the general conditions found to exist in the "heads" proper.

A general description of the cliff-heads is all that is needed in this paper. I have carefully examined the cliffs

* See page 127, Geological Report for 1891.

almost everywhere, and I have drawn a diagram to show their general conditions and contents.

FIGURE 2.



DIAGRAMMATIC SECTION OF CLIFF SHOWING POSITIONS OF ROCK PLATFORM, RAISED BEACHES, RUBBLE AND CLAY BANDS.

Commencing from their bases we invariably find large detached angular stones, varying in size from 2 feet diameter to pieces of a few inches (see diagram). At places large detached blocks are found embedded in this portion, but they are not so commonly found as the smaller pieces. This layer varies largely in different places and can only be described in general terms as a collection of loose stones, angular, unworn, unweathered and usually identical in kind with the rock

existing in the immediate neighbourhood. Exceptions to this rule exist, but with our present knowledge we are bound to reason on the fact as stated. This portion of the cliff-head will vary from one to six or seven feet in thickness. The next layer, though mixed up with the first in a sense, is nevertheless a distinct formation. It is a sandy clay. This also varies in its nature, being more sandy in some places than in others, where a small rubble and clay mixture seems to rule. The probability is that a stony mass was first deposited, and the sandy clay, which came next in order, permeated into the interstices of the fallen stone, and thus produced the apparent mixture. This formation rarely exceeds fifteen feet, and in some cases does not exist. This is followed by a rubble-head more or less distinct from the lower portions, and in places possessing the appearances of bedding, very indistinct, but traceable wherever a long section is exposed to view.

This band is never very decided, and no general depth can be given to it, but at Divette Mr. Cooper fixed its depth at 5 feet. I think it would be fair to average it at that figure, but I really believe that I have found it as deep as 8 feet in one or two places inland, to be alluded to directly.

We next come to a distinct and very well marked layer of clay. This is very plainly marked everywhere in the head. It is yellow in colour, of good plastic consistency and very impermeable to water. It is to this clay layer that the concretions and breccia existing at St. Martin's Point and studied by the geological section, only yesterday, is due. At Divette this layer is four feet in depth. At St. Martin's Point it is in places quite eight feet thick. I am inclined to give it an average not much below eight feet, but I am not sure that I am right in this. Over this clay is usually a clayey sand and earthy clay, true earth and mould. These upper layers are very modern, and will not be of much importance in forming conclusions.

THE RUBBLE-HEAD

Is a formation met with inland. I have found it generally present on the sides of hills and hougues, very visible in roadside cuttings, field hedges, where the field has been lowered, and on the sides of quarries. It usually rests on the rock of the district, and roughly follows the order of deposition found in the cliff-heads, commencing with the upper bands of rubble, upwards.

The true cliff-head is found wherever a cliff exists in the island, but where the slope is gentle and inland it is more

usual to find that portion of it which I have designated rubble-head.

Portions of the formation are present in some parts of the island and not in others. For instance, I have found in several places at St. Saviour's and at the Vale formations answering to the rubble-band, but without any other portion of the head. In others I have found the rubble and clay. In others again the clay, or clay and clayey sand, is found without rubble.

As far as my observations guide me, I believe that the order I have described is maintained all the island over, that is, that the yellow clay is always above the rubble band, and the rubble band above clayey sand containing loose stones. The presence of stones in the clays help to determine the layer to which they belong. The lower sandy clay is full of rubble, whilst the upper clay deposit contains but few, and in many cases, none at all.

I have come to the conclusion that at one time cliff-head or some of its component parts covered the island completely.

THE RELATION OF THE "HEAD" TO THE RAISED BEACHES.

The 25 feet level beach is invariably found under the whole of the head, in fact it rests directly upon the rock wherever it occurs.

The Capelles series (50 feet) also rests on rock, but is different in this sense, that it rests on the sides of rock out-crop and on flat out-crop platforms chiefly. It is not directly covered with "head," but is at times associated with quite modern deposits. This series seems to rest on the tops of "hougues," on their sides and in their hollows.

The Rouvets series appear to be chiefly in association with the upper rubble-head, but the number of deposits so far found (3) is insufficient to justify any positive assertion.

The upper clay has been found (in common with the upper portion of the rubble band) to contain numbers of pebbles. These occur at all elevations. For instance, at the Vale, opposite Omptolle islet, Mr. Carey found the elevation of such a deposit to be 32.60 feet. Another patch, higher up the same hill, was at 35.52 feet elevation. Another place in the same hill was estimated as at 38 feet. At Divette pebbles are found in the clay at 39 feet. At various places on the rise of the west coast I have seen them in clay or rubble at elevations of from 20 to 40 feet.

On the upper plateau of the island I have found them on the slopes of Pleinmont and tracked them to its summit, so

that they occur from 50 feet to 300 feet elevation. From Pleinmont, towards Torteval, they are still to be found in various places. I have not examined clays between Torteval and the Forest, but on the St. Martin's side of the Forest I have seen them, though more sparsely distributed than at Pleinmont. Inland I have found them at Les Fauxquets. At the Varclin, Captain Carteret Carey found a few pebbles in the upper clays, and kindly brought them to me. The Society itself yesterday had an opportunity of seeing pebbles at Jerbourg, also in the upper portion of the head. In the two last cases the elevation of the deposits is 300 feet and above.

I have noticed these facts for the last two years, but have not drawn any conclusions from them, not feeling sure that they were not accidental occurrences. I have, however, satisfied myself that the Pleinmont deposit, which is fairly important, owing to the number of pebbles and the area covered, which is not far short of a square mile, is not accidental. Feeling satisfied, I have no hesitation in systematising the deposit.

I conclude that a deposit of beach stones, the location of which is as yet undetermined (or possibly a number of small deposits) existed on the highest levels of the island before the deposit of the upper portion of cliff-head, and that the pebbles occur in this portion of the head in consequence of the destruction of such deposit or deposits simultaneously with the deposit of the clay in the head.

THE PROBABLE ORDER OF THE FORMATIONS.

Inasmuch as the beaches rest on the rocks and are under the "heads," they must have been laid before the "heads."

The large stones at the base of the "heads" are next in order.

Their deposit was followed by the lower clay or what we may term stony clay, owing to the large proportion of stones present. This was followed by a re-deposit of rubble of smaller size than the first, and then the fine yellow clay was laid down. Lastly, the earthy clay with fine rubble immediately below the soil covering the "head."

CLAY DEPOSITS.

The Society is already acquainted with the fact that clay exists in large quantities on the very highest portions of the island, as well as in many lower portions.

I am seriously inclined to associate these clay deposits with the clay of the "heads." They are alike in colour and consistency, and occur in the same order, for I have traced the margin of the Forest bed (13 feet thick), on the north-west edge to its connection with the overlying uppermost layer of the "head." The clays in some places show a distinct stratification. You will see that my views have recently enlarged and that I am now obliged to admit that the evidence of submergence for the whole island has gained such strength as to oblige me to believe in such submergence. I shall, in a few words, place my conclusions and the evidence for such submergence before you.

CONCLUSIONS.

That the beaches and heads prove that the island has been completely submerged during the "recent" period.

Evidences:—The beaches and their remains at all levels.

The association of the clays with the remains of the beaches.

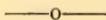
The evidence of stratification in the clays.

The presence of the clays at the highest levels.

For the purpose of to-night's paper I confine myself to this conclusion. I am perfectly willing to admit that there exists a strong amount of contrary evidence, in fact, it was the presence of that contra-evidence which prevented my coming to my present conclusion long ago. I thought the apparent want of stratification in the lower portions of the head unanswerable, but I have given the matter careful examination in the field during the last year, and I now am forced to the conclusions I have placed before you.

A GLANCE AT THE ROCKS OF ALDERNEY.

BY C. G. DE LA MARE.



ON the 25th June, 1891, I took advantage of the excursion by the *Courier* to pay a visit to the above island, and, during the few hours I spent there, noted a few points in connection with its geology which I thought might be of interest to this Society; Alderney, though not distant, being comparatively little known.

I first directed my course towards the east end of the island. After passing Fort Albert I noticed that the headlands and outlying rocks were composed of a coarse granitic or syenitic rock, presenting a tabular appearance, and contrasting strongly with the diorite forming the main body of the island. This granite appears to be intrusive in the diorite.

On the west side of Corbelets Bay I noticed a dyke of mica-trap cutting the diorite. It is about 2 feet wide, of reddish colour, somewhat schistose, and lies about E. and W.

The sandstone or grit formation for which Alderney is noted commences abruptly on the east side of Corbelets Bay. There is a flat beach between the diorite and the grit, and this probably conceals a fault separating the two formations. It is therefore impossible to say to what depth the sandstone may exist beneath the beds first exposed. The dip is about 30° E. or N.E. The sandstone formation continues to the eastern extremity of the island, the beds being passed over in ascending order, and their shelves form on the sea-shore an interesting type of rock scenery not seen elsewhere in the Channel Islands. The road passes through Maunez Quarries, whence the chief part of the materials for the construction of the breakwater and forts has been extracted. These quarries present fine sections of the grit series—which there shows alternating bands of purplish and greenish tints. The rock varies in texture, as the Rev. E. Hill states in his paper on Alderney, from a coarse sandstone to a fine mudstone. The sandstone in these quarries is cut by two dykes of greenstone, whether diorite or diabase I cannot say. These dykes are only a few yards from each other and parallel, so that they are probably connected with one another. Their direction is approximately E. and W. The adherence between the green-

stone and the sandstone is slight; the sandstone is altered at the contact and becomes a species of white quartzite. At the extremity of the island I saw another dyke of the same nature running out to sea, which may be a continuation of those in Maunez Quarries.

Returning along the south-east coast of the island I came to the quarry under Essex Castle, where, as well as on the adjoining beach of Longy Bay, I noticed occasional seams of pebbles in the sandstone, these pebbles being mostly small, but occasionally reaching three or four inches in their longer diameter. They consist of quartz, diorite, and felsite.

After having visited the town I found I had yet a short time at my disposal; I walked along the coast to the west of the breakwater, and noticed the intrusion of the felsite or quartz-felsite veins in the diorite. These veins, further west, become so thick and numerous as to seem to form the principal rock in that part of the island, being the "porphyry" referred to by MacCulloch and Ansted.

I noticed raised beaches all along the eastern extremity of the island, also in Longy Bay, where it is overlaid by "head." These beaches correspond in appearance and position with the "low level" beaches in Guernsey. A very extensive raised beach, overlaid by "head," occurs in Plate Saline Bay (somewhat resembling that near Fort Le Marchant in this island). The pebbles are chiefly local rocks, some being about a foot in diameter. A large proportion of the pebbles do not lie horizontally, but dip inland at an angle of about 60°. Flints are found in this and other raised beaches. The present beach of Plate Saline Bay contains a considerable proportion of flints, mostly small.

The age of the Alderney sandstone or grit has been discussed in Rev. Hill's paper, read before the Geological Society, and I referred to it in the paper which I read before you about eighteen months ago; but I have thought that by means of a diagram the subject might, perhaps, be made somewhat clearer. I have, therefore, shown on the annexed diagram the correlation of the rocks of France with the typical series of England and Wales, according to M. Bigot, and also with the Channel Islands rocks. By the investigations of M. Bigot and Rev. Hill the following points appear satisfactorily established:—

- 1st.—That the Alderney grit is identical with the "Grès feldspathique" of the northern part of Contentin.
- 2nd.—That the "Grès feldspathique" immediately underlies the "Grès armoricain," the oldest

fossiliferous rock hitherto found in north-western France.

3rd.—That the fossils of the “Grès armoricain” establish its correspondence with the Arenig rocks of Wales and Shropshire.

The Grès armoricain is the quartzite found at Cherbourg, Falaise, Domfront and Mortain, in Normandy, and which runs through Brittany, terminating near Brest. It follows that the Alderney grit is somewhat, but probably not much older than the Arenig rocks; as there appears to be no unconformability between it and the Grès armoricain. M. Bigot considers it to be contemporaneous with the “Lingula Flags.” It would therefore be Lower Silurian according to the nomenclature adopted by the Geological Survey, but would be placed either at the base of the Ordovician or summit of the Upper Cambrian, according to the system proposed by Lapworth, which is viewed with increasing favour by geologists. The Alderney grit, as will be seen by the diagram, is a newer formation than the Jersey conglomerate.

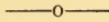
DIAGRAM.

Typical Rocks of England & Wales.	Nomenclature.*			French Rocks according to M. Bigot.	Channel Island Rocks.		
	A	B	C				
Ludlow Series....	Silurian	Upper Silurian	Silurian	Grès Armoricain.			
Wenlock „							
Mayhill „							
Bala „	Upper Cambrian	Lower Silurian	Ordovician				
Llandeilo „							
Arenig „	Middle Cambrian	Lower Silurian	Upper Cambrian			Grès Feldspathique.	{ Alderney Grit.
Tremadoc „							
Lingula Flag Ser.							
Menevian „	Lower Cambrian	Cambrian	Lower Cambrian			Schistes Vert Clair. Schistes Pourprés. { Grès et Conglo- merat Pourprés. }	{ Jersey Conglomerate. Jersey Argillites.
Harlech { Solva .. Caerfai.							
Precambrian.....				Schistes de St. Lô.			

* The nomenclature in column A is that adopted by Sedgwick: in column B, that of Murchison, adopted by the Geological Surveys of England and France: in column C, Lapworth's.

LOCAL SUPERSTITIONS.—OMENS, SIGNS AND WARNINGS.

BY MR. DENYS CORBET.



I SPOKE to you some time ago about "Local Witchcraft," or "Witchcraft in Guernsey," as one of the many superstitious notions in which nine persons out of ten of our rural population, at least, were firm believers some forty or fifty years ago, if they are not so still. But, although I did not exhaust the subject on that occasion, I do not mean to return to it to-night, but rather to speak to you about another popular delusion, quite as superstitious, if not more so, and which had quite as many adherents as witchcraft, at the time to which I refer, but which, I have every reason to believe, has now lost much of its popularity, owing, no doubt, to the spread of education, and, consequently, of civilisation—I mean the belief in omens, signs and warnings. There was then scarcely an old woman, or an old man either, to be found, at least in that part of the country where I was born and brought up, who was not quite an adept in the art of decyphering and predicting, from the various ways in which either the fire; or the primitive fish-oil lamp, or *crâsset*, as it was called; or even the old-fashioned dip-candle—to say nothing of the farthing rushlight—burned, what was to happen, not only on the following day or week, but possibly for a month to come.

To begin by the coal fire, for instance:—If it burnt dull, it was a sure sign of rain; if bright, it denoted easterly wind and dry weather; if it emitted a blueish flame, it was the sure sign of a gale; if a greenish one, witches were abroad and at their tricks; if a piece of coal flew out, it was examined most attentively, and, if it bore the least resemblance to a ship or a boat, that denoted a sea voyage by the person towards whom it flew; or else either news from, or the speedy arrival of, some seafaring relative or member of the family, according to the manner in which the bit of coal was shaped; on the contrary, if it resembled a box or a coffin, it was a warning of the death of some friend or relation.

Infinite again were the deductions drawn from the various fantastic shapes assumed by the coal or wood embers as they burned in the old brick grate, or under the *terpid*, as it was,

and is still called—from the French *trepied*—a simple barred contrivance, usually with three legs, called in English a “tripod,” and which is still in daily use in every country-house. Many of these deductions, however, I cannot now bring to mind, and if I could they would not be worth your listening to, on account of their complete absurdity.

I now come to the *crâsset*, or primitive lamp, a very perfect specimen of which I have brought with me for your inspection. Unfortunately, I have not been able to procure all its accessories, but I think I can show you a rough drawing of most of them, especially the old-fashioned stand, which was the *crâsset's* constant companion, that is, when it did not hang from the ceiling above, by a simple lath, perforated with holes throughout its length, for the sake of putting the lamp higher or lower, as convenience required. Thus,—the lath was made to run on a horizontal rod, along which it slid at pleasure, thus giving light in different parts of the room. The first to be moved about the room as occasion required, the second to hang over the green-bed, where the women invariably sat of an evening to knit, or mend the family linen. Quite a favourite place for the *crâsset* to hang from was the oven-mouth, especially when some sort of cooking was going on, at night, or in the early morning, or when the family baking was being done, in which case it threw its light all over the inside of the old-fashioned furze oven, where every family baked its own bread at that time, bakers' carts being then totally unknown about the country. Indeed, this last place, the oven-mouth, has become almost proverbially identified with the *crâsset*; so much so, that quite a popular anecdote was frequently told of one who pretended that he recollected perfectly when he was born, since, “on his first opening his eyes in this world he saw the *crâsset* hung to the oven-mouth, which was then closed by a thick wooden door—part of the trunk of a large tree—and plastered round with yellow clay, as the bread was baking at the time.”

But to return to my subject, viz., the *crâsset* and its tell-tale manner of burning, I have already said that in my part of the country, at least, which abounded with fishermen, the *crâsset* was almost always fed with fish-oil, made from the liver of the cod, the conger-eel, or the ray-fish. The wick was nothing but a half-burnt, or singed rag, twisted like a small rope, or a thickish piece of twine. Of course, like the common dip candle, it required frequent snuffing, and this was usually done with a small piece of wire, or by means of a stick, kept in the *crâsset* itself. In the case of the candle, an old pair of

scissors was used, and frequently the finger and thumb, for few houses possessed such things as snuffers. This is illustrative of the following: A man was boasting that he never was frightened of anything. "Then you never snuffed a candle with your fingers," said someone who heard him. He was silenced. But before snuffing, great notice was taken of the manner in which the wick had burnt. If there appeared a kind of bright head or ball at the end, it denoted a death in the family or in the neighbourhood; the head itself representing that of the *prieux-d'entèrr'ment*, as the person—invariably a man, and, if possible, a nephew of the deceased individual—was called, who went round, sometimes from one end of the island to the other, inviting, by word of mouth, the various friends and relations of the departed, to attend the funeral. But, sometimes, the burnt end of the wick was flat; this was a sign of ghosts, and denoted the shroud in which their dead bodies had been laid out. If very small, however, it was a token of news, and meant a letter. The manner in which the dip candle, and even the rushlight burnt, was interpreted much in the same way, with this addition, that great notice was taken of the various fantastic forms assumed by the tallow, as it melted and ran down the candle or candlestick. If it formed a kind of handle, or handles, it was a figure of those usually attached to both ends of a coffin, and was another omen of death.

Perhaps you will allow me to quote a few stanzas relating to this subject of omens, from a poem in Guernsey-French, composed by myself some forty years ago, and published some ten or twelve years later in a volume of poetry in English, French, and Guernsey-French, entitled: *Les Fieilles d'la Fouarét—The Leaves of the Forest*. This short extract relates to the very subject of which I have been treating, viz., omens, and it will show you that what I have just read is not mere imagination, but a simple narrative of what I was in the habit of seeing and hearing frequently when young. It must also have made considerable impression on my mind at the time to induce me to preserve the superstitions in the form of verse. These stanzas form part of a description of what I frequently saw and heard at evening parties in the country, such as used regularly to take place among neighbours and friends in the long winter evenings. Part of the poem relates to other superstitious beliefs, but I will confine myself solely to that which treats of the omens or warnings which we are now considering. The piece is entitled: "*Les Vill'ries du Vier G'llaume—Old William's Evening Parties.*"

Ll'ya pus d'vingt àns ; pourtàn coum si ch'tait d'hier 1
 I' m'est avis que j'le r'vé, l'bouan vier G'llaume,
 Au couain de s'n'âtre assis, ser après ser,
 La pipe au bec, à marmounnaïr quiq siaume :
 A côtaï d'li s'en p'tit fortificat—
 Ah ! d'màndaïz-mé, si l'vieil aimait se-n-huile !
 S'il y v'nait fier sur l'barbari muscat !
 Et s'il avait pour tout pertu sa g'ville !

 Mais chu que l'vier avait l'pus près du queur,
 Ch'tait sen crâset—i pouvait nous en dire 10
 Sus chu chapiter là jusqu'au p'tit jeur,
 Tant qu'atouar d'li j'étion nets paumaïs d'rïre.
 Ch'tait là sen livre : Ah ! coum il y liésait—
 Et que l'bouan vieil était fin sous sen roue—
 En savait-i ? l'cat en heurlait, ma fé,
 Surtout qu'ànd l'vier li pilvaudait la coue.

 Si brûlait blû, l'lend'main ll'érait du vent ;
 Si vert, ll'y-avait pus d'un sorchier en route ;
 Tête ou malon ch'tait l'prieux d'enterr'ment,
 Et un lincheur, des r'venants, sans nul doute. 20
 Hors d'sen vier bec, à qu'ànd nou l'amichait,
 S'il écànchait d'sortir une étinchelle,
 Pour la personne en d'viers qui a' volait
 G'llaume était saeur que ch'tait pour quiq nouvelle.

 Mais s'la chândelle, aurun du vier crâset,
 V'nait sus la table, à qu'ànd nous mànquait d'huïle,
 A nos ha ! has ! craquotànt (si ventait)
 Sus les chervons nou s'érait ouï la tuïle !
 Jamais prophète au béni temps jadis 30
 N'vit ossi clair dans les visions d'un rêve,
 Coum faisait G'llaume à qu'ànd purotait l'si,
 Coum i'll-avient, qu'ànd l'gros vent d'nord endève.

 Aut'fais assis sans d'auter veue ou lun,
 Qu'un beluet d'faeu, l'vier nou liésait sans paine
 Dans l'querbon rouage, ou ner, ou jaune, ou brun
 Chu qui nou s'arrivrait durànt la s'maïne.
 S'll-avait parent ou vaïsin en s'mouarànt,
 De d'dans la flàmbe i faisait volaïr l'coffre ;
 S'lettre ou ami du large était en v'nànt,
 D'mourtraïr l'navire i nou s'érait fait l'offre. 40

[The following literal translation of the above interesting Franco-Norman stanzas, has been kindly furnished by the author :—]

It is more than twenty years ago, nevertheless it seems to me as if it were
 but yesterday 1
 That I used to see good old William
 Sitting in his chimney corner night after night,
 Pipe in mouth, and humming some old psalm tune.
 Beside him stood his little pick-me-up (or mug of cider),
 Oh ! you needn't ask if the old fellow liked his oil !
 If he got merry on his favourite apple juice,
 And if he had for every hole a peg (*i.e.*, for every question an answer).

But what the old fellow had nearest his heart
 Was his *crâsset*—he could talk 10
 Upon that subject till dawn,
 While around him we were all convulsed with laughter.
 It was his book : ah ! how he read it !
 And wasn't the old chap bright under his rust !
 Didn't he know a thing or two ! On my faith, even the cat howled at
 hearing him,
 At least when the old fellow trod on its tail.

If it (the *crâsset*) burnt blue, next day there would be wind ;
 If green, there surely were witches on the road.
 A head or scab (on the wick) denoted an inviter to a funeral,
 And a winding-sheet was a sign of ghosts. 20
 If, when it was snuffed or trimmed,
 A spark happened to fly from it,
 Then for the person towards whom it flew
 William was sure that it portended news.

But if the candle, instead of the old *crâsset*,
 Came upon the table when the oil ran short,
 With our ah ! ah ! if it blew hard enough,
 The very tiles on the roof would clatter.
 There never was a prophet in those blessed old times 30
 Who so clearly saw into the visions of a dream
 As did William in the way in which the mutton-suet dribbled,
 As it does when the strong north wind is raging.

At other times, when seated without any other light
 Than that of a small flickering fire, the old man would read to us without
 difficulty,

In the very coal, red, or black, or yellow, or brown,
 What would happen to us during the week.
 If a relation or neighbour was dying,
 Out from the flame he made the coffin to fly ;
 If a letter or a friend was expected from abroad,
 He would show (in the grate) the vessel that was bringing the one or the
 other. 40

I may also mention another object whose every movement was fraught with intelligence of what was to happen in a given time—this was, and still is, the domestic cat. For instance, if it was seen washing its face with its paw in the morning, some strange visitor would be sure to call during the day ; if at night, then the stranger would come on the morrow. But for the prediction to come true it was necessary that the cat should be a female, and that its paw, in washing, should pass quite over its ear. Moreover, if the cat washed itself on the right ear, the visitor would be a man, if on the left, a woman.

I should scarcely end were I to tell you all that I have seen and heard on this subject. But, perhaps the most fruitful source of omens, signs, and warnings were dreams. Yet these were mostly interpreted by contraries, like that of the

old Irishwoman who went into a grocer's shop, and there found a lady and gentleman making some purchases. Addressing herself to them, she told them that she had dreamed the night before that the lady had given her a pound of tay, and the gentleman a pound of sugar. "Ah! but my good woman," replied the gentleman, "dreams are always explained by contraries." "Oh! very well," said the old woman, "your honour can give me the tay, and your lady can give me the sugar." It will readily be seen that according to this most convenient way of interpreting dreams, they can be made to coincide with almost anything that comes to pass, or rather, anything that happens may be made to coincide with them.

However, as the continuation of this subject would lead one to an interminable length, I will conclude by simply observing that there must have been persons, at all times, somewhat sceptical on the subject of dreams denoting future events, otherwise we should scarcely have the old Guernsey proverb, which says: "*Senge n'est qu'ombre, et ombre n'est rien.*" That is: "Dreams are but shadows, and shadows are nothing."

Furthermore, I cannot help thinking that what has helped in a great measure to perpetuate the belief in dreams among the ignorant, at least, has been dream-books. I have seen several in country houses—though I never had the patience to read any of them through—which professed to interpret all kinds of those visions of the night as gravely as if their authors had been so many Josephs of dream-interpreting memory.

Young people also pretend to find out the time of their marriage by means of the number of kernels, or stones, found in the portion of plum-pudding which they eat at their Christmas dinner. Thus reckoning the stones, they say: "This year, next year, never, now," or something of the kind, over and over again, till they come to the last stone, which is supposed to give the desired information.

It is also a popular notion, as regards death-omens, that opening a book all at once at the required page, or hitting upon the exact number of anything in like manner, is a sure sign that the person so doing will die during the year.

Other prolific sources of omens and signs are the various aspects of the weather. I am not going into this now, but will simply observe that the rainbow has given rise to this proverb:—

"Ardailance au matin fait la mare au ch'min,
Ardailance au ser fait bel aver."

or, in English :—

“ A rainbow in the morning is the sailors’ warning,
A rainbow at night is the sailors’ delight.”

Finally, I could also say a great deal about ghosts and apparitions as having been made to foretell coming events, but, as I may possibly take up that subject at some future time, I will refrain from referring further to it at present.

But I can scarcely close this subject of signs and omens without touching lightly upon that other popular mania, viz. : pretending to discover indications of one’s intended among the dregs or tea-leaves in the bottom of the last cup of tea, whenever that beverage is taken. After giving the cup a few whirls to separate the dregs, it is set down in the saucer bottom upwards for a few seconds. Then, upon turning it up again, the examination takes place. Should a longish stem be conspicuous among the rest, it is at once set down as the tea-drinker’s beau, if a young woman. If a man, of course he will look for something more typical of a young lady. This may be practised now as mere child’s fun, but yet the fact of its still continuing so general, clearly implies that there must have been some faith put in it at one time. I believe it was first practised by professed fortune-tellers. Be that as it may, I know one elderly widow even now who seldom fails to end her “ tea ” in this way. Nor is she at all ashamed to say that she expects to see her next spouse in the bottom of her tea-cup one of these days. That her faith in this prediction has not been shaken appears to me strange, for, when in her teens, she never failed to look for her young man’s apparition in the same way ; and though she often pretended to have seen him, yet, when he did come, it was in the shape of a middle-aged widower. Surely the tea-leaves must have proved awfully treacherous. That this pretended reading of the future in tea-leaves is not limited to Guernsey I have often had occasion to observe. Only the other day, while taking tea with a Jersey friend—a clergyman of the Church of England, too—I was surprised to see him make the same examination of his tea-cup. Upon my making some remark about it, he told me that it was quite a practice in the sister isle. This leads me to ask myself, in conclusion, whether the Guernsey community, with all its ignorance, superstition and popular delusions, is more benighted as a whole than the people of any other country in these respects ? I think it is not.

GUERNSEY

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AND

LOCAL RESEARCH.

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- Mr. W. Stranger, jun., St. Sampson's.
- Brigade - Surgeon Thornhill, A.B.,
M.B., T.C.D., Grange.
- Miss Tupper, Candie.
- Miss Turner, Ladies' College.
- Mr. H. Tourtel, Market Square.
- Mr. J. Whitehead, F.R.G.S., F.S.A.,
Royal Hotel.
- Rev. J. Woodhouse, Hauteville.

TRANSACTIONS OF THE SOCIETY.

Monthly Meeting held on November 9th, 1892, Mr. E. D. Marquand, President, in the chair.

The minutes of the last meeting having been read and confirmed, Mr. J. W. Morgan, of La Croute, St. Martin's, was unanimously elected a member of the Society. The subject of birds being introduced, Mr. Derrick mentioned that he had seen about a dozen swallows at Le Bourg, St. Andrew's, on October 29th. The President said he had seen during the past week a pair of Golden-crested Wrens, and a Goat-sucker, the latter being a very rare bird here. Mr. Z. Robert presented to the Society Vol. III. of Dr. MacCulloch's "Description of the Western Islands of Scotland and Isle of Man," for which he was cordially thanked. The President stated that he had lately received from Mr. W. F. Miller, of Sidcot, North Somerset, a list of plants observed by him in Sark during a fortnight's stay there last August. It comprised between 60 and 70 additions to Babington's list, and about 30 species hitherto unrecorded for Sark. The total number of Flowering Plants recorded for Sark now amounted to some 320 or 330 species, a number which the President did not consider by any means exhaustive. About a dozen species occur in Sark which are unknown in Guernsey. Mr. Derrick read a paper on "Guernsey Clays," which will be found printed in full on page 212 of these Transactions.

Monthly Meeting held on December 14th, 1892, Mr. E. D. Marquand, President, in the chair.

After disposing of the formal business of the evening, Mr. Cecil Carey was unanimously elected a member of the Society. Mr. Luff read from the *Field Club* an interesting paper on "The Insusceptibility of some individuals to the Stings of Wasps, Bees and Nettles," detailing particular cases in Jersey and Herm in which persons had been repeatedly stung on the neck, arms and hands by scores of wasps, and yet experienced no pain or inconvenience whatever; and an instance where children had been known to be incapable of feeling nettle stings. Mr. Z. Robert entertained the meeting

with a varied collection of local proverbs and scraps of folklore, explaining the use and application of many curious words and idioms used in the Guernsey *patois*. The President read an excellent paper (Part I.) written for the Society by Mr. Hornell, of Jersey, on the Marine Worms of the Channel Islands, dealing chiefly with the strange and unaccountable habit known as "commensalism," of which many remarkable examples were given.

Monthly Meeting held on January 11th, 1893, Mr. E. D. Marquand, President, in the chair.

The minutes of the previous meeting having been duly read and confirmed, Mr. G. E. Derrick read the following note: "A deposit of limpet shells was dug through in a field at the town side of the corner formed by the Fort Road and the lane leading to the Damouettes. A circular pit was sunk at the back of the field for cess-pools of houses about to be erected there, and at five feet below the surface a bed of shells, almost all limpets, was cut through. The bed was 3 feet broad, apparently about 6 feet long, and 4 inches thick. Both pits passed through it, but it did not extend to the further side of either of them.

"The bed rested upon the undisturbed rock, a vein 6 inches thick being immediately underneath it in one place. The earth covering it was pure earth, *i.e.*, it contained no artificial matter, bricks, mortar, or rubbish; in it was one blue stone completely disintegrated, falling to powder on being touched; it seemed foreign to the neighbourhood. There were one or two spots of black earth, but no signs of burnt wood. In fact, there was nothing to prove the age of the covering material. The shells themselves were soft, easily picked to pieces, and were very similar in appearance to those at Richmond."

The President then read a chatty paper entitled "Holly and Mistletoe," in which, as being appropriate to this season, he referred to the customs and superstitions connected with these two plants, and their employment for purposes of decoration during the festivities of Christmastide. An interesting conversation ensued, in which many of those present took part.

A suggestion was brought forward by the President that an endeavour should be made to collect short biographical notes on Guernsey scientists, or others who had at any time contributed towards a better knowledge of the natural history and antiquities of the island, with a view to the publication of

these notes in the Transactions in the form of a biographical index. The suggestion was warmly approved, and it was arranged that the matter should be brought before the notice of the public by the publication of a letter in all the local papers simultaneously. The result, however, was somewhat disappointing, and the subject remains in abeyance.

Monthly Meeting held on February 8th, 1893, Mr. E. D. Marquand, President, in the chair.

After reading and approving the minutes of the last meeting, Mr. Edwin P. Marquand was unanimously elected a member of the Society.

Mr. G. E. Derrick read a note on the discovery of an unusual colony of bats in a disused store in Hospital Lane, which was opened last month. There were about 60 in all, some of them hanging singly, others in little clusters of from 8 to 15. Being torpid they were easily captured, and two specimens, which were exhibited, had been preserved for the museum. They all belonged to one species, the Horseshoe Bat (*Rhinolophus ferrumequinum*). This species is not given in Ansted's list of the mammalia of Guernsey, but a specimen is now in the museum taken last year at the Vale Castle; and the President said he remembered when a boy taking a living specimen at the Forest, which he tried to stuff.

Mr. Collenette exhibited two rudely cylindrical masses of baked clay bearing the impression of the thumb and fingers. These examples were found in the cromlech at l'Ancrese by Mr. Lukis, and are exactly similar to those found at Richmond last year, associated with deposits of limpet shells.

Mr. F. Rose, L.D.S., then read a paper on "The minute Anatomy of the Teeth and Jaws of Vertebrates," illustrating the subject by means of prepared diagrams and rough sketches on the blackboard. The histology of the human tooth was minutely described, and some practical remarks upon the treatment of the teeth of young children, and other useful information, added much to the interest of the paper.

Monthly Meeting held on March 8th, 1893, Mr. E. D. Marquand, President, in the chair.

The minutes of the previous meeting having been read and signed, Mr. W. A. Luff exhibited a number of *Hemiptera*, new to the island, which he had recently captured, and made remarks upon them. Mr. Collenette exhibited a specimen of dressed flint found by Mr. Bartlett in a field near the Bailiff's

Cross; also a number of mineralogical specimens. A contribution was read from the pen of Mr. J. Sinel, of Jersey, describing the exploration of the Goat's Cave, or Cotte à la Chèvre, near Grosnez Point. On excavating through the successive clayey deposits that formed the floor they found the site of an ancient fire, quantities of wood ashes, fragments of bone, worked flints, flint arrowheads, &c., all clearly showing that in former times the cave had been used as a habitation. Some notice of this cave appeared in *Science Gossip* for Feb., 1882. Possibly some of the caves in Guernsey, especially the Creux Mahié, would repay an examination of this kind.

The President read some notes giving the results of microscopical examinations which he had made of various samples of clay taken from different parts of the island. No trace of diatoms, foraminifera, or other organic remains had been discovered.

Monthly Meeting held on April 12th, 1893, Mr. E. D. Marquand, President, in the chair.

After reading the minutes of the last meeting, the Honorary Secretary announced that the British Museum authorities had presented to the Society copies of the "Guide to Sowerby's Models of British Fungi" and the "Catalogue of British Echinoderms." Mr. G. A. Schmitt (through Mr. Collenette) presented five numbers of the Transactions of the Massachusetts Horticultural Society.

Specimens of the coral anemone (*Caryophyllia Smithii*) found here by Mr. Tourtel and Mr. Puttock were exhibited.

Mr. T. C. Royle then read a paper on "What is a Flower?" looking at the subject from a strictly botanical point of view. The question was dealt with in a very able manner, and gave rise to much discussion at its close.

Monthly Meeting held on May 10th, 1893, Mr. C. G. De La Mare in the chair.

After the formal business of the meeting had been disposed of, Major-General Harvey was unanimously elected a member of the Society. The Hon. Secretary announced that the Smithsonian Report of the U.S. National Museum for 1890 had been received. Mr. Luff exhibited a butterfly new to Guernsey, the Orange Tip (*Anthocaris cardamines*), one specimen of which he captured at Grande Mare on April 23. Mr. Luff also showed a Longicorn Beetle (*Asty-*

nomus œdilis) found in Victoria Road, probably introduced with imported timber.

The summer series of weekly excursions having opened yesterday by a visit to Houmet Paradis, the secretaries of the various sections stated what had been done, after which Mr. Collenette read the first part of a paper on the subject of "Droughts in Guernsey during the last fifty years," and showed that the recent absolute drought which had lasted from March 18 to April 21 had only once been equalled in this island during half a century.

Monthly Meeting held on June 14th, 1893, Mr. E. D. Marquand, President, in the chair.

The minutes of the last meeting having been read and signed, Colonel A. Simon, of Les Caches, St. Saviour's, was unanimously elected a member of the Society. The chief business was the receiving of the reports of the sectional secretaries detailing the work done at the last four weekly excursions. The flowering plants of the little islet of Houmet Homptolle had been carefully catalogued and only fifteen had been found, and it was curious that many very common plants found on the mainland abundantly within a hundred yards of the islet did not occur upon it. The Trapdoor Spider (*Atypus Sulzeri*) had been found on Homptolle, under the same conditions as at Richmond. Several other interesting entomological notes were made which will be only recorded in their proper place. The geological section had made some important observations, an outline of which was sketched by Mr. De La Mare. Mr. E. Allen described a fire-hole which had been discovered at Homptolle, and said it was of the usual kind. Mr. J. J. Carey exhibited a fine collection of flint chippings, flakes and cores (some hundreds in number), collected by him in India, and also in Guernsey.

Monthly Meeting held on July 12th, 1893, Mr. E. D. Marquand, President, in the chair.

The minutes of the previous meeting having been signed, the following six gentlemen were unanimously elected members of the Society:—Mr. H. D. Mauger, Captain R. Macrea, Captain Gostling, Commander Le Cocq, Mr. M. St. G. Glasse, and Major C. H. Ozanne.

The entire evening was occupied with the reports of the work done in the various sections during the recent weekly excursions, and many interesting specimens were exhibited.

Monthly Meeting held on September 13th, 1893, Mr. E. D. Marquand, President, in the chair.

After reading and signing the minutes of the last meeting (in July), the following persons were unanimously elected members of the Society:—Lieut.-Col. J. H. Harvey, Col. C. Durand, Rev. J. L. Le Pelley, and Mr. J. S. Ozanne.

The President called attention to the inconvenience of terminating the financial year of the Society in September, as at present, and urged many cogent reasons for altering the rule, fixing the annual meeting in October. After discussion it was unanimously decided to make the required change in the Society's rules so as to fix the annual meeting during the month of December, and the Society's year to commence on January 1st and terminate on December 31st.

Mr. W. Sharp exhibited a collection of flint chips and cores from Alderney, and Mr. Collenette several curious and interesting examples of rock and minerals from Bordeaux. Mr. Luff exhibited specimens of the new British moth (*Caradrina rupestris*), about twenty of which he captured on the coast near the Vale Castle on August 20th. The sectional secretaries described the work that had been done at the excursions since the last meeting.

The President then gave a lucid explanation of that curious phenomenon called "alternation of generations," illustrating his remarks, which were mostly confined to certain of the leaf-fungi *Æcidium*, *Puccinea* and *Uredo*, by diagrams on the blackboard.

Monthly Meeting held on October 11th, 1893, Mr. E. D. Marquand, President, in the chair.

After disposing of formal business, Mr. T. Domaille was unanimously elected a member of the Society. Mr. Luff exhibited several rare insects, some of which were additions to the Guernsey list, perhaps the most interesting being a new butterfly (*Cænonympha pamphilus*), taken by Mrs. Boley, who also exhibited some very fine specimens of the Pale Clouded Yellow Butterfly (*Colias Hyale*) lately captured by her. Mr. Collenette reported the finding of pebbles in the St. Martin's clay deposit, and pointed out the importance of the find as bearing upon the probable origin of the clay.

The President read a paper on the "Diatoms of Guernsey," which, together with the list of species, is printed in the following pages. The subject was afterwards more minutely gone into and elucidated by means of enlarged drawings and blackboard sketches.

Monthly Meeting held on November 8th, 1893, Mr. G. Derrick in the chair.

The minutes of the previous meeting having been read and signed, Mr. John S. Hocart, of Les Mielles, Vale, was unanimously elected a member of the Society. Mr. Luff exhibited some interesting insects lately taken in the island, including a moth (*Eubolia cervinaria*) new to Guernsey. Mr. Collenette read the second part of his paper on the "Droughts in Guernsey during the last 50 years." Mr. J. J. Carey contributed a short paper detailing excavations he had made at La Chapelle Dom Hue, where he disinterred a quantity of bones and fragments, specimens of which were exhibited.

Eleventh Annual Meeting of the Society held on December 20th, 1893, Mr. E. D. Marquand, President, in the chair.

After passing the minutes of the previous meeting, the Hon. Secretary read the Report of the Council as follows:— "The Council has much pleasure in recording the satisfactory character of the work done by the Society during its eleventh year. Indoor meetings have been held regularly every month (except August) and the attendance has been fairly good. Many interesting papers have been read at these meetings, the most important of which will be printed *in extenso* in these pages. The weekly excursions during the summer months were, as a rule, well attended, and good work was done, as will be seen by the sectional reports presently to be read. The more important of these excursions were those to Creux Mahié, to Pleinmont, to l'Erée, and to some of the islets on the Vale Coast. It is difficult to overestimate the value of thus systematically exploring the island, and carefully recording the result of the researches then made.

During the year we have had an accession of nineteen new members, and the roll now stands at 89, being the highest number ever registered since the foundation of the Society.

A change in the Society's year, so as to commence January 1st instead of November 1st, has been made chiefly for two reasons:—1st, That the Transactions as published might bear the date of one year only, and—2nd, In order to include the whole of the records for the autumnal months.

The following works have been presented to the Society during the year, and the Council beg to return their best thanks to the donors:—

- “Description of the Western Isles of Scotland and the Isle of Man,” by Dr. MacCulloch. Vol. III.—Presented by Mr. Z. Robert.
- “Guide to Sowerby’s Models of British Fungi and Catalogue of British Echinoderms,” by Professor Bell.—Presented by the British Museum Authorities.
- “Transactions of the Massachusetts Horticultural Society.”—Presented by Mr. G. A. Schmitt.
- “Smithsonian Report of the U.S. National Museum for 1890.”—Presented by the Museum Authorities.
- “Transactions of the Penzance Natural History and Antiquarian Society for 1892-3.”—Presented by the Society.

The Council acknowledge with many thanks their indebtedness to Messrs. Guille and Allès for providing the Society gratuitously with a room in which to hold its meetings. In view of the heavy expense entailed in printing the Transactions it is earnestly hoped that strenuous efforts will be made by members to increase the strength of the Society.”

W. SHARP, Hon. Sec.

Mr. W. A. Luff then read a paper on “The Coleoptera of Guernsey,” which, with the appended list of species, will be found in the following pages. The reports of the various sections next followed, read by the respective Secretaries, after which came the election of officers and committee for the ensuing year, the result being as follows:—President, Mr. E. D. Marquand; Hon. Secretary, Mr. W. Sharp; Hon. Treasurer, Mr. W. A. Luff. Committee, Messrs. J. Le M. Bougourd, A. Collenette, C. G. De La Mare, G. Derrick, J. L. Pitts and T. C. Royle.

Mrs. Boley exhibited a number of living larvæ of the Small Copper Butterfly, and some pupæ of the Clouded Yellow.

The President then announced the establishment of an Archæological Section, and Messrs. J. J. Carey and E. Allen were appointed secretaries.

Votes of thanks to the President, Hon. Secretary and Hon. Treasurer for their services during the past year brought the meeting to a close.

REPORT OF THE BOTANICAL SECTION.

As will have been gathered from my last year’s report the section has been mainly employed in the collection and preparation of specimens for the Society’s herbarium. During the winter months the work of mounting and labelling was steadily proceeded with. The search for new plants and for specimens of those already known to exist was resumed in the

early spring, at first by the members of the section individually and afterwards, when the Society's excursions were resumed, in their collective capacity. The section was represented at each of the seventeen excursions organised by the Society.

The number of specimens collected and dried this year amounts to 147, bringing up the total to 509, and leaving 189 to be obtained in order to make the collection complete. It is hoped that the greater part, if not the whole, of these may be collected during the coming season. The 509 plants referred to above are mounted and will be available for reference next year.

The list of additions to the flora is necessarily much shorter than that of last year; the island has been so thoroughly botanised that we cannot expect much progress in this direction. In all nine new species have been added to the list and some of these are by no means without interest. In the early part of the year Mr. Marquand reported *Tamus communis* (the Black Briony) from Fort Bay, a very interesting creeper, probably indigenous, possibly introduced by birds, in either case a legitimate and important addition to our flora. In June, Mr. Derrick and myself were fortunate enough to find in the same locality the variety *flavescens* of *Orobanche minor*; this variety is a recent addition to the British flora, it is recorded for the Channel Islands only. Our specimen was kindly named for us by Mr. Bennett, as it was not described in any of the Floras available here.

Some particulars concerning the other new plants will be found in the list itself.

During the year two papers have been read before the Society by members of this section:—"What is a Flower," by myself; and "Diatoms," by Mr. E. D. Marquand, the latter being accompanied by a list of observed species.

Since my last report lists have been published in the Society's Transactions of the Mosses, Hepaticæ and Lichens of the Island; these complete the enumeration of the entire indigenous plants of Guernsey, except the Fungi and Algæ. The list of Diatoms referred to above forms the first instalment of the Algæ, and Mr. Marquand hopes to complete the whole of this section next year, so that, leaving out the Fungi, a class which presents special difficulties, and which requires observations extending over a considerable number of years for the compilation of a reliable list, every plant phanerogamic and cryptogamic known to be indigenous to this island, and of which specimens in a living state have been seen by members of our Society will be recorded in our Transactions.

For this satisfactory result we are mainly, if not entirely, indebted to Mr. Marquand and to his special knowledge of the Cryptogamia. I may mention that the mere enumeration of the species occupies thirty-five pages of the Society's Transactions, and, to say nothing of work done in the field and at home for the verification of the plants, the labour of compiling and passing such matter through the press is very great. The best thanks of the section must be accorded to our worthy President for his invaluable assistance.

As the other islands of the bailiwick come within the operations of the Society, a commencement has been made by this section towards the compilation of reliable lists of their Floras. Here again special difficulties are encountered. If a member of the section could be stationed in each island for a twelvemonth the work could be easily and promptly done; as this is evidently impossible it is only by casual and brief visits and by the help of the inhabitants where such exist, that reliable information can be obtained.

In the spring, by the assistance of Mr. Derrick, important additions were made to the floras of Herm, Sark and Alderney. Later in the year the Society's excursion to Herm afforded the section an opportunity of making further additions to the list of plants for that island. We are also indebted to Mr. A. Mourant, a member of the Society, and to Mr. Gaudion, schoolmaster of Alderney, for gatherings of plants from that island, by which further additions have been made to the list. In this connection I may note that one of the plants so sent (*Anthriscus sylvestris*) has, as far as my information goes, been noted only once before for the Channel Islands, and that as far back as 1833, when it was reported by Mr. W. C. Trevelyan to Mr. Babington as occurring in Jersey, but Mr. Babington does not appear to have seen it himself.

The section takes this opportunity of thanking Mr. Gaudion for his assistance, and would be very glad to obtain similar help from persons residing in any of the neighbouring islands.

PHANEROGAMS.—ADDITIONS IN 1893.

Fumaria pallidiflora, *Jord.* Roadside, Videclins (VIII.) in 1889, and Castel Road in 1890 (E. D. M.)

Reseda suffruticulosa, *L.* One large plant on the shore at Grand Havre, evidently a garden outcast (E. D. M.)

Silybum marianum, *Gaert.* Waste ground at Ruettes Brayes, several plants (Miss Dawber). One plant in a cultivated field near Woodlands (Miss Dawber and E. D. M.)

Trachelium cœruleum, *L.* Wall in Candie Cemetery Lane, several plants (G. E. Derrick and T. C. Royle). A Mediterranean plant recorded in *Journal of Botany* for November, 1892, as thoroughly established on high, somewhat ruinous walls on the outskirts of St. Peter-Port, where Mr. Buchanan Brown counted at least 150 blooms on August 16. He is said to have known the plant there in the same profusion for quite sixteen years.

Melissa officinalis, *L.* Roadside below Le Tertre (IX.), a few large plants near a house (E. D. M.)

Atriplex laciniata, *L.* Common in the sand on the shore of the lowlands.

Tamus communis, *L.* Path descending to Fort Bay, in fair quantity on both sides of the path.

Carex Cederi, *Ehr.* Abundant in a basin-like hollow on l'Ancrese Common, near l'Ancrese Lodge; and also plentiful in a moist spot at the eastern end of l'Ancrese (E. D. M.)

Setaria Viridis, *Beauv.* Roadside behind St. Sampson's Bridge, one plant (E. D. M.)

T. C. ROYLE, Sec. Bot. Sect.

REPORT OF THE ENTOMOLOGICAL SECTION.

The season of 1893 has been a very successful one as far as our local researches are concerned, and several important additions have been made to the lists of insects already published. The exceptionally fine weather, which set in so early, promoted an abundance of insect life, many species appearing long before their usual time.

The first butterfly, a specimen of *Vanessa Urticæ* (the Small Tortoiseshell), was captured by Mr. G. Derrick as early as March 3rd, and a week later several of the same species were observed flying about the cliffs near Saints' Bay.

Melitæa Cinxia (the Glanville Fritillary) was much earlier on the wing than it has been for many years. I took several specimens on April 20th. In ordinary seasons they do not begin to emerge until the first or second week in May. Singularly enough we have this year to record the latest date for this species, a fine male specimen being taken by Mr. A. J. Hodges on August 15th, near the Creux Terrible, in Sark.

I captured a fine male specimen of *Anthocharis Cardamines* (the Orange Tip Butterfly) at the Grande Mare, Vazon, on April 23rd; the Rev. F. E. Lowe also records the occurrence of one near his house on May 6th. This butterfly is quite new to the Guernsey list, and a Jersey collector, Mr. Stanley Guiton, informs me that he has taken several specimens in that island for the first time during this season; one specimen only being recorded as taken in Jersey many years ago.

Another addition to our list of Butterflies is *Cænonympha Pamphilus* (the Small Heath), a specimen of which was cap-

tured on our cliffs by Mrs. Boley; this is the first record of its capture in Guernsey, although it is to be found in abundance in Sark, Herm and Jethou.

The Rev. F. E. Lowe records the occurrence of that beautiful and rare species *Papilio Polalirius* (the scarce Swallow-tail) in his garden. He was so close to it that he was able to identify it without the shadow of a doubt.

Colias Edusa (the Clouded Yellow) has been fairly common this autumn, although not so abundant as it was last year.

Mrs. Boley has taken several of *Colias Hyale* (the Pale Clouded Yellow), one of them being a fine variety, almost pure white.

Pyrameis Atalanta (the Red Admiral) has been abundant, but scarcely any specimens of the *Pyrameis Cardui* (the Painted Lady) have been seen; this is remarkable as they were extremely abundant last year.

Amongst the moths several additions to our local list have been made.

Caradrina Superstes, one of the noctuæ, has been taken abundantly at sugar near the coast by Mr. A. J. Hodges, an enthusiastic and well-known English collector, to whom belongs the credit of taking the only British specimen recorded, in the Isle of Wight. A good coloured figure of this species is given in the *Entomologist's Record* for February, 1893.

Agrotis Obelisca, *A. tritici*, *A. lunigera*, and *Caradrina Blanda*, all new to the list, were also taken at sugar near Bordeaux Harbour, during August.

One specimen of *Acroncyta Ligustri* was taken on June 10th, and I found another in my breeding cage, the larva of which was taken on privet. On October 21st I took *Eubolia Cervinaria* flying to the light of a shop window in Fountain Street at 10 o'clock in the evening; this is also an addition. A boy brought me a specimen of that extremely rare and handsome moth *Catocala Fraxini* (the Clifden Nonpareil) on October 3rd; he had picked it up at the Ruettes Brayes. It was much worn, but very interesting, as the second one captured in Guernsey.

Acherontia Atropos (the Death's Head Hawk Moth) has been very common both in the larva and perfect state; but *Sphinx Convolvuli* (the Convolvulus Hawk Moth) has been much scarcer than in previous years.

In the order *Neuroptera* nine additions have to be recorded, the most important being *Micropterna Sequax*, which was captured by Mr. E. D. Marquand in 1888. I took

a specimen in Sark in 1874, which was recorded in Mr. R. McLachlan's Monograph of the European Species; it is of rare occurrence in England.

Three additions have been made to the list of *Hemiptera*.

During recent years great attention has been paid to the *Coccidæ*, a hitherto much neglected tribe of insects, and Mr. Newstead, of Chester, one of the best authorities on the order, received a specimen or two of a species new to science, taken in Guernsey by Miss Tomlin, which he named *Ripersia Tomlinii*. These *Coccids* live in ants' nests under stones. Wishing to examine more specimens and to find out the ants with which they associate, Mr. Newstead applied to our Society through the Secretary for assistance, and ere long we were able to send him specimens from both Guernsey and Alderney with their ant protectors, and notes on their economy. The ants were *Tetramorium Cæspitum* from Guernsey and *Lasius Alienus* from Alderney. During the present season another ants' nest species was discovered near Bordeaux Harbour during one of the Society's excursions. This also may prove new. Several other interesting species of *Coccidæ* have been noted, and it is hoped that with Mr. Newstead's assistance we shall be able to give a list of the Guernsey species shortly.

Bees and wasps have been very abundant, and many interesting species have been taken with a view to a list of this order at no distant date.

A list of the *Coleoptera* or Beetles will appear in this year's transactions, and of these many of the specimens were collected this season.

ADDITIONS TO THE LIST OF MACRO-LEPIDOPTERA PUBLISHED IN THE TRANSACTIONS FOR 1889.

RHOPALOCERA (Butterflies).

Anosia plexippus. A fine specimen of this beautiful North American Butterfly was captured by Colonel A. H. Collings in his garden in the Grange on October 2nd, 1886. It is interesting that five or six specimens were captured in England in the same year.

Cænonympha pamphilus (the Small Heath). One taken by Mrs. Boley, 1893.

Papilio podalirius (scarce Swallow-tail). A specimen was seen by Rev. F. E. Lowe in his garden, but having no net with him at the time he was unable to capture it.

Euchloë cardamines (Orange Tip). One male specimen captured by Mr. W. A. Luff at the Grande Mare, Vazon, on April 23rd, 1893. One seen by Rev. F. E. Lowe near St. Stephen's Rectory, May 6th, 1893.

HETEROCCERA (Moths).

Ellopia fasciaria (the Barred Red). One specimen taken by the Rev. F. E. Lowe.

Acronycta ligustri (the Coronet). One taken at rest on June 10th. One bred from a larva beaten from privet in September, 1892. W. A. L.

- Caradrina superstes**. Abundant at sugar on the north-east coast during August. It also occurs in June and September.
- Agrotis lunigera** (the Crescent Dart). Several taken at sugar by Mr. A. J. Hodges near Bordeaux Harbour during August, 1893.
- A. tritici** (the White Line Dart). Taken at sugar near Bordeaux Harbour, August 19th, 1893, by Mr. A. J. Hodges.
- A. obelisea** (the Square Spot Dart). Several captured at sugar during August by Mr. A. J. Hodges, near Bordeaux Harbour.
- Gonoptera libatrix** (the Herald Moth). Very common; accidentally omitted from previous list.
- Eupethecia centaureata** (the Lime Speck Pug). Common on ragwort and at sugar.
- E. pumilata** (the Double Striped Pug). Taken at sugared flower-heads by Mr. A. J. Hodges, August, 1893.
- Eubolia cervinaria** (the Mallow Moth). One taken at light by Mr. W. A. Luff, October 21st, 1893.
- Cidaria corylata** (the Broken Barred Carpet). One specimen taken in Talbots Valley, June 7th, 1892.

ADDITIONS TO THE LISTS OF HEMIPTERA (HETEROPTERA AND HOMOPTERA) ALREADY PUBLISHED.

- Miris calcaratus**, *Fall.* Several specimens taken by sweeping low herbage near Rocquaine Bay, June 20th, 1893.
- Plea minutissima**, *Leach.* Common in ponds on l'Anresse Common in September.
- Libernia mesomela**, *Boh.* In fields near Vale Mill, June, 1893.

ADDITIONS TO THE NEUROPTERA PREVIOUSLY RECORDED IN THE TRANSACTIONS FOR 1891.

PSOCIDÆ.

- Cæilius atricornis**, *McLach.* One.
- Elipsocus unipunctatus**, *McLach.* About a dozen specimens taken from June 26th to 30th on a wall at top of Mount Durand.
- E. flaviceps**, *McLach.* Two beaten from bushes at the Gouffre, July 26th, 1892.
- E. hyalinus**, *McLach.* Several taken on wall at Mount Durand in June.

NEUROPTERA-PLANIPENNIA.

- Hemorobius micans**, *Oliv.* One taken near Vazon.
- H. Humuli**, *Lin.* One taken on June 7th, 1892, near Old Water Mill, Talbots Road.
- Chrysopa vulgaris**, *Schn.* Not uncommon, several taken during August. Mr. R. McLachlan remarks that some of the specimens are unusually large.
- Coniopteryx tineiformis**, *Curtis.* Common in July.

TRICHOPTERA (Caddis-flies).

- Micropterna sequax**, *McLach.* One specimen of this fine caddis-fly was taken by Mr. E. D. Marquand in the water-lane near Petit Bot Bay, on December 7th, 1888. I took a specimen in Sark in 1874. It is of rare occurrence in England. The above species were all kindly determined by Mr. R. McLachlan, F.R.S.

W. A. LUFF, Sec. Ent. Sect.

REPORT OF THE GEOLOGICAL SECTION.
SUPERFICIAL DEPOSITS.

These have again occupied the chief attention of the section. The following exposures have been examined :—

1.—*Vrangue Brickfield.*

A re-examination of the clay-pits at the Vrangue resulted in the discovery of a few pebbles at the base of the clay in the north-east corner of the older or southern excavation. Immediately under the soil was clayey loam containing some pebbles. It looks a natural formation, but Mr. Kellow says some of it was thrown back from old workings. Underlying this clayey loam are two feet of certainly undisturbed clay, and at the base of this, immediately over the decomposed rock, a few pebbles were found. Three were dug out; the two larger were of flint, 3in. and 2in. in diameter, a smaller one was of felsite.

The surface of the decomposed rock dips at a considerable angle to north and east. In the extreme corner a layer of sand 3ft. thick overlies the decomposed rock, but thins out rapidly to westward and disappears.

2.—*Drain at St. Sampson's.*

Near the Weighbridge a deposit from 5 to 10 feet thick of head with angular stones was seen. The matrix closely simulates decomposed rock.

3.—*New Road from Croft's to La Couture.*

Entering the cutting from the south, the rock at first reaches the surface, but towards the north (where the brake ends and the field begins) it is overlaid by a deposit of head reaching 6ft. in thickness. The rock underlying this head is much disturbed, and the head contains a bead of large blocks up to 6 cubic feet, apparently derived from the outcrop of rock to the south.

4.—*Hommet Paradis.*

A quarry in the centre of the islet shows the following section :—

Soil, 1 foot.

Rubble head, 15 inches to 3 feet.

Raised beach from a few inches to 2 feet.

5.—*Homtolle.*

Here we have rubble head overlying raised beach. The rubble head is very compact and forms the roof of several small caves, the underlying rock having been removed by the sea.

6.—*Fort Doyle.*

A section in the large quarry adjoining shows:—

Soil.

Head in places 10 feet in thickness.

Raised beach sometimes 10 feet thick (in pockets).

The Head contains very large blocks, mostly angular, but some appear waterworn.

7.—*Rousse.*

The most remarkable point here is the beach, which is covered with large boulders some 10 feet and more in diameter. These boulders in many instances resemble outcrops of rock, but are seen to rest on rubble head with angular pieces of rock, or on ancient beach, fine patches of which are exposed owing to the recent removal of the boulders by the waves. This ancient beach corresponds to the raised beach of other localities, but is here found at least as low down as the level of mean tide. It is evident that the present beach was at one time almost if not entirely covered with ancient beach overlaid by rubble head, in which latter most of the boulders now exposed were embedded.

8.—*Vaugrat Quarry.*

The rock is covered by head, including, besides the usual angular *débris*, sea-washed boulders, one of which was 5 feet in diameter. At 4 feet below the surface a pebble and a flint chip were found in what seemed to be undisturbed head. Pebbles and flint flakes are found abundantly in the cutting of the upper opening leading into said quarry, but only immediately underneath the soil.

On the summit of the hill a cutting has recently been opened, showing

Soil: 2 feet, containing very numerous flint chips.

Clay of irregular thickness, resembling head, but containing numerous pebbles and resting on decomposed rock.

9.—*Mare de Carteret.*

Some sections of Lord De Saumarez's excavations in this locality are reported in the Transactions for 1892, page 182. The excavations having since been continued in a south-west direction towards the Genats Road, a further visit has been made this year and the following sections measured:—

(a) At the extremity of the excavation nearest Genats Road;—

Sandy soil, 1 foot.

Peaty land, 6 inches.

Loose sand, somewhat iron-stained, and of very irregular thickness, but persistent, averaging 8 inches.

Peaty land, 1 to 2 feet.

Sandy clay, 9 to 10 feet, some parts very plastic; colour blue, weathering yellow; bottom not seen.

(b) About 25 feet from the above, down the course of the excavation:—

Soil, sandy and peaty, partly removed and disturbed in the work of excavating.

Sandy clay, 7 feet.

Sandy clay and peaty clay, interstratified in ribbon-like layers, 2 feet. In this bed are included pockets of coarse micaceous sand, which are seen to arise from the decomposition of diorite boulders.

10, 11 and 12.—*Grande Mare to Richmond.*

Three patches of raised beach have been reported by Mr. J. J. Carey. One discovered in excavating at Fairmount Cottage, just above Le Roquer (where patches were found last year which are described at page 185) is 10 feet below the surface and 2 feet thick. It ranks amongst the most elevated above mean tide level. It is stated to be accompanied by yellow sand. The two others, one at Brooklyn Cottage, King's Mills, 6 feet from the surface, and one at Mr. Vidamour's, behind Richmond Hotel, 4 feet from the surface, both found in excavating wells, are of lower level.

13.—*Neighbourhood of St. Saviour's Church.*

In a lane facing St. Saviour's Rectory and passing behind the Moulin du Beauvalet various sections have been noticed showing clay of no great thickness overlying rubble head. The interest of these sections lies in their throwing some light on the formation of the head. The rock under the head is much cracked and disturbed. The disturbance gradually increases; the spaces between the blocks become larger and the blocks are turned in various directions and no longer fit together, until by imperceptible gradations the true head is reached.

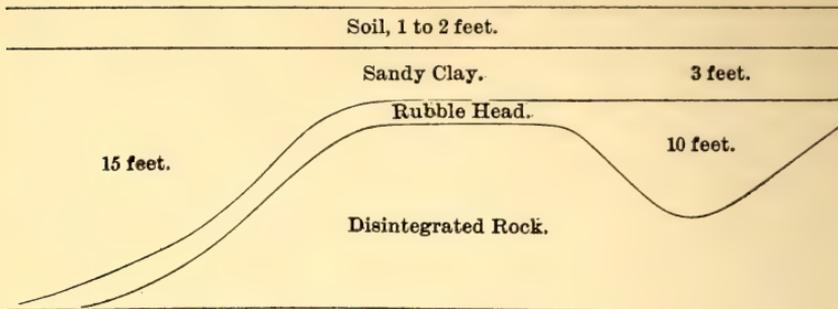
14.—*Les Adams and l'Erée.*

Rubble head was noticed in various sections, but no traces of raised beach.

15.—*Douit de Beauval, St. Peter's.*

A very good section is here exhibited, showing:—
Sandy clay, 3 to 15 feet.

Rubble head, absent in places, but reaching 9 to 10 feet in a pocket. The appended diagram will show the relation of the deposits.



16.—*Rocquaine Castle or Fort Gray.*

Section immediately to north of causeway :—

Soil, 18 inches.

Brick deposit, 6 to 8 inches (see Archæological Notes).

Head, 0 to 2 feet.

Raised beach, 2 feet.

17.—*Trinity Cottages, Rocquaine Bay.*

Soil.

Clay

Rubble head } very thick, 20 feet or more.

Raised beach.

18.—*Creux Mahie, Torteval.*

A stratum of pebbles about 8 inches thick was found under rubble and blocks apparently fallen from the roof. The sea does not at present enter the cave, but it remains undetermined whether the rubble and pebbles above referred to correspond with the rubble head and raised beach of other localities, or are more modern.

19.—*Fort Road, St. Peter-Port.*

In a field to the west of the houses being constructed by the Guernsey Real Property Trust a well has been sunk exposing about 6 feet of yellow clay, showing indistinct stratification overlying decomposed rock. No clay is seen in the adjoining field to the east. A deposit of limpet shells in this field is described in the Archæological Notes.

20.—*New Road at Croutes.*

A fine deposit of sand and clay overlying decomposed rock has been exhibited by the cutting of this road, which

cutting in some places is 8 feet deep. The sand is almost pure; the clay is always more or less sandy, but the layers are quite distinct and do not graduate into each other. There are numerous interstratified layers of each kind, but the stratification is irregular and shows remarkable contortions. The decomposed rock is pseudo-stratified as if from pressure. The layer immediately resting on the rock is sand, 16 inches in thickness, with a few angular stones at the base similar to undecomposed veins in the underlying rock. The relations of the sand and clay are very similar to what is found at Vrangue Brickfield southern excavation, but the elevation above sea level is, of course, much greater, and no pebbles have been found. The spot where these deposits are best seen is at the angle of the two new roads. To the south and east the deposit thins rapidly, and the decomposed rock comes to the surface.

PEBBLES IN SOIL.

Mr. Collenette having in some of his papers and lectures referred to the abundance of pebbles in the soil and in the clay immediately below it; these have been looked for and found in many localities at all elevations. Their significance, however, is not insisted upon.

ROCKS.

The schistose rock at Pezeries, Torteval, believed to be that referred to in M. Noury's work on the Geology of Jersey as similar to the Jersey argillites, has been visited. It is referred to also in Mr. Hill's paper on the Geology of this island, but as an intrusive vein. The latter is undoubtedly the true nature of the rock in question, which has a marked structure suggestive of stratification, but more probably due to fluxion, dipping E. about 40° , the strike of the vein being N. to S. The rock is somewhat soft, being easily scratched by steel or iron. It is very wide, perhaps the widest in Guernsey, and is bounded on either side by granitoid gneiss, which appears altered at contact. Its width, as measured roughly on the beach, may be from 300 to 400 feet, which would give from 200 to 250 for the true width at right angles to its dip.

The rock at Fort Gray, supposed to be that called argillaceous schist by MacCulloch and referred to by other geologists has been also examined. It is a soft rock, not unlike shale in some parts, but does not appear to be intrusive like the Pezeries vein, although it corresponds with it in strike and also dips E., but at a greater angle. It graduates into the adjoining dioritic or syenitic gneiss and seems to be due

(as suggested by Rev. Hill) to crushing and subsequent consolidation. It has an argillaceous odour, and setting aside its relation to the adjoining rocks, might, in detached specimens, be taken for an argillaceous shale.

MICA TRAP DYKES.

A vein at Hommet Paradis and one at Homtolle are suspected to be mica traps, but they are small, and very much blended with the adjoining rock.

Three veins of undoubted mica trap were found in the quarry near Fort Doyle, all running about E. and W. As they lie so close to each other they doubtless coalesce at no great distance. Their respective widths are 3 feet, 1 foot, and 8 inches.

The large vein north of St. Sampson's Harbour has been cut through by the drainage excavation. It is seen to be of irregular width. A remarkable feature is the inclusion of nodules of diorite in it, many of which are so rounded and separate so cleanly from the matrix as to resemble pebbles.

Mica trap has been reported at Barker's Tonnelle Quarry, but has not been visited.

C. G. DE LA MARE, Sec. Geol. Sect.

REPORT OF THE FOLKLORE SECTION.

The investigations and enquiries made during the year by some of the members of the Folklore Section have resulted in a few interesting discoveries; but have, perhaps, been valuable chiefly as showing the extensive local field that lies ready for careful and systematic working.

Papers of considerable interest were contributed by Mr. Zachary Robert on Guernsey Proverbs and also on local agricultural and social usages; and on general Guernsey Folklore by another member, who wishes to remain anonymous, and who sent his contribution through Mr. Sharp. These papers appear at the end of this report. Mr. Herbert Tourtel also devoted some time to assisting in different investigations, notably in the matter of divination by the Bible and key, the practice of which proves to be very prevalent in the island, and is implicitly believed in by its votaries.

Numerous cases of this mode of divination by means of a Bible and a key have been reported to me during the twelvemonth; especially as regards the endeavour to discover the guilty party when any articles were missing and were believed to have been stolen. Two out of the many examples that thus came to my knowledge may perhaps be worth recording.

In one case, during the building of a greenhouse, certain carpenters' tools mysteriously disappeared. Circumstances seemed to point to someone among the workmen as being the culprit; but, of course, all denied the theft, and the question was how to identify the delinquent. The men were summoned before their employer, and the ordeal of the Bible and key was invoked. The names of the men were successively called, when, at one of them, the Bible "turned," and the man was at once charged with the theft. To make assurance doubly sure, however, the experiment was repeated, and—as generally happens in such cases, when suspicion is once aroused—the Bible again "turned" at the same name. This was held to be proof positive. The bearer of the ill-fated appellation was a highly respectable workman, against whom there had never been a breath of suspicion, and who—distressed beyond measure at the aspersion—stoutly maintained his innocence of the crime. This, however, by no means cleared his reputation in the eyes of his intelligent (?) employer. The Bible had decided the case, and the Bible could not err. Indeed, the man's persistent denial of the theft, and his previous unsuspected character, were, rather regarded as merely so many aggravations of his actual offence, for they now simply seemed to indicate that he was a consummate hypocrite as well as an unprincipled thief. Consequently he was at once ignominiously discharged from his situation, although there was no other ground of suspicion. Happily, however, a week or two later the real culprit was discovered, and the unfortunate victim of the divination was conclusively proved to have been entirely innocent of any complicity in the theft. Here, then, was a signal instance of failure in the divination, and also of gross injustice done to an entirely innocent man.

Another example of the practice occurred in connection with the mysterious disappearance of a few pieces of family plate after the death of the owner—comprising an antique silver cream-jug and sugar basin, a dozen tea-spoons, &c. One of the relatives, an old lady, had been seen after the funeral to leave the house of mourning in a suspiciously hurried and furtive manner. She was noticed, too, to be holding her dress-pocket, as though it contained something heavy and bulky; while, as the plate disappeared just at the same time, suspicion not unnaturally was fixed upon her. The Bible and key were invoked by the other relatives who were entitled to share in the plate, the ordeal being gone through again and again. On every occasion the Bible "turned"

when the suspected lady's name was mentioned, though it never moved at the name of any other member of the family. Indeed, as one of the disappointed co-heirs remarked, the sacred volume seemed to fall with quite a disgusted and indignant flop, as though it had no patience with the sinful cupidity of the hypocritical and dishonest old woman, whom they all felt morally certain was the thief. The latter, however, although confronted with the tell-tale Bible, stoutly maintained her innocence, while not a trace of the missing articles was ever seen in her cottage. But, a few months later, she herself was taken ill and died. And then, when eager hands rummaged her cupboards, they found, carefully packed away on a top shelf, the whole of the purloined silver, which, on account of the family outcry, she had never dared to use. Here, then, was a triumphant proof that the ancient mode of divination had spoken truly.

One old lady tells me that for many years past she has been most successful in the cure of abscesses or tumours by the method known as *Décomptai*, or uncounting (counting backward). The process lasts nine mornings. On the first morning certain circular passes are made round the abscess from right to left—that is, in the opposite direction to the movement of the hands of a clock. The operator then counts slowly backward from nine to one, and next offers a short prayer or form of exorcism, the tenor of which is a secret. On each of the remaining eight mornings the backward counting and the form of prayer are repeated, but it is not necessary on these occasions to renew the passes, or even to see the patient. The operator can recite the formula in her own house and it will be equally efficacious. On the ninth day the patient is cured—or ought to be. One curious feature in the case, as told me by the old lady-operator, is that on every one of the nine mornings when reciting the prescribed prayer, &c., she herself feels very sick, just for the time, but the nausea passes off directly after. It is the prayer or exorcism that is held to be the most important feature in the ceremony; indeed, this is the key to all the rest. So much so, in fact, that its form or tenor cannot be imparted to anyone else without the operator personally losing the special power of healing which it confers. My informant had it from an old woman who was on her deathbed, and who therefore felt that she herself would have no further opportunities of using it. Hence her willingness to transfer the power to this friend of hers, who, in turn, hopes herself to hand on the tradition before she joins the majority—but she will not part with the secret yet.

Many very curious cases of fortune-telling have also come under my notice, in which the exact correspondence of the event with the prediction—even under very unlikely circumstances—could not but forcibly strike anyone acquainted with the facts, and would undoubtedly greatly strengthen any belief that might exist in minds already inclined in that direction.

Various other members have assisted in different ways, and notes have been recorded for further enquiry, relating to several other matters of popular practice and belief.

J. LINWOOD PITTS, Sec. Folklore Sect.

GUERNSEY PROVERBS.

BY MR. ZACHARY ROBERT.

The following is the interesting list of Guernsey Proverbs contributed by Mr. Z. Robert, as mentioned in the foregoing report :—

L'Coueron est pour la dame d'la maison.

The tail-piece is for the lady of the house.—When farmers sell their fat cattle by weight it is the custom for them to take back the bony piece near the tail, about 10 or 12lb. in weight.

Les v'la tous prins par l'bec.

They are all taken by the beak.—Said of persons taking their meals.

Un blânche gelas

Est terjous lavas.

A white frost is always washed—that is followed by rain.

I gèle à pierres fendre.

It freezes to stone-splitting.

Je n' sait qu'est qui li-en pond !

I wonder who lays eggs for him !—Said of a man who is getting rich.

A poignies, Messe Allez.

With your fists, Mr. Allez.—Often repeated at meals when a person makes use of his hands instead of a knife and fork.

Il en reste assàï pour tous les Taud' vins.

There is enough left for all the Taudevins.—Said very often when plenty of food is left on the table after meals.

Mauvais garçon, t'eras du saïl à ta soupe et d'la graisse à tés châteaux.

You naughty child, you shall have salt in your soup and fat with your cabbage.

Il a une minne coum un sonneur d'tambour.

He frowns like a drum-beater.

I met la quérue d'vant les bœux.

He puts the plough before the oxen.—Putting the cart before the horse.

I prend dés brais pour ramendaïr la cotte.

He takes from the breeches to mend the coat.—He robs Peter to pay Paul.

I n' peut pas apprendre à sa grand'mère à suchier d's ouex.

He can't teach his grandmother how to suck eggs.

Ne m' fait pas montaï dans m'en poummier d'suret.

Don't make me climb into my sour apple tree.

Pierre Pipet n' donne pas a Moussieu Careye.

The poor gives not to the rich.—The Pipets being the poorest and the Careys the richest families in the island.

Quand l's hirondelles volent haut, c'hest pour du biau temps, mais quand i volent bas c'hest singne de pllie.

When the swallows fly high it is for fine weather, but when they fly low it is a sign for rain.

Quand l' bllaï est bel en herbe,

I n'y est jamais en guerbe.

When wheat is fine in leaf,

It is never so in the sheaf.

Fraid Mai, pllaïne grange ;

Caud Mai, pllaïn chimquière.

Cold May, full barns.

Warm May, full burying-grounds.

Gros vent, point d'abri ;

Paure homme, point d'ami.

Stormy weather, no shelter ;

Poor man, no friend.

A Noué au perron,

A Pâques au tison.

At Christmas on the seat by the front door,

At Easter near the fire-place.

Si l'mais d'Mars durait sept ans,

L'hiver dur'rait autant.

If the month of March lasted seven years, winter would last as long.

Avril doux ; mais quand i s'y met, ch'est l'pierre de tous.

April mild ; but when it shows itself, it is the worst of all.

La poussière de Mai vaut un écu l'bouisset.

May dust is worth a crown a bushel.

Quand l'orge épie l' coucou s'en va.

When barley comes in ear, the cuckoo goes away.

A la mi-Août l'hiver se noue.

In the middle of August winter begins to form.

Février, pour avé dit à Janvier que s'il était à sa pièche i frait les pots gelaï su' l' faeu, fut racourchi d'daeux jours.

February, for having said to January that if it was in the latter's place it would make the pots freeze on the fire, was shortened two days.

L'arc d'aliance du matin
 Met la mare au chemin ;
 L'arc d'aliance du ser
 Est belle à voir.

The rainbow of the morning
 Puts water on the path ;
 The rainbow in the evening
 Is beautiful to behold.

Dis mé qu'est q'tu penses quant tu n'pense en rien ?

A t'répondre quand tu n'dis rien.

What do you think of when you think about nothing ?

To answer you when you say nothing.

Il a la câsaque au Maite Georges Fenean.

An idle fellow is said to wear the coat of Mr. George Faignant.

Il a étai à betanie.

He has taken a drop too much.

Ses poules valent des oies.

His fowls are worth geese.

Un sauche bran.

A miser.

Un pinche-maigre.

A skinflint.

Un Agrippa.

A needy fellow.

Si tu tue ten pourchet au cressant, t'a viande r'soudera dans l'pot ; mais si tu l'tue au r'qué-ant, a r'aptichra.

If you kill your pig before the full moon, your meat will swell in the pot ; but if you kill it on the wane, it will shrink in cooking.

I n'est pas guéri d'la lourde.

He is not cured of stupidity.

Qu'est qu'est quée ?

What has fallen ?

Qu'est-ce qui est tombé ?

La lune est l'soleil es voleu τ.

The moon is the thieves' sun.

Un bouan r'pas vaut mû que ds'équers de cannes.

A good meal is better than broken crockery.

La s'maine es très Jaudis.

The week with three Thursdays, *i.e.*, the week in which promises are to be accomplished.

Ch'est un sac a daeux goules.

He is a bag with two mouths, *i.e.*, Jack on both sides.

Ch'est un couté a daeux tranches.

He is a two-edged knife, *i.e.*, a back-biter.

Daeux œux pourris.

Two rotten eggs, *i.e.*, blackguards both.

S'tu veur attrappai une bellette, met l'i du saïl sous la coue.
If you wish to catch a weasel put salt under its tail.

Nou n'attrappe pas des mouques atou du vinaigre.
Flies are not caught with vinegar.

Qui marrie Jerriaias ou Jerriaise n'vivra jamais a s'n aise.
Who marries a Jerseyman or a Jerseywoman never lives at ease.

L'homme qu'est dans la lune atout un fagot su s'en dos, et s'en tchièn derrière li, i fut mis pour avé fait ds'allumettes au Dimanche.

The man in the moon, with a faggot on his back and his dog behind him, was put there for making matches on Sundays.

LA GRAND QUERUE.—THE BIG PLOUGH.

It has long been the custom for three or four neighbouring farmers to associate together and to help each other to plough their fields for parsnips. They used a large plough, making a furrow about 12 inches deep by about 18 to 24 inches wide. This plough was generally drawn by four oxen, with from eight to ten horses in front, each farmer providing an ox and two or three horses. The owner of the field usually guided the plough; while often a smaller plough, drawn by a couple of old horses, followed the big one for the purpose of turning the upper soil and weeds down to the bottom of the furrow. Work began about seven o'clock in the morning; at ten lunch was taken, consisting of bread and butter with cheese or fried codfish, and good strong coffee. Then at twelve o'clock (noon) the cattle were unharnessed and put to feed. Dinner lasted from one to two o'clock, the fare generally being a large boiled ham, (a "palette") a breast-piece of pork, sometimes a round of beef; three or four, or sometimes as many as half-a-dozen large puddings ("grosses houichepotes"), with plenty of good cider. Friends and relatives partook of the feast. Between two and three o'clock the party would sit in front of the fire, drinking wine and brandy, gossiping and telling stories. At three o'clock work was resumed, and carried on till six or seven in the evening, with occasional stoppages at intervals "pour prendre une petite goutte,"—to take a small drop! For it was a well-known tradition that "I faut prendre une petite goutte pour arousaï, ou bien j'nairons pas d'panais,"—"They must take a small drop to moisten the field, or else there would be no parsnips."

It was the custom with some farmers to give a good supper in the evening, instead of the dinner, after which the best part of the night was passed in merry-making, singing, fiddling and dancing, the festivities very often being carried on until morning.

The "Big Plough" was first introduced and used on the estate of "Les Fontaines," in the Castel parish. This was in the time of one of the ancestors of the late Mr. Thos. Lenfestey, probably about a hundred years ago. Before the time when the Big Plough was thus first introduced, it was the custom to dig the ground for parsnips about one foot deep. This was done by the farm-labourers and jobmen, with a peculiarly shaped spade, which was called "une bêque de Guernesî." The old farmers used to say, with regard to digging

the ground for their parsnip crop, that they should begin it whilst eating the bread baked at Christmas. A man was thought to have done well if he dug four perches a day. "La bêque de Guernesî" was a spade made by the country blacksmiths of the island. The blade was heart-shaped; the upper portion of the blade, as well as the handle, being of wood (generally ash), and the lower half or tip of the blade of steel.

L'IRONQUET DE NOUÉ.—THE CHRISTMAS LOG.

It was also the custom to reserve the root, or part of the trunk, of a large tree for burning on the fire at Christmas, a practice similar to that of the English Yule-log. "Au matin du jour de Noué tous les fouars sont étoupaïs."—"On the morning of Christmas Day all the ovens are shut." It being the custom in the country to bake the Christmas dinner in the oven.

LA CHEVAUCHERIE D'ANES.—THE DONKEY'S CAVALCADE.

When, in family quarrels, the good lady of the house had given her beloved husband a good, sound thrashing, it was the custom for some young man representing the injured husband to go in procession, accompanied by friends and neighbours all mounted on donkeys, the friends leading the way and a mob following the procession, to the music of old pots, pans and kettles. In this fashion they went, calling from house to house, to be regaled with cider, the afflicted husband's representative plaintively calling out, from time to time, "Ma femme m'a battu! Ma femme m'a battu!"—"My wife has thrashed me! My wife has thrashed me!"

FOLK MEDICINE.

Le mal d'la fontaine.

The well disease.—This is a sort of swelling above the instep, also sometimes on the arms and hands, and it is cured by washing the part with water from certain much-reputed springs or wells.

Le mal du roi.

The king's evil.—The seventh successive son of a family, born without sisters between, is believed to be "un docteur pour guéri l'mal du roi," "a doctor who can cure the king's evil."

Le mal d'l'église.

The church disease is cured by the patient walking several times round the parish church.

La poumillère.

A disease of cattle, in which the animals grow lean and in poor condition from their not feeding properly. This is cured by some old person who makes a hole in the small part of the animal's brisket, and passes through it the root of the herb "pommelée," or hellebore (*Heleborus fetidus*). The result is considerable suppuration of the part, and in some cases a cure is effected. (See Métivier's *Dictionnaire Franco-Normand*, page 400). The remedy is called "Passaï la Poumillère."

GUERNSEY FOLKLORE.

(Contributed anonymously through Mr. W. SHARP.)

SUPERSTITIONS CONNECTED WITH NATURAL OBJECTS.

1.—There is a rock near Fort Le Marchant on which the people believe that Satan planted his foot, and as proof they point out a huge footprint on it.

2.—At Pleinmont there is a round table (“la table des pions”) where the fairies are supposed to dance. On a certain day “les pions,” who had to be men of the “Court,” would hold a dinner at the table, and they were allowed to kiss anybody they met without fear of prosecution.

3.—On l’Anresse Common there is a “wishing well.”

4.—A few years ago a rock in the Vale Parish, known amongst the people as “la rocque qui sonne,” was unearthed by some inquisitive people. When the stone was blown up a man was killed, and the ship in which the stone was exported was wrecked on the way to England.

TREE AND PLANT SUPERSTITIONS.

1.—It is bad luck to bring “May-flower” into a house.

2.—If a lot of “hagues” (berries of the white thorn) grow, a rough winter will ensue.

Some Guernsey people put crosses in their gardens to keep the devil out, and thus secure good crops.

ANIMAL SUPERSTITIONS.

1.—Magpies continually screeching near a house ;

2.—Crows passing over a house ;

3.—A Redbreast tapping at the window, and

4.—Cock-crow during the night—all these four foretell death.

5.—“Bibets” (small insects) flying in unusual numbers are a sign of rain.

6.—If a person, on hearing the cuckoo for the first time in the spring, runs and shakes his pockets, he will prosper during the year.

GOBLINDOM.

1.—In 1888, the l’Islet people were nearly scared out of their lives by the report that night after night a white figure was seen flying about, and uttering the most unearthly wails. The apparition seems to have disappeared as suddenly as it came. This reminds us of the “Banshee.”

2.—Several people who can be trusted (?) say that they have seen a ghost walking up the steep hill near Ronceval, and they have beheld it disappearing into an old, disused quarry. A woman of nerve, who saw the apparition, determined to find out what became of it, so she followed the spectral form into the quarry, but she suddenly lost sight of it.

3.—The “Faeu bélenger ou bélengier” is a light which appears in marshy places, and is probably the same as the Will o’ the Wisp. To prevent its laying hold of you, you must turn your pockets inside out.

FOLK MEDICINE.

King's evil is cured by water obtained at certain fountains, of which the best known in this district (Vale) is near the Capelles School.

A necklace of garlic is a specific against convulsions.

A necklace of glass beads is good in "teething."

A nutmeg carried in the pocket cures pimples.

Quicksilver around the neck secures immunity from witchcraft.

The left stocking ought to be put on first in cases of toothache.

Five-leaved clover in a boot gives good health.

Snails, rubbed over warts, and stuck on a thorn, cause the warts to disappear as they (the snails) rot.

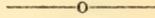
CUSTOMS.

The pips of a love-apple are taken on St. Thomas' Day and placed under the pillow.

In the olden times certain men were employed as road surveyors. They had a stick which was the standard width of the road. Any place along the road which was not the required width, had its confining banks or barriers knocked down.

THE DIATOMS OF GUERNSEY.

BY MR. E. D. MARQUAND, PRESIDENT.



MOST persons who have made an intelligent use of the microscope know what Diatoms are; but there are many who have admired the exquisite beauty of their forms and markings without having any distinct idea of the exact position they occupy in the system of nature. They are plants, it is true, but of all plants they are the most unplanklike; and anyone observing for the first time the peculiar spontaneous movements of these tiny organisms would certainly assign to them a place in the animal kingdom, as indeed did all the best naturalists down to comparatively recent times.

The *Diatomaceæ*, or Diatoms as they are more usually called, are very near relatives of the Seaweeds proper, for they constitute one family of the unicellular *algæ* closely allied to the *Palmellaceæ*, of which probably the two most familiar examples are the half-powdery, half-slimy green coating which spreads itself over every damp wall, and the purplish spots, resembling wine stains or blood marks, which cover the ground in moist corners of greenhouses and gardens.

Everything that is known about these little plants has been learnt through the medium of the microscope, because they are all exceedingly minute, the very largest among them being scarcely discernible by the naked eye; whilst a multitude of species require a very high magnifying power to render them visible at all. Frequently, however, they occur aggregated together in countless myriads, so that their presence is at once noticeable by the deep coffee-brown film which they form on submerged stones or wood, or on the surface of the mud in roadside ditches and rain puddles, especially in early spring.

Of all organised beings Diatoms are the most widely distributed, being found in a living state wherever there is standing water—fresh, salt or brackish—from the equator to the poles; and immense tracts of country are composed almost entirely of their fossil remains. Plenty of information about these very curious little organisms may be found in every work treating upon microscopical objects, and therefore it is

unnecessary for me to do more than say a word or two about the Diatoms of this island as a preface to the list of species which follows.

The only published paper bearing upon this subject, or at any rate the most reliable one, is to be found in Ansted's *Channel Islands*, second edition, p. 193. It consists of a catalogue of the Diatoms occurring in a very fine series of gatherings made in Guernsey during the years 1858 and 1859 by Dr. Wallich, and submitted for identification to the well-known accomplished diatomist, Mr. T. G. Rylands, of Warrington. The list is supplemented by some valuable notes and suggestions from the pen of Mr. Rylands, who concludes his paper in these words: "It would be difficult to name a locality more likely to reward with success a diligent search for these things in their natural haunts than the shores of Guernsey, or in general to point to a more desirable field for the collection of *Diatomaceæ* than the Channel Islands."

In a few cases localities for the rarer forms are specified in the paper quoted, but as a rule no indication is given of the comparative frequency of each species or its range within our area. If this had been done it would have been of the greatest value to us as local botanists, for our aim should be not simply to ascertain what plants occur in our little island, but whether they are common or rare or local, because much depends upon this in the future study of the influences and circumstances which have determined the existing conditions of plant distribution.

My own researches among the Diatoms of Guernsey, carried on in a rather desultory manner for several years, have not been sufficiently exhaustive to enable me to make out anything approaching a complete list; a large number of Dr. Wallich's rarer forms have never occurred in my gatherings, though I have been able to add nearly one hundred species to his catalogue; but it seems to me that the whole of the material now collected together is sufficient to warrant the compiling of a provisional list which will at any rate serve as a basis for further work. Localities will be specified for all my own finds, and where the bare name only of a species is given it is to be understood as signifying that the record rests on the authority of Mr. Rylands, who examined Dr. Wallich's Guernsey collections.

Rock scrapings and the washings of corallines from extreme low water mark will be found as a rule very productive on this coast, though occasionally in certain places the results are somewhat disappointing. A single gathering which

I made in that way at Cobo in September, 1889, yielded sixty-eight species. Dredgings and surface skimmings would most certainly produce some good things, but I have done nothing in that way, though Dr. Wallich adopted both means with gratifying results. Brackish pools hardly equal in richness and variety those in the south of England, perhaps because the water is too salt, but most probably because these pools are for the most part contaminated by the drainage of highly-manured land, or by cattle. The fresh water species are fairly represented, considering the entire absence of sphagnum bogs in Guernsey, but for the reason just given they are found but sparsely in many promising stations.

Up to the present time no trace of fossil Diatoms has been found in the island. I have on many occasions prepared and carefully examined samples of various deposits submitted to me by my geological friends, hoping to find indications of diatom life at an early period, but not a vestige has been detected.

A certain inconsistency in the annexed list requires a word of explanation. Whenever possible the names employed are those given in that classical work, the *Synopsis* of William Smith, the father of British Diatomology, but the order followed is not the one adopted in that work. Even in this small island many species and not a few genera have been found which were quite unknown to Professor Smith, and therefore it has been thought advisable to follow a more recent arrangement in order to locate satisfactorily these newly discovered forms. The classification of the present list, therefore, is that of the last edition of Pritchard's *Infusoria* (1861), which still remains the best descriptive text book of the Diatoms of the world, both recent and fossil. During the last thirty years, however, a multitude of new species have been described both in England and abroad, so that a complete revision of the entire class is greatly needed.

A word in conclusion as to the present list. The fact that only a solitary valve or perhaps a few scattered frustules of any species have occurred here must not by any means be accepted as certain proof of the rarity of that species in the island; it is quite likely that it will subsequently be found plentifully in some other spot, or under more favourable conditions. Certain species which occurred very sparingly indeed in Dr. Wallich's gatherings have been found by me in considerable abundance, and *vice versa*.

The total number of Diatoms now recorded for Guernsey amounts to 322 species, besides a small number which, being

apparently undescribed, at least in any work to which I have access, have not been noted in this paper.

Epithemia gibba. Common in gatherings from Grandé Mare.

E. ventricosa.

E. argus. Grande Mare. Base of cliffs at Petit Port.

E. constricta.

E. musculus. Brackish pools, north-west coast.

E. Westermanni. Grande Mare. Petit Port. L'Ancrese.

E. turgida. Generally distributed, but not common.

E. granulata.

E. marina (*Donk.*) Rock scrapings at extreme low water mark, Cobo, two frustules.

Himantidium pectinale. Cobo.

H. gracile. Valley below Le Casrouge (IV).

H. undulatum. Marsh between Grande Mare and Vazon.

Meridion constrictum.

M. marinum (*Greg.*)

Podosphænia Ehrenbergii.

Rhipidophora Dalmatica.

R. Lyngbyei.

R. paradoxa.

R. elongata. Common generally.

Liemophora splendida.

L. flabellata (*of Smith*). Generally distributed.

Podocystis Americana. Mr. Rylands says "Two valves only, seen in different slides. Locality, Cobo rocks at extreme low water, on corallines attached to the rock."

Denticula tenuis.

D. obtusa.

D. decipiens (*Ryl. M.S.*)

Plagiogramma Gregorianum.

P. interruptum.

P. inæquale.

P. lævis.

Odontidium mesodon. Saint's Bay Valley.

Fragilaria capucina. Marsh on l'Ancrese Common.

F. virescens.

Diatoma hyalinum.

Nitzschia amphioxys. Generally distributed.

N. vivax. Marsh between Grande Mare and Vazon.

N. parvula. Common in a gathering from the roadside near Hougue du Pommier (VIII).

N. minutissima.

N. virgata.

N. dubia. Brackish pool at Pulias (IX).

N. plana.

N. panduriformis.

N. sigmoidea. Pool by Fort Doyle.

- N. Brebissonii.** Grande Mare.
N. sigma. Common generally.
N. obtusa. A few specimens in a peaty deposit from Cobo.
N. spectabilis.
N. scalaris. Not uncommon in a brackish marsh between Grande Mare and Vazon. Occasional specimens on other parts of the north-west coast.
N. insignis.
N. linearis. Common generally.
N. palea. Valley below Le Casrouge (IV).
N. spathulata.
N. birostrata. Salerie, one specimen. Cobo, a few.
N. closterium.
N. socialis.
Amphipleura sigmoidea.
Bacillaria paradoxa.
Homœocladia filiformis, var. B.
Synedra lunaris. Saint's Bay Valley.
S. longissima. "Curiously intermediate between *S. longissima* and *S. radians*" (Rylands).
S. pulchella. Generally distributed.
S. minutissima. Pool by Fort Doyle.
S. gracilis.
S. acicularis.
S. undulata. Several very fine specimens in a gathering from rocks and corallines at extreme low water mark, Bordeaux.
S. radians. Common in the valleys in the south.
S. tenera.
S. investiens.
S. deformis.
S. ulna.
S. Gallionii. Frequent all round the coast.
S. fasciculata.
S. tabulata.
S. affinis.
S. arcus.
S. fulgens. Generally distributed.
S. superba. Common generally.
Dimeregramma minor.
D. nanum.
D. distans.
D. fulvum.
D. marinum.
D. mutabile.
Doryphora ampiceros.
Tryblionella gracilis. Pool by Fort Doyle.
T. marginata. Marsh at Bordeaux. Cobo peat deposit.
T. acuminata. Brackish pool, Pulias (IX.)
T. angustata.
T. punctata.

- T. constricta*. Generally distributed.
T. apiculata.
Cymatopleura solea. Generally distributed, usually a short form.
Surirella biseriata. Valley below Le Casrouge (IV.)
S. angusta.
S. linearis. Marsh at the eastern end of l'Ancresee.
S. splendida. Saint's Bay Valley.
S. striatula. Brackish pool at Pulias, abundant; occasional in some other parts of that coast.
S. ovalis. Common generally.
S. ovata. Generally distributed and rather common.
S. fastuosa. Common on all parts of the coast.
S. lata. Common.
Campylodiscus limbatus.
C. costatus. Grande Mare, common. Cobo. Saint's Bay Valley.
C. Ralfsii. Moulin Huet, in rock scrapings.
C. decorus. Generally distributed and not uncommon.
C. Hodgsoni.
C. eximius.
C. clypeus.
C. simulans (*Greg.*) Frequent all round the coast.
C. parvulus.
C. spiralis. Saint's Bay Valley. Grande Mare.
Striatella unipunctata. Common.
Rhabdonema minutum.
R. arcuatum. Common.
R. adriaticum. Common generally.
Grammatophora marina. Common.
G. macilenta. A few specimens in a gathering from Perelle Bay.
G. hamulifera. Cobo rock scrapings, a few specimens.
G. serpentina. Common.
Cyclotella Dallasiana.
Hyalodiscus cervinus. Marked with a query by Mr. Rylands.
Podosira Montagnei. "A form occurs not uncommonly which is probably a peculiar variety of this species" (Rylands).
P. hormoides.
P. maculata. Frequent in all gatherings from low water mark.
Melosira nummuloides. Common.
M. Westii.
M. Borreri.
M. varians. Common.
Orthosira orichalcea.
O. marina. Cobo.
Coccinodiscus centralis.
C. oculus Iridis.
C. concinnus. Moulin Huet. Cobo.
C. radiatus. Rather common.
C. lineatus.

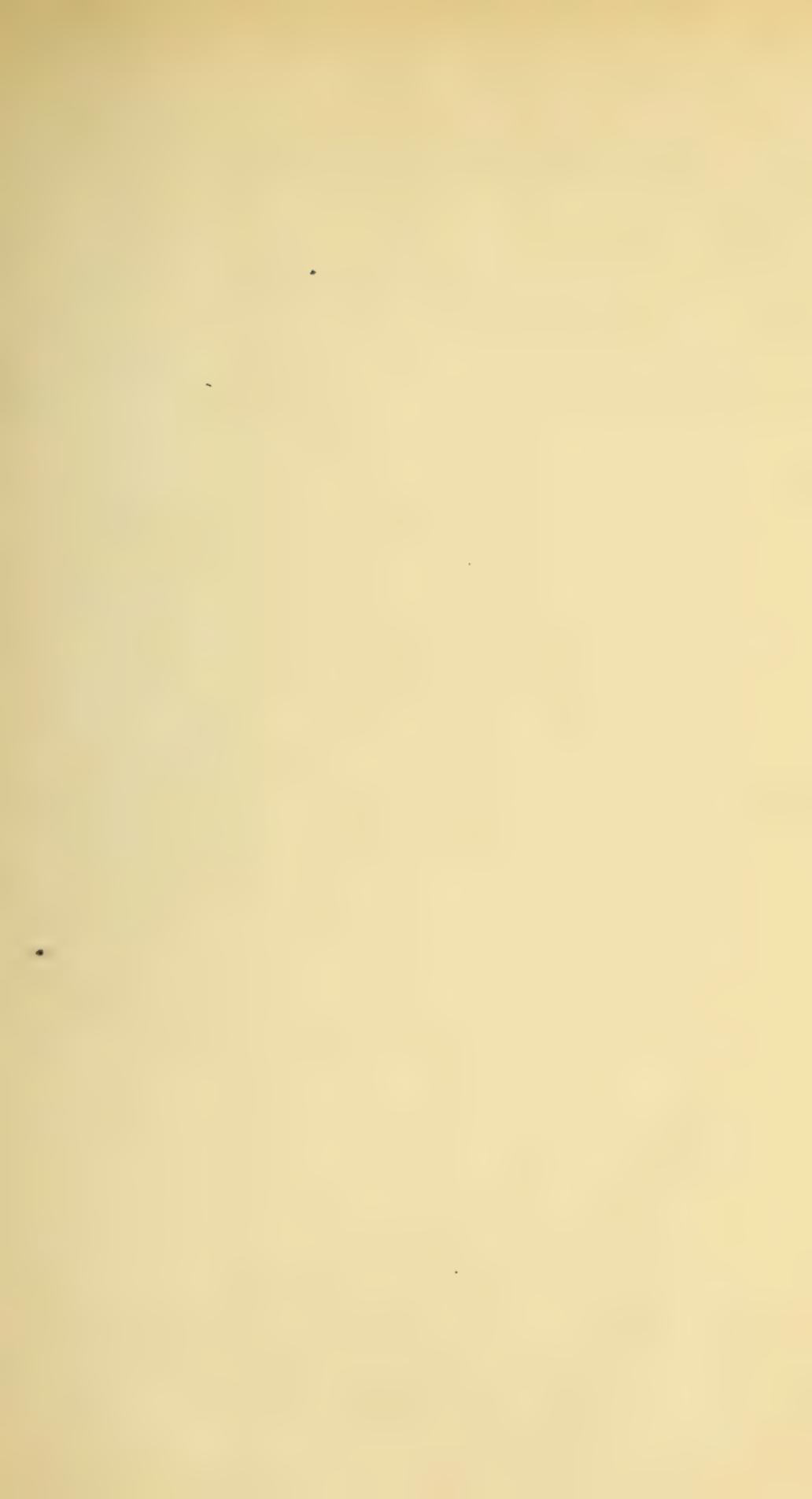
- C. eccentricus.** Moulin Huet. Petit Bot. Salerie.
- C. minor** (*Ehr.*) Not uncommon in scrapings and gatherings from low water mark.
- C. nitidus.** Cobo. Perelle. Petit Bot.
- C. minor** (*Kutz.*)
- Actinocyclus quinarius** (*Ehr.*)
- A. Ralfsii.** Common in most deep water gatherings.
- A. fulvus.** Bordeaux, a single specimen.
- A. crassus.**
- A. subtilis.** Petit Bot.
- A. tessellatus.**
- Asterolampra flabellata.** Mr. Rylands says that "This species has occurred two or three times in different gatherings."
- Actinoptychus undulatus.** Common.
- A. senarius.**
- Auliscus sculptus.** Petit Bot, one small specimen.
- Biddulphia pulchella.** Rather common.
- B. regina.** "Occurs in three of the gatherings; ought to be sought for growing" (Rylands).
- B. aurita.**
- B. granulata.**
- B. turgida.** I have only seen a single specimen of this, from Cobo; but Mr. Rylands gives "Pond and beach at the Vale; plentiful in the slides."
- B. rhombus.**
- B. Baileyi.** Scattered specimens have occurred in nearly all my coast gatherings. Dr. Wallich says "Taken with the skimming-net; evidently a floating species."
- Isthmia enervis.** Occurs more or less commonly all round the coast.
- Triceratium armatum.**
- T. alternans.**
- T. Brightwellii.**
- T. striolatum.**
- T. favus.**
- Amphitetras antediluviana.** Generally distributed, especially common on the south coast; the var. B. occasionally.
- Chætoceros Wighami.** "Taken by the skimming-net; found in myriads at or near the surface; day quite calm" (Wallich).
- Rhizosolenia styliiformis.** Taken with the last species by Dr. Wallich. "A second species occurs in one of the sea surface skimmings—a very fine form, but not in a condition to be identified" (Rylands).
- Cocconeis diaphana.** Rather common; chiefly the var. B. of Smith.
- C. pediculus.** Pool by Fort Doyle.
- C. placentula.** Occasional in roadside gatherings.
- C. dirupta.** Not uncommon.
- C. transversalis.**
- C. scutellum.** Common.
- C. distans.** Perelle Bay, one fine specimen. Also a single one in the peaty deposit from Cobo.
- C. lamprosticta.** Petit Bot. Perelle Bay.
- C. splendida.** Cobo, two specimens. Perelle, one.

- C. punctatissima*.
C. Grevillei. Generally distributed, but scarce.
C. pinnata.
C. ornata.
C. nitida. Cobo, a few examples.
C. pseudo-marginata.
C. excentrica. Cobo, three valves. Agrees exactly with Donkin's description, except that the median line is central.
C. sparsa.
C. Morrisii.
Achnanthidium lanceolatum.
A. lineare.
A. coarctatum.
Achnanthes longipes. Common.
A. brevipes. Common.
A. subsessilis.
A. exilis.
Cymbella cuspidata. Grande Mare.
C. affinis.
C. maculata. Marsh on l'Ancrese Common.
C. ventricosa.
Cocconema lanceolatum. Rather common generally.
C. cistula.
C. cymbiforme. Base of the cliffs at Petit Port.
Amphora binodis. Perelle Bay, one.
A. lævissima.
A. minutissima.
A. acuta.
A. lineata. Cobo.
A. salina. Salerie.
A. costata. Cobo.
A. ovalis. Rather common.
A. Grevilleana. Cobo. Bordeaux.
A. robusta.
A. hyalina. Brackish pool at Pulias.
A. affinis. Brackish pool at Pulias.
A. marina. Common.
A. crassa. Petit Bot.
A. spectabilis.
A. biseriata (*Greg.*) Moulin Huet ; often unsymmetrical.
A. fasciata.
A. incurva. Common on the north coast.
A. sarniensis (*Grev.*)
Gomphonema acuminatum. Common.
G. olivaceum. Valley below Le Casrouge. Saint's Bay Valley.
G. curvatum. Roadside gathering by Hougue du Pommier.
G. marinum.
G. tenellum.

- G. vibrio.**
G. dichotomum. Marsh on l'Ancrese Common.
Navicula incurvata.
N. musca.
N. bombus. Cobo. Perelle.
N. didyma (*of Gregory*). Frequent.
N. didyma (*of Smith*). Common. Var. B. ("sporangial" of Smith). Single valves have occurred in many coast gatherings.
N. pandura. Common.
N. mesotyla.
N. lævissima.
N. gibberula. Saint's Bay Valley.
N. lyra. Occasional in coast gatherings, varying much in size.
N. foreipata.
N. Henedyi. Salerie. Cobo. Perelle.
N. clavata. Cobo. Perelle.
N. nebulosa.
N. prætexta. Perelle Bay, a few specimens.
N. californica. Cobo, a few. My specimens come nearest to this species, but do not quite agree. I have also found one or two more species belonging to this beautiful group which are undescribed in any work to which I have access.
N. Smithii.
N. fusca.
N. lineata. Cobo, a few valves.
N. elliptica (*ovalis, Smith*). Common.
N. minutula. Roadside by Hougue du Pommier.
N. æstiva. Not uncommon. Easily recognised by the dry valve being bright blue.
N. inflata.
N. amphisbœna. Common. Var. B. (of Smith). Brackish pools at Pulias and Fort Doyle.
N. pusilla.
N. punctulata (*Smith*). Pulias pool.
N. crassinervia. Saint's Bay Valley.
N. dicephala.
N. cryptocephala. Common.
N. lacustris.
N. humerosa. Specimens have occurred sparingly in most of my coast gatherings.
N. granulata. Salerie, one valve.
N. latissima.
N. rhombica.
N. palpebralis. Salerie and Cobo, sparingly.
N. angulosa. Perelle Bay, a few specimens.
N. cuspidata. Hougue du Pommier roadside. Pool by Fort Doyle.
N. elegans. Marsh between Grande Mare and Vazon. Plentiful in the Cobo peat deposit.
N. liber. Not uncommon.
N. pectinalis.

- Pinnularia nobilis*. Frequent.
- P. major*. Rather common.
- P. viridis*. Common.
- P. aerosphæria*. Casrouge Valley. Saint's Bay Valley.
- P. Tabellaria*.
- P. divergens*. Marsh on eastern side of l'Ancrese, near the shore. A rather small form resembling Smith's *P. stauroneiformis*, var. B.
- P. interrupta*. Valley below Le Casrouge (IV.)
- P. acuminata*.
- P. Allmaniana*.
- P. radiosa*. Cobo peat deposit.
- P. gracilis*. Marsh between Grande Mare and Vazon.
- P. acuta*. Grande Mare.
- P. peregrina*. Common.
- P. longa*. Cobo, two specimens.
- P. acutiuseula*.
- P. distans*. Common.
- P. borealis*.
- P. oblonga*. Grande Mare.
- P. viridula*. Common.
- P. cyprinus*. Brackish pool at Pulias.
- P. hemiptera*.
- Stauroneis anceps*. Valley below Le Casrouge.
- S. linearis*.
- S. Phœnicenteron*. Not uncommon generally.
- S. gracilis*. Generally distributed.
- S. pulchella*. Common; very variable in size.
- Pleurosigma macrum*. Cobo, one fine specimen.
- P. prolongatum*.
- P. arcuatum*. Quarry marsh at Bordeaux.
- P. Wansbeckii*. Perelle Bay, one specimen.
- P. formosum*. A single valve in the Cobo peat.
- P. decorum*. Common.
- P. angulatum*. Common in brackish pools.
- P. quadratum*. Pulias pool, one.
- P. naviculaceum* (transversale). Rather common.
- P. nubecula*. Generally distributed.
- P. intermedium*.
- P. rigidum*. Rather common in low water gatherings.
- P. elongatum*. Brackish pool at Bordeaux.
- P. strigosum*. Cobo.
- P. Spencerii*. Roadside near Hougue du Pommier. Cobo peat deposit.
- P. attenuatum*. Saint's Bay Valley. Fort Doyle pool.
- P. acuminatum*.
- P. hippocampus*. Marsh between Grande Mare and Vazon.
- Toxonidea insignis*. Cobo, three valves. Perelle, one.
- Donkinia compacta*. Perelle Bay, one valve.
- Amphiprora alata*. Marsh at Bordeaux, plentiful. Scattered specimens elsewhere.

- A. vitrea.
- A. elegans.
- A. lepidoptera. Not uncommon.
- A. maxima.
- A. complexa (*Greg.*)
- Diadesmis Williamsoni.
- Mastogloia Danseii. Base of cliffs at Petit Port.
- M. Smithii. Grande Mare.
- M. apiculata. Cobo.
- Berkeleya fragilis.
- Colletonema vulgare.
- Schizonema crueiger.
- S. Grevillei.



Omission :

DROUGHTS IN GUERNSEY
DURING THE FIFTY YEAR PERIOD, 1843-1893.

BY MR. A. COLLENETTE, F.C.S.

PART I.

OBSERVATIONS on rainfall have been taken in Guernsey uninterruptedly for fifty years, counting from the commencement of the year 1843 to the end of the year 1892. We are, therefore, able to compare the droughts of the whole period of the fifty years with those just over. Dr. Hoskins, F.R.S., kept records from 1843 to 1881, while my own overlapped his during 1881 and continued to the present day. From these I have drawn the facts mentioned in this paper.

I shall divide this paper into two parts; the first part will deal with absolute droughts, that is periods of over fourteen consecutive days during which no rain fell. The second part will deal with partial droughts, that is periods of more than twenty-eight consecutive days during which the aggregate rainfall did not exceed an average of one-hundredth of an inch per diem.

See Table I.

Table I. gives a graphic view of the whole of the absolute droughts. These are found to be seventy-six in number, and to have occurred in forty-two years, that is, there were only nine years out of fifty during which no absolute drought was recorded. Those years were 1843, 1862, 1866, 1873, 1878, 1879, 1881, 1885, 1888 and 1892. It is worthy of remark that these years were not all wet years, nor did they differ from the remainder in any appreciable way.

TABLE II.

Duration of Drought. Dys.	Number of Droughts.	Years
		(inclusive of the present year).
15	17	1855, 56 (2), 57, 58, 59, 60, 61, 65, 70 (2), 75 (2), 82, 83, 84, 89, 93.
16	9	1857, 58 (2), 68, 70 (2), 87, 89, 91.
17	6	1845, 48, 51, 52, 67, 72, 77.
18	5	1846, 47, 54, 55, 63.
19	8	1845, 54, 61, 70, 74, 76, 80, 84, 90.
20	6	1850, 51, 65, 68 (2), 76.
21	6	1844, 52, 53, 65, 69, 70.
22	4	1850, 63, 64, 74.
24	3	1849, 51, 71.
25	1	1865.
26	2	1852, 86.
27	1	1864.
30	1	1893.
32	2	1854, 87.
33	1	1880.
35	1	1869, 93.

Table II. shows how the droughts fell as regards their durations. The table shows the droughts of the fifty years, by which it will be seen that the longest is one of thirty-five days. The drought of April last extended from the 18th of March to the 22nd of April, also a period of thirty-five days, hence it was equal to the longest absolute drought experienced as far back as our records go. As regard March and April droughts, Table III. will show that the droughts of these months exceed the average both in duration and number, in other words there is a tendency for the spring drought to fall within these two months. The average duration of a drought is nineteen days, whilst that of the March-April period proves to be 20.5 days. The number that fell to these months was sixteen, whilst according to the average of the fifty years they should have given twelve only. The number of droughts falling to May and June is twenty-eight, so that these months are richer as regards the number, but the duration falls slightly below, being 19.9 days against 20.5 for March-April. The number of absolute droughts of twenty-eight days (a lunar month) and over is but four. The only one of thirty-five days occurred in June, 1869 (see Table I.) The present drought has not broken the record, but has equalled this June drought, hitherto the longest on record.

It is worthy of remark that no duration greater than nineteen days occurred between the years 1854 and 1863.

TABLE III.
SPRING DROUGHTS.

Year.	Began.	Ended.	Dys.	Year.	Began.	Ended.	Dys.
1844	April 24	March 18	21	1863	March 21	April 7	18
1850	March 3	March 22	20	1870	March 26	April 9	15
1852	March 4	March 29	26	1870	April 11	April 29	19
1852	April 2	April 22	21	1872	April 4	April 20	17
1854	March 20	April 20	32	1874	April 15	May 3	19
1855	April 15	May 12	18	1875	March 21	April 4	15
1858	March 15	March 30	16	1880	January 10	January 28	19
1858	April 10	April 25	16	1880	March 28	April 30	33
1861	April 9	April 27	19	1893	March 18	April 21	35

Another point to which attention may be drawn is the fact that several of the droughts follow each other immediately, being, in fact, interrupted only. That is the case with the present (1893) one, it having commenced on the 18th of March, was interrupted on the 21st and 28th of April, and continued again to the 14th of May, when after an eight day interval, it was again renewed for thirty days, finally ending with the 22nd of June. In 1851 a drought began on the 19th of May, lasted twenty days, was interrupted for seven days, then recommenced and lasted twenty-four days. In 1852, began on the 4th of March, lasted twenty-six days, was interrupted for three days, then recommenced and lasted for twenty-one days. In 1856, from May 29th to July 7th, we had two intervals of fifteen days. In 1861, from April 9th to May 27th, we had two intervals of nineteen and fifteen days. In 1860, from June 6th to July 12th, we had two intervals of sixteen and twenty days. In 1869, from June 21st to September 4th, we had two intervals of thirty-five and twenty-one days. In 1870, from May 17th to July 3rd, we had three intervals of sixteen, sixteen and fifteen days. This was followed by another period of fourteen days, but just one day short of a drought, and again by a twenty-one days' drought. In 1874, from April 15th to June 2nd, we had two intervals of nineteen and twenty-two days. All these with many other partial droughts will be more fully considered under Part II. That of this year gave three intervals, viz. : thirty-five, fifteen and thirty days.

PART II.

PARTIAL DROUGHTS.

Twenty-eight partial droughts have occurred during the period under consideration. These have ranged from twenty-

eight days to seventy-three, the latter having occurred this year. The duration of the droughts are shown in

Table IV.

From this table it will be seen that the average daily rainfall during the partial drought ranged from $\cdot 001$ inch to $\cdot 010$ inch, thus:—

1 period of 41 days,	daily average	$0\cdot 001$	inch.
1 period of 35 ,,	,,	$0\cdot 002$,,
2 periods of 29 and 43 days,	,,	$0\cdot 003$,,
1 period of 35 days,	,,	$0\cdot 004$,,
2 periods of 42 and 46 days,	,,	$0\cdot 005$,,
1 period of 29 days,	,,	$0\cdot 006$,,
7 periods of 30 to 62 days,	,,	$0\cdot 007$,,
6 periods of 28 to 40 days,	,,	$0\cdot 008$,,
6 periods of 30 to 73 days,	,,	$0\cdot 009$,,
1 period of 26 days,	,,	$0\cdot 010$,,

Table V. shows the number of partial droughts for each period.

TABLE V.

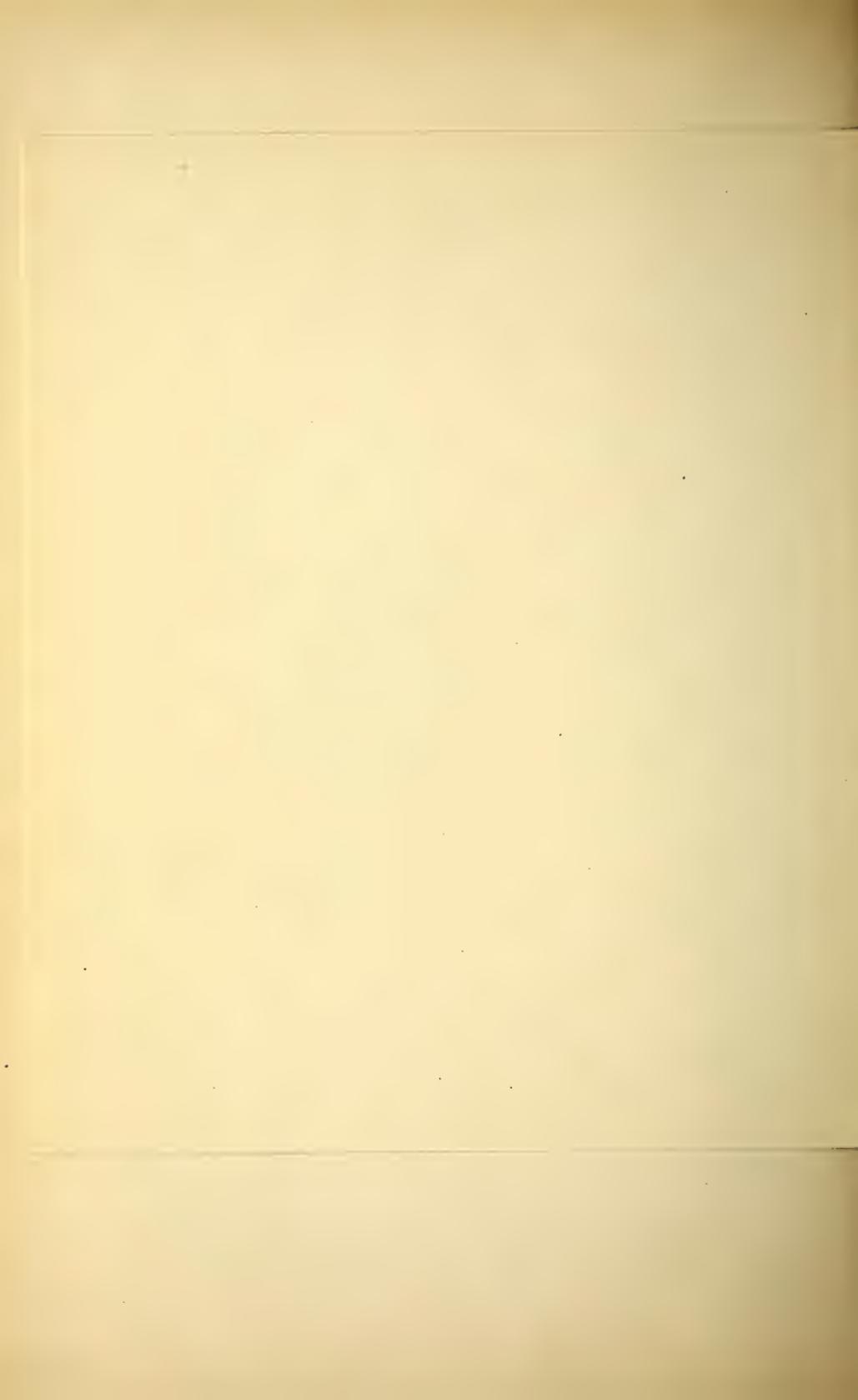
Days.	Droughts.	Days.	Droughts.
28	1	42	2
29	2	43	2
30	2	44	1
31	1	46	1
32	2	53	1
33	2	61	1
35	5	62	1
41	2	73	1

MEAN RESULTS OF METEOROLOGICAL OBSERVATIONS TAKEN IN GUERNSEY DURING THE PERIOD OF FIFTY YEARS, 1843-1892.

These observations were taken twice daily from January 1st, 1843, to December 31st, 1882, by Dr. HOSKINS, F.R.S., F.R.C.P., F.R. Met. Soc., and from January 1st, 1881, to December 31st, 1892, by Mr. ADOLPHUS COLLENETTE, F.C.S.

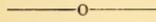
THE MONTHS.	BAROMETER.		SHADE TEMPERATURE.							EXPOSED THERMOMETERS.		VAPOUR.			Humidity.	RAINFALL.		Mean Weight of a cubic foot of Air in grains.	Mean Amount of Cloud. 0 to 10.	Mean Amount of Ozone. 0 to 10.	Force 0 to 12.	WIND.				
	Corrected and Reduced to 32° F. at mean Sea Level.	Mean Range.	Extremes.		Mean Extreme Range.	Means of			Mean.		Means of all Readings.		Elastic Force.	In a cubic foot of Air.		Total Amount.	Number of Wet Days.					Directions.				
			Highest.	Lowest.		Highest.	Lowest.	Range.	Air.	Dew Point.	In the Sun.	On the Grass.		Mean.								Required	N.E.	S.E.	S.W.	N.W.
1.—JANUARY	29.961	1.352	60.5	23.0	22.2	46.0	39.3	6.9	43.0	39.1	69.0	34.9	.248	2.6	0.3	87	3.94	18.7	545	6.5	3.8	1.7	5.7	7.0	10.1	7.7
2.—FEBRUARY	29.989	1.167	60.3	22.0	21.1	46.4	39.0	7.2	42.9	39.2	78.6	34.4	.249	2.8	0.3	88	2.62	15.7	549	6.8	3.8	1.5	6.7	5.4	8.8	6.8
3.—MARCH	29.937	1.241	64.0	24.7	23.5	48.1	39.4	8.3	43.1	39.3	91.0	34.7	.249	3.0	0.5	86	2.49	15.3	544	5.3	3.8	1.5	9.2	5.4	7.3	8.8
4.—APRIL	29.930	1.006	70.5	30.4	25.2	52.8	43.0	9.7	47.0	43.0	101.7	36.3	.280	3.0	0.5	85	2.29	13.6	542	4.6	3.9	1.4	9.8	4.6	7.3	7.7
5.—MAY	29.958	0.886	76.5	35.8	26.5	59.2	47.4	10.9	51.4	46.2	110.1	41.2	.322	3.6	0.7	84	2.21	11.8	538	4.3	3.7	1.4	11.3	4.2	7.7	8.2
6.—JUNE	29.999	0.773	80.0	38.3	25.8	64.1	52.2	11.4	56.2	51.2	114.2	45.6	.408	4.2	0.7	86	2.08	11.1	530	4.7	3.8	1.2	7.8	3.3	9.2	9.6
7.—JULY	29.993	0.733	83.5	43.8	23.9	67.0	55.6	10.9	59.7	54.9	118.8	48.5	.438	4.7	0.8	85	2.23	11.5	535	4.4	4.0	1.2	6.9	3.0	10.8	10.2
8.—AUGUST	29.976	0.726	82.5	41.0	23.3	66.9	56.1	10.3	59.9	54.9	117.6	48.8	.438	4.8	0.8	85	2.41	12.4	523	4.3	3.5	1.3	6.7	2.9	10.0	11.2
9.—SEPTEMBER	29.984	0.922	81.5	40.0	22.8	61.5	53.2	9.2	58.1	53.6	110.0	46.5	.421	4.6	0.8	86	3.07	14.4	532	4.5	3.7	1.3	8.4	4.5	8.7	8.5
10.—OCTOBER	29.884	1.200	78.7	34.4	23.4	57.3	49.3	7.8	53.1	48.3	96.9	40.7	.346	3.6	0.8	83	5.03	18.8	534	5.8	3.5	1.5	6.9	6.1	9.4	8.7
11.—NOVEMBER	29.892	1.257	62.0	23.0	22.1	52.2	44.7	6.9	47.9	43.0	77.6	39.4	.305	3.2	0.5	85	4.57	19.0	547	6.3	3.8	1.6	7.1	5.8	8.1	8.6
12.—DECEMBER	29.972	1.258	60.0	23.5	22.4	47.9	41.2	6.8	44.7	40.1	68.5	35.4	.276	2.9	0.5	85	4.05	18.0	555	5.5	3.8	1.5	6.4	6.1	9.4	8.9
SEASONS.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
The months 3, 4 and 5, Spring.	29.941	1.044	76.5	24.7	25.0	53.3	43.2	9.6	47.2	42.8	100.9	37.4	.283	3.2	0.5	85	6.99	40.7	541	4.7	3.8	1.4	10.1	4.7	7.4	8.5
„ 6, 7 and 8, Summer.	29.989	0.744	83.5	38.3	24.3	66.0	54.6	10.1	58.6	53.6	116.8	47.6	.428	4.5	0.7	85	6.72	35.0	529	4.4	3.7	1.2	7.1	3.0	10.0	10.3
„ 9, 10 and 11, Autumn.	29.920	1.126	81.5	23.0	22.7	58.0	49.0	7.9	53.0	48.3	94.8	42.2	.357	3.8	0.7	84	12.67	52.2	537	5.5	3.6	1.4	7.4	5.4	8.7	8.6
„ 12, 1 and 2, Winter.	29.974	1.259	60.5	22.0	21.9	46.7	39.8	6.9	43.5	39.4	72.0	34.9	.257	2.7	0.3	86	10.61	52.4	549	6.0	3.8	1.5	6.2	6.1	9.4	7.8
THE YEAR.	29.956	1.045	83.5	22.0	23.5	56.0	46.7	8.8	50.6	46.0	96.1	40.5	.331	3.5	0.6	85	36.99	180.3	539	5.2	3.7	1.4	7.7	4.8	8.9	8.9

From 1843 to 1881 the station was 204 feet above mean sea level and the rain gauge 12 feet above the ground. From 1881 to 1892 the station was 275 feet above mean sea level and the rain gauge 1 foot above the ground. During the first 40 years the observations were taken at 9 a.m. and 3 p.m., after which the hours were changed to 8 a.m. and 9 p.m. The means in columns 11, 12, 14 and 15 are deduced from 13 years' observations. For column 19, 37 years' observations have been used. The instruments are all standards, and are certified and mounted in accordance with Royal Meteorological Society's recommendations. The index and other error corrections have been applied.



THE COLEOPTERA OF GUERNSEY.

BY MR. W. A. LUFF.



COLEOPTERA or Beetles form one of the most important orders of the class *Insecta*.

In the perfect state they are easily separated from the other orders by their horny or leathery *elytra*, or wing-cases, which usually cover two ample membranaceous wings; these latter are, however, obsolete in some species.

The *elytra* meet in a straight line down the centre, never overlapping as in the Hemiptera.

They possess also cutting forcep-like jaws and other organs for the mastication of their food, whilst the Hemiptera are provided with a suctorial apparatus.

The technical name Coleoptera is very appropriate, being formed of two Greek words, *Coleos*, a sheath, and *pteron*, a wing.

They vary greatly in size, from the gigantic Hercules Beetle of the Tropics, measuring several inches in length, to some species of the genera *Trichopteryx* and *Atomaria*, which do not exceed one-eighth part of a line in length. When it is remembered that a line is the twelfth part of an inch, the complicated structure of these minute atoms, almost invisible to the naked eye, must excite our wonder and admiration, as they are endowed with the same number of parts as the larger insects, and their nervous and respiratory systems are of greater complexity than that of many of the larger animals.

Several species of Beetles are well known to everyone, such as the "shard-borne beetle," immortalised by Shakespeare, which buzzes past at dusk; the little scarlet lady-bird with its black spots, and which every child knows and loves; the death watch beetle, which riddles holes in our furniture, and, when the old wooden bedsteads were in vogue, almost frightened our grandmothers to death by the ticking noise it made whilst boring into the posts.

The cockchafer is also a well-known beetle. They were formerly so abundant in Guernsey that the market-women used to retail them by measure to the urchins of the period for the purpose of spinning them. This they did by driving a pin through them, when they spun around, making a

humming noise as they tried to get away. So great a nuisance did this chafer-spinning become that our Royal Court passed an Ordinance on May 25th, 1811, to put a stop to it. As this is perhaps the only law for the prevention of cruelty to insects in existence, I here give it in the original French, thinking it worthy of insertion in our Transactions:—

“*Samedi, le 25e de Mai 1811, devant Pierre de Havilland, écuyer, Baillif; présents, &c.*

“Sur la représentation faite à la Cour par les Officiers du Roi que des Enfants presque journellement font voler des Hanneçons, en leur attachent, un fil avec une Epingle,—LA COUR, afin de mettre fin à une coutume aussi cruelle, ouïe la conclusion des Officiers du Roi, à défendu d'en faire voler de la manière susdite, sur la peine de Trois Livres Tournois d'amende, ladite amende applicable moitié au Roi et moitié au délateur. Et sera cette présente Ordonnance publiée au cri du Marché et affichée aux lieux ordinaires, afin que personne n'en prétende cause d'ignorance.”

The number of species of Beetles at present known is at least 100,000 (the British species alone numbering about 3,300) and new forms from all parts of the globe are being constantly described in the various periodicals devoted to Entomology.

In our little island we have succeeded in finding 515 species, many of them rare and local, and I have no doubt that ere long the list will be greatly extended.

In collecting the material for the present list I have to thank our worthy President, Mr. E. D. Marquand, and his brother, Mr. E. P. Marquand, for their kind and able assistance. As the result of three or four months assiduous collecting in the early part of the year they have added no less than 116 species to those collected by myself. Many of these belong to the minute and difficult orders. The initials (E. D. and E. P. M.) are appended to these.

Specimens of most of the species have been submitted for examination and naming to three of the best known and ablest Coleopterists in England, viz.; Mr. G. C. Champion, F.Z.S., Editor for Coleoptera of the *Entomologist's Monthly Magazine*; the Rev. Canon Fowler, M.A., F.L.S., author of the “Coleoptera of the British Islands,” and Mr. W. G. Blatch, F.E.S., of Knowle, near Birmingham. To these gentlemen I here tender my hearty thanks, for on the correct naming of the species the value of any local list must depend.

Amongst our Guernsey species three have never occurred in Great Britain, and one is only doubtfully British. These are:—

Hyphydrus variegatus.
Cryptocephalus vittatus.
Cetonia morio.
Onthophagus taurus.

Cetonia morio is the most interesting of these, as it seems quite out of its latitude in Guernsey. A work on the European Coleoptera gives it as occurring in Southern Germany, and Mr. Champion tells me he has taken it abundantly in the Pyrenees. It is not very common here, but I have taken it several times on blackberry blossom on our southern cliff coast, where it seems to take the place of *Cetonia aurata*, which is absent here although so abundant in Sark, and occasionally to be taken in Herm. A specimen of *C. morio* was also taken in Herm a few years ago by an English collector, who showed it to me alive.

The following sixty species are worthy of special notice as being extremely rare, or local as British:—

Panagæus quadripustulatus.	Œdemera lurida.
Badister peltatus.	Trachyphlæus myrmecophilus.
Stenolophus Teutonius.	T. aristæus.
S. Skrimshiranus.	T. squamulatus.
Harpalus servus.	Barypeithes sulcifrons.
Zabrus gibbus.	Gronops lunatus.
Pterostichus dimidiatus.	Heterothops quadripunctula.
Amara ovata.	Philonthus quisquiliarius.
Taphria nivalis.	Scoptæus sulcicollis.
Sphodrus leucophthalmus.	Sunius filiformis.
Cymindis axillaris.	Pæderus caligatus.
Dromius vectensis.	Proteinus macropterus.
Bidessus unistriatus.	Necrophorus vestigator.
Dytiscus circumflexus.	Hister quadrimaculatus.
Octhebius punctatus.	Olibrus affinis.
Falagria sulcata.	Nitidula quadripustulata.
Hypocyptus lævusculus.	Antherophages pallens.
Tachyporus formosus.	Copris lunaris.
Onthophagus vacca.	Cleonus albidus.
Trox sabulosus.	Lixus bicolor.
Melanotus puncto lineatus.	Pachytychius hæmatocephalus.
Psilotrix nobilis.	Dorytomus tremulæ.
Callidium violaceum.	Sibinia sodalis.
Callidium variable.	Mecinus collaris.
Clytus arcuatus.	Poophagus nasturtium.
Acanthocinus ædilis.	Ceuthorrhynchidius rufulus.
Cryptocephalus moræi.	Baris laticollis.
Mantura chrysanthemi.	Pentarthrum Huttoni.
Crypticus quisquilius.	Caulotrypis æneopiceus.
Œdemera nobilis.	Cryphalus fagi.

COLEOPTERA.

- Cicindela campestris**, *L.* Common, but local.
- Notiophilus biguttatus**, *Fab.* Common in gardens and waste places in the spring.
- N. quadriguttatus**, *Dej.* L'Ancrese, by Fort Doyle (E. D. and E. P. M.) Grande Rocques (W. A. L.)
- N. aquaticus**, *L.* L'Ancrese Common.
- Leistus spinabarbis**, *F.* In a garden at Mount Row. One.
- L. fulvibarbis**, *Dej.* Not uncommon.
- Nebria brevicollis**, *F.* Generally distributed and common in spring and autumn.
- Loricera pilicornis**, *F.* St. Saviour's. One.
- Clivina fossor**, *L.* One specimen taken.
- Brosicus cephalotes**, *L.* Not uncommon under stones in the sandy bays of the north-west and west coasts.
- Panagæus quadripustulatus**, *St.* Moulin Huet cliffs, one specimen (E. D. and E. P. M.) Two under stones on Jerbourg cliffs (W. A. L.)
- Badister bipustulatus**, *F.* Several taken in the spring near Gouffre and Petit Bôt streams.
- B. peltatus**. Rocque Maingay, Vale, one specimen (E. D. and E. P. M.)
- Stenolophus Teutonius**, *Schr.* Grande Mare, Vazon. One.
- S. Skrimshiranus**, *Steph.* Not uncommon in mud under stones near a dried up pool on the north coast.
- Acupalpus exiguus**, *Dej.* Var. *luridus*. L'Ancrese Common. One.
- A. meridianus**, *L.* Four specimens under clods of earth in garden at Mount Row.
- Bradycellus verbasci**, *Duft.* Gouffre. One.
- Harpalus rufibarbis**, *F.* L'Ancrese, one. Island of Herm, one.
- H. ruficornis**, *F.* Castel, one specimen (E. D. and E. P. M.) Vale coast, one (W. A. L.)
- H. puncticollis**, *Payk.* Several by sweeping.
- H. æneus**, *F.* Common.
- H. consentaneus**, *Dej.* Common under stones in sandy places near the coast. Jethou, several specimens.
- H. tardus**, *Panz.* Generally distributed and frequent (E. D. and E. P. M.)
- H. servus**, *Duft.* Albecq, one specimen (E. D. and E. P. M.)
- H. anxius**, *Duft.* Common under stones, Vale.
- H. serripes**, *Schön.* Common near the coast.
- H. neglectus**, *Dej.* Vale coast. One.
- Dichirotrichus pubescens**, *Payk.* Local, several under stones, Vale.
- Anisodactylus binotatus**, *F.* Rather common.
- Zabrus gibbus**, *F.* Rare, under stones near Doyle's Monument and at Gouffre.
- Stomus pumicatus**, *Panz.* Near Ronceval. One.
- Pterostichus cupreus**, *L.* Not uncommon.
- P. dimidiatus**, *Ol.* L'Ancrese. One specimen.
- P. mandidus**, *F.* Common.
- P. cristatus**, *Dufour.* Fermain cliffs, St. Saviour's (E. D. and E. P. M.)
- P. vulgaris**, *L.* St. Saviour's, one (E. D. and E. P. M.) L'Ancrese, one (W. A. L.)

- P. nigrita**, *F.* Not uncommon on west coast.
- P. minor**, *Gyll.* Rocque Maingy, Vale (E. D. and E. P. M.)
- P. striola**, *F.* Not yet taken in Guernsey, but I took two in Sark on August 7th, 1889.
- Amara apricaria**, *Sturm.* Common.
- A. bifrons**, *Gyll.* Grande Rocque. One.
- A. ovata**, *F.* St. Saviour's. One.
- A. similata**, *Gyll.* Three specimens taken.
- A. tibialis**, *Payk.* Common.
- A. lunicollis**, *Schiödte.* Two specimens in a garden, St. Martin's (E. D. and E. P. M.)
- A. familiaris**, *Duft.* Generally distributed.
- A. trivialis**, *Gyll.* Common.
- A. lucida**, *Duft.* Grande Rocque. Several.
- A. communis**, *Panz.* Vale Castle (E. D. and E. P. M.)
- Calathus cisteloides**, *Panz.* Frequent.
- C. flavipes**, *Foure.* Not uncommon near the coast.
- C. mollis**, *Marsh.* Sandy west coast and l'Anresse Common.
- C. melanocephalus**, *L.* Common. Vale coast.
- Taphria nivalis**, *Panz.* Island of Jethou. One.
- Pristonychus terriicola**, *Herbst.* One in our garden, St. Martin's, and one at Castel (E. D. and E. P. M.)
- Sphodrus leucoptthalmus**, *L.* One crawling under door in Mansell Street, September, 1892.
- Anchomenus dorsalis**, *Müll.* Abundant.
- A. albipes**, *F.* Common under stones on the borders of streams.
- A. marginatus**, *L.* Grande Mare, not common.
- A. viduus**, var. *mæstus*, *Duft.* Rocque Maingy, one specimen (E. D. and E. P. M.)
- A. parampunctatus**, *F.* Vale; two.
- Olisthopus rotundatus**, *Payk.* Vale; one under stone.
- Bembidium rufescens**, *Guér.* Common, especially near the coast.
- B. quinquestriatum**, *Gyll.* l'Anresse; one.
- B. guttula**, *F.* Vale; one.
- B. biguttatum**, *F.* Not uncommon.
- B. lampros**, *Herbst.* Very common.
- B. littorale**, *Ol.* Common in sandy places on the coast.
- Tachypus flavipes**, *L.* Not uncommon under stones, dead leaves, &c.
- Trechus minutus**, *F.* Forest, one. Richmond, one (E. D. and E. P. M.)
St. Saviour's (W. A. L.)
- Pogonus chalcus**, *Marsh.* Brackish places on north coast.
- Cymindus axillaris**, *F.* Under stones on southern cliffs. Two in Herm.
- Demetrius unipunctatus**, *Germ.* One.
- D. atricapillus**, *L.* Common.
- Dromius linearis**, *Ol.* Common.
- D. quadrimaculatus**, *L.* Under bark of elm. One.
- D. agilis**, *F.* One in a garden, Mount Durand.
- D. meridionalis**, *Dej.* Gouffre. Two (W. A. L.) La Fosse, St. Martin's, one (E. D. and E. P. M.)

- D. melanocephalus**, Rather common.
- D. vectensis**, *Ryl.* One near Doyle's Monument. One, May 12th, 1892, Gouffre.
- Blechnus maurus**, *Sturm.* Not uncommon by sweeping on cliffs.
- Metabletus foveola**, *Gyll.* Common. L'Ancrese, Grande Rocque, &c.
- Haliphus ruficollis**, *De G.* Common, ponds at l'Ancrese.
- H. lineatocollis**, *Marsh.* Pool by Fort Doyle (E. D. and E. P. M.)
- Pelobius tardus**, *Herbst.* Common.
- Laccophilus obscurus**, *Panz.* Quarry pool at Pulias, Vale (E. D. and E. P. M.)
- Noterus sparsus**, *Marsh.* Pond on l'Ancrese Common.
- Bidessus unistriatus**, *Schr.* One in pool at Grande Mare, Vazon, October 4th, 1893.
- Hyphydrus variegatus**. Common in ponds at Vale; it has never been taken in England.
- Cælabus inæqualis**, *F.* Quarry pool at Pulias, Vale (E. D. and E. P. M.)
- Hydroporus lepidus**, *Ol.* Pond on l'Ancrese Common.
- H. picipes**, *F.* Quarry Pond, Vale. One.
- H. Gylenhali**, *Schiödte.* Grande Mare, Vazon. One.
- H. pubescens**, *Gyll.* Common.
- Agabus paludosus**, *F.* Pond on l'Ancrese.
- A. didymus**, *Ol.* Ditch near Ivy Castle, July 19th, 1892.
- A. conspersus**, *Marsh.* Pool near Vale Coast. One.
- A. nebulosus**, *Forst.* In quarry pools, Vale.
- A. chalconotus**, *Panz.* L'Ancrese, one. Rocque Maingay, one (E. D. and E. P. M.)
- A. bipustulatus**, *L.* Not uncommon.
- Rhantus Grapii**, *Gyll.* Grande Mare, Vazon. Two.
- Colymbetes fuscus**, *L.* Not uncommon in ponds and ditches, l'Ancrese and Grande Mare.
- Dytiscus marginalis**, *L.* Common in ponds, l'Ancrese. I once found more than twenty in a small zinc cistern on a roof in Bordage street.
- D. circumflexus**, *F.* Pond on l'Ancrese Common, two.
- Aeilus sulcatus**, *L.* Grande Mare, one.
- Gyrinus natator**, *Geoff.* Very common.
- Hydrophilus piceus**, *L.* Quarry pool, Vale. One.
- Hydrobius fuscipes**, *L.* Common.
- H. oblongus**, *Herbst.* Grande Mare. Vazon. Two.
- Philhydrus testaceus**, *F.* Grande Mare, one.
- P. maritimus**, *Thoms.* Pools at Pulias (E. D. and E. P. M.)
- P. Nigricans**, *Zett.* L'Ancrese, one.
- Anacæa limbata**, *F.* Common.
- A. bipustulata**, *Steph.* (E. D.)
- Berosus affinis**, *Brulle.* Grande Mare, one (W. A. L.) Pool by Fort Doyle, one (E. D. and E. P. M.)
- Chætarthria seminalum**, *Herbst.* Pool near Rocque Maingay. Plentiful. (E. D. and E. P. M.)
- Helophorus aquaticus**, *L.* Grande Mare, three or four specimens.
- H. æneipennis**, *Thoms.* Albecq, one. Pulias, one (E. D. and E. P. M.)
- H. brevipalpis**, *Bedel.* Grande Mare, one.

- Oethebius bicolor**, *Germ.* Pool at Rocque Maingy, one (E. D. and E. P. M.)
O. punctatus, *Steph.* Pool near Grandes Rocques, one (E. D. and E. P. M.)
Cyclonotom obiculare, *F.* Cliff stream at Petit Port, one (E. D. and E. P. M.)
Sphæridium scarabæoides, *F.* Common.
S. bipustulatum, *Fab.* Not so common as the preceding.
Cereyon obsoletus, *Gyll.* L'Anresse and St. Saviour's (E. D. and E. P. M.)
C. flavipes, *F.* Common.
C. melanocephalus, *L.* Frequent.
C. unipunctatus, *L.* L'Anresse (E. D. and E. P. M.)
C. lugubris, *Payk.* Rather common (E. D. and E. P. M.)
Megasternum boletophagum, *Marsh.* In haystack refuse, St. Saviour's, two (E. D. and E. P. M.)
Aleochara bipunctata, *Ol.* St. Saviour's, one (E. D. and E. P. M.)
A. nitida, *Grav.* Forest, one (E. D. and E. P. M.)
A. grisea, *Kr.* Under decaying seaweed, l'Anresse (E. D. and E. P. M.)
Astilbus canaliculatus, *F.* Forest, one (E. D. and E. P. M.)
Homolata vestita, *Grav.* North coast, frequent (E. D. and E. P. M.)
H. aquatica, *Thoms.* Talbots Valley, one.
H. euryptera, *Steph.* By sweeping, St. Saviour's, two.
H. trinitata, *Kr.* Common in haystack refuse.
H. sericea, *Muls.* In garden, St. Martin's, one (E. D. and E. P. M.)
H. fungi, *Grav.* Fermain cliffs, two (E. D. and E. P. M.)
Falagria sulcata, *Payk.* Near Gouffre stream, two.
Hypocyptus longicornis, *Payk.* Jerbourg, one (E. D. and E. P. M.)
H. læviusculus, *Mann.* Sweeping at Gouffre, one.
Conosoma pubescens, *Grav.* In garden, St. Martin's, one (E. D. and E. P. M.)
C. lividum, *Er.* Common in hedges in spring (E. D. and E. P. M.)
Tachyporus chrysomelinus, *L.* Common.
T. hypnorum, *F.* Common.
T. formosus, *Matth.* St. Saviour's Valley, one.
T. brunneus, *F.* St. Saviour's, one (E. D. and E. P. M.)
Cilea silphoides, *L.* In a garden at Mount Row, one.
Tachinus rufipes, *L.* Common.
T. subterraneus, *L.* St. Martin's, one. Forest, one (E. D. and E. P. M.)
Mycetoporus splendens, *Marsh.* L'Anresse Common (E. D. and E. P. M.)
Heterotophs quadripunctula, *Gyll.* Forest, one (E. D. and E. P. M.)
Quedius fuliginosus, *Grav.* Common under stones.
Q. tristis, *Grav.* Near Grandes Rocques (E. D. and E. P. M.)
Q. semisæneus, *Steph.* Coast by Rouse Tower, one (E. D. and E. P. M.)
 One taken at Herm in 1891 (W. A. L.)
Creophilus maxillosus, *L.* Common.
Leistotrophus nebulosus, *F.* Not common.
L. murinus, *L.* More frequent than last.
Staphylinus cæsareus, *Ceder.* Under stones near Grandes Rocques, two.
Ocypus oleus, *Müll.* Not very common.
O. cupreus, *Rossi.* Common.
O. ater, *Grav.* Under stones near Grandes Rocques.

- Philonthus splendens**, L'Ancrese, one. Castel, one (E. D. and E. P. M.)
- P. laminatus**, *Creutz.* Common.
- P. æneus**, *Rossi.* Gouffre, one.
- P. proximus**, *Kr.* Gouffre, one.
- P. politus**, *F.* Not uncommon.
- P. fimetarius**, *Grav.* St. Martin's and St. Saviour's (E. D. and E. P. M.)
- P. sordidus**, *Grav.* L'Ancrese Bay (E. D. and E. P. M.)
- P. cruentatus**, *Gmel.* Common.
- P. varius**, *Gyll.* Not uncommon.
- P. varians**, *Payk.* Generally distributed.
- P. agilis**, *Grav.* St. Saviour's, one.
- P. trossulus**, *Nord.* L'Ancrese.
- Cafius xantholoma**, *Grav.* Common on the coast under decaying seaweed, &c. Var. *variolosus*, Sharp. St. Saviour's, one (E. D. and E. P. M.)
- Xantholinus glabratus**, *Grav.* Not uncommon.
- X. punctulatus**, *Payk.* Common.
- X. linearis**, *Ol.* Frequent.
- Leptacinus linearis**, *Grav.* Frequent.
- Stilicæus affinis**, *Er.* Common.
- Scopæus sulcicollis**, *Steph.* Gouffre, one.
- Medon propinguus**, *Bris.* Petit Port cliffs, by sweeping, one.
- M. melanocephalus**, *F.* Rather common.
- Sunius diversus**, *Aubé.* Vale, two.
- S. angustatus**, *Paykull.* Hedges at St. Martin's and Forest (E. D. and E. P. M.)
- S. filiformis**, *Latr.* L'Ancrese Common, one.
- Pæderus littoralis**, *Grav.* Common.
- P. riparius**, *L.* Marshy spot, Rocque Maingy, Vale (E. D. and E. P. M.)
- P. caligatus**, *Er.* Generally distributed, but not common (E. D. and E. P. M.)
- Stenus bimaculatus**, *Gyll.* One specimen under a log at Gouffre (E. D. and E. P. M.)
- S. providus**, *Er.* St. Saviour's one (W. A. L.) Forest, two (E. D. and E. P. M.)
- S. speculator**, *Er.* St. Saviour's Valley, one.
- S. declaratus**, *Er.* St. Saviour's, one (E. D. and E. P. M.)
- S. brumipes**, *Steph.* Common.
- S. annulatus**, *Crotch.* Not uncommon (E. D. and E. P. M.)
- S. flavipes**, *Steph.* Not uncommon (E. D. and E. P. M.)
- S. similis**, *Herbst.* Frequent.
- S. ossium**, *Steph.* One.
- S. cicindeloides**, *Grav.* Grande Mare, Vazon. One.
- Platystethus arenarius**, *Foure.* In moss, one.
- Oxytelus laqueatus**, *Marsh.* Several in haystack refuse, Delancey Hill.
- O. sculpturatus**, *Grav.* In a garden, one.
- O. tetracarinatus**, *Block.* Common in hedges (E. D. and E. P. M.)
- Philorhinum sordidum**, *Steph.* Common in furze blossom on the cliffs in spring.
- Homalium rivulare**, *Payk.* Common (E. D. and E. P. M.)

- H. læviuseulum*, *Gyll.* In decaying seaweed, l'Ancrese, one (E. D. and E. P. M.)
- H. riparium*, *Thoms.* Rather common.
- Proteinus ovalis*, *Steph.* Common.
- P. macropterus*, *Gyll.* In garden refuse, one (E. D. and E. P. M.)
- Megarthus affinis*, *Mill.* Common in garden refuse (E. D. and E. P. M.)
- Phlæobium clypeatum*, *Müll.* Jerbourg. St. Saviour's (E. D. and E. P. M.)
- Bryaxis juncorum*, *Leach.* One under a stone, Petit Bot Valley (E. D. and E. P. M.)
- Calyptomerus dubius*, *Marsh.* Haystack refuse, St. Saviour's (E. D. and E. P. M.)
- Necrophorus humator*, *F.* Under a dead sheep, Petit Port, one.
- N. vestigator*, *Heer.* Under dead birds, two, St. Martin's.
- N. vespillo*, *L.* Not uncommon near the coast.
- Silpha tristris*, *Ill.* Saints' Bay, one. Sark, one.
- S. sinuata*, *F.* Common.
- S. atrata*, *L.* Frequent.
- Choleva fusca*, *Panz.* One at Gouffre, by sweeping, in June.
- C. grandicollis*, *Er.* Saints' Bay, one.
- C. nigrita*, *Er.* In a garden, St. Martin's, one (E. D. and E. P. M.)
Gouffre cliffs, two (W. A. L.)
- C. tristris*, *Panz.* L'Ancrese, two specimens by sweeping.
- C. Watsoni*, *Spence.* Gouffre, one by sweeping.
- Hister quadrimaculatus*, *L.* Two or three specimens under stones at Saints' Bay.
- H. unicolor*, *L.* L'Ancrese, one.
- H. cadaverinus*, *Hoff.* Not uncommon.
- H. 12 striatus*, *Sch.* Near St. Appoline's Chapel, one (E. D. and E. P. M.)
Petit Port, one (W. A. L.)
- Carcinops minima*, *Aubé.* Common under stones in early spring (E. D. and E. P. M.)
- Saprinus æneus*, *F.* Common.
- Onthophilus striatus*, *F.* Near St. Appoline's Chapel, two (E. D. and E. P. M.)
- Corylophus cassidioides*, *Marsh.* Beaten from hedges, often in abundance (E. D. and E. P. M.)
- Sericorderus lateralis*, *Gyll.* St. Martin's, one. St. Saviour's, one (E. D. and E. P. M.)
- Sub-coccinella globosa*, *Schneid.* Abundant on our southern cliffs.
- Coccinella 11 punctata*, *L.* Sometimes abundant.
- C. 7 punctata*, *L.* Common.
- Halyzia 18 guttata*, *L.* One specimen beaten from an apple tree in a garden at Mount Row, Sept. 4th.
- H. conglobata*, *L.* By sweeping near Saints' Bay, two.
- H. 22 punctata*, *L.* Common.
- Mieraspis 16 punctata*, *L.* Common (E. D. and E. P. M.)
- Scymnus frontalis*, *F.* By sweeping at St. Andrew's, two.
- Platynaspis luteorubra.* Common under stones near the coast.
- Chilocorus bipustulatus*, *L.* Local. On the cliffs, Saints' Bay, Gouffre, &c.; often abundant on furze, broom, and heath.

- Rhizobius litura*, *F.* Common.
- Myctæna hirta*, *Marsh.* Common in garden refuse (E. D. and E. P. M.)
- Eustilbus testaceus*, *Panz.* One by sweeping.
- Brachypterus pubescens*, *Er.* Not uncommon.
- Epuræa melina*, *Er.* Vale, one.
- Nitidula quadripustulata*, *F.* Petit Port cliffs, July, one.
- Soronia grisea*, *L.* Took two specimens from wet burrows of *Cossus ligniperda* in elm tree, top of Moulin Huet Water Lane.
- Carpophilus hemipterus*, *L.* One found in a box of raisins, 15th November, 1873.
- Olibrus liquidus*, *Er.* Generally distributed.
- O. particeps*, *Muls.* Generally distributed (E. D. and E. P. M.)
- Omosita discoidea*, *F.* Gouffre cliffs, under an old bone, in some numbers (E. D. and E. P. M.) Fermain Bay, two (W. A. L.)
- Pria dulcamaræ*, *Scop.* St. Saviour's, one specimen by sweeping.
- Meligethes rufipes*, *Gyll.* By sweeping, two.
- M. picipes*, *Sturm.* In flowers of pilewort, St. Saviour's (E. D. and E. P. M.)
- M. obscurus*, *Er.* Forest, by beating hedges, one (E. D. and E. P. M.)
- Coninomus nodifer*, *Westw.* Common (E. D. and E. P. M.)
- Eniemus minutus*, *L.* In a garden, St. Martin's, one (E. D. and E. P. M.)
- E. transversus*, *Ol.* One in moss from Gouffre.
- Cartodere ruficollis*, *Marsh.* Several in haystack refuse.
- Melanopthalma gibbosa*, *Herbst.* Common.
- M. fuscula*, *Humm.* Forest, one (E. D. and E. P. M.)
- Antherophagus pallens*, *Gyll.* One by sweeping, Gouffre.
- Cryptophagus lycoperdi*, *Herbst.* Common.
- C. pilosus*, *Gyll.* In our garden, one (E. D. and E. P. M.)
- C. saginatus*, *Sturm.* In a garden, St. Martin's, one (E. D. and E. P. M.)
- C. scanicus*, *L.* In a garden, St. Martin's, two (E. D. and E. P. M.)
- Micrambe vini*, *Panz.* Common.
- Atomaria analis*, *Er.* Fermain cliffs, one (E. D. and E. P. M.)
- A. atricapilla*, *Steph.* Gouffre, one.
- A. ruficornis*, *Marsh.* In garden refuse.
- Ephistemus gyrimoides*, *Marsh.* St. Saviour's, three specimens (E. D. and E. P. M.)
- Byturus tormentosus*, *F.* Gouffre, three by sweeping.
- Simplocaria semistriata*, *F.* St. Saviour's, one (E. D. and E. P. M.)
- Dermestes murinus*, *L.* Common under dead birds and animals near the coast.
- D. undulatus*, *Brahm.* Near Petit Port, one under dead bird.
- D. lardarius*, *L.* One in a house in Mansell Street.
- Attagenus pellio*, *L.* Common.
- Byrrhus pilula*, *L.* Not uncommon.
- Elmis æneus*, *Mull.* Under stone in stream at Saints' Bay, one.
- Parnus prolifericornis*, *F.* Gouffre Valley, two.
- Potaminus substriatus*, *Müll.* Two specimens near Gouffre stream.
- Copris lunaris*, *L.* Common in sandy places on the north and west coasts of the island.
- Onthophagus taurus*, *L.* Local; not uncommon in sandy fields on the north-west coast of the island in May and June.

- O. cœnobita*, *Herbst.* Not uncommon.
- O. vacca*, *L.* Common on the north-west coast with *Taurus*.
- O. fraticornis*, *Payk.* Frequent.
- O. nuehicornis*, *L.* Not so common as the preceding.
- Aphodius erraticus*, *L.* Common.
- A. fossor*, *L.* Common.
- A. hæmorrhoidalis*, *L.* Grandes Rocques, two.
- A. fimetarius*, *L.* Common.
- A. ater*, *De G.* L'Ancrese, one.
- A. pusillus*, *Herbst.* Common.
- A. granarius*, *L.* Vale, two (E. D. and E. P. M.)
- A. merdarius*, *F.* L'Ancrese, one.
- A. inquinatus*, *F.* L'Ancrese.
- A. punctato-sulcatus*, *Sturm.* Common.
- A. luridus*, *F.* Vale, one.
- A. rufipes*, *L.* Not uncommon.
- A. contaminatus*, *Herbst.* Common.
- Heptaulacus testudinarius*, *F.* Not uncommon in the sandy fields near the west coast.
- H. sus*, *Herbst.* One near Grandes Rocques.
- Ægialia arenaria*, *F.* Near Grandes Rocques, three.
- Geotrupes typhæus*, *L.* Generally distributed but not common.
- G. spiniger*, *Marsh.* Common.
- G. stereorarius*, *L.* Not uncommon.
- G. sylvaticus*, *Panz.* Not common.
- G. vernalis*, *L.* Common.
- Trox scabulosus*, *L.* Fermain Bay, one.
- T. scaber*, *L.* Common amongst dead leaves in a greenhouse in Mount Row ; several at Moulin Huet and Gouffre.
- Serica brunnea*, *L.* L'Ancrese, one. Talbots Road, one.
- Rhizotrogus solstitialis*, *L.* Common.
- Melolontha vulgaris*, *F.* Common.
- Cetonia aurata*, *L.* It is curious that this beautiful beetle has never been taken in Guernsey, although it is very abundant in Sark, and taken occasionally in Herm.
- C. morio*. Several specimens taken on our southern cliffs on blackberry blossom, and one taken in Herm
- Læon murinus*, *L.* Very abundant.
- Melanotus puncto-lineatus*, *Pel.* Not uncommon in the Vale parish.
- Athous longicollis*, *Ol.* Two specimens taken near Richmond.
- A. hæmorrhoidalis*, *F.* Common.
- Dolopius marginatus*, *L.* Petit Port cliffs, one.
- Adrastus limbatus*, *F.* Common under stones in hedges, &c.
- Agriotes sputator*, *L.* Fermain Bay, one (W. A. L.) Gouffre cliffs, one (E. D. and E. P. M.)
- A. lineatus*, *L.* Common.
- Corymbites Quercus*, *Gyll.* Common.
- Helodes minuta*, *L.* By sweeping at Gouffre cliffs, one.
- H. marginata*, *F.* Common by sweeping.

- H. livida*, *F.* Gouffre cliffs, three.
- Cyphon nitidulus*, *Thoms.* St. Saviour's, by sweeping, two.
- Telephorus bicolor*, *F.* By sweeping, two.
- T. fulvus*, *Scop.* Common.
- T. flavilabris*, *Fall.* Not uncommon by sweeping in damp meadows near Claire Mare.
- Malthinus fasciatus*, *Fall.* Two by beating near Vazon.
- Axinotarsus ruficollis*, *Ol.* Several specimens by sweeping near the coast.
- Dasytes flavipes*, *F.* Common by sweeping on the southern cliffs.
- D. ærosus*, *Kies.* Two, by sweeping.
- Psilothrix nobile*, *Ill.* Common by sweeping flowers of the thrift on the south cliff coast.
- Neerobia ruficollis*, *F.* Common.
- Niptus hololeucus*, *Fald.* Two in a house in Mansell Street.
- Anobium domesticum*, *Four.* Common.
- Cis boleti*, *Scop.* Not uncommon.
- Callidium violaceum*, *L.* One on a skylight in Bordage Street; had probably flown to light.
- C. variable*, *L.* One crawling up a post in a shop in Bordage Street.
- Clytus arcuatus*, *L.* On board a ship in the Town Harbour, one.
- Clytus arietis*, *L.* Common.
- Gracilia minuta*, *F.* By beating hedges at St. Andrew's, one.
- Acanthoecinus ædilis*, *L.* Found by a boy on a wall in Victoria Road, and brought to me alive.
- Bruchus rufimanus*, *Boh.* Several in lentils purchased in town.
- B. villosus*, *F.* Several by sweeping at Pleinmont.
- Lema lichenis*, *Voet.* Generally distributed.
- L. melanopa*, *L.* Gouffre, two (W. A. L.) Near Grantez Mill, one (E. D. and E. P. M.)
- Cryptocephalus moræi*, *L.* By sweeping on south cliffs, not common.
- C. vittatus*, *F.* Moulin Huet cliffs (E. D. and E. P. M.) Abundant on Gouffre cliffs on a species of *Leontodon* (W. A. L.)
- Timarcha violaceonigra*, *De G.* Abundant. Those found on l'Anresse Common and the north coast are a much smaller race than those of the southern cliff coast.
- Chrysomela Banksii*, *F.* Common.
- C. hæmoptera*, *L.* Common on the sandhills.
- C. hyperici*, *Forst.* Not common.
- Phytodecta olivacea*, *Forst.* On broom on the Gouffre cliffs.
- Gastrodidea polygoni*, *L.* By sweeping near the Corbière, three.
- Prasocuris juncei*, *Brahm.* By sweeping water plants in streams at Saints' Bay, Petit Bot and Gouffre. Common.
- P. phellandrii*, *L.* Common in the Grande Mare, Vazon, by sweeping.
- Adimonia tanaceti*, *L.* Near Grandes Rocques, one.
- Sermyla halensis*, *L.* Petit Port, two.
- Longitarsus brunneus*, *Duft.* St. Martin's, one (E. D. and E. P. M.)
- L. atricillus*, *L.* Jerbourg, one. St. Saviour's, one (E. D. and E. P. M.)
- L. melanocephalus*, *All.* Fermain Point, one (E. D. and E. P. M.)
- L. tabidus*, *F.* Rocquaine, two.
- L. jacobææ*, *Wat.* Frequent on ragwort (E. D. and E. P. M.)

- L. lævis*, *Duft.* Generally distributed (E. D. and E. P. M.)
- Haltica oleracea*, *L.* Hedges at the Forest (E. D. and E. P. M.)
- H. ampelophaga*, *Guér.* Not uncommon.
- H. pusilla*, *Duft.* By sweeping, Gouffre, one.
- Phyllotreta consobrina*, *Curt.* Generally distributed (E. D. and E. P. M.)
- P. cruciferæ*, *Goez.*
- Aphonia nonstriata*, *Goez.* On the yellow flag. Local, but abundant where it occurs (E. D. and E. P. M.)
- A. venustula*, *Kuts.* On wood spurge, lane behind Forest school (E. D. and E. P. M.)
- Batophila ærata*, *Marsh.* Frequent.
- Sphæroderma testaceum*, *F.* Petit Port, three.
- Apteropoda orbiculata*, *Marsh.* Generally distributed.
- Mantura chrysanthemi*, *Koch.* Generally distributed (E. D. and E. P. M.)
- Crepidodera ferruginea*, *Scop.* St. Saviour's, several by sweeping.
- C. ventralis*, *Ill.* St. Saviour's, one (E. D. and E. P. M.)
- C. aurata*, *Marsh.* St. Saviour's, one.
- Plectroscelis concinna*, *Marsh.* Jerbourg (E. D. and E. P. M.)
- Psylliodes chrysocephala*, *L.* One.
- P. napi*, *Koch.* On sea radish, Gouffre cliffs (E. D. and E. P. M.)
- Cassida nebulosa*, *L.* By sweeping in a field near Gouffre, one.
- C. hemispherica*, *Herbst.* St. Saviour's, one (E. D. and E. P. M.) Petit Bot Valley, one (W. A. L.)
- Blaps mucronata*, *Latr.* In cellars; not uncommon.
- B. similis*, *Latr.* In a cellar, two.
- Crypticus quisquilius*, *L.* Not uncommon on the sand hills near the Vale coast, also on the cliffs near Gouffre.
- Opatrum sabulosum*, *Gyll.* Common near the coast.
- Heliopathes gibbus*, *F.* Common.
- Microzoum tibiale*, *F.* Albecq, in sandy places, two (E. D. and E. P. M.)
- Phaleria cadaverina*, *F.* Frequent.
- Tenebrio molitor*, *L.* Victoria Road, two.
- M. obseurus*, *F.* One in a house in Mansell Street.
- Helops striatus*, *Foure.* Common.
- Cistela murina*, *L.* Abundant by sweeping, Gouffre.
- Cteniopus sulphureus*, *L.* Abundant on the cliffs.
- Lagria hirta*, *L.* Abundant.
- Edemera nobilis*, *Scop.* Not uncommon by sweeping on the southern cliffs.
- O. lurida*, *Marsh.* Common.
- Mordellistena pumila*, *Gyll.* Common on the flower of the ox-eye daisy, Gouffre.
- Anapsis ruficollis*, *F.* Frequent on May blossom.
- A. maculata*, *Foure.* Common.
- Notoxus monoceros*, *L.* Grandes Rocques, two.
- Anthicus tristis*, *Schmidt.* Common.
- Meloe proscarabæus*, *L.* Frequent.
- Rhynchites minutus*, *Herbst.* Generally distributed (E. D. and E. P. M.)
- Aplon ulicis*, *Forst.* Common on furze.

- A. fuscirostre*, *F.* Several by sweeping near Petit Bot.
A. malvæ, *F.* By sweeping at Gouffre, one.
A. miniatum, *Germ.* Rather common.
A. cruentatum, *Walton.* Jerbourg, Forest (E. D. and E. P. M.)
A. hæmatodes, *Kirby.* Forest, one (E. D. and E. P. M.) Vale, two
(W. A. L.)
A. rubens, *Steph.* Near Grandes Rocques, one.
A. rufirostre, *F.* One.
A. difforme, *Germ.* Jerbourg (E. D. and E. P. M.)
A. lævicolle, *Kirby.* One.
A. apricans, *Herbst.* Common (E. D. and E. P. M.)
A. dichroum, *Bedel.* Fermain cliffs, one. Forest, one (E. D. and E. P. M.)
A. nigritarse, *Kirby.* Probably the commonest of the genus (E. D. and
E. P. M.)
A. onopordi, *Kirby.* Common (E. D. and E. P. M.)
A. virens, *Herbst.* St. Martin's, one. St. Saviour's, one (E. D. and E. P. M.)
A. striatum, *Kirby.* Common (E. D. and E. P. M.)
A. immune, *Kirby.* Hedges at Forest, two (E. D. and E. P. M.)
A. marchicum, *Herbst.* St. Saviour's, one (E. D. and E. P. M.)
A. humile, *Germ.* Forest, beating hedges one (E. D. and E. P. M.)
Otiorrhynchus atroapterus, *De G.* Albecq, one (E. D. and E. P. M.)
L'Anresse, two (W. A. L.)
O. scabrosus, *Marsh.* Gouffre, one.
O. picipes, *F.* Common.
O. sulcatus, *F.* Common; often abundant in greenhouses.
O. rugifrons, *Gyll.* Fairly common.
Trachyphlæus myrmecophilus, *Seidl.* Generally distributed.
T. aristatus, *Gyll.* One by sweeping near Gouffre.
T. squamulatus, *Ol.* Under leaves of sea radish, Gouffre cliffs, two (E. D.
and E. P. M.) By sweeping at St. Saviour's, three (W. A. L.)
T. scabriculus, *L.* Grandes Rocques, by sweeping, three.
T. scaber, *L.* By sweeping, two.
Cænopsis Waltoni, *Schön.* Vale, one.
Strophosomus coryli, *F.* Frequent.
S. capitatus, *De G.* Pleinmont, St. Saviour's.
S. retusus, *Marsh.* Not uncommon, Gouffre, &c.
S. faber, *Herbst.* L'Anresse Common, one (E. D. and E. P. M.)
S. lateralis, *Payk.* Gouffre cliffs, two.
Sciaphilus muricatus, *F.* St. Saviour's, one (E. D. and E. P. M.)
Barypeithes sulcifrons, *Boh.* Common (E. D. and E. P. M.)
Liophlæus nubilus, *F.* Near Moulin Huet Bay, beating, three.
Polydrusus confluens, *Steph.* Gouffre Valley, two.
Phyllobius oblongus, *L.* Talbots Road, two.
P. pyri, *L.* Common.
P. pomonæ, *Ol.* By sweeping at Torteval, common.
P. viridæris, *Laich.* By beating, Talbots Valley, several.
Philopodon geminatus, *F.* Common.
Alophus triguttatus. Generally distributed, but not common.
Sitones griseus, *F.* Not uncommon, near Richmond.

- S. regensteiniensis*, *Herbst.* Gouffre cliffs, one.
S. tibialis, *Herbst.* Gouffre cliffs, three (W. A. L.) Saints' Bay cliffs, two (E. D. and E. P. M.)
S. hispidulus, *F.* Vale and Cobo.
S. flavescens, *Marsh.* Gouffre, one.
S. puncticollis, *Steph.* Cobo, not common.
S. suturalis, *Steph.* Petit Port, by sweeping, one.
S. lineatus, *L.* Common.
S. sulcifrons, *Thumb.* Rather common.
Gronops lunatus, *L.* Cobo, one.
Hypera punctata, *F.* L'Ancrese, Cobo. Not common.
H. fasciculata, *Herbst.* Near Vazon, two.
H. pollux, *F.* Gouffre, by sweeping near stream.
H. rumicis, *L.* By sweeping, three.
H. alternans, *Steph.* Gouffre, two.
H. polygoni, *L.* Hedges at Forest, two (E. D. and E. P. M.)
H. suspiciosa, *Herbst.* Not uncommon.
H. variabilis, *Herbst.* Two, by sweeping.
H. plantagnis, *De G.* Gouffre, several.
H. trilineata, *Marsh.* Grande Mare, one.
H. nigrirostre, *F.* Common.
Cleonus sulcirostris, *L.* Resting on gate posts at St. Martin's, three at various times (W. A. L.) Ronceval, one. St. Saviour's, one (E. D. and E. P. M.)
C. albidus, *F.* Near Cobo, one.
Lixus bicolor, *Ol.* Top of Petit Port cliffs, two. Near Grandes Rocques, one.
Liparus coronatus, *Goez.* Gouffre, two.
Hylobius abietis, *L.* Two near Doyle's Monument.
Orchestes quercus, *L.* On oaks.
O. alni, *L.* Beaten from elms, not uncommon.
O. ilicis, *F.* Common.
Pachytychius hæmatocephalus, *Gyll.* Gouffre cliffs, one.
Dorytomus tremulæ, *F.* St. Martin's, two. St. Saviour's, two.
D. tortrix, *L.* Petit Port, one.
D. maculatus, *Marsh.* Not common.
Sibinia arenariæ, *Steph.* Two, Rocquaine.
S. sodalis, *Germ.* Saints' Bay, one.
Gymnetron pascuorum, *Gyll.* Petit Port, one by sweeping.
G. antirrhini, *Payk.* Gouffre, one.
Mecinus pyrastii, *Herbst.* One specimen under bark at St. Saviour's (E. D. and E. P. M.) Several by sweeping near Doyle's Monument (W. A. L.)
M. collaris, *Germ.* Vale, one.
Anthonomus ulmi, *De G.* On elm.
A. pedicularius, *L.* St. Martin's, one.
A. rubi, *Herbst.* St. Andrew's, one.
Cionus hortulanus, *Marsh.* Saints' Bay.
C. thapsus, *F.* Several at Gouffre.

- Orobites cyaneus*, *L.* Near Grantez Mill, one (E. D. and E. P. M.)
- Acolles turbatus*, *Boh.* Moulin Huet, one specimen taken Oct. 11th, 1891.
- Cœliodes rubricundus*, *Herbst.* Gouffre, two by sweeping.
- C. quadrimaculatus*, *L.* Common (E. D. and E. P. M.)
- Poophagus nasturtii*, *Germ.* St. Saviour's Valley, one.
- Ceuthorrhynchus assimilis*, *Payk.* Common.
- C. ericæ*, *Gyll.* By sweeping on the cliffs.
- C. contractus*, *Marsh.* On sea radish, &c. Common.
- C. quadridens*, *Panz.* One, cliffs at Pleinmont.
- C. pollinarius*, *Forst.* Common on nettles.
- C. pleurostigma*, *Marsh.* Cobo, one.
- C. chrysanthemi*, *Germ.* Richmond, one.
- Ceuthorrhynchidius troglodytes*, *F.* Common.
- C. rufulus*, *Dufour.* Generally distributed (E. D. and E. P. M.)
- Rhinoneus pericarpus*, *L.* Common on nettles (E. D. and E. P. M.)
- Baris picicornis*, *Marsh.* Two on cliffs.
- Calandra granaria*, *L.* Common in old corn bins, &c., amongst wheat.
- Pentarthrum Huttoni*, *Wollaston.* Under a log, St. Saviour's (E. D. and E. P. M.)
- Caulotrypis æneopiceus*, *Boh.* In rotten stump of tamarisk near Cobo, three.
- Scolytus destructor*, *Ol.* Two from an elm log, Saints' Bay.
- Cryphalus fagi*, *Nord.* St. Saviour's, by beating, one.
- Hylesinus fraxini*, *Panz.* By sweeping near Gouffre, two.

GUERNSEY

SOCIETY OF NATURAL SCIENCE

AND

LOCAL RESEARCH.

REPORT AND TRANSACTIONS

1894.

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1895.

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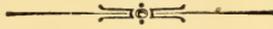
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- | | |
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| General Harvey, Queen's Road. | |
| Lieut.-Col. Harvey, Queen's Road. | |
| Mr. A. Hewitt, Brock Road. | |
| Mr. J. S. Hocart, Les Mielles, Vale. | |
| Mr. S. G. Hugo, Allez Street. | |

TRANSACTIONS OF THE SOCIETY.



Monthly Meeting held on January 10th, 1894, Mr. E. D. Marquand, President, in the chair.

Dr. R. S. Boley, M.D., and Miss M. Domaille were unanimously elected members of the Society.

The President exhibited a rare lichen, *Umbilicaria pustulata*, lately found by him on the cliffs between Petit Bot and Le Jaonnet. Being a strictly subalpine species it seemed to indicate that the cliffs of Guernsey must at one time have attained a far higher elevation than they do now. This lichen is common in all the mountain districts of England.

The subject of the indigenous mammalia of Guernsey was introduced by the President, who gave the following list of species from his own knowledge:—Hedgehog (introduced about fifty years ago, and now comparatively common); Rabbit; Hare (introduced and exterminated); Brown Rat; Common Mouse; Short-tailed Field Mouse; Common Shrew; Horse-shoe Bat; Long-eared Bat; Little Bat, and Common Porpoise. From information supplied by members present the following species were added:—Stoat (a specimen shot by Colonel Collings, and also two in the museum recently taken in Guernsey); Long-tailed Field Mouse (two specimens from Guernsey in the museum; Mr. Hocart said they used to be plentiful at Mont Crevelt); Seal (specimens taken in Alderney, Sark and Herm). The Weasel is said to occur in Guernsey, and it is probable that one or two additional Bats are native. The Black Rat occurs in Herm, Sark and Brechou, and it seems probable that it still survives in Guernsey. Any reliable information upon the mammalia of Guernsey will be welcome, with a view to compiling a correct list with notes on the relative frequency or rarity of the various species.

Monthly Meeting held on February 14th, 1894, Mr. E. D. Marquand, President, in the chair.

Dr. H. Merrall, of George Place, St. Sampson's, was unanimously elected a member of the Society. The Honorary Secretary announced the receipt of four parts of the proceed-

ings of the Boston Society of Natural History. Mr. Luff read a note from Mr. Newstead upon a species of Coccid (*Dactylopius citri*) found upon an orange by Mr. Luff; it was said to be the first specimen ever found on an imported orange. Mr. Hocart exhibited a piece of limestone containing *Pholas* borings, found at l'Ancrese. A curious bifurcated example of the worm *Glycera alba* was exhibited by Mr. Puttock.

The President drew attention to the structural differences noticeable in the flowers of the common Primrose—differences in the relative position of the stamens, and the length of the pistil, so that the flowers were popularly divided into “pin-centres” and “rose-centres.” An interesting discussion followed on the subject, especially with regard to its bearing on the evolution of the flower.

Monthly Meeting held on March 7th, 1894, Mr. E. D. Marquand, President, in the chair.

Mr. Luff reported that the small Tortoiseshell Butterfly had been seen on the wing as early as February 24th; and further noted the occurrence on the 4th inst. of a large number of sea-birds, apparently Puffins, floating about dead in the bay at Petit Port, the question being whether they had succumbed to the recent cold and storms. The President exhibited a number of dried specimens of the common Sea-horse (*Hippocampus*) probably from the Belgian coast, as he had bought them in Brussels some years ago.

The President then opened a discussion on the “Divining Rod,” tracing its use back to ancient times and quoting a number of recorded instances in which its efficacy in finding water or minerals was attested by credible witnesses. It was largely believed in among Guernsey people, and its use frequently resorted to. He offered no personal opinion on its merits, but it was certainly not a question of wilful fraud or deception. Those who practised the art of Rhabdomancy generally admitted that they could not explain how it worked—and yet there ought to be some simple scientific explanation of the cause. Mr. Pitts said he had invited a gentleman to be present whose services were in wide request in the island for finding water by means of the divining rod, but unfortunately a pressing engagement prevented his attendance. Mr. Pitts, however, was able to show, by means of a rod actually in use, the *modus operandi* as practised in Guernsey. Mr. Hocart also demonstrated the use of the rod, a simple forked twig

about two feet long, the two branches being held in the hands, with the stem pointing outwards. Several other gentlemen offered observations on the subject, and then Mr. Collenette came forward and showed that there was nothing mysterious about the movement of the rod in the operator's hand—it was simply the result of muscular force applied in a certain way. The action was mechanical and involuntary, and the “diviner” was quite unconscious of it. Mr. Collenette illustrated his theory by diagrams on the blackboard, and also by various rods he had prepared, one of which, composed of numerous strands of wire, showed the movement referred to. Many of the members present tried the experiment for themselves with varying degrees of success. It was pointed out that Mr. Collenette's theory, while no doubt applicable in many cases, still left certain points unaccounted for, and, therefore, if it were possible to secure the attendance of a professional “diviner” the subject might be further discussed with much advantage.

Monthly Meeting held on April 11th, 1894, Mr. E. D. Marquand, President, in the chair.

The Rev. T. D'E. Jesse, M.A., was unanimously elected a member of the Society.

Among the visitors present was Mr. Charles Mellish, who for some years has used the “divining rod” professionally in this island with great success. He very kindly gave a clear and detailed description of his method of using the rod, from which it became at once evident that Mr. Collenette's theory of unconscious muscular action, so ably propounded at the last meeting, was wholly untenable, or at any rate inapplicable in this particular case. Mr. Mellish, however, frankly admitted that he could not explain how or why the rod was deflected when held over a spring of water, but, in the hundreds of cases he had been engaged in professionally, he had never had a failure. On behalf of the meeting the President warmly thanked Mr. Mellish for having favoured them with his experience as a rhabdomantist, and his views on a subject which must still remain an unsolved mystery.

With reference to the extraordinary severity of the frost which occurred during the first week in January last, Mr. G. Derrick read the following notes :—

“The frost which visited Guernsey in common with the adjacent parts of England and France was the severest on record for many years, and though fortunately of brief duration, had a most disastrous effect upon vegetation,

“ At that early period of the year there were no out-door crops to suffer much, but the stocks of potatoes and roots, which were only covered with the usual slight protection, were, in many instances, completely destroyed, some farmers affirming they had lost many pounds’ worth of seed potatoes.

“ In green-houses, potato plants suffered severely, and even peas, though generally hardy enough to stand all the winter frosts in the open, were in many instances rendered valueless, and where not actually dug up, have yielded comparatively poor crops. Freesias in boxes and in the soil of green-houses, where the flowering stem was already developed, were completely destroyed, even the bulbs perishing ; but where the leaves were only just above ground no harm was done.

“ The *Nerine* (Guernsey lily) were in most places completely killed, nurserymen thus suffering severely.

“ Many cacti and nearly all the geraniums were killed. Even where fires were burning and a good heat maintained in the house generally, the cold air and snow penetrated close under the glass and destroyed the foliage.

“ There was great destruction among ornamental trees and shrubs. Guernsey has long been a noted acclimatization station, but it will take years to replace plants which had thoroughly established themselves and become practically naturalised among us. Fuschias generally have been cut down to the roots, but will shoot again and soon recover. New Zealand flax has generally perished, though in a few instances a few sheltered roots are shooting afresh. Gum-trees seem completely destroyed, though one thought that in their native country they were often exposed to frosts as severe. The *Cordylines*, forming such a conspicuous ornament in many frontages, have almost universally perished, a few apparently sheltered from the direct drift of the frozen storm have escaped, and will revive. Myrtles and heath trees have been cut down.

“ Yet, amidst this destruction, the trees of camellias and rhododendrons continued blooming profusely, and now in the first week of April, vegetation generally is more forward than usual at this period, and when the withered stumps of perished trees are removed, the frost of January, 1894, will be forgotten.”

Monthly Meeting held on May 9th, 1894, Mr. E. D. Marquand, President, in the chair.

After disposing of the formal business of the evening, the President said he had great pleasure in recording the occur-

rence of the Nightingale in Guernsey. In company with a friend he heard one in full song at Saints' Bay on the 20th of April, between three and four in the afternoon. He had lived for years where nightingales abounded, and the song was perfectly familiar to him, so that there was no possible mistake about it. Probably the bird had just arrived; a day or two after he visited the spot at night, but could hear nothing of it. Mr. Marquand said he had always been so sceptical about newspaper records of the occurrence of the Nightingale in this island, that it was with unbounded pleasure that he listened to the sweet songster on the day in question.

Mr. Luff reported the finding of three interesting species of Coccids, which he exhibited, viz. :—*Lecanium hesperidium* on lemon and roses; *L. hemisphæricum* on stephanotis; and *Pulvinaria camellicola* on camellia. These insects are very injurious to stove and greenhouse plants.

The sectional secretaries read their reports on the excursions to the cromlechs at l'Ancrese on May 1st, and to the cave at Icart on May 8th.

Monthly Meeting held on June 13th, 1894, Mr. E. D. Marquand, President, in the chair.

General F. B. Mainguy was unanimously elected a member of the Society.

The *Transactions* for the year 1893 were distributed to the members present, and the President complimented the Society on the excellent character of the work embodied in its pages, and its high scientific value.

Mr. Luff recorded the recent capture (and exhibited specimens) of several Hemiptera and other insects new to the Guernsey list. Mr. Royle announced that several additions to our flowering plants had been made this year, particulars of which will be found in the botanical report.

A very rare fungus (*Clathrus cancellatus*) had been submitted to the President who exhibited and described it, remarking that he had seen it in this island on two previous occasions.

The work done during the weekly excursions was detailed by the sectional secretaries, and many points in connection therewith were discussed.

Monthly Meeting held on July 11th, 1894, Mr. E. D. Marquand, President, in the chair.

Mr. Luff exhibited a living specimen of the rare non-British beetle (*Cetonia morio*) which he took flying at Petit

Port, also a large dragon fly (*Anax formosus*) taken by Mr. Hugo in Allez Street. Also a singular ant-like spider (*Salticus formicarius*) taken by the President at Grande Mare. It is an excessively rare species, only a few having ever been taken in Britain.

The very enjoyable excursion to Jethou on the 26th of June afforded much material for notes and records. The list of insects captured on that occasion comprised 58 species, viz.: 12 Lepidoptera, 25 Coleoptera, 6 Hemiptera, 14 Hymenoptera and 1 Earwig. Twenty new plants were added to the flora of Jethou, so that the number is now raised to 184 flowering plants and 7 ferns. Some interesting observations were made throwing further light on the geology of the island, and specimens of the rocks were exhibited.

The results of the excursion to Creux Mahié on July 3rd were noted, especially as regards the measurements which had been taken, and Mr. Collenette presented a plan of the cave, drawn to scale.

[No indoor meetings were held during August and September.]

Monthly Meeting held on October 10th, 1894, Mr. E. D. Marquand, President, in the chair.

Miss Dawber exhibited a very beautiful specimen of the so-called "green rose." The President exhibited an ox-shoe, as used in Guernsey at the present time; also the yellow-berried variety of the Black Nightshade (*Solanum nigrum*), found by him on St. Martin's cliffs; it had not been found in Guernsey before.

Mr. Collenette read a statement of account in connection with the weekly excursions during the past summer, showing a balance in favour of the Society of over four guineas.

The sectional secretaries made their respective reports of the work done since the previous meeting, and Mr. Luff announced the discovery by him of a coccid new to science, which Mr. R. Newstead had provisionally named *Exaretopus formiceticola*.

Mr. N. Gaudion, of Alderney, communicated a paper (which was read by Mr. Luff) on "The Leaf-cutting Bee, and its Honey-barrels."

The President read a paper on "The Land and Fresh Water Shells of Guernsey," with list of species; this will be found in the following pages.

Monthly Meeting held on November 14th, 1894, Mr. E. D. Marquand, President, in the chair.

Mr. P. S. Domaille, Mr. G. E. Kinnersley and Dr. Dobrée Chepmell were unanimously elected members of the Society.

Mr. Luff exhibited several beetles recently captured here which are additions to the Guernsey list. Mr. Hocart exhibited a fungus (*Clavaria fastigiata*) found on l'Ancrese Common. Mr. Collenette presented to the Society a photograph of the Priory at Lihou Island taken by himself during the Society's excursion there on August 21st.

Mr. Collenette announced that Professor Gwatkin, of Cambridge, had presented to the Society, conjointly with the Guille-Allès Museum, a valuable collection of Palates of Mollusca, comprising about one hundred slides. He would have much pleasure in exhibiting them to the members one evening and saying something on the subject.

The President read a paper on the "Seaweeds and Fresh Water Algæ of Guernsey," with lists of indigenous species. Mr. Luff read a paper kindly communicated by the Rev. F. O. Pickard-Cambridge, on "The Spiders of the Channel Islands," with list of species. Both these papers are published in full in these pages.

Twelfth Annual Meeting of the Society, held on December 14th, 1894, Mr. E. D. Marquand, President, in the chair.

Lord De Sausmarez and Dr. J. B. Cockburn were unanimously elected members of the Society.

Mr. Luff read a paper on "The Ants, Bees and Wasps indigenous to Guernsey," with lists of species; and Mr. Collenette followed with a paper on "The Year's Sunshine in Guernsey." Both these contributions are printed in the following pages.

The Hon. Secretary then read the Report of the Council as follows:—

"In presenting its Twelfth Annual Report, the Council has much pleasure in stating that the Society continues to do good and useful work, and is gradually but surely fulfilling the object of its existence. The attendance at the indoor meetings, which have been ten in number, has been rather less than that of last year. We have had, however, an addition of ten to the list of members, which has now reached a creditable total of 92, the highest yet attained. The outdoor meetings inaugurated three years ago have been continued during the year,

and have both scientifically and financially proved a great success. An account of the work done at these excursions, and the discussion thereon formed not the least interesting part of the business of several indoor meetings. A *resumé* of the results will be supplied you in the reports of the sectional secretaries. Besides exploring various distant parts of the island, another visit was paid to the neighbouring islet of Jethou, and it proved the most popular excursion of the season. Evidence is not wanting that the work of the Society is becoming, through the medium of its printed *Transactions* each year, more widely known. It is gratifying to find from the Treasurer's Report, about to be read to you, that the finances of the Society are in a more flourishing state than in previous years, there being at present a balance in hand of £7 17s. 3½d. The Council acknowledges with many thanks the gift of a valuable set of 100 slides of the Palates of Mollusca from Professor Gwatkin, of Cambridge, and also of a most interesting paper on "The Spiders of the Channel Islands," by the Rev. F. O. Pickard-Cambridge. The best thanks of the Council are also returned to the donors of the following works duly received:—

Report and Transactions of the Penzance Natural History and Antiquarian Society, 1893-94. (From the Society).

Report of the Smithsonian Institution, 1892. (From the Institution).

Report of the United States National Museum, 1891-92. (From the Museum).

"The Council desire again to tender their sincere and hearty thanks to Messrs. Guille and Allès for the free use of a room in which to hold the meetings of the Society. And in conclusion the hope is expressed that during the ensuing year the number of *working* members may be materially increased, so as to enlarge the sphere of the Society's work."

W. SHARP, Hon. Sec.

The Hon. Treasurer (Mr. W. A. Luff) then read a statement showing in detail the receipts and expenditure for the year, leaving a balance in hand of £7 17s. 3½d.

After the reading of the Sectional Reports which are given below, the address of the retiring President followed, at the close of which Mr. A. Collenette was unanimously elected President of the Society for the ensuing year, with the Council consisting of Mr. W. Sharp, Hon. Sec., Mr. W. A. Luff, Hon. Treasurer, and as Committee, Messrs. J. Le M. Bougourd, J. J. Carey, C. De La Mare, G. Derrick, J. L. Pitts and T. C. Royle.

REPORT OF THE BOTANICAL SECTION.

In Phanerogamic Botany the work of the Section has been mainly confined to the search for new plants, and the collection, verification, and preparation of others required for the completion of the Society's herbarium.

The search for new plants has resulted in the addition of thirteen new species to the list, bringing up the total to 711.

To illustrate the progress made in this direction I may say that in Professor Babington's Flora, compiled in 1838-9, he records 553 species for Guernsey. This number has now been exceeded by 158, or more than one-fourth. Again, for the whole of the six islands, 848 species were recorded; now the list for Guernsey alone comes within 137 of this number.

Of the thirteen new plants recorded, four are undoubtedly natives (*Orobanche cœrulea*, *Carex lævigata*, *Myosotis Balbiana* and *Catabrosa aquatica*), while two others, probably casuals, are interesting from their great rarity (*Centaurea calcitrapa* and *Medicago falcata*). On the other hand, the non-occurrence of many common British plants, which, in view of the constant intercourse with and imports from England, one would expect to find, is very remarkable.

New stations for the following plants, rare locally, have been noted:—*Orchis morio*, *Briza maxima*, *Trifolium suffocatum*, *Geranium columbinum*, *Lathyrus pratensis*.

In Cryptogamic Botany we have the pleasure to record the publication of Mr. Marquand's list of the Fresh Water and Marine Algæ of the island; this list brings our Flora Phanerogamic and Cryptogamic (with the sole exception of the Fungi) up to date, the whole being recorded in our *Transactions*, and every plant having been seen in a living state by members of the Society. The Section has again to acknowledge the great obligation it is under to Mr. Marquand for bringing this very difficult work to a successful conclusion.

The Section has been represented at each of the seventeen excursions organised by the Society, and has made two extra ones confined to its members.

The Section is very desirous of obtaining the help of persons residing in or visiting the other islands of the bailiwick, in the compilation of their respective floras, and any plants sent in to the Secretary will be gratefully received and duly acknowledged.

PHANEROGAMS.—ADDITIONS IN 1894.

Ranunculus Drouetii, *Godr.* Quarry pool, Vale, in 1891 (T. C. Royle).

Reseda lutea, *Lin.* Spur Point (G. E. Derrick and T. C. Royle).

- Medicago falcata**, *Linn.* Bordeaux Harbour (J. S. Collens).
Melilotus parviflora, *Lam.* Doyle's Column (E. D. Marquand).
Trifolium incarnatum, *Linn.* St. Briocq, St. Peter's (excursion).
Trifolium hybridum, *Linn.* St. Sampson's Harbour (excursion).
Lathyrus aphaca, *Linn.* Field at Paradis (J. S. Collens).
Centaurea calcitrapa, *Linn.* Near Vale Castle (Miss Dawber).
Anagallis cœrulea, *Schreb.* St. Andrew's (E. D. Marquand). Pleinmont
(Miss Dawber), Also very fine at Jethou.
Myosotis Balbisiana, *Jord.* Cliffs at Icart (Miss Dawber).
Orobanche cœrulea, *Vill.* Field near St. George Lookout (Rev. G. F.
Saxby).
Carex lævigata, *Sm.* Field path between Les Paysans and Caudre Mill
(Miss Dawber in 1888).
Catabrosa aquatica, *Beauv.* Ditches near Ivy Castle (E. D. Marquand).
T. C. ROYLE, Sec. Bot. Sect.

REPORT OF THE ENTOMOLOGICAL SECTION.

Owing to the wet summer, butterflies have been far less abundant than usual, and there has been a noticeable scarcity of such common species as the Garden Whites.

Colias Edusa (the Clouded Yellow) has been seen both in the early spring and late autumn, but not in any numbers.

The Black Rose-chaffer (*Cetonia morio*), one of our Guernsey prizes, has been again captured on the cliffs between Moulin Huet Bay and Petit Port. It was flying swiftly in the sunshine, and would be easily mistaken when on the wing for the common Dor Beetle. It had not previously been taken for some years.

Fifteen species have been added to the list of *Coleoptera* already published. Amongst these *Cistela fusca* does not occur in Great Britain. *Meloe brevicollis*, one of the oil beetles, is very rare and local in England. *Gyrinus colymbus*, a whirligig beetle, is also extremely rare.

I noticed a specimen of *Brachinus crepitans* (the Bombardier Beetle) amongst some insects collected in Guernsey by Mr. Peter Fourneau about twenty years ago. Dr. Lukis records it for Guernsey in "Ansted's Channel Islands." I have never taken it myself. It must be extremely local, or it may be one of those species which is gradually dying out.

There are seven additions to the list of *Hemiptera-Heteroptera*. Of these *Scirius bicolor* is the largest and most conspicuous.

The species of *Coccid* mentioned in the last report as taken near Bordeaux Harbour turns out to be quite new to science. Mr. R. Newstead, F.E.S., has given a full description of it in the *Entomologist's Monthly Magazine* for

September of this year, under the name of *Exæretopus formiceticola*. Not only is it a new species, but a new genus has been named to receive it. Mr. Newstead says that "so far this is the only *Coccid* described having a two-jointed tarsus, and it is for this reason alone that I establish a new genus for it." The specimens were taken in ants' nests, under stones, just on the edge of a beach, part of which had been rolled up beyond the action of the tide, near Bordeaux Harbour. They were attached to the roots of *Dactylis glomerata*, not *Nardus stricta*, as wrongly stated in the *Entomologist's Monthly Magazine*. Under the same stones were larvæ of a beetle *Platynapsis luteo-rubra*, which were thickly covered, as is usual, with a white fluffy material, and at a glance scarcely to be distinguished from the *Coccids*. *E. formiceticola* is rather larger than *R. Tomlinii*. The female, which is the only sex known at present, envelops herself in a white felted sac.

One addition has been made to the list of *Neuroptera*, a fine species of Lace-wing Fly, *Chrysopa flava*.

The beautiful Blue-winged Grasshopper, *Ædipoda cærulescens*, has been taken in abundance at a spot on the cliffs between Moulin Huet Bay and Petit Port. Hitherto it had only been noticed between the Gouffre and Pleinmont Point.

On the occasion of the Society's excursion to Lihou Island on August 21st, a very large species of earwig was found in some numbers under stones near the shore. These, as far as I can make out, are *Forficula forcipata*. I have also taken the same species on the little islet of Chapelle Dom Hue, but never on the mainland of Guernsey.

During the season Mr. Gaudion, of Alderney, kindly sent some fresh specimens of the honey-barrels formed by the leaf-cutter bees in that island, for exhibition to the members of the Society. He also wrote a graphic description of the habits of the perfect insect as observed by himself. Unfortunately he did not send specimens of the bee, so its name remains uncertain. It is probably, however, either *Megachile maritima* or *M. argentata*, both of which occur in Guernsey.

A list of the *Aculeate Hymenoptera* of Guernsey will appear in this year's *Transactions*, most of the species being captured during the last three seasons.

A paper on "The Spiders of the Channel Islands" has been communicated to the Society by the Rev. F. O. Pickard Cambridge, and will form a valuable addition to the lists of our fauna already published.

ADDITIONS TO THE LIST OF COLEOPTERA PUBLISHED
IN THE TRANSACTIONS FOR 1893.

- Chlænienus vestitus**, *Payk.* Several taken in a damp quarry near Spur Point by Mr. W. B. Waterfall, of Bristol.
- Stenolophus vespertinus**, *Panz.* In a marshy hollow at l'Anresse, July 21st, 1894.
- Brachinus crepitans**, *L.* (Bombardier Beetle). One specimen noticed amongst some insects captured by Mr. Peter Fournau nearly twenty years ago, and labelled "Vale."
- Gyrinus colymbus**, *Er.* One taken at the Grande Mare on April 8th, 1894.
- Oethebius marinus**, *Payk.* One specimen taken by Mr. E. D. Marquand.
- Ptenidium evanescens**, *Marsh.* In garden refuse, March 5th, 1894.
- Coccinella 10 punctata**. Two, by sweeping, near Cobo.
- Coccinella bipunctata**. Taken by the late Mrs. Collings in Sark.
- Omosita colon**, *L.* Several beaten from old sheep-bones on the cliffs near Petit Port on July 7th, 1894.
- Cryptophagus cellaris**, *Scop.* Common amongst dead leaves in a greenhouse at Mount Row.
- Hoplia philanthus**, *Füss.* One specimen taken in a garden near St. Jacques by Mr. Peter Fournau many years ago.
- Cassida nobilis**, *L.* One, by sweeping near Petit Bot Bay, June 3rd, 1894.
- Cistela fusca**. I took one specimen of this non-British species by sweeping on the cliffs at Torteval, June, 1894.
- Anthicus floralis**, *var. quisquilarius*. Common in haystack refuse at Grande Mare, Vazon, Dec. 2nd, 1894.
- Meloe brevicollis**, *Panz.* I took two specimens, male and female, of this great rarity many years ago, near the Gouffre.

ADDITIONS TO THE LIST OF HEMIPTERA-HETEROPTERA
ALREADY PUBLISHED.

- Sehirus bicolor**, *Linn.* Two, taken near Petit Bot on June 3rd, 1894.
- Berytus minor**, *H. Schf.* One, by sweeping at Petit Bot in June, 1894.
- Piesma quadrata**, *Fieb.* One specimen taken by Mr. E. D. Marquand near Vazon.
- Piesma capitata**, *Wolff.* Several by sweeping on the cliffs near Petit Bot.
- Gerris lacustris**, *Linn.* Several taken in streams at Grande Mare, Vazon, April 8th, 1894.
- Anthocoris nemoralis**, *Fbr.* Common at Grande Mare, Vazon, September 28th, 1894.
- Asciodema obsoletum**, *D. & S.* Two specimens by sweeping near Saints' Bay in July, 1894.

ADDITION TO THE LIST OF NEUROPTERA PREVIOUSLY
RECORDED.

NEUROPTERA-PLANIPENNIA.

- Chrysopa flava**, *Scop.* One specimen taken in the Talbots Valley on April 21st, 1894.

W. A. LUFF, Sec. Ent. Sect.

REPORT OF THE GEOLOGICAL SECTION.

This Section has taken part in all the excursions and has continued its work on the lines laid down in the preceding years. The following are the results, classified in the order previously adopted.

SUPERFICIAL DEPOSITS.1.—*Hauteville and Strand.*

Excavations for drains were made in the early part of the year, and revealed a deposit of sandy clay or “jaune terre,” commencing near Capt. Lihou’s house and extending some 80 feet up the road. In the deepest part the bottom was not reached at 11 or 12 feet from the surface. This deposit showed no signs of stratification. A pebble, evidently of great age, being very much pitted, was found.

A similar deposit was found in Strand Lane, about east of that in Hauteville. It extended 105 feet along the lane. It is doubtless connected with the Hauteville one, and indicates that the deposit fills a small valley running from Hauteville towards the cliff. In this cliff, but more to the south, the same kind of material has also been exposed, by the cutting back of the cliff at two levels for the erection of greenhouses. It was shown in both levels and follows the slope of the cliff.

2.—*Isabel Road.*

In the cutting leading to the quarry recently opened a section is seen showing:—

- (a) Soil, 1 foot.
- (b) Clay, thickening towards the north from 0 to 3 feet.
- (c) Decomposed rock, curved and drawn out into a pseudo-stratified arrangement following the slope of the hill.

3.—*Neighbourhood of Vale Church.*

The eastern margin of the raised beach surrounding the hill on which the church is built has been traced in the field to the east of the “Abbey.” A small pocket of raised beach was observed in a quarry behind “Ville Baudu.”

4.—*Neighbourhood of Fort Le Marchant.*

On the sea face of the rock called Le Catelain some pebbles have been observed which agree in altitude with the patches of high-level beach found in other localities, but whether they are remains of such a deposit or whether their presence in

that position is only accidental remains undetermined. The low level beach is well marked in the immediate neighbourhood.

5.—*Clay Pit in Lane from Mauxmarquis to Bailiff's Cross.*

This pit has been again visited. There is but a foot or so of clay above the disintegrated rock. This capping had been removed on a certain area, and on the surface thus exposed were found pebbles, some of flint, one of porphyry, one of quartzose granite, and some of diorite; also some angular pieces of diorite and some flint flakes. One of the diorite pebbles and one of the angular pieces showed striations of undetermined origin.

6.—*St. Peter-in-the-Wood.*

A little head was observed near Le Lorier and in St. Briocq Valley, but this district is generally bare of superficial deposits. The surface of the decomposed rock under the soil is in many places (notably near the Vinares) remarkably smooth and distinct.

7.—*Waterworks Well near La Villiaze, St. Andrew's.*

A well excavated in Mr. A. Mansell's field showed clay about 1 foot in thickness between the soil and decomposed rock.

8.—*Waterworks Wells at St. Martin's.*

A well in "Pompe Lane," close to the site of Hougue Hatenez, showed soil passing into clay, together about 6 feet in thickness, overlying decomposed rock.

Another well, near the Half Moon Inn, showed 3 feet of soil and 5 feet of clay overlying decomposed rock. The clay resembles that in Mr. Heaume's well and, like it, exhibits lenticular patches of more sandy character.

9.—*Les Douvres, St. Martin's.*

In an excavation clay 2 feet thick was found overlying decomposed rock.

10.—*St. Martin's Brickfield.*

This has been revisited. The sandy clay or "jaune terre" is 10 feet or more in thickness, overlying decomposed gneiss. At the bottom, resting on the rock, and occasionally at a higher level, are found pieces of quartz. Most of these have the angles rounded, especially the smaller pieces, but no true pebbles were found.

11.—*East Coast, between Bec-du-Nez and Calais Valley.*

Calcareous concretions in the head similar to those at Jerbourg and Fermain Bay have been noticed.

12.—*Jethou.*

RAISED BEACHES.

On the east of the landing is a good specimen consisting of pebbles up to 6 inches in diameter, resting on 2 or 3 feet of sand and overlain by head. In Grand Fauconnière Bay there is a raised beach about 300 feet in length, with large pebbles up to a foot or more in diameter. The extreme thickness is 15 feet.

The above beaches are of no great elevation above present sea level, but on the south-west a patch of raised beach about 50 feet above mean tide occurs over the mouth of a cave. Head is generally found, in some places containing blocks up to 6 feet in diameter. The beach in many places is strewn with similar blocks, doubtless derived from the destruction of the head by the action of the sea.

ROCKS.

1.—*Isabel Road.*

The rock exposed is very much decomposed and generally stained with iron peroxide. It appears to be a fine grained syenite, but in the quarry, where it is seen in a better condition, it has a gneissic appearance and contains red felspar and chlorite. Veins of felsite and diorite are also seen in the quarry.

2.—*Gravel Pits near St. George.*

The gravel is chiefly decomposed granite similar to that at Cobo, and, like some parts of said granite mass, it contains many inclusions of gneiss and the associated diorite veins. These veins were intrusive in the gneiss, and have been caught up with the gneiss into the newer granite, although in one or two places one might be misled by appearances.

3.—*Cliffs from Pleimont to Creux Mahié.*

In these cliffs dykes are numerous. Most of them are of fine grained diorite, but in a gorge eastward of that known as Victor Hugo's is a dyke of somewhat different character, resembling vesicular lava; the cavities, however, appear to be due to the weathering out of crystals, probably felspar. At the Thielles the dykes are also numerous and dip N.E. at an angle of about 30°. Some of these dykes appear to blend in

places with the gneiss, a peculiarity also observed at La Moye and other places along the southern coast. The country rock from Pleinmont to near Mont Herault is granitoid gneiss, similar to that of Richmond. At Mont Herault the gneiss is porphyritic and very compact, almost resembling granite or syenite; thence to Les Thielles and further east, the prevailing rock is coarse porphyritic gneiss, to which the abundant large red orthoclase felspar crystals give a warm tint of pleasant and picturesque appearance.

4.—*Creux Mahié Cave.*

The roof appears to be a fault plane partly coinciding with the boundary of a diorite vein. The slope of the cliff west of the cave is the upper surface of another vein of the same nature. The following measurements were taken:—The cave descends from the mouth inwards until a depth of about 20 feet is reached, then the floor continues at the lower level to a distance of 76 feet from the mouth, then rises at an angle of 29° for a further distance of 109 feet, making about 180 feet for the total length of the cave. The greatest width is 60 feet. The height at the mouth is only $5\frac{1}{2}$ feet, but in the centre at least 18 feet. At the further extremity of the cave the floor meets the roof, at a point about 50 feet in vertical height above the lower level of the floor. The direction of the level part of the cave is nearly south to north, N. 5 E., but the ascending portion bends considerably to the west.

5.—*East Coast of St. Martin's.*

The marble caves under Doyle's Monument have been visited. They are probably the most picturesque in the island and only inferior in size to the Creux Mahié. They are due to the erosion of diorite veins. The length of the principal one is 70 to 80 feet, its extreme width 18 feet, height 10 to 12 feet. The side cave is open to the sky, forming in the side of the cliff a funnel opening, which is overgrown with bushes. The rock is a bluish gneiss very much contorted with white veins of calcite mixed with quartz. From a distance it has the appearance of marble, hence the name.

6.—*Jethou.*

The prevailing rock is a syenitic granite containing numerous inclusions of a darker rock (similar to that occurring abundantly in Herm, and probably corresponding to the St. Sampson's and Vale diorite), but nowhere in Jethou occurring *en masse*. This included rock is, however, distinguished from the generality of the Guernsey diorite by its con-

taining felspar crystals, giving it a porphyritic aspect. These crystals may be derived from a fused portion of enclosing rock, having become mixed with the inclusion. The enclosing rock, though evidently an igneous rock, is slightly gneissic, and occasionally reminds one of the gneiss of the southern coast of Guernsey. In this granite or syenite there are also numerous veins of a more gneissic and schistose character, and occasionally almost slaty. These do not, however, seem to be true veins, but are probably similar in origin to the slaty rocks noticed at Rocquaine and Sommeilleuse, being due to pressure and crushing of the rock in early ages and subsequent reconsolidation. Rocks of this nature have been termed "Mylonite," from the Greek word for a mill.

A vein of felsite 2 feet wide crosses Crevichon. Some smaller veins were observed; one of these in the first cove to the west of the landing was of a soft nature, and presented a banded appearance.

No veins of diorite (so abundant in Guernsey) have been noticed.

MICA TRAP VEINS.

Two of these occur close together some distance to the north of Bec-du-Nez. One is 10 feet in width, with mica in rather large flakes. Its erosion has given rise to a small but picturesque cave. Its direction is N.E. to S.W. The other vein, a few yards to the N., is much smaller but of similar character, and is probably a branch of the larger one. A very wide vein of mica trap is found in Monument Bay, south of the marble caves above described, running E.N.E. to W.S.W., close to and parallel to the well-known quartz vein which crosses the isthmus near Doyle's Column. The mica flakes are small and not very noticeable, but the rock exhibits the characteristic roughness and fantastic weathering.

Jethou.

Mica trap dykes abound. The following were noticed on the west coast, going from north to south:—

(a) Direction, N.E. and S.W. Width, 4 feet.

(b) Direction, N.W. and S.E. Width, 10 feet.

The rock on each side is altered to a distance of 10 feet.

(c) Direction, W.N.W. and E.S.E. Narrow.

(d) Direction, E. and W. Width, 14 feet.

(e) Direction, N.E. and S.W. Width, $1\frac{1}{2}$ feet.

(f) Direction, W.N.W. and E.S.E. Width, 4 feet.

This dyke is remarkable on account of its undecomposed condition.

On the S.E. coast, from S. to N., some of which may be continuations of the above after having crossed the island:—

- (g) Direction, E.N.E. and W.S.W. Width, 8 inches, in Grande Fauconnière Bay.
- (h) Direction, E.N.E. and W.S.W. Width, 3 feet, in Grande Fauconnière Bay.
- (i) Direction, E.N.E. and W.S.W. Width, 1 foot.
- (j) Direction, E. and W. Width, 12 feet.

This forms the gully south of the “Creux,” or funnel. Mica trap also appears at the side of the archway forming the entrance to the “Creux” from the sea.

C. G. DE LA MARE, Sec. Geo. Sect.

REPORT OF THE FOLKLORE SECTION.

Among the various communications which I have received during the year connected with the Folklore of the island, is one from the Rev. R. H. Tourtel, B.D., Rector of the parish of Torteval. This document, which is of considerable local interest, is a copy of an old manuscript giving the ancient names of the rocks, creeks, and bays on the south coast of Guernsey, extending from Castle Cornet to Pleinmont. Many of these names, I am informed, are passing away from popular recollection, and therefore it is very desirable that an authentic record of them should be preserved. The names are, of course, all in French, and the signification of many of them is well worth examination. Instead, therefore, of publishing Mr. Tourtel's very interesting “find” just in the form it now assumes—as I had at first intended to do—I think it will add much to its permanent value as a record of local place-names, if I delay its appearance for a short time, so as to obtain, if possible, an English translation of the names, and also a few additional topographical elucidations, which will tend to throw further light upon their origin and history. This I hope to accomplish by the aid of some of the dwellers in the different localities, and then to publish the names and their signification side by side, together with any of these explanatory notes which I may be able to gather. Some of these rocks, &c., I find have local proverbs or popular sayings connected with them, which are also of much interest.

A number of the popular beliefs, &c., which have been brought to my notice during the past twelvemonth, were merely repetitions of similar ones already recorded. But even these re-discoveries have their value, if only as showing the prevalence and extensive distribution of the traditions to which

they relate. There appears to be a great dearth of folk-stories in the island. If any genuine old versions of tales of this kind do really exist they ought to be carefully preserved. I should like to urge very strongly upon members of the Society, and others who take an interest in folklore researches, the great desirability of preserving as far as they can every scrap of legend and tradition which may come under their notice. This kind of local lore is rapidly vanishing, as the older generation of Guernseymen and Guernseywomen gradually pass away; much of it has already gone beyond recall; hence it is increasingly needful that the remainder should be preserved. I shall always be glad to receive authentic items—however slight and apparently trivial. They may form missing links in the lengthy chain of traditional continuity, and will all help towards the formation of that symmetrical whole, which we Guernsey folklorists are so earnestly endeavouring to construct out of the ancient legends of the Channel group.

J. LINWOOD PITTS, Sec. Folklore Sect.

REPORT OF THE ARCHÆOLOGICAL SECTION.

It was getting late in the season when I first met the Society of Natural Science in their excursion trips, so that I can only describe what came under our notice for the three or four days I was with the members. Everyone knows that high stone situated in a field just off the road from l'Erée to St. Peter's, on the west side. It is called on the maps "Longue Rocque," close to the farm called "Les Paysans," now occupied by Mr. Le Mesurier. He kindly allowed me to excavate underneath this stone. The old legend accounts for its being there that a fairy had in the quiet of the night brought it in her silk apron, and placed it in its present upright position; further, the general belief in Guernsey was that the stone was as deep in the ground as what it shows above. I was determined to find this out, so, accompanied by Mr. Nesfield, we commenced on the north-east side; digging down 2 feet 6 inches through yellowish soil we came to gravel. In this gravel we found a long oval round water-worn stone weighing about $2\frac{1}{2}$ lb., and about 18 inches from the surface came on a stone which appeared to us like a support to the large stone. At 3 feet 2 inches below the surface, we came to the bottom of the stone, bedded in yellow clay. Thus the total length of the stone is 11 feet 6 inches out of the ground and 3 feet 2 inches below the surface—14 feet 2 inches in all. The average circumference is about 11 feet; so the weight of

this huge stone is about 8 tons. There are decided water-worn markings on the south side of this Longue Rocque and also on top.

In the Paysans Farm is a small trough supposed at one time to have been used to hold holy water, hollowed out of a beach stone. I know many of these little troughs lying about at different farm houses in this parish. There is also a niche in the hall, similar to those at the King's Mills, in three or four houses there. These may have been intended to hold figures of saints. We then passed on to visit an old farm called "Lorier," in St. Saviour's parish, belonging to the Torode family. The date given is 1687, printed in small pebbles stuck in plaster over a window in an upper room, with the letters MOYNT, believed to be that Nicolas Torode built the house. In the same room is a handsome only fireplace in well-carved stones; over the fireplace are the words "La paix de Dieu soit ici,"—"The peace of God be here." This is about the finest old fireplace I have seen in this island. Some have carved heads and are very quaint; the workmanship is rough, but there is a refinement about this. In the same room is a bedstead or cupboard, the first of its kind I have seen in Guernsey. How the people of old could have passed eight or ten hours in such a miserable box, 6 by 6 by 5, when the curtains were closed, sunk down in feather beds and feather pillows in a small stuffy room, is beyond belief. Yet they were a hardy race; strong and able, used to hard labour, either walking to market, or on horses with their garden and dairy produce, and sitting in open market in all weather to sell their vegetables or butter, not as now, when they must have their omnibuses and carriers.

Passing over from the mainland, we on another day, visited Lihou Island. The new causeway crosses and runs alongside the old causeway, which was on a higher level, made by the monks of old. The lower level raised beach is visible right round the Island of Lihou, showing it must have been detached from the Island of Guernsey many hundreds of years ago. The severe storms we have had lately, accompanied by very high tides, have undermined many banks, exposing and washing very clean these raised beaches. In one spot, in fact the only spot on the island, I found some very good flint chippings. The ruins of the old chapel and convent show a great determination to withstand nature's forces: wind, rain and frost; the mortar used was very strong, composed of sand, sea-shells, limpets and lime, quite as compact as the stone it cemented. Had that stupid order of one of our Governors never been issued, urged on by the sage advice of an engineer officer who ima-

gined that an enemy landing here might make the building a shelter, from which he could bombard the island, this fine old relic might have lasted to this date intact; other vandals also had a finger in the pie of destruction by removing much of the carved Caen stone which formed part of the arches in the chancel doorways and windows, carrying them away to build out-houses and wallings of the residence now occupied by the caretakers of the island. Fortunately, years ago Mr. Lukis resided there with his family for a few days, making excavations and plans of the buildings, gleaning much information. Ah, indeed, Guernsey is not half grateful enough to him and his family for all they did in finding out the antiquities of the island. Their efforts were unceasing, but the fruit of their labours has been vast; and yet how little is known of that splendid museum. Very few, comparatively, have ever seen it, and very many care less to see it, having no interest in it. Added to this museum are volumes of valuable exquisitely-done drawings of all cromlechs, celts, whorls, pottery, bronzes, &c., &c., found by them; volumes of manuscript showing an immense amount of labour, care and thought, all tending to show what the Lukis family have done. I doubt if there is another private collection of antiquities to compare with this.

There is now in the possession of Mr. De Garis, Bon Air, Les Adams, St. Pierre-du-Bois, a stone which was removed from the outside of an old house, now taken away (close to the present residence), which was supposed to have been where the Padre of Lihou lived. This carved stone or picture represents the Lihou Chapel with a tower; to the right or east of the tower is a high cross, with the initials L.H.M., and to the west end of the building the initials H.D.M., and underneath the date, 1114. This would make this chapel to have been built about the time of St. Sampson's and the Vale churches. On some rocks called "Lihoumets," a few hundred yards beyond Lihou, grass grows, and is the dwelling of many rabbits. There is no doubt land extended to these rocks and to the "Prudantes," not far off, and from here right away to the "Hanois," just off Pleinmont. In my prowls, gaining information here and there, I heard of a paper or contract, now in the possession of the Lenfestey family, given to a woman who had the maintaining of the road between the mainland and the Hanois. In many places iron rings are seen at low water fixed into the rocks, showing the sites of gates. A small island called "De Dom Hue," in l'Erée Bay, contains the foundation of an old chapel, which was once

erected there. In making excavations I started on the west wall, working south, coming to a large corner stone, which gave the line of the south wall. Along this I worked until coming to what I supposed was a buttress, as the masonry turned off from the main wall. I dug about there and tried in vain to find the east wall. I failed also in finding the north wall, at least to any very great extent, as from the corner about 18 inches, it butted up against a rock. I next turned my attention to digging in the interior of what I supposed was the chapel. The walls are 2 feet 6 inches thick, having an offset of 8 inches, two feet from the top of the wall, on the inside of the space. I commenced digging on the south-west corner and worked to below the offset, about one foot; there appeared to be a loose flooring of stones, under which the soil was sandy mixed with small stones, easily worked. I found small pieces of lime mortar, which was odd, as the walls are not built in lime, and a few bones; these were found in various places. There was no decided layer or uniformity in the find of these, simply found here and there. I paid a second visit to the excavation I had previously made, and for four hours dug away underneath the rough flooring; I found the brain portion of a skull, which I am quite satisfied is that of a deer, for it so closely resembles the head of a black buck, a small deer found in great numbers in India. Two portions of the lower jaw I also found, along with other bones. The lower jaws of deer are, as a rule, never kept, only the skull for the sake of the horns as trophies. There is no doubt whatever that in the old days deer roamed about the forests which existed along the whole of the coast from the Vale right away to Pleinmont, when the beech, fir and oak shaded the low lands of Cobo, Vazon, Perelle, l'Erée and Rocquaine Bays. There is a family in the island who had a contract for feeding pigs in Cobo and Vazon Bays on the beech nuts found there. A celt was found in Vazon Bay imbedded in the peat, 8 feet below the surface of the beach. This celt is in the possession of the Lukis family. The surface of these forests is below the level of our low-lying raised beaches.

An old farm-house was visited in the parish of St. Peter's called "Le Clercs," now occupied by James Robilliard. Here we saw a small trough, on which the date 1762 was cut, also a round wooden bushel measure with the date 1765. On looking over some of Mr. Robilliard's old family papers I saw mentioned that a "fouidre," or stone celt, fell through the roof of St. Martin's Church during a thunderstorm in the year 1819, in the night. Another paper mentioned that in the

year 1761 (29th July) the right ears of cattle were slit right down the ear, and a nick on each side of the ear was made.

The supposed site of the old chapel of St. Brioc (Tor-teval parish) was visited. There is nothing to indicate decidedly the situation of the building; but tradition, handed down from generation to generation, says that the chapel once stood here, so we must rest satisfied to take this rumour as fact. The only chapel which has stood the wear and tear of some hundred of years is St. Appoline. The removal of all the ivy from the roof and walls will be the means of still further increasing its chance of life. Inside, the ceiling and walls, which are plastered, are very damp; the frescoes which adorn the walls being almost obliterated. It is just possible to count eight heads, all the rest of the figures are quite gone. There should be a thorough circulation of air to remove all chance of damp and keep the plaster dry. At the back of the house, opposite to the chapel on the other side, is an out-house which is supposed to have been a convent; the arched fire-place and arched window are quite in keeping with the entrance doorway of the chapel.

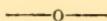
Mr. Collenette kindly assisted me in taking levels from Vazon right away to the Grand Moulin Road, to the King's Mills, then half-way up the Talbot Valley to a field from which "gorban" has been dug 12 feet below the surface of the ground. I make the height of this "gorban" above mean sea level to be 98.23 feet. I have heard since that "gorban" mixed with shingle has been dug close to the old pond at St. Andrew's, the height of which cannot be less than 140 feet above mean sea level.

During one of the late gales the spring tide rose a foot higher than any record I have seen. The sea then, had it not been for the sea walls, would have flooded the low lands at Perelle 1 foot 6 inches to 2 feet higher than my previous levels, and made a lake at the Grande Mare, 9 feet deep in the deepest part. People driving along the coast road, probably never seem to realize the great difference of levels existing when the tide is very high. It is only when levels are taken that these facts become very prominent.

J. JAMES CAREY, Sec. Arch. Sect.

PRESIDENTIAL ADDRESS.

BY MR. E. D. MARQUAND, RETIRING PRESIDENT.



IN a Society like ours, whose chief aim is the investigation and study of local phenomena, it is of great advantage to review from time to time the work which has been accomplished, and to mark the progress which is being made towards attaining the objects for which such a Society was originally established. By so doing a general outlook is obtained from a higher standpoint, and as a consequence a fresh stimulus is imparted, and a new start made.

The time has now arrived when we may conveniently consider our position in this respect ; and a fitting opportunity presents itself this evening, as it is the last occasion on which I shall have the honour of addressing you in my capacity as President. I should have felt somewhat reluctant, however, to undertake the subject if the Society were not to-day in a more healthy and vigorous condition than ever before in its history.

As the result of a public meeting held in October, 1882, to consider the question of forming a Local Natural History Society, the want of which had been long felt, the Guernsey Society of Natural Science was founded, with the warm support of the leading scientists resident in the island. During the first two years a great deal of excellent work was done ; meetings were held regularly every month, sometimes every fortnight, at which papers were read and discussed, and objects of local interest exhibited ; summer excursions were made to places easy of access presenting attractive features, and the roll of members, which had started at thirty, was increased to forty-four. In a short time a museum was established for the permanent exhibition of the various natural products of the island, and several influential gentlemen came forward and generously aided this effort by the donation of their own private collections to serve as a nucleus. On several occasions small money prizes were offered for collections of plants and insects, so as to stimulate a taste for Natural History among the youthful members of the community. All efforts in this direction,

however, met with but a feeble response, and the results were on the whole disappointing.

And then gradually, little by little, the interest of the outside public flagged and deadened; the meetings and excursions were scantily attended, so that as a consequence they became less frequent and separated by longer intervals. Only a very small band of energetic workers remained faithful and staunch, and even they became discouraged at last. Why expend labour, time and thought in trying to interest people who refused to be interested? At the annual meeting held in 1887 the Report of the Council held it to be "a matter of some congratulation that the Society is still in existence, and that a small number of the inhabitants are found who continue to take an interest in scientific matters, and to fulfil the object for which the Society was founded." The following year showed no improvement. The number of members had dwindled down to a couple of dozen, fewer indoor meetings than usual were held, and only two excursions took place during the year.

This was certainly a very disheartening and lamentable condition of affairs; but the same thing has happened a hundred times before. In all small communities the number of scientific men and women is necessarily limited, and of these only a small proportion are energetic workers; for the true worker, like the true poet, is born, not made. Well, the reiterated announcement of fresh researches and discoveries, of old theories overthrown and new lines of study opened up, all these things, however valuable *per se*, fail to sustain month after month the interest and attention of persons who are quite deficient in scientific training and bias, and who cannot without great mental effort follow the intricacies and technicalities of the subject. These persons are perfectly willing to admit that scientific observations have their value, but they frankly confess their inability to appreciate it; and so, when once the charm of novelty has passed off they grow weary, and their interest in the matter fades away.

There is no doubt that at the close of the year 1888 the Society was in a condition which may be described as anæmic, if not moribund; but the timely resolve of the Council to preserve a permanent record of its proceedings in the form of annual *Transactions*, quickened it into life again, and gave a fresh impulse to its dormant energies. In these days a scientific society which publishes nothing is practically non-existent; its labour is wasted, however important and trustworthy it may be.

The success that has attended the publication of our proceedings year by year exceeds the most sanguine expectations of those who advocated the project six years ago. Not only as members of this Society, but also as inhabitants of Guernsey, we have every reason to feel proud of the solid, enduring work which has been achieved in various departments of science during that period. Never before has this island been searched and explored and hunted over as it has been since what may be called the resuscitation of the Society. The few old naturalists who in years gone by studied the fauna and flora and the record of the rocks, worked single-handed, and, alas! much of their labour is now irretrievably lost. But we are banded together for mutual help and encouragement and stimulation, and the result of our work is preserved for all future time in the annals of our Society.

The Field Excursions which have been held weekly during the summer for the past three years have successfully demonstrated that even dry science has its attractive side; and if the monthly indoor meetings are as a rule less numerously attended than could be wished, the friendly notices and reports which appear in the local journals compensate in some measure for sparse audiences.

An enormous advance has been made in the study of local geology; old theories and the views of the past generation have been proved in many cases totally untenable; the entire subject has been revised under the brilliant light of modern discovery; researches have been carried on in directions hitherto supposed to be barren, and have yielded the most gratifying results. Hand in hand with the geologist, the archaeologist has been busy exploring and excavating, unearthing evidences of human inhabitants at a very early epoch. Full particulars of all these discoveries and the conclusions to which they lead you will find in the 500 or 600 pages composing the two volumes of our proceedings.

In entomology the papers and lists which have been published show how unexpectedly rich is a small island when assiduously worked year after year. The absence of woodland and of large ponds and rivers militates against an extensive insect-fauna; and allowance must also be made for the exposure of the island to the full violence of Atlantic storms; but, in spite of all this, see what a number of species have been collected here in the only orders at present recorded:—

Lepidoptera	291
Coleoptera	530
Hemiptera-Heteroptera	116
Hemiptera-Homoptera	43
Neuroptera	71
Aculeate Hymenoptera	97
Spiders	121

making a total (counting the spiders as insects) of 1,269 species. A very interesting feature in these lists is the number of species occurring here which are not found in Britain proper. If reliable information could be obtained upon the distribution of these insects on the French mainland some very instructive deductions might be drawn.

The botany of Guernsey has been more exhaustively worked out than ever before, and the remarkable wealth of its flora in every section has caused considerable astonishment to experienced botanists both at home and abroad. Here is an analysis of the published lists as they stand to-day:—

Flowering plants	684
Ferns and fern-allies	27
Mosses	142
Hepaticæ	38
Lichens	243
Seaweeds	236
Fresh Water Algæ	52
Diatoms	322

amounting in the aggregate to 1,744 plants catalogued within the last few years in a tiny sea-girt spot of land hardly five miles square.

Another important subject which, though as yet only in its infancy, has received attention recently, is the Folklore of the island. Old traditions and superstitions, proverbs and quaint beliefs are rapidly dying out, and a praiseworthy endeavour has been made to rescue them from utter oblivion. It is to be hoped that the members who are interested in this subject will spare no effort to collect and preserve such vestiges as still linger among the country folk, because the times are changing, old usages are becoming obsolete, and ere long it will be too late to gather together these curious relics of the past.

In many other departments of science the activity and vigilance of our members is abundantly manifest. The smaller islands comprised within the bailiwick of Guernsey have received a large measure of attention, and their geology, antiquities and natural history have been as carefully and systematically studied as circumstances would permit. The

meteorological records for the past fifty years have, at the cost of great labour, been so condensed, analysed and tabulated that we may at a glance compare the climatic phenomena of Guernsey with those of any other part of the globe. And then, in addition to all this, our *Transactions* register a mass of notes and memoranda, trivial it may be, and, taken alone, of little importance, but all going to swell the sum total of knowledge upon which the science of the future depends. It is rarely the observer himself who can best judge of the intrinsic value of the observation he records; a fact which appears to him a trifle may possibly prove years hence an inestimable aid in the solution of some perplexing problem.

And now, ladies and gentlemen, the question may be asked, are we not rapidly exhausting our field of labour? Is not the time approaching when there will be nothing left to do, when every branch of science in this island will have been completely worked out and done with? In a few more years shall we not come to a standstill, and mournfully sigh like Alexander for new worlds to conquer? Oh, no; emphatically, no. The more you do, the better you will perceive how much still remains to be done. The field of original research is absolutely boundless and inexhaustible.

But without busying ourselves to consider what might engage the attention of scientific men in the remote future, we may profitably enquire whether there are matters that urgently demand our immediate study to-day. In what sections of the harvest field may our labourers be set to work with the greatest advantage?

Well, the geology is in very good hands. The Society happily numbers among its members several enthusiastic and thoroughly competent geologists, well versed in the local aspects of the science, and they may safely be trusted not to relinquish their labours in the investigation of the testimony of the rocks. But in the rich domain of Archæology I would venture to point out one or two fresh lines of work which might be carried out with great benefit both to ourselves and to others outside our own circle.

First and foremost, I should like to have in our *Transactions* a complete descriptive catalogue of all our prehistoric remains, classified under the different heads of cromlechs, menhirs, inscribed stones, and so on, giving accurate measurements, bearings and other details, so as to be available for ready reference in the study. The precise situation of these ancient monuments should, of course, be clearly described, so as to render it easy for a stranger to find any given one with-

out a guide. Then again, I should wish to see in one concise paper an account of our venerable parish churches, with the principal points of antiquarian interest peculiar to each duly indicated, and so described as to be of practical use to ecclesiologists who have no opportunity of visiting the island. Other ancient buildings also, such for instance as Ivy Castle and the Chapel of St. Appoline, should be dealt with in the same manner, and likewise "holy wells," and things of that kind. All these should be classified and minutely described, not from books or other published data, but from personal observation made at the time of writing, so that we should then have accurate and thoroughly reliable records of the condition and appearance of these structures as they exist at the present moment.

And then there is a subject which must come in here, if it is to come in anywhere within the scope of our Society's work, and that is the Guernsey vernacular, the local *patois*. No one has ever yet succeeded in writing the *patois* in such a manner that it shall be read out and pronounced by a total stranger exactly as spoken. And the reason is that it contains peculiar sounds and accents which are unknown in both the English and French languages, and consequently cannot be phonetically reproduced without inventing an entirely new system of vowel sounds. The phonograph would do in a moment what the English and French alphabets are incapable of doing, even when combined.

Now let us turn to the Natural History of Guernsey and see what remains to be done, even merely in the matter of recording its indigenous fauna and flora.

As regards botany, I have already told you what progress has been made, but the Fungi remain untouched. A few years of patient study devoted to this division of plants would suffice to start a list; though the place will be found, I think, far less productive in these than in other sections of the cryptogamia. The entomology, like the geology, is being steadily worked at, and there is no need to urge diligence and perseverance, for these qualities are conspicuously manifested in the papers and lists which have already been published.

But the one branch of Natural History which more than all others prominently suggests itself to the mind in picturing a naturalist on a small island, is, curiously enough, the very one which has hitherto been persistently neglected by our Society—I mean the Marine Zoology. Here is a coast hardly to be equalled in the United Kingdom for productiveness, teeming with life in all its most curious forms, and yet not a

single list of species in any department of its fauna has been published in our *Transactions*. Surely the subject does not lack attractiveness and variety, and the field is almost virgin ground. We want localised lists of shells, of sea anemones, of star-fishes, of crustacea, of hydrozoa and polyzoa, of sea-worms and sea-slugs, of sponges and other allied low forms of life, in almost every section of which there are to be found in these waters species confined to the Channel Islands. On these rocky shores we have facilities for the study of marine life almost unparalleled on the British coast; and the geographical position of these islands is peculiarly favourable to the growth and development of species which find here the northernmost limit of their range. The life-histories of many of these curious inhabitants of our shores are totally unknown; and here again is opened up a fascinating field of research which is practically without boundary. Assuredly, the end of the Society's work is not yet within measurable distance.

Just a word or two on another subject, ladies and gentlemen, before I conclude. I wish to avail myself of the present opportunity to pay a just tribute to the memory of a man who in his day was a faithful worker, although his work has too long been lost sight of. Permit me to introduce him to you as

AN OLD GUERNSEY BOTANIST.

If you refer to Berry's "History of Guernsey," published in the year 1815, you will find that the first appendix on page 303 bears a title as follows: "Flora Sarniensis, or Genera of Guernsey Plants arranged alphabetically, after the genera and species of Hudson's *Flora Anglica*, by the late Josua Gosselin, Esq., a native of the island, 1788; and presented to the History of Guernsey by his grandson, Thomas William Gosselin, Esq." Then follows a catalogue of names without note or comment of any kind. I have spent a good deal of time over this list, studying and analysing it, and puzzling out its quaint, obsolete names; but I will not trouble you at present with more than a brief outline of this early contribution to the botanical literature of Guernsey.

Of the personal and family history of Josua Gosselin I have no knowledge whatever. All I know is that he was a close and accurate observer, as well as a botanist of no mean ability. He was the contemporary of Linnæus, of Gilbert White of Selborne, and of William Hudson, whose *Flora Anglica* established in England the Linnæan principles of botany.

The total number of plants comprised in Josua Gosselin's list, some of them being repeated under different names, amounts to 528 species, distributed as follows :—

Flowering plants.....	458
Ferns and fern allies	15
Mosses	31
Hepaticæ	6
Lichens.....	18

I pass over the cryptogams, merely remarking that the disproportion between them and the flowering plants is not really as great as it appears to us now. The number of mosses described by Hudson is only about one-sixth as many as are at present recognised as British, and of lichens hardly one-tenth. Taking the flowering plants as the most important section of the list, I find that out of the 458 species recorded by Gosselin, no less than 415 are known to occur here at the present time, or, to put it in another way, out of the total number of indigenous flowering plants collected by members of this Society during the last five years, and recorded in our *Transactions*, 415 species were known to Josua Gosselin more than a century ago as natives of Guernsey.

Of the remaining 43 species which have not been found in recent times, 8 were recorded by Babington as existing in this island some fifty years ago, 13 have not been confirmed by any subsequent botanist, but they are plants which could not well have been mistaken by so acute an observer as the author of the list; in all probability they are now extinct. Eleven species may be regarded as casuals and aliens, and consequently may turn up again at any time; 9 plants may possibly have been confounded with allied species already recorded, but in any case an element of doubt attaches to them; and lastly, two species are certainly erroneous, which may possibly be due to clerical errors in transcribing the list for the press.

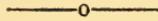
It would be easy for me to pursue this analysis much further, and bring to light additional evidence of the accurate observation and painstaking work of this old botanist; but that could be done more conveniently in a strictly scientific paper. All I have desired to do is to call your attention to the fact that more than a hundred years ago there lived in this island an accomplished worker in the field of botany, whose labour has until now remained wholly ignored. In the preface to the *Flora Sarnica*, published in 1839, Professor C. C. Babington dismisses it in this cavalier fashion: "A catalogue of Guernsey plants drawn up in 1788 by Mr. Gosselin has been recently

published by his grandson in Berry's 'History of Guernsey,' but without any correction or augmentation; and it is very imperfect." Surely, a hastily-penned and unjust criticism, unworthy of the brilliant young botanist who compiled the first Flora of the island,—a work admirable in its way, though itself not entirely devoid of error and imperfection.

In these closing years of the nineteenth century we are building upon the foundations laid by these veteran pioneers; we pursue their line of study, adding a little here, and correcting a little there, until by united effort we have produced what we may honestly regard as a more complete and exhaustive record. A century hence other botanists with greater light and wider knowledge will judge our achievements on their own merits, and estimate them at their true value. Let us hope that it may be said of us, as we say of the old workers: "They did their work faithfully, diligently and well."

THE ACULEATE-HYMENOPTERA OF GUERNSEY.

BY MR. W. A. LUFF.



THE order *Hymenoptera* contains many insects of greatly diverse structure and habits. It includes the Ants, Wasps, Bees, Ichneumon Flies, Saw Flies, Gall Flies and their allies. They may be known from other insects by their mouths being mandibulate, or formed for biting, their four membranous wings with branching nerves, enclosing a few large-sized cells, and by the form of the thorax, all the segments of which are exhibited dorsally.

The British *Hymenoptera* alone number more than 4,000 species, and of these about 400 only belong to the *Aculeata*.

The *Aculeata* are the highest section of the order, and comprise the Ants, Wasps and Bees. They are, indeed, by far the most intelligent of the whole insect race. Who has not heard of the industry of the Ant and the Bee? These insects have been mentioned by the poets and philosophers of all ages. Solomon says: "Go to the ant thou sluggard, consider her ways and be wise." Shakespeare, in his play of "Henry V.", shows how well he was acquainted with the natural history and habits of the domestic bee, by describing the economy of the hive and comparing it to the polity of a populous kingdom under monarchical government. In our own times, Sir John Lubbock, a well-known naturalist and philosopher, has spent many years in the investigation and life history of these insects, and as the result of his experiments, has come to the conclusion that they are possessed of something more than instinct, their knowledge and forethought being more akin to reason.

The *Heterogyna* or Ants nearly all form communities consisting of males, females and neuters, or workers. The males and females are winged and the workers apterous. They make their nests in various ways. *Formica rufa*, our largest species, forms large dome-shaped nests on or near the cliffs of our southern coast. These nests are composed of bits of furze, leaves, grass stems, &c., and well-worn paths leading to them may be noticed amongst the surrounding herbage.

Lasius fuliginosus, a shining jet-black species, nests in trees and old posts, as I know to my cost. I was once beating the branches of a tree into an umbrella for beetles when I became covered with hundreds of these ants, and had to beat a hasty retreat. *Lasius flavus* is our common yellow ant, forming its nest under stones. Our common garden ant is *Lasius niger*, which runs its galleries underground and swarms in July and August.

Leptothorax tuborum, a small species found on our cliffs, is of local occurrence in England.

Monomorium Pharaonis, a minute, introduced species, is a common pest in some houses in St. Peter-Port, swarming in cupboards containing sugar and other provisions.

The next section comprises the *Mutillidæ*, or solitary ants. They are not, however, true ants, as their structure and habits are not at all similar. They, however, possess apterous females, and seem to form a connecting link between the *Heterogyna* and the *Fossores*. I have only found one species in Guernsey, *Myrmosa melanocephala*. I have taken several of the rarer *Mutilla rufipes* at St. Ouen's Bay, in Jersey.

The section of *Fossores*, or sand-wasps, comprise a number of very different forms, their habits being also diverse. They all provide their larvæ with animal food, although they themselves can only live on vegetable. The various species make their nests in sandy banks, in the ground, rotten wood, bramble stems, &c., and provision with caterpillars, flies, spiders, bees and aphides. The parent stings the insects in such a manner that they are paralysed, and cannot move away, but they do not die until her eggs hatch and the larvæ want them for food.

Ammophila sabulosa is our largest species. It is black and red in colour, and, with its very long and slender waist, is the one most likely to strike the eye of an ordinary observer.

A. lutaria, a rather rare and local species in England, has also been taken here. Strange to say I did not meet with either of these species in Jersey this year, but captured the only remaining British species, *A. campestris* and *A. hirsuta*.

The genus *Crabro* contains a large number of species, many being very small black insects, very difficult to make out. It contains also, however, the beautiful golden yellow species, *C. cribrarius* and *C. cephalotes*, which are common with us.

The true wasps belong to the section *Diploptera*, and may be known by their having their wings folded longitudinally when at rest. They form two families the *Vespidæ* and

Eumenidæ. The former is composed of social species and the latter of solitary. The social species are those yellow wasps so well known and dreaded by everybody, and include the hornet, which happily is not a native of this island. The social wasps, like the hive bees, live in societies, these communities being divisible into three different classes, viz.—males, females and workers. They make their nests of a kind of paper manufactured out of the masticated fibres of wood scraped by their strong jaws from the outsides of weather-beaten posts or rotten timber. The female only lives through the winter, and in the spring commences to build a nest, either in the branches of a tree or in a bank, and after making two or three layers of cells, which are of the same general shape as that of the hive bee, lays an egg in each. These eggs hatch and the larvæ feed up and come to maturity in about a month, producing workers only at first, which, as they hatch out, help to increase the size of the nest until it consists of thousands of cells. It is fortunate for us that very few females escape the inclemencies of winter, as one specimen may see at the close of the year a family of between thirty and forty thousand descendants. The only two *Vespas* I have taken here are both common species.

The *Eumenidæ*, or solitary wasps, are narrow black insects ornamented with yellow bands. They construct their cells of mud and provision them with caterpillars. Of this family two of our species are rare and local in England, viz.: *Odynerus reniformis* and *O. pictus*. The first-named has only occurred near Cobham, Surrey, in two localities, and near Virginia Water Station, about four miles from Cobham. The latter is not so rare, but is very local.

We now come to the *Anthophila*, a division embracing the whole tribe of bees, most of which possess the faculty of making honey, with which and the pollen collected from flowers they feed their young during the larval state. The Bees are divided into two sections, the *Obtusilingues*, bees with the tongue short and obtuse, and the *Acutilingues*, or bees with tongues pointed and acute or elongate. Of the former I have only taken one species, *Prosopis hyalinata*, so that the greater portion of our bees belong to the *Acutilingues*.

The first genus is *Sphecodes*, so named from the Greek word signifying a wasp, from their superficial resemblance to some of the sand wasps. They are usually black and red in colour. I have taken no less than six species here. Of one *Sphecodes subquadratus*, Smith says "It is a rare species and seldom met with."

Of *Halictus* we have fourteen species, and amongst these is the smallest of British Bees, *H. minutissimus*, the male only measuring $1\frac{1}{2}$ lines in length. *Halictus gramineus*, of which I have taken one specimen only, is one of the greatest rarities in England, being only recorded for certain from Cove Common, in Hampshire. The genus *Andrena* may be said to be the harbingers of spring, as they are the earliest of our bees. Fourteen species have been taken in Guernsey. One of the most beautiful is *Andrena fulva*, which is common in the spring and frequents the flowers of the gooseberry. *Andrena flessœ* is worthy of special note as it is not on the British list, never having been taken in Great Britain. It is a large and handsome species, black and white in colour, with dark wings, and is not uncommon here. It is widely distributed on the Continent, extending even into Algiers.

Of the genus *Panurgus* we have both the British species. They have very similar habits to the *Andrenidæ*, excavating burrows and laying up a store of pollen and honey in a similar manner.

The *Nomadæ* are popularly known by the name of wasp-bees from their close resemblance to the *Vespidæ*, their colour being yellow or red intermixed with black. They are cuckoo bees, making no provision for their young themselves, but the female laying its eggs in the cells of other species. Of these I have taken five species. *Epeolus productus* and *Melecta armata* are also parasites; the latter, a very handsome bee, is parasitic on *Anthophora pilipes*.

The bees included in the genus *Megachile* are popularly called leaf-cutters. We have two species—the rare British species, *Megachile argentata*, being abundant on l'Ancrese Common, making holes in the sand-banks and forming its cells with leaves cut with great precision from the rose, laburnum, and other plants.

Anthidium manicatum is the next in order, and is a very pretty species. It forms its cell in any suitable hole which it finds ready made, such as the burrows of *Cossus ligniperda*, the Goat Moth. The cell is lined with down collected from plants with woolly leaves.

The genus *Osmia* are called mason-bees from their habit of mixing sand, earth and minute pebbles, with a secretion which they emit, and of which they form their cells. I have taken two species here, one of which, *Osmia bicornis*, has never been taken in Great Britain.

Eucera longicornis, or the long-horned bee, burrows six or eight inches into a clayey bank and forms a cell at the end of its burrow.

The genus *Anthophora*, of which we have two species, are large and conspicuous insects.

The genus *Apathus* are parasites of the Humble Bees, and are very similar to them in colouring and appearance. Of the two species found with us, *A. rupestris* accompanies *Bombus lapidarius* and *A. vestalis* is attached to *B. terrestris*.

We now come to the "Social Bees," which live in communities comprising males, females and neuters. The genus *Bombus* are the well-known humble bees. They construct their nests of grass, moss, &c., and make use of ready-made excavations in banks, hedgerows, and sometimes in walls, where they form large communities.

The genus *Apis* closes the list. It consists of a single representative, the common hive bee, *Apis mellifica*, which is well known everywhere.

The following list contains 95 species of *Aculeate-Hymenoptera* taken in Guernsey, to which I have added two species captured in Alderney. It may be considered far from exhaustive, as I have no doubt that with further careful working many more will turn up; it is, however, the first list of *Hymenoptera* ever published for Guernsey.

In Ansted's "Channel Islands" a list of 25 species of *Aculeata* is given for Jersey by Mr. Piquet. To this list I have made 20 additions as the result of two or three days' collecting there this season in not very favourable weather. I have appended a list of the 45 Jersey species for the purposes of comparison.

I have to thank Messrs. E. D. and E. P. Marquand for kind assistance rendered in the collection of specimens, and I am deeply indebted to Mr. E. Saunders, F.L.S., who is at present engaged on a most valuable and exhaustive work on the "Hymenoptera-Aculeata of the British Islands," for his great kindness in examining and naming most of the species.

HYMENOPTERA-ACULEATA.

HETEROGYNA.

FORMICIDÆ.

Formica rufa, *Lin.* Race *Congereus*. Abundant, especially on the southern cliff coast.

F. fusca, *Lin.* Common.

Lasius fuliginosus, *Latr.* Common.

L. niger, *Lin.* Race *Alienus*. Abundant in gardens everywhere. Common in Alderney.

L. flavus, *De Geer*. Common under stones, especially on the sandy north portion of the island.

Tapinoma erraticum, *Latr.* Not uncommon on the cliffs.

MYRMICIDÆ.

Tetramorium cœspitum, *Linn.* Common on the coast.

Leptothorax tuberum, *Fab.* Two specimens taken on April 4th at the Gouffre.

Myrmica rubra, *Linn.* Race *Scabrinodis*. Abundant.

Monomorium Pharaonis, *Linn.* An introduced species, common in some houses in St. Peter-Port.

FOSSORES.

MUTILLIDÆ.

Myrmosa melanocephala, *Fab.* One specimen, a female, taken near Grande Rocque.

SCOLIIDÆ.

Tiphia femorata, *Fabr.* One specimen taken at Platte Saline, Alderney, August 6th, 1892.

POMPILIDÆ.

Priocnemis parvulus, *Dahlb.* One specimen taken at Petit Port, April 21st.

Pompilus unicolor, *Spin.* I took three specimens of this rare species on April 21st, near Doyle's Monument.

P. chalybeatus, *Schiödte.* One taken in Alderney, August 5th, 1892.

P. gibbus, *Fab.* Not uncommon.

SPHEGIDÆ.

Ammophila sabulosa, *Linn.* Common on the sandy coast and on the cliffs.

A. lutaria, *Fab.* Common on the coast.

PEMPHREDONIDÆ.

Diodontus minutus, *Fab.* Petit Port, and one in the Island of Jethou.

Pemphredon lethifer, *Shuck.* Taken by Mr. E. D. Marquand in his garden at St. Martin's. I have taken it in Jethou.

Mimesa Shuckardi, *Wesm.* This is a rare British species. I took one at Jerbourg, April 24th, 1894.

MELLINIDÆ.

Mellinus arvensis, *Linn.* This fine species was very common during August in a sandy path near Petit Port Bay.

Philanthus triangulum, *Fab.* One specimen of this rare species taken at Grande Rocque, July 23rd.

Cerceris arenaria, *Linn.* Took several at Icart Point, July 6th, 1894.

C. labiata, *Fab.* One on June 25th at Pleinmont; one, August 6th, 1892, on the cliffs of Alderney.

C. ornata, *Schæff.* One at Icart Point on July 6th; one near Doyle's Monument.

CRABRONIDÆ.

Crabro palmipes, *Linn.* One taken by Mr. E. D. Marquand.

C. elongatulus, *V. d. Lind.* Several taken by Mr. E. P. Marquand in a garden at St. Martin's. One taken in Jethou.

C. cephalotes, *Pz.* One at the Gouffre.

C. cribrarius, *Linn.* Not uncommon near the coast.

Oxybelus uniglumis, *Linn.* One specimen taken on l'Anresse Common.

DIPLOPTERA.

VESPIDÆ.

Vespa vulgaris, *Linn.* Only too common.

Vespa sylvestris, *Scop.* Not common.

EUMENIDÆ.

Odynerus reniformis, *Gmel.* Took two specimens of this rare species on June 30th, 1893, at Petit Port.

O. parietum, *Linn.* Common.

O. pietus, *Curt.* One at the Gouffre, May 29th, 1892. One in Alderney, August 4th, 1892.

O. antilope, *Panz.* One, taken near Saints' Bay in June.

ANTHOPHILA.

OBTUSILINGUES.—COLLETIDÆ.

Prosopis hyalinata, *Smith.* Common at Petit Port, Gouffre, Saints' Bay, &c.

ACUTILINGUES.—ANDRENIDÆ.

Sphecodes gibbus, *Linn.* One taken at Gouffre, July 10th, 1892.

S. subquadratus, *Sm.* Several specimens captured at a hedge-bank near Bailiff's Cross.

S. pilifrons, *Thoms.* Two at the Gouffre, July 10th, 1894.

S. similis, *Wesm.* Two at the Gouffre, June, 1892.

S. dimidiatus, *Hog.* One at Petit Bot Bay, May 8th, 1892.

S. affinis, *Hog.* Common.

Haliectus rubicundus, *Chr.* Abundant.

H. xanthopus, *Kirb.* One at the Gouffre, June 12th.

H. leucozonius, *Schr.* Common.

H. cylindricus, *Fab.* Common.

H. albipes, *Kirb.* Not uncommon. One taken in Alderney, August, 1892.

H. villosulus, *Kirb.* One at Gouffre, July 22nd, 1894. One at Bon Repos, June 22nd, 1893.

H. punctatissimus, *Schk.* One specimen taken at the Gouffre.

H. minutissimus, *Kirb.* This, the smallest British bee, is not uncommon on the coast.

H. tumulorum, *Linn.* Not uncommon from May to July near the coast.

H. gramineus, *Smith.* One specimen of this very rare British bee was taken near Doyle's Monument, September 4th, 1892.

H. Smeathmanellus, *Kirb.* Common on the coast, taken also in Jethou.

H. morio, *Fab.* Very common, several taken in Jethou.

H. leucopus, *Kirb.* One taken at Petit Port.

Andrena cingulata, *Fab.* One specimen of this pretty species was taken several years ago at St. Andrew's.

A. rosæ, variety *Trimmerana*, *Panz.* Not uncommon.

A. cineraria, *Linn.* Common in April and May.

A. flessœ. This handsome non-British species is common with us in June and July.

A. thoracica, *Fab.* One taken on March 25th, 1892, at Saints' Bay.

A. fulva, *Schr.* Very common at gooseberry and apple blossom in gardens in the spring.

A. Clarkella, *Kirb.* Not uncommon. Earliest date of capture March 23rd, 1894.

A. nigro-ænea, *Kirb.* Very common.

A. Gwynana, *Kirb.* Common in March and April at Saints' and Moulin Huet Bays.

A. angustior. This species, which is rare in England, is not uncommon near the coast in May and June.

- A. varians**, *Rossi*. One, cliffs near Doyle's Monument.
A. fulvicerus, *Kirb.* Common.
A. fasciata, *Nyl.* One taken at Gouffre.
A. Afzeliella, *Kirb.* Not uncommon.
Panurgus calcaratus, *Scop.* One specimen taken at Saints' Bay in August.
P. ursinus, *Gmel.* Two taken on l'Ancrese Common.
Nomada succineta. Very common.
N. Lathburiana, *Kirb.* Three specimens taken at Saints' Bay, April, 1892.
N. ruficornis, *Linn.* Abundant. Variety *Signatus*. Two at Ville-au-Roi, April 8th.
N. Fabriciana, *Linn.* Common in hedge-bank near Ville-au-Roi, in May.
N. furva, *Panz.* One specimen taken at the Gouffre, 12th June, 1892.
Epeolus productus, *Thoms.* One taken near Richmond, by sweeping, June 28th, 1892.
Melecta armata, *Panz.* Not uncommon.
Megachile maritima, *Kirb.* Two specimens taken by Mr. Peter Fourneau at the Vale, many years ago.
M. argentata, *Kirb.* Abundant on l'Ancrese Common, making its burrows in sandbanks near the coast.
Anthidium manicatum, *Linn.* One taken at Saints' Bay, July 6th, 1894.
Osmia bicornis. Two specimens of this non-British species were taken in a garden at Mount Row, May 7th, 1892.
O. aurulenta, *Panz.* One, taken April, 1893, at Vazon.
Eucera longicornis, *Linn.* Not uncommon.
Anthophora retusa, *Linn.* Very abundant in June near the cliffs at Pleinmont.
A. pilipes, *Fab.* Not uncommon.
Apathus rupestris, *Fab.* Common in Guernsey; I have taken one in Herm.
A. vestalis, *Fovec.* Common.
Bombus Smithianus, *White.* Two taken on l'Ancrese Common.
B. muscorum, *Linn.* Common.
B. hortorum, *Linn.* Two taken in Guernsey; one in Alderney.
B. lapidarius, *Linn.* Abundant.
B. terrestris, *Linn.* Common in Guernsey, Alderney, Herm and Jethou.
Apis mellifica, *Linn.* Abundant everywhere.

LIST OF JERSEY HYMENOPTERA-ACULEATA.

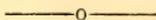
- Formica rufa**,* *Linn.*
Lasius niger, *Linn.* Common.
L. flavus, *De Geer.* Common.
Mutilla rufipes, *Ltr.* Captured three female specimens near the Corbière.
Salinus pusillus, *Schiödte.* One, St. Brelade's Bay.
S. fuseus, *Linn.* Two taken on the sandhills near St. Ouen's Bay.
Ceropales maculatus, *Fab.* Sandhills, St. Ouen's Bay.
Pompilus plumbeus, *Fab.* One, St. Ouen's Bay.
Ammophila campestris, *Latr.* Took several near St. Ouen's Bay.
A. hirsuta,* *Scop.* One near St. Ouen's Bay.
Philanthus triangulum, *Fab.* Captured two, boring into a sand-bank near St. Brelade's Bay.

- Cerceris arenaria*, *Linn.* Not uncommon, near St. Ouen's Bay.
Crabro elongatulus, *V. D. Lind.* One.
C. dimidiatus.*
Vespa vulgaris.*
V. sylvestris.*
Odynerus parietum.*
Halictus leucozonius, *Schr.* Common near St. Helier's.
Andrena albicans.*
A. atra.*
A. nigroœnea, *Kirb.* One, at Gorey.
A. fulvago, *Chr.* One, near St. Aubin's.
Nomada jacobææ, *Panz.* One near St. Ouen's Bay.
N. ruficornis, *Linn.* Common.
Epeolus productus, *Thoms.* Taken by sweeping near St. Ouen's Bay.
Megachile maritima.*
M. muraria.*
M. argentata, *Kirb.* Two, taken at St. Ouen's.
Anthidium manicatum.*
Osmia cornuta.*
Eucera longicornis.*
Anthophora acervorum.*
A. pilipes.*
A. retusa.*
Apathus campestris.*
A. vestalis, *Foure.* Two at St. Aubin's.
A. rupestris.*
Bombus muscorum.*
B. lucorum.*
B. pratorum.*
B. senilis.*
B. hortorum.*
B. lapidarius, *Linn.* Common.
B. terrestris,* *Linn.* Common.
Apis mellifica, *Linn.* Common.

The species marked * in the above list are given in Ansted's "Channel Islands" on the authority of Mr. Piquet.

THE LAND AND FRESH WATER SHELLS OF GUERNSEY.

BY MR. E. D. MARQUAND, PRESIDENT.



So little appears to be known concerning the Land and Fresh Water Mollusca of this island, and the published information is so scanty, that I venture to think the following list, though incomplete, will supply a want, and perhaps serve to direct attention to a subject which will repay investigation. After much consideration I have thought it best to restrict this list to species which I have myself seen and can vouch for; but at least two others have been found in Guernsey, *Helix rupes- tris* and *Bulimus obscurus*, and our resident conchologists should do their best to turn them up.

Two shells deserve mention, although they have no claim to a place in the present list. In a small fish-pond at St. George may be seen *Planorbis corneus* in numbers; they are the progeny of a few English specimens introduced into the pond some years ago by the proprietor, as he himself has informed me. The second species is *Planorbis parvus*, which occurs plentifully in an artificial pond in Mr. Dawber's garden at Ruettes Brayes. Waterplants of many kinds, both British and exotic, have from time to time been grown in this little reservoir, and it is probable that the shells have been introduced in this way.

The slugs are entirely omitted for the present, as they require further working up, especially with respect to the distribution of the rarer varieties and forms. As regards the names, some of which will be unfamiliar to many conchologists, I have followed the last edition (1892) of the Conchological Society's "List of British Land and Fresh Water Mollusca"; the more commonly known names being given in brackets when necessary.

It gives me great pleasure to acknowledge my indebtedness to Miss M. Dawber, who has assisted me both in the collection of specimens, and also in ascertaining the general range and comparative frequency of the species now recorded.

- Vitrina pellucida.** Generally distributed and not uncommon.
- Hyalinia (Zonites) Draparnaldi.** Frequent in all parts of the island.
Varies in size.
- H. cellaria.** Common in the south.
- H. alliaria.** Not uncommon in the south.
- H. nitidula.** I have taken this species in all parts of the island, including the Vale and Pleinmont.
Var. *Helmi*. Valley below St. Saviour's Church, one specimen.
- H. radiatula.** Sparingly in many scattered localities throughout the island.
- H. pura.** Moulin Huet, one specimen.
- H. crystallina.** I have taken single specimens occasionally at Saints' Bay, Moulin Huet, and Petit Bot.
- H. nitida.** Petit Bot Valley, one specimen. Field ditch at Cobo, abundant (Miss Dawber).
- Helix rotundata.** Common.
- H. pygmaea.** Apparently rare, but probably frequently overlooked. I have taken it at Moulin Huet, Gouffre, King's Mills, and Bordeaux.
- H. pulchella.** Moulin Huet, several specimens taken both by Miss Dawber and myself. Cliff Valley towards Corbière, one specimen.
- H. aspersa.** Abundant everywhere.
Var. *conoidea*. Moulin Huet cliffs.
Var. *minor*. Generally distributed. My smallest specimen from Petit Bot Bay measures 21 mills.
Var. *tenuior*. Common on the cliffs.
Var. *zonata*. Creux Mahié, Miss Dawber. I have taken very beautiful typical specimens on the sandhills at Herm.
Var. *exalbida*. A few specimens on the coast at Bordeaux.
- H. nemoralis.** Very common.
Var. *conica*. Cliffs at Bon Repos.
Var. *minor*. Not uncommon. The smallest specimen I have (from my garden) measures 17 mills.
Var. *roseo-labiata*. Fort Doyle.
Var. *albo-labiata*. Occasional on the southern cliffs. All I have seen were dead shells, and of small size, so that I mistook them at first for *H. hortensis*. The latter species has been recorded for the island, but probably erroneously, the white-lipped variety of *H. nemoralis* having been taken for it.
Var. *bimarginata*. Pleinmont Point, one. Jerbourg, one.
Var. *rubella*. Common. The most frequent band form is 00300, having occasionally a whitish band below the black one. At Moulin Huet and several places at the Vale I have taken the form 00000.
Var. *libellula*. Common, presenting a great variety of band forms.
Var. *castanea*. Bordeaux, one, 00000.
Var. *roseo-zonata*. On the sea wall at Vazon I have taken a specimen which is probably this; it is a uniform pale red, with a slender band of a darker shade than the ground colour.
- H. hispida** (*H. concinna*, Jeffreys). Waste corner by St. Andrew's Church. Cobo, in a nettle bed.
Var. *hispidosa* (*H. hispida*, Jeffreys). Rather common generally.
Var. *conica*. Near St. Andrew's Church.
Var. *albida*. Near St. Andrew's Church, one specimen with the type.
- H. revelata.** Occurs in many places on the southern cliffs; usually gregarious.
- H. pisana.** In the greatest profusion all round Vazon, especially under the sea wall. Much less handsomely marked than the Tenby form—average size 19 mills. My largest specimen measures 21 mills, my

smallest 13. At Bordeaux a rather larger and finer form occurs, but not in the immense numbers of the Vazon station. This species is said to have been introduced into the island many years ago by Dr. Lukis, but I have not had an opportunity of consulting the "Journal of Conchology," Vol. II., where some information is given on this point.

Var. *minor*. Occasional with the type.

Var. *alba*. Vicinity of the Vale Castle, and also on the north side of Bordeaux.

H. caperata. Generally distributed, but not common.

H. virgata. Abundant on the coast.

Var. *lineata* (*submaritima*, Jeffreys). In profusion on the sandhills of the north and north-west.

Var. *minor*. Probably most of our shells belong to this variety.

Var. *leucozona*. Occasional all along the north-west coast.

Var. *albicans*. Common on the coast of the lowlands.

Var. *alba*. Amongst Fennel in a waste corner at Les Goubais, between Noirmont Mill and Grandes Rocques. Near Vale Castle, Miss Dawber.

Var. *tessellata*. L'Erée Bay.

H. acuta (*Bulimus acutus*, olim.) An abundant species on the coast of the lowlands; less common in the south. The type is much less frequent than some of the varieties.

Var. *bizona*. Near Vale Castle.

Var. *strigata*. Common on the north and north-west coast.

Var. *articulata*. Equally common with the last.

Var. *alba*. Grandes Rocques. Les Goubais.

Pupa anglica (*P. ringens*, Jeffreys). Not uncommon along the south coast, occurring in some places in abundance under stones in the little cliff streamlets, often accompanied by *Vertigo antivertigo*.

P. cylindracea (*P. umbilicata*, Jeffreys). Common in all parts of the island. One of the most plentiful of our small snails.

Var. *edentula*. Bordeaux. Vazon Green.

Var. *curta*. Here and there, mixed with the type, and always connected with it by intermediate forms.

P. muscorum (*P. marginata*, Jeffreys). Vazon Green, scarce.

Var. *undentata*. Abundant on some parts of Vazon Green. L'Anresse Common. Richmond.

Vertigo antivertigo. In some of the cliff streamlets this little shell occurs abundantly in company with *Pupa anglica*. I have also taken it at Grande Mare. Near the Corbière I found a specimen having an angled lip and two teeth on the pillar.

V. pygmæa. Local, but plentiful where it occurs. Richmond. Bordeaux. Cliff valley towards Corbière. Enfer Lane, near King's Mills.

V. edentula. Lane at Bordeaux, with *V. pygmæa*. Petit Bot. Saints' Bay Valley.

Balea perversa. Generally distributed throughout the island on mossy walls and tree trunks, but rather local.

Clausilia perversa (*C. rugosa*, Jeffreys). Common.

Var. *tumidula*. Whorls ten. Moulin Huet.

Var. *gracilior*. Whorls thirteen. Wall of Clarence Battery, several specimens.

Cochlicopa lubrica. Generally distributed, but always occurs sparingly.

Succinea putris. [I have not seen the type in Guernsey.]

Var. *Ferussina*. Millpond below l'Echelle. Talbots Valley. Grande Mare.

S. elegans. Generally distributed and common throughout the island.

Carychium minimum. Frequent in wet places in the south.

Planorbis nautilus. Amongst *Callitriche* in stream crossing the Vale Road. Ivy Castle marshes.

P. spirorbis. Common.

Var. *ecarinata.* Quarry pool at Spur Point. Ditch in field at Cobo; Miss Dawber.

P. vortex. Ivy Castle marshes. Vrangue millpond.

Bullinus (Physa) hypnorum. Generally distributed throughout the lowlands; usually plentiful where it occurs.

Limnæa peregra. Very common in the lowlands.

Var. *inflata.* Millpond below l'Echelle, Talbots Valley. A smaller form in Vrangue millpond.

Var. *ovata.* Pond by Fort Doyle.

Var. *pulchella.* Ditch near Hougue du Pommier.

L. palustris. Occurs in many pools and ditches at the Vale and St. Sampson's. Grande Mare. Cobo. Talbots Valley.

L. truncatula. Generally distributed throughout the island, but seldom in any numbers.

Var. *minor.* Saints' Bay valley.

Var. *elegans.* Grande Mare.

Ancylus fluviatilis. Common in streamlets in the south. Perelle.

Var. *albida.* Fermain Lane, in a spring. Bon Repos Cove, under the cascade.

Sphærium corneum. A small variety of this occurs plentifully in the ditches behind Ivy Castle.

S. lacustre. Roadside pool near the Hermitage, l'Anresse.

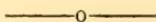
Pisidium pusillum. Echelle Mill, Talbots Valley, one specimen among wet mosses.

P. nitidum. Grande Mare, one specimen.

BRIGHT SUNSHINE IN GUERNSEY

Compared with Jersey, London, Southampton and Plymouth during the year 1894.

BY MR. A. COLLENETTE, F.C.S.



HAVING commenced to record the bright sunshine of this island on the 1st of January, 1894, I thought it would interest the Society to hear the results of the year's observations, both as they have occurred and as they compare with those of other places.

I first give my own results, appending a table of the

MONTHLY TOTALS IN HOURS.

January	64·85		July	187·20
February	87·02		August	186·43
March	196·77		September	155·16
April	191·05		October	91·86
May	230·01		November	74·53
June	215·31		December	44·20

The Year, 1724·39.

By the comparison which immediately follows it will be seen that though Guernsey is below Jersey, it is far above the other towns compared. It does not follow that because Guernsey is below Jersey this year, that it will prove so over a longer period.

A comparison of the year, month and week now follows:—

SUNSHINE FOR 1894.

	Sunniest Day.	Sunniest Week, ending	Sunniest Month. May.	Sunniest Quarter.	The Year.
Guernsey	June 13, 14·26*	July 7, 80·9 †	230	636 ‖	1724
Jersey	†	June 30, 78·4	234	624 §	1789
London	†	„ 74·7	177	544 ‖	1251
Southampton ..	†	„ 79·8	210	574 §	1560
Plymouth	†	„ 70·1	203	600 §	1568

* This was 89 per cent. of the possible sunshine for the day.

† This was not obtainable at the time of writing.

‡ The percentages of the possible are as follows:—Guernsey, 72; Jersey, 69; London, 68; Southampton, 73; Plymouth, 67.

‖ In Guernsey and London the Summer Quarter (3 months) comprised the months April, May and June.

§ In the other places March, April and May gave the greatest sunshine.

In Guernsey 4,446 out of the 8,760 hours in a year are capable of giving sunshine. Of these we secured 1,724 or nearly 39% of the possible.

LIST OF THE ARANEIDEA OR SPIDERS OF THE CHANNEL ISLANDS.

BY REV. FREDK. O. PICKARD-CAMBRIDGE, B.A.

THE following list of the species of spiders found in the Channel Islands has been compiled from six different sources, whose recorded observations extend over a period of forty years. The first, a paragraph in a Guernsey Guide-Book, contributed by Mrs. Collings, of Sark, was published in 1863; the last, a list kindly furnished by Mr. Cecil Warburton, of Christ's College, Cambridge, of species taken by himself in September, 1894.

The first list was published by Mrs. Collings in Le Lièvre's "Guide to Guernsey" in 1863, as follows:—"Spiders." This short list of spiders has been contributed by Mrs. W. Collings, of Sark, and is a mere fractional part of this numerous class of insects." It contains the names of thirty-one species.

The second was published by Mr. Francis Walker in the "Zoologist" for 1864, pp. 9,273, under the title "Arachnids of the Channel Islands." This list, including the names of thirty-seven species, identified by Mr. Blackwall, seems to have remained incomplete, for, although Mr. Walker concludes with the promise that it is "to be continued," I am unable to find any further mention of the "Arachnids of the Channel Islands" in any subsequent volume of the "Zoologist."

A third list, kindly furnished by the Rev. O. Pickard-Cambridge, was forwarded by Mr. Blackwall to Mrs. Collings and contains the names of fifty-three species, two of which, *Drassus Collingii*, and *D. cupreus*, are of doubtful value, while one of them alone, **Theridion grossum*, is at all rare in England. The names of six species sent by Mrs. Collings to the Rev. O. Pickard-Cambridge on November 3rd, 1869, must be added to the above. All of the species contained in this list were captured in the island of Sark.

* Since this was written I have been able to distinguish two distinct forms of *D. lapidosus*, Wlk., both male and female; and I have come to the conclusion that one of them is the *D. cupreus* of Blackwall. The types whence the figures of *cupreus*, in "Spiders of Great Britain and Ireland," were taken are still in existence, and though some arachnologists might not recognise the two forms as species, I find reasons for doing so which cannot be entered into at present, but are to my mind quite sufficient.

The fourth list, compiled from the names on the bottles in which Mrs. Collings had preserved her specimens, was kindly sent to me by Mr. W. A. Luff, of Guernsey, and contains the names of nine species not mentioned in the Guide Book of 1863. Unfortunately the spirit has long since evaporated from the phials, so that the specimens themselves have either perished completely or become unrecognisable.

The fifth list contains the names of twenty-five species collected by Messrs. B. B. and M. F. Woodward in the Channel Islands in 1890, which, through the kindness of Mr. R. I. Pocock, of the South Kensington Museum, were handed over to me for identification.

The sixth list, containing the names of twenty-four spiders, the result of a few days' collecting in Guernsey in September, 1894, was given to me by Mr. Warburton, and records no less than nine species not hitherto observed in the Channel Islands, besides an adult female *Micaria* whose identity has not yet been satisfactorily determined.

A final list drawn up from a parcel of specimens kindly sent me by Mr. Luff on the eve of closing the list, enables us to add four species not hitherto recorded, out of a total of twenty-five submitted for examination.

We are thus able to bring the sum total of the spiders of the Channel Islands to the creditable number of one hundred and twenty-one, but of these, five species, marked in the list with an asterisk are of very doubtful value.

The comparative number for each of the islands is as follows :—

Guernsey.....	Thirty-nine species.
Jersey	Eighteen species.
Alderney	Two species.
Sark	Eighty-three species.
Herm	Five species.
Lihou	One species.

The most interesting of the species recorded in the above list are *Eresus cinnabarinus*, *Atypus piceus*, *Scytodes thoracica*, *Teutana grossa*, *Asagena phalerata*, *Lycosa cinerea*, and *Salticus formicarius*. The first has been taken, but only very rarely, in the sandy heath districts of southern Hampshire and Dorset. The second is a spider, though not by any means rare, not often observed on account of its habit of constructing a tubular retreat in the earth, where it resides. Here, too, it lies in wait for insects, which are seized as they pass over the exposed end of the tube and drawn in through a vent made with the falces, in the act of seizing, in the silken tissues of

the tunnel. It is abundant on the southern coast of this country.

Scytodes thoracica is a species distinctly characteristic of a sub-tropical fauna. It has indeed been taken in England, but under circumstances which would suggest an introduction from foreign parts. *Teutana grossa* and *Asagena phalerata* are both rare in England, while *Lycosa cinerea* is interesting from the fact that it has occurred, as far as Great Britain is concerned, only in the mountainous districts of Wales, North Britain and Scotland.

Of the very interesting species *Salticus formicarius* four specimens only have occurred in Great Britain, so that it will always be regarded as one of the greatest prizes with which the arachnologist may hope to reward himself.

It occurs, however, much more frequently on the continent where it appears to haunt low-lying, swampy localities, running freely on the grass and rush heads.

Remarkable as it is in its appearance, it is not singular amongst the *Araneidæ* in its resemblance to members of the family of *Aculeate-Hymenoptera*. Other species of various genera, notably, *Micaria* and *Myrmecium*, also exhibit this peculiarity in form.

The division of a spider's body into two main trunks united by a narrow "pedicle," renders it liable in the first instance, through its resemblance to the body-plan of the *Hymenoptera*, to further ant-like attenuation of parts and constrictions of both thorax and abdomen.

The likeness to some or other species of ant would thus become more and more complete and striking through the influence of habit, habitat and natural protective selection, if, indeed, I may any longer, in the face of recent revelations, dare to place my faith in such a *Deus ex machinà* of evolutionary theory.

Of the whole number of species recorded, with the exception of the doubtful ones marked with the asterisk, there is only one species, *Heliophanus cambridgei*, Sim., taken in the Channel Islands, which has not also occurred on this side of the Channel.

The large total placed to the credit of Sark is undoubtedly due to the zeal displayed by the late Mrs. Collings in collecting material, for she alone, save for a few collected by Mr. Walker, has worked amongst the spiders of this island.

For those recorded from Guernsey we are indebted to Messrs. F. Walker, Woodward, C. Warburton and W. A. Luff; while those from Jersey and Alderney were taken by Mr. Walker.

The species taken by Mr. Walker near St. Malo have not been included in the above total and are added only as a matter of interest, being taken on the coast of the mainland which lies nearest to this group of islands. For the single species taken on Lihou we are indebted to Mr. Luff, who observed numbers of the tubes of *Atypus piceus*, Sultz., during the summer of the present year.

Judging from the physical character of the islands, their favourable geographical situation, and the great variety in the character of their surface and soils, one would not hesitate to say that they probably possess a very rich spider-fauna indeed, and, although the species hitherto recorded are, with a few exceptions, precisely what one might expect to meet with on the coast of England, there are even now indications which would point to the existence of species belonging rather to a fauna more nearly allied to that of France and the Continent than to that of the British Islands.

There can be little doubt but that the present list might with very little trouble be certainly doubled, and perhaps trebled, for the species that have come to hand are, with a few exceptions, those which would be likely to fall under the observation of the ordinary collector who secures the most obvious specimens which are either running over the surface of the ground or lurking under the loose stones.

There is a noticeable absence of the more minute forms which so greatly help to swell a list, but are less easily observed; while there is at the same time an unaccountable absence of many species so common in England, and such as would force themselves on the notice.

We shall await with great interest and some curiosity the result of the further investigation of these interesting islands, and may be allowed to express a hope that, during the approaching season, several consignments may find their way over to us from some energetic members of the Guernsey Society of Natural Science and Local Research.

I must in conclusion express my thanks to those who have so kindly contributed material towards the compilation of this list, and especially to Mr. W. A. Luff and the Committee of the Society for permitting its publication in their Transactions.

Swanage, Oct., 1894.

FAM. THERAPHOSIDÆ.

Atypus piceus, Sultz. (*A. sultzeri*, Bl.) Sark. Herm. Jersey. Guernsey. Lihou. Houmet Homptolle.—Collings. Luff.

ERESIDÆ.

Eresus cinnabarinus, Oliv. Sark.—Collings.

DICTYNIDÆ.

Amaurobius similis, Bl. (Sub *Ciniflo*, Bl.) Sark. Jersey.—Collings. Walker.

Amaurobius fenestralis, Strœm. (*C. atrox*, Bl.) Sark. Guernsey.—Collings. Walker. Woodward.

Amaurobius ferox, Wlk. (*Ciniflo ferox*, Bl.) Sark.—Collings.

Dictyna arundinacea, Linn. (*Ergatis benigna*, Bl.) Sark. Jersey.—Collings. Walker.

Dictyna latens, Fabr. (*Ergatis latens*, Bl.) Sark.—Collings.

Dictyna flavescens, Wlk. (*Ergatis pallens*, Bl.) Sark.—Collings.

Lathys humilis, Bl. (*Ciniflo humilis*, Bl.) Sark.—Collings.

FAM. DYSDERIDÆ.

Dysdera cambridgii, Thor. (*D. erythrina*, Bl.) Guernsey. Sark. Herm. Jersey.—Collings. Woodward. Walker.

Dysdera crocota, C.K. (*D. rubicunda*, Bl.) Guernsey.—Warburton.

Harpactes hombergii, Scop. (*Dysdera hombergii*, Bl.) Sark. Guernsey.—Collings. Woodward. Luff.

Segestria senoculata, Linn. Sark. Guernsey.—Collings. Woodward.

Oonops pulcher, Templ. Guernsey.—Luff.

SCYTODIDÆ.

Scytodes thoracica, Latr. Guernsey.—Luff.

DRASSIDÆ.

Prothesima pedestris, C.K. Sark. Guernsey.—Collings. Walker.

Prothesima electa, C.K. (*Drassus pumilus*, Bl.) Guernsey.—Woodward.

Prothesima petiverii, Scop.? (*Drassus ater*, Bl.) Herm.—Walker.

Prothesima nigrita, Fabr.? (*Drassus pusillus*, Bl.) Sark.—Collings.

Gnaphosa anglica, Cb. (*Drassus lucifugus*, Bl.) Sark.—Collings.

Drassodes lapidosus, Wlk. (*D. lapidicolens*, Bl.) Sark. Guernsey. Jersey. Herm.—Collings. Woodward. Walker. Warburton.

Drassodes troglodytes, C.K. (*D. clavator*, Bl.) Sark. Jersey.—Collings. Walker.

Drassodes cupreus, Bl. Sark.—Collings.

Drassodes collingii, Bl.* Sark.—Collings.

Drassodes ferrugineus, Bl.* Sark.—Collings.

PHOLCIDÆ.

Pholcus phalangioides, Fuessl. Herm. Guernsey.—Walker.
Luff.

THERIDIIDÆ.

Episinus truncatus, Wlk. (*Theridion angulatum*, Bl.) Sark.
Guernsey.—Collings. Woodward.

Pholcomma gibbum, Wstr. Sark.—Collings.

Steatoda bipunctata, Linn. (*Theridion quadripunctatum*, Bl.)
Guernsey.—Woodward. Warburton.

Crustulina sticta, Cb. Sark. Guernsey.—Collings. Warburton.

Crustulina guttata, Wid. (*Theridion guttatum*, Bl.) Guernsey.—
Warburton.

Asagena phalerata, Panz. (*Theridion signatum*, Bl.) Guernsey.
—Warburton.

Teutana grossa, C.K. (*Theridion versutum*, Bl.) Sark. Guernsey.
—Collings. Luff.

Theridion lineatum, Clk. (*Phyllonethis lineata*, Bl.) Sark.
Guernsey.—Collings. Woodward,

Theridion bimaculatum, Linn. (*Th. carolinum*, Bl.) Sark.—
Collings.

Theridion pallens, Bl. Sark.—Collings.

Theridion pulchellum, Wlk. Jersey.—Walker.

Theridion pictum, Hahn. Jersey.—Walker.

Theridion varians, Hahn. Sark.—Collings.

Pedanostethus lividus, Bl. (*Neriene livida*, Bl.) Sark.—Collings.

Enoplognatha thoracica, Hahn. (*Neriene albipunctata*, Cb.)
Guernsey.—Warburton.

Floronia bucculenta, Clk. (*Linyphia frenata*, Bl.) Guernsey.—
Warburton.

Linyphia clathrata, Sund. (*Neriene marginata*, Bl.) Sark.—
Collings.

Linyphia triangularis, Clk. (*L. montana*, Bl.) Guernsey.—Luff.
Woodward.

Labulla thoracica, Wid. (*Linyphia cauta*, Bl.) Sark.—Collings.

Stemonyphantes lineatus, Linn. (*Neriene trilineata*, Bl.) Sark.
Guernsey.—Collings. Luff.

- Lepthyphantes tenuis**, Bl. (*Linyphia tenuis*, Bl.) Guernsey.—
Woodward. Warburton.
- Lepthyphantes obscurus**, Bl. (*Linyphia obscura*, Bl.) Sark.—
Collings.
- Peociloneta variegata**, Bl. (*Neriena variegata*, Bl.) Sark.—
Collings.
- Bathyphantes concolor**, Wid. (*Theridion filipes*, Bl.) Sark.—
Collings.
- Centromerus bicolor**, Bl. (*Neriene bicolor*, Bl.) Sark.—Collings.
- Micryphantes flavipes**, Bl. (*Neriene flavipes*, Bl.) Sark.—Collings.
- Erigone atra**, Bl. (*Neriene longipalpis*, Bl.) Sark.—Collings.
- Erigone dentipalpis**, Wid. (*Neriene dentipalpis*, Cb.) Sark.—
Collings.
- Erigone graminicola**, Bl. (*Neriene graminicola*, Bl.) Sark.—
Collings.
- Tiso vagans**, Bl. (*Neriene vagans*, Bl.) Sark.—Collings.
- Gonatium isabellinum**, C.K. (*Neriene rubella*, Bl.) Sark.—
Collings.
- Kulczynskiellum fuscum**, Bl. (*Neriene fusca*, Bl.) Sark.—Col-
lings.
- Kulczynskiellum agrestis**, Bl. (*Neriene agrestis*, Bl.) Sark.—Col-
lings.
- Diplocephalus cristatus**, Bl. (*Walkenaera cristata*, Bl.) Sark.—
Collings.
- Maso sundevallii**, Westr. (*Neriene sundevallii*, Cb.) Sark.—
Collings.

EPEIRIDÆ.

- Pachygnatha degeerii**, Sund. Sark. Guernsey. — Collings.
Walker. Warburton.
- Tetragnatha extensa**, Linn. Sark. Guernsey. — Collings.
Walker. Luff.
- Tetragnatha solandri**, Scop. Guernsey.—Luff.
- Meta segmentata**, Clk. (*Epeira inclinata*, Bl.) Sark. Guernsey.
—Collings. Woodward.
- Meta merianæ**, Scop. (*Epeira antriada*, Bl.) Sark. Guernsey.—
Walker. Warburton.
- Meta merianæ**, (var. *Celata*, Bl.) Sark.—Collings.
- Zilla x-notata**, Clk. (*Epeira similis*, Bl.) Guernsey.—Woodward.
Luff.

- Zilla atrica**, C.K. (*Epeira calophylla*, Bl.) Sark. Jersey.—Collings. Walker.
- Cercidia prominens**, Wstr. (*Epeira bella*, Bl.) Sark.—Collings.
- Epeira adianta**, Wlk. Sark. Guernsey.—Collings. Warburton. Luff.
- Epeira acalypha**, Wlk. Guernsey.—Warburton. Luff.
- Epeira diademata**, Clk. (*Epeira diadema*, Bl.) Sark. Guernsey.—Collings. Luff.
- Epeira redii**, Scl. (*Epeira sclers*, Bl.) Sark. Jersey.—Collings. Walker.
- Epeira cornuta**, Clk. (*Epeira apoclisa*, Bl.) Jersey.—Walker.
- Epeira diversa**, Bl.* Sark.—Collings.

THOMISIDÆ.

- Xysticus erraticus**, Bl. (*Thomisus erraticus*, Bl.) Sark. Guernsey. Jersey.—Collings. Woodward. Warburton. Walker.
- Xysticus cristatus**, Clk. (*Thomisus cristatus*, Bl.) Sark. Jersey. Guernsey.—Collings. Walker. Luff.
- Xysticus bifasciatus**, C.K. (*Thomisus bifasciatus*, Bl.) Alderney.—Walker.
- Oxyptila praticola**, C.K. (*Thomisus incertus*, Bl.) Sark. Alderney. Guernsey.—Collings. Woodward. Warburton.
- Oxyptila atomaria**, Panz. (*Thomisus versutus*, Bl.) Sark.—Collings.
- Misumena vatia**, Clk. (*Thomisus citreus*, Bl.) Jersey.—Walker.
- Diaea dorsata**, Fabr. (*Thomisus flavicolens*, Bl.) Sark.—Collings.
- Philodromus cespiticolis**, Wlk. Sark. Guernsey.—Collings. Luff.
- Philodromus aureolus**, Clk. Sark. Guernsey.—Collings. Luff.

SPARASSIDÆ.

- Micrommata virescens**, Clk. (*Sparassus smaragdulus*, Bl.) Sark. Collings.

CLUBIONIDÆ.

- Micaria pulicaria**, Sund. (*Drassus nitens*, Bl.) Sark. Guernsey. Collings. Warburton.
- Micaria scintillans**, Cb. Sark.—Collings (O.P.C.)
- Micariosoma festivus**, C.K. (*Drassus propinquus*, Bl.) Guernsey.—Woodward. Warburton.
- Clubiona brevipes**, Bl. Sark.—Collings.

Clubiona terrestris, Wstr. (*Clubiona amarantia*, Bl.) Sark.
Jersey.—Collings. Walker.

Clubiona phragmitis, C.K. (*Clubiona holosericea*, Cb.) Guernsey.
—Luff.

Chiracanthium erraticum, Wlk. (*Clubiona erratica*, Bl.) Guernsey.—Warburton.

AGELENIDÆ.

Tegenaria atrica, C.K. Sark. Guernsey.—Collings. Woodward. Warburton.

Tegenaria parietina, Frc. (*Tegenaria domestica*, Bl.) Sark.—Collings.

Tegenaria domestica, Clk. (*T. civilis*, Bl.) Sark.—Collings.

Hahnia elegans, Bl. (*Agelena elegans*, Bl.) Sark.—Collings.

LYCOSIDÆ.

Lycosa cinerea, Fabr. (*Lycosa allodroma*, Bl.) Sark.—Collings.

Lycosa picta, Hahn. Sark.—Collings.

Lycosa ruricola, Deg. (*Lycosa campestris*, Bl.) Guernsey.—Woodward.

Lycosa terricola, Thor. (*Lycosa agretyca*, Bl.) Sark. Guernsey.—Collings. Walker.

Lycosa pulverulenta, Clk. (*Lycosa rapax*, Bl.) Sark.—Collings.

Lycosa accentuata, Latr. (*Lycosa andrenivora*, Bl.) Sark.—Collings.

Lycosa trabalis, Clk. Guernsey.—Warburton.

Pardosa monticola, C.K. (*Lycosa exigua*, Bl. in part). Sark. Jersey. Guernsey.—Collings. Walker. Luff.

Pardosa palustris, Linn. (*Lycosa exigua*, Bl. in part). Sark. Jersey.—Collings. Walker.

Pardosa herbigrada, Bl. Guernsey.—Woodward.

Pardosa saccigera.* Sark.—Collings.

Pardosa nigriceps, Thor. Guernsey.—Woodward. Warburton. Luff.

Pardosa amentata, Clk. (*Lycosa saccata*, Bl.) Sark. Guernsey. Collings. Woodward.

Pardosa pullata, Clk. (*Lycosa obscura*, Bl.) Guernsey.—Walker. Woodward.

Pirata hygrophilus, Thor. (*Lycosa piscatoria*, Bl.) Guernsey.—Woodward.

- Pirata piraticus**, Clk. (*Lycosa piratica*, Bl.) Guernsey.—Walker.
Pisaura mirabilis, Clk. (*Dolomedes mirabilis*, Bl.) Sark. Jersey.
 Guernsey.—Collings. Walker. Luff.

ATTIDÆ.

- Salticus formicarius**, De Geer. (*Attus formicarius*, Bl.) Guernsey.—Luff. Marquand.
Epiblemum scenicum, Clk. (*Salticus scenicus*, Bl.) Sark. Guernsey. Jersey.—Collings. Woodward. Walker.
Heliophanus cambridgii, Sim. Sark. Guernsey.—Collings. Warburton.
Heliophanus cupreus, Wlk. (*Salticus cupreus*, Bl.) Sark. Guernsey.—Collings. Woodward.
Heliophanus flavipes, C.K. (*S. cupreus*, Bl. in part). Sark.—Collings.
Marptusa muscosa, Clk. (*Salticus tardigradus*, Bl.) Sark.—Collings.
Euophrys frontalis, Wlk. (*Salticus frontalis*, Bl.) Guernsey.—Woodward. Luff.
Neon reticulatus, Bl. (*Salticus reticulatus*, Bl.) Sark.—Collings. (O.P.C.)

The names printed in italics with Bl., Cb., are those under which the species are noted or described in "Spiders of Great Britain and Ireland," by John Blackwall; and "Spiders of Dorset," by Rev. O. Pickard-Cambridge. Those marked with an asterisk are of doubtful value as species.

SPECIES TAKEN IN OR NEAR ST. MALO BY THE LATE
 MR. F. WALKER.

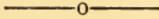
- Tegenaria alpestris**.
Oxyptila praticola, C.K. (*Thomisus incertus*, Bl.)
Oxyptila atomaria, Panz. (*Thomisus pallidus*, Bl.)
Theridion bimaculatum, Linn. (*Th. carolinum*, Bl.)
Lepthyphantes tenuis, Bl. (*Linyphia tenuis*, Bl.)
Epeira acalypha, Wlk.

October, 1894.

F. O. P. C.

THE ALGÆ OF GUERNSEY.

BY MR. E. D. MARQUAND, PRESIDENT.



THE popular term "Seaweed" is so universally understood that it is unnecessary to define what is meant by it. Thousands of persons who have very vague notions indeed as to what lichens are, and who have probably never heard of Liverworts and Scale Mosses, know in a moment what seaweeds are. These "flowers of the ocean" have become favourites with multitudes of men and women who have neither leisure nor inclination to master the technicalities of science, serving to recall many a pleasant holiday spent at the seaside,—because in a greater degree than any other tribe of plants they may be easily and permanently preserved, so as to retain for an indefinite period the graceful forms and lovely tints which so pre-eminently characterize them.

They belong to that immense class of flowerless plants known in science as *Algæ*; but it is well to bear in mind that although all seaweeds proper are algæ, all algæ are not seaweeds in the strict sense of the word. Under this term is comprised a very large section composed of plants inhabiting ponds and streams, bogs and ditches, and in fact wet places generally; these are called the Fresh Water Algæ. And further there are included two extensive divisions of purely microscopical plants, of which the Desmids are confined to fresh water exclusively; whilst the Diatoms are found all over the globe in a living state wherever there is pure standing or running water of any kind, fresh, salt or brackish.

It is not my intention to say anything about the Diatoms to-day, because I read a paper on the subject before this Society twelve months ago, and a list of 322 species indigenous to Guernsey was published in the last number of our *Transactions*. What I wish to do now is to direct your attention to the three other groups: the Seaweeds proper, the Fresh Water Algæ, and the Desmids. And I may just mention in passing that these present lists will complete the task I set myself to accomplish six years ago, viz.: the

recording of the entire indigenous flora of Guernsey, phanero-gamic and cryptogamic, with the exception of the Fungi.

Only two published lists of the seaweeds of this island have come within my knowledge. The first is to be found in the "Phytologist," first series, vol. I., where the late Dr. R. K. Greville, the eminent algologist, communicates a list of eighty-three species forming a collection made in Guernsey in 1841 by Mr. D. Ross, of Lasswade. Dr. Greville explains that this gentleman "not being an algologist, merely took such species as came in his way; and this will account," he goes on to say, "for the absence from the list of various common plants, as well as of a large number of species which have such a general resemblance to each other as to cause them to be passed over by individuals unacquainted with their forms."

Dr. Greville's list, compiled more than fifty years ago, is naturally of very great interest to us now; its only defect is that no habitats are given. However, I am happily able to supply this deficiency, having myself collected all the species enumerated except three, viz. :—

Desmarestia viridis,
Dictyosiphon fœniculaceus and
Rytiphlæa pinastroides.

The second list of Guernsey seaweeds is that contained in the second edition of Ansted's "Channel Islands," at page 191. It is a bare catalogue of names, contributed by Miss Le Lièvre, and comprises 123 species, not 223 as erroneously stated in the summary of the flora given on page 198. Thirteen of these I have not up to the present been able to discover on this coast. I give their names, though as regards some of them it would be advisable to have confirmatory evidence of their occurrence before permanently placing them on record.

<i>Cystoseira barbata</i> .	<i>Nitophyllum</i> Gmelini.
<i>Fucus ceranoides</i> .	<i>Kallymenia</i> Dubyi.
<i>Sporochnus pedunculatus</i> .	<i>Ceramium flabelligerum</i> .
<i>Cutleria multifida</i> .	<i>Callithamnion arbuscula</i> .
<i>Sphacelaria sertularia</i> .	<i>Callithamnion roseum</i> .
<i>Ectocarpus mertensii</i> .	<i>Cladophora repens</i> .
<i>Dasya venusta</i> .	

The exceeding richness of Guernsey in the matter of seaweeds will be apparent on a careful study of the subjoined list, which comprises a remarkable number of rarities; and many of these attain a luxuriance of growth and development quite unknown on the English coasts.

In the course of my researches it has been my good

fortune to discover four species which are entirely new to the British flora. These are

Streblonema Zanardinii,
Polysiphonia opaca,
Liebmannia Leveillei and
Lithophyllum expansum.

For the identification of these novelties, as well as for an immense amount of help in the determination of critical and puzzling forms, I am indebted to the kindness of Mr. E. M. Holmes, F.L.S.

A great deal, however, still remains to be done among the seaweeds of Guernsey before anything approaching an exhaustive list can be compiled. My own work has been chiefly done at intervals during the summer and autumn months, and consequently many winter and spring species have escaped me. And then again only a portion of the coast has been at all carefully investigated. The entire western half of the island remains practically unexamined, that is to say, the part lying to the westward of Cobo on the north and Petit Bot Bay on the south, and also the Vale coast between Grandes Rocques and Bordeaux. When it is borne in mind that certain seaweeds are excessively local, confined sometimes to one small cove, or even to a single rockpool, it is very clear that a great many additions are still to be made to the present list by close and persistent research. Moreover, it is well known that some species are very uncertain in their appearance, occurring in abundance perhaps during one season, and then disappearing for years. But one thing, however, may be affirmed; no more delightful and productive field for the algologist is to be found on the British shores, than this little rockbound island of Guernsey.

And now a word with regard to the Fresh Water representatives of the group. It is customary to treat separately and keep in distinct divisions the algæ growing in the sea, and those inhabiting fresh water and damp ground. And although this arrangement is a very convenient one, it should always be distinctly remembered that it is purely artificial. No natural line of demarcation exists between the two. Several genera include both marine and fluviatile species, and in brackish pools plants normally belonging to both divisions will often be found growing together.

That Guernsey is not particularly rich in these lowly forms of plant life is not at all surprising when we call to mind its physical features. And yet I confess to a general sense of disappointment at the paucity of species occurring in what are to all appearance promising habitats.

At first I imagined that this was due to the fact that on a small wind-swept island like this all marshes and ditches must to a certain extent be impregnated with salt, and also that the likeliest spots, especially at the north and north-west, are situated on land that was until comparatively recent times covered by the sea. But on further reflection, and bringing to bear on the point an experience of several years in this same field of work in the Land's End district of Cornwall—itsself almost an island—I incline to think the scarceness of Fresh Water Algæ in general, and more particularly of Desmids, is due to another cause, viz. : the natural drainage of highly-manured land, and the pollution of cattle. And this view is favoured by the generally poor and unhealthy condition and feeble growth for the most part of such species as I am about to record.

Be this as it may, however, the collector of Fresh Water Algæ will not find here a very productive hunting ground. The most attractive spot, the most promising piece of ground in the whole island—Grande Mare, the home of so many rare flowering plants—is extremely poor in the matter of algæ. Very few species occur in quantity, and even these comparatively common ones are seldom found in a state of fructification. Many filamentous fresh water algæ are perplexingly alike in a barren state, and can only be identified with certainty after an examination of the fruit ; hence I have been obliged to omit from my list a considerable number which I could not name with confidence, although recognising them as new. I have in mind a very similar piece of boggy ground in Cornwall, about the size of Grande Mare, and equally close to the sea, which was amazingly rich in algæ. A single gathering of Desmids once yielded me no less than sixty-eight species ; and in all I have collected in that same marsh considerably over one hundred different forms ; whereas repeated gatherings from Grande Mare, selected and examined with great care, have scarcely produced half-a-dozen Desmids, and these mostly in poor condition.

I think it well to record my experience on this point, because it is certainly as instructive to learn that a given district is deficient in some branches of its fauna and flora, as it is to know that it is more than usually productive in others. Guernsey is as I have said exceedingly rich in seaweeds, but that is no reason at all why it should be relatively so poor in the fresh water algæ. If these remarks should induce other students to carry on investigations with a view to discover the true cause my aim will have been fully attained.

It will facilitate future reference if I state here that the number of species enumerated in the subjoined list is as follows: Seaweeds, 236; Fresh Water Algæ, 43; Desmids, 9; which with the 322 Diatoms published last year, makes a total altogether of 610 algæ recorded for Guernsey in the *Transactions* of this Society.

In the marine section I have closely followed the order and the names used in Messrs. Holmes and Batters' "Revised List of British Marine Algæ," published in December, 1892, inserting in brackets the more familiar names of Harvey's *Phycologia Britannica*, whenever necessary.

SEAWEEDS.

- Pleurocapsa amethystea**, *Rosen.* Parasitic on *Cladophora rupestris*.
Petit Port. This species has only recently been added to the British flora.
- Oscillaria corallinæ**, *Gom.* Bordeaux.
- Lyngbya semiplena**, *J. Ag.* (*Calothrix cæspitula*). Petit Port. Cobo. St. Martin's Point. Fermain.
- L. majuscula**, *Harv.* Cobo; common in some of the pools at high water mark.
- Symploca hydroides**, *Kutz.* (*Calothrix semiplena*). Fermain, common on corallines near high water mark. Grandes Rocques. Cobo, frequent.
- Calothrix confervicola**, *C. Ag.* Common in autumn on all parts of the coast.
- C. scopulorum**, *C. Ag.* Lihou Island. Cobo. Bec-du-Nez.
- Isactis plana**, *Thur.* Vazon.
- Rivularia Biosolettiana**, *Meneg.* (*Schizosiphon Warreniæ*). Rock pools at high water mark, Fermain Point. Dripping cliff, Petit Port.
- R. atra**, *Roth.* Common.
- R. nitida**, *C. Ag.* (*R. plicata*, Ph. Br.) On wet rocks in a cave, Petit Port.
- R. bullata**, *Berk.* (*R. nitida*, Ph. Br.) Common all round the coast.
- Anabaena torulosa**, *Lag.* (*Sphærozyga Carmichaelii*). Cobo; frequent in pools at half-tide level.
- Enteromorpha clathrata**, *J. Ag.* Belgrave Bay. Bordeaux. St. Martin's Point. Grandes Rocques.
- E. percursa**, *C. Ag.* Brackish pool at Pulias.
- E. ramulosa**, *Harv.* Bordeaux.
- E. compressa**, *Grev.* Very common.
- E. Linza**, *J. Ag.* (*Ulva*). Found all round the coast; usually abundant where it occurs.
- E. intestinalis**, *Link.* Common, especially in brackish ditches.
- Ulva latissima**, *J. Ag.* Very common.
- Chaetomorpha tortuosa**, *Kutz.* (*Conferva*). Petit Port. Bec-du-Nez. La Vallette.
- C. crassa**, *Kutz.* (*Conferva linum*). Rock pools near Bec-du-Nez.
- C. ærea**, *Kutz.* Common.
- C. baltica**, *Kutz.* Bordeaux. A very recent addition to the British flora.
- Rhizoclonium tortuosum**, *Kutz.* (*Conferva implexa*). Petit Bot. Moulin Huet.

- Cladophora pellucida**, *Kutz.* Cobo. Petit Port. Vazon.
C. diffusa, *Ph. Br.* Frequent all round the coast.
C. lætevirens, *Ph. Br.* Not uncommon.
C. rupestris, *Kutz.* Common.
C. flexuosa, *Griff.* Fermain. Rocquaine.
C. fracta, *Kutz.* Brackish pool at Pulias ; a curious state of the plant.
C. flavescens, *Kutz.* Pulias pool.
C. albida, *Kutz.* Bec-du-Nez.
C. refracta, *Ph. Br.* All round the coast.
C. arcta, *Kutz.* Bec-du-Nez. Cobo.
Bryopsis hypnoides, *Lam.* Not uncommon ; occurs all round the coast.
B. plumosa, *C. Ag.* Moulin Huet. Bordeaux. Spur Point.
Codium adhærens, *C. Ag.* Saints' Bay, spreading over the vertical face of a rock at low water mark.
C. tomentosum, *Stack.* Very common.
Desmarestia aculeata, *Lam.* Specimens washed up all round the coast.
D. ligulata, *Lam.* Rather common ; grows luxuriantly at Cobo and at Petit Bot.
Litosiphon pusillus, *Harv.* Fermain. Belgrave Bay. Bordeaux.
Punctaria latifolia, *Grev.* Petit Bot.
P. plantaginea, *Grev.* Cobo.
Myriotrichia filiformis, *Ph. Br.* Common.
Asperococcus echinatus, *Grev.* Belgrave Bay, plentiful.
A. bulbosus, *Lam.* (A. Turneri). Rocquaine, in pools near the Trinity Houses.
Streblonema fasciculatum, *Thur.* Parasitic on *Castagnea virescens*, Fermain.
S. velutinum, *Thur.* (Elachista). Cobo.
S. Zanardinii, *Cm.* Parasitic on *Chylo. kaliformis* ; Belgrave Bay, not uncommon. Fermain, one specimen. New to Britain. (*Ectocarpus parasiticus*, *Saw.?*)
Ectocarpus pusillus, *Harv.* Petit Port.
E. virescens, *Thur.* In several places between Fermain Point and Jerbourg.
E. secundus, *Kutz.* Cobo.
E. confervoides, *Le Jol.* (*E. siliculosus*). Common.
E. fasciculatus, *Harv.* Cobo. Fermain. Petit Bot. Bordeaux.
E. granulosus, *C. Ag.* Petit Port.
E. tomentosus, *Lyng.* Not uncommon all round the coast.
Pylaiella litoralis, *Kjell.* (*Ectocarpus*). Common.
Myriaetis pulvinata, *Kutz.* (*Elachista attenuata*). Bordeaux. Fermain. Lihou Island.
Elachista stellulata, *Aresch.* Fermain, on *Dictyota*.
E. seutulata, *Duby.* Fermain. Grandes Rocques. Bordeaux.
E. flaccida, *Aresch.* Grandes Rocques. Petit Port.
E. fucicola, *Fries.* Common.
Sphacelaria radicans, *Harv.* Vazon Bay.
S. cirrhosa, *C. Ag.* Very common.
Cladostephus spongiosus, *C. Ag.* Here and there on the south coast.
C. verticillatus, *C. Ag.* Common.

- Halopteris filicina**, *Kutz.* (Sphacelaria). Moulin Huet. Petit Bot. Vazon. Petit Port. L'Ancrese Bay, washed up.
- Stypocaulon scoparium**, *Kutz.* (Sphacelaria). Common.
- Myrionema strangulans**, *Grev.* Common.
- M. punctiforme**, *Havn.* On *Ceramium rubrum*. Belgrave Bay. Rocquaine.
- Aseocyclus Leleacherii**, *Mag.* (Myrionema). Rather common.
- Ralfsia clavata**, *Crn.* Fermain, on limpets. Bordeaux. L'Ancrese Bay. Vazon.
- R. verrucosa**, *Aresch.* (*R. deusta*). Moulin Huet. Cobo. Grandes Rocques. Petit Bot, with plurilocular sporangia.
- Stilophora rhizodes**, *J. Ag.* Cobo. Grandes Rocques.
- Chordaria flagelliformis**, *C. Ag.* Cobo. Lihou Island.
- Mesogloea vermiculata**, *Le Jol.* Petit Bot. Cobo. Fermain. Bordeaux.
- Liebmannia Leveillei**, *J. Ag.* Bordeaux, one specimen. New to Britain.
- Castagnea virescens**, *Thur.* (*Mesogloia*). Fermain. Cobo. Rocquaine. Vale coast behind Rouse Tower.
- Petrospongium Berkeleyi**, *Nag.* (*Leathesia*). All round the coast at extreme low water mark.
- Leathesia difformis**, *Aresch.* (*L. tuberiformis*). Common.
- Phyllitis Fascia**, *Kutz.* (*Laminaria*). L'Ancrese Bay, in shallow rock pools at mid-tide level.
- Seytosiphon lomentarius**, *J. Ag.* (*Chorda*). Generally distributed but rather rare.
- Chorda filum**, *Stack.* Common.
- Laminaria saccharina**, *Lam.* Common.
- L. digitata**, *Edm.* Common.
- Saccorhiza bulbosa**, *De la Pyl.* (*Laminaria*). Common.
- Aglaozonia reptans**, *Kutz.* (*Zonaria parvula*). Bordeaux. Vazon.
- Zanardinia collaris**, *Crn.* (*Zonaria*). Vazon.
- Fucus vesiculosus**, *Linn.* Frequent.
- F. serratus**, *Linn.* Common.
- Ascophyllum nodosum**, *Le Jol.* (*Fucus*). Generally distributed and common.
- Pelvetia canaliculata**, *Dene.* (*Fucus*). Common.
- Bifurcaria tuberculata**, *Stack.* (*Pycnophycus*). Frequent all round the coast.
- Himanthalea lorea**, *Lyng.* Common.
- Halidrys siliquosa**, *Lyng.* Common.
- Cystoseira ericoides**, *C. Ag.* Occurs all round the coast in rock pools, but not very commonly.
- C. granulata**, *C. Ag.* Cobo. L'Ancrese Bay.
- C. discors**, *C. Ag.* (*C. fœniculacea*). Fermain. Bordeaux. Lihou Island. L'Erée. Cobo.
- C. fibrosa**, *C. Ag.* Common.
- Dietyota dichotoma**, *Lam.* Common. Var. *implexa*, *J. Ag.* (*intricata*, Ph. Br.) Bordeaux. Moulin Huet. Petit Port.
- Padina pavonia**, *Gail.* Cobo. Grandes Rocques. Rocquaine.
- Dietyopteris polydoides**, *Lam.* (*Haliseris*). Fermain. Coast by Rouse Tower.
- Erythrotrichia carnea**, *J. Ag.* (*Bangia ceramicola*). Near Bec-du-Nez on a plant of *Ceramium ciliatum* at extreme low water mark.

- Porphyra laciniata**, *C. Ag.* Common.
- P. linearis**, *Grev.* (*P. vulgaris*). With the last.
- Chantransia Daviesii**, *Thur.* (Callithamnion). Saints' Bay. Petit Bot. Fermain. Bec-du-Nez. Lihou Island.
- C. luxurians**, *Thur.* On limpets in mid-tide pools, St. Martin's Point.
- Helminthocladia purpurea**, *J. Ag.* (Nemaleon). Petit Bot. Moulin Huet.
- Helminthora divaricata**, *J. Ag.* (Dudresnaia). Saints' Bay. Petit Port. Spur Point.
- Seinaia furcellata**, *Biv.* (Ginnania). Moulin Huet. Very fine specimens washed up in l'Anresse Bay.
- Naccaria Wiggii**, *Endl.* Rocquaine.
- Pterocladia capillacea**, *Born.* (Gelidium). Spur Point.
- Gelidium corneum**, *Lam.* Var. *pulchellum*. Common. Var. *plumula*. Bordeaux. Var. *latifolia*. Bordeaux. Var. *setaceum*. Fermain.
- Chondrus crispus**, *Stack.* Very common.
- Gigartina pistillata**, *Stack.* Petit Bot. Moulin Huet. Petit Port.
- G. acicularis**, *Lam.* Rather common all round the coast.
- G. mamillosa**, *J. Ag.* Generally distributed, but not common.
- Phyllophora rubens**, *Grev.* South coast, frequent. Cobo.
- P. palmettoides**, *J. Ag.* Petit Bot.
- P. membranifolia**, *J. Ag.* Petit Port.
- Gymnogongrus Griffithsia**, *Mart.* Petit Bot.
- G. norvegicus**, *J. Ag.* (*Chondrus*). Fermain. Bec-du-Nez. Moulin Huet. Petit Bot.
- Ahnfeltia plicata**, *Fries.* (*Gymnogongrus*). Frequent.
- Callophyllis laciniata**, *Kütz.* (*Rhodymenia*). Rather common, often washed ashore.
- Callymenia reniformis**, *J. Ag.* Petit Bot. Moulin Huet. L'Anresse Bay.
- Cystoclonium purpurascens**, *Kütz.* (*Hypnæa*). Rather common.
- Catenella opuntia**, *Grev.* Entrance to a cave at Bec-du-Nez, abundant. Causeway to Lihou Island.
- Rhodophyllis bifida**, *Kütz.* (*Rhodymenia*). Rather common.
- R. appendiculata**, *J. Ag.* (*R. bifida*, var. *ciliata*, *Harv.*) Fermain. Cobo. Bordeaux. Bec-du-Nez.
- Sphærococcus coronopifolius**, *Grev.* Fragmentary specimens found washed up at Petit Bot and Bec-du-Nez.
- Graeilaria confervoides**, *Grev.* Frequent.
- Calliblepharis ciliata**, *Kütz.* (*Rhodymenia*). Fermain. Bordeaux. L'Anresse Bay.
- C. jubata**, *Kütz.* Here and there all round the coast.
- Rhodymenia palmata**, *Grev.* Very common. Var. *Sarniensis*. Several places on the Vale coast. Var. *sobolifera*. Fermain. Bec-du-Nez.
- R. palmetta**, *Grev.* Petit Bot. Fermain. L'Anresse Bay.
- Lomentaria articulata**, *Lyng.* (*Chylocladia*). Common.
- L. clavellosa**, *Gail.* (*Chrysomenia*). Cobo. Bordeaux. Rocquaine.
- Champia parvula**, *Harv.* Fermain. Petit Bot. Bordeaux. Cobo.
- Chylocladia kaliformis**, *Grev.* Rather common.
- C. ovalis**, *Hook.* Frequent all round the coast.
- C. reflexa**, *Lenorm.* Cobo.

- Plocamium coccineum**, *Lyng.* Occurs in all parts, but not commonly.
- Nitophyllum uncinatum**, *J. Ag.* Bordeaux.
- N. laceratum**, *Grev.* Rather common.
- N. reptans**, *Crn.* Petit Port, growing on Lithothamnion polymorphum.
- N. punctatum**, *Grev.* Cobo. Var. ocellatum. Petit Bot. Cobo. Moulin Huet.
- N. Hilliæ**, *Grev.* Fermain, at extreme low water mark.
- Delesseria alata**, *Lam.* Frequent.
- D. hypoglossum**, *Lam.* Here and there all round the coast, but not common. Usually a pale narrow form.
- D. ruscifolia**, *Lam.* Common.
- D. sinuosa**, *Lam.* Petit Bot. Vazon. L'Ancrese Bay. Cast up at Moulin Huet in great abundance.
- D. sanguinea**, *Lam.* Frequently washed up; growing specimens mostly small.
- Bonnemaisonia asparagoides**, *C. Ag.* A small specimen washed in at Petit Bot Bay.
- Rhodomela subfusca**, *C. Ag.* Fermain. Bordeaux. Grandes Rocques.
- Laurencia obtusa**, *Lam.* Cobo. Rocquaine. Bordeaux. Fermain.
- L. hybrida**, *Lenorm.* (*L. cæspitosa*). Common.
- L. pinnatifida**, *Lam.* Very common.
- Chondria tenuissima**, *C. Ag.* (*Laurencia*). Belgrave Bay, plentiful. Cobo.
- C. dasyphylla**, *C. Ag.* Fermain. Petit Bot. Vale coast. Cobo.
- Polysiphonia sertularioides**, *J. Ag.* (*P. pulvinata*). Petit Port. Spur Point.
- P. fibrata**, *Harv.* Common.
- P. urceolata**, *Grev.* Petit Bot.
- P. violacea**, *Wyatt.* Rather common.
- P. opaca**, *Zan.* Petit Port, in sand at mid-tide level. (*f. simplicior*). New to Britain.
- P. fastigiata**, *Grev.* Common.
- P. simulans**, *Harv.* Fermain. Moulin Huet. Spur Point.
- P. atro-rubescens**, *Grev.* Petit Port. Vazon.
- P. subulifera**, *Harv.* Belgrave Bay, in considerable quantity. Petit Bot.
- P. obscura**, *J. Ag.* Vazon Bay, in crevices of rocks at low water mark.
- P. nigrescens**, *Grev.* Cobo. Petit Port. Fermain.
- P. byssoides**, *Grev.* Frequent all round the coast.
- P. Brodiæi**, *Grev.* Petit Bot. Cobo. Fermain.
- P. thuyoides**, *Harv.* (*Rytiphlæa*). Moulin Huet. Fermain. Petit Port. Vazon.
- P. fruticulosa**, *Spreng.* (*Rytiphlæa*). Common.
- Dasya arbuscula**, *C. Ag.* Fermain. Bec-du-Nez. Cobo.
- D. coccinea**, *C. Ag.* Rather common.
- Sphondylothamnion multifidum**, *Nag.* (*Wrangelia*). Here and there all round the coast.
- Spermothamnion Turneri**, *Aresch.* (*Callithamnion*). Rocquaine. Bordeaux. Fermain. Grandes Rocques.
- Ptilothamnion pluma**, *Thur.* (*Callithamnion*). Petit Bot, on *Laminaria* stems.

- Griffithsia corallina**, *C. Ag.* Rather common.
- G. setacea**, *C. Ag.* Common.
- Halurus equisetifolius**, *Kutz.* (Griffithsia). Cobo. Bordeaux. L'Ancrese Bay. Frequent on the south coast.
- Bornetia secundiflora**, *Thur.* (Griffithsia). Cobo. Moulin Huet. Rocquaine. Bec-du-Nez. Fermain.
- Monospora pedicellata**, *Solier.* (Callithamnion). Frequent all round the coast.
- Pleonosporium Borreri**, *Nag.* (Callithamnion). Fermain. Bec-du-Nez. Petit Port. Petit Bot.
- Rhodoehorton Rotheri**, *Nag.* (Callithamnion). Common.
- R. floridulum**, *Nag.* Petit Port. L'Ancrese Bay.
- Callithamnion Hookeri**, *C. Ag.* Belgrave Bay. Grandes Rocques. Bordeaux. L'Ancrese Bay.
- C. tetragonum**, *C. Ag.* Frequent in the south.
- C. tetricum**, *C. Ag.* Occasional all round the coast.
- C. corymbosum**, *Lyng.* Common.
- C. byssoideum**, *Arn.* Moulin Huet. Cobo. Bordeaux.
- C. granulatum**, *C. Ag.* (*C. spongiosum*). Fermain. Moulin Huet. Petit Bot. Petit Port.
- Composhamnion thuyoides**, *Schm.* (Callithamnion). Fermain.
- Plumaria elegans**, *Bon.* (Ptilota). Common on perpendicular rocks.
- Antithamnion plumula**, *Thur.* (Callithamnion). Vazon, one specimen washed up.
- Crouania attenuata**, *J. Ag.* Common.
- Ceramium tenuissimum**, *J. Ag.* (*C. nodosum*). Rocquaine. Cobo.
- C. Deslongchampsii**, *Chauv.* Bordeaux.
- C. strictum**, *Harv.* Grandes Rocques, on *Zostera*.
- C. diaphanum**, *Roth.* Cobo. Bordeaux. Grandes Rocques.
- C. rubrum**, *C. Ag.* Very common. f. *prolifera* (*C. botryocarpum*). Fermain. Saints' Bay. Cobo. Bordeaux.
- C. echionotum**, *J. Ag.* Common.
- C. acanthotum**, *Carm.* Vazon.
- C. ciliatum**, *Ducl.* Rather common all round the coast.
- Microcladia grandulosa**, *Grev.* Moulin Huet. Bec-du-Nez.
- Gloiosiphonia capillaris**, *Carm.* Cobo.
- Halymenia ligulata**, *C. Ag.* L'Ancrese Bay, washed up.
- Grateloupia filicina**, *C. Ag.* Bordeaux. Petit Bot. f. *intermedia*. Moulin Huet.
- Dumontia filiformis**, *Grev.* Moulin Huet. Fermain.
- Dudresnaya coccinea**, *Bon.* Rocquaine.
- Dilsea edulis**, *Stack.* (Iridæa). Moulin Huet. Fermain. Bordeaux.
- Furcellaria fastigiata**, *Lam.* Rather common.
- Polyides rotundus**, *Grev.* Bec-du-Nez. Petit Bot.
- Petrocelis cruenta**, *J. Ag.* (*Cruoria pellita*). Fermain.
- Peyssonelia Dubyi**, *Dene.* Fermain. Bordeaux. Petit Bot.
- Hildenbrandtia prototypus**, *Nard.* (*H. rubra*). Common.
- Schmitziella endophlœa**, *Born. et Batt.* On *Cladophora pellucida*. Petit Port. Vazon.

- Melobesia corticiformis**, *Kutz.* On Rhod. palmata and on stems of Clad. pellucida: Fermain. Cobo. Petit Bot. L'Ancrese Bay.
- M. membranacea**, *Lam.* Fermain, on Rhod. palmata.
- M. verrucata**, *Lam.* Fermain. Cobo. Vazon.
- M. Le Jolisii**, *Rosan.* On Zostera. Vazon. Petit Port.
- M. pustulata**, *Lam.* Cobo. Fermain. Petit Port.
- M. Laminariæ**, *Crn.* Fermain. Bordeaux.
- M. Corallinæ**, *Crn.* Petit Bot.
- M. sp.** I have found at Petit Bot and also at Vazon a species approaching *M. cystoseiræ*, *Hauck.* but it has not yet been satisfactorily determined.
- Lithothyllum lichenoides**, *Phil.* (Melobesia). Common.
- L. Lenormandi**, *Rosan.* Common.
- L. expansum**, *Phil.* Fermain. Bordeaux. L'Ancrese Bay. Vazon. New to Britain.
- Lithothamnion polymorphum**, *Ares.* (Melobesia). Common.
- L. intermedium**, *Kjellm.* Bordeaux. Petit Bot. Vazon. A very recent addition to the British flora.
- Corallina officinalis**, *Linn.* Common.
- C. squamata**, *Ellis.* Common.
- C. rubens**, *Ellis.* (*Jania*). Rather common.
- C. corniculata**, *Ellis.* Cobo. Petit Bot. Rocquaine.

FRESH-WATER ALGÆ.

- Pleurococcus vulgaris**, *Meneg.* Common on tree trunks and shaded walls.
- Glæocystis rupestris**, *Rab.* At the foot of the cliffs at Petit Port.
- Porphyridium cruentum**, *Nag.* Common on damp ground and at the base of walls.
- Rhaphidium falcatum**, *Rab.* Grande Mare.
- Chlorococcum gigas**, *Grun.* Grande Mare.
- Scenedesmus obtusus**, *Meyen.* Grande Mare.
- S. quadricauda**, *Breb.* Abundant in a water-tank in my greenhouse.
- Pediastrum ellipticum**, *Ralfs.* Grande Mare.
- P. Boryanum**, *Twrp.* Saints' Bay Valley, abundant. Pool by Fort Doyle.
- Cœlastrum sphæricum**, *Nag.* Grande Mare.
- Characium ornithocephalum**, *Br.* Saints' Bay Valley, on algæ.
- Zygnema cruciatum**, *Vauch.* Grande Mare.
- Z. anomalum**, *Ralfs.* Grande Mare.
- Spirogyra bellis**, *Hass.* Grande Mare.
- S. porticalis**, *Vauch.* Roadside near Vazon.
- Mesocarpus nummuloides**, *Hass.* Grande Mare.
- Vaucheria sessilis**, *Vauch.* Moulin Huet Valley.
- Conferva bombycina**, *Ag.* Moulin Huet.
- Cladophora glomerata**, *Linn.* In streamlets near Ivy Castle and near Hougue du Pommier.
- Bulbochæte setigera**, *Ag.* On submerged reed stems, Grande Mare.
- B. pygmæa**, *Wittr.* Grande Mare.
- Ulothrix radicans**, *Kutz.* Base of shaded walls about St. Martin's.
- Chroolepus aureus**, *Linn.* Common on old walls and tree trunks.

- Stigeoclonium tenue**, *Ag.* Moulin Huet Cascade. Stream behind Ivy Castle.
- Chætophora tuberculosa**, *Roth.* Plentiful in a water trough at the Corbière.
- C. endivæfolia**, *Ag.* In pools, Grande Mare.
- Chroococcus turgidus**, *Nag.* Grande Mare.
- Merismopedia glauca**, *Nag.* Saints' Bay Valley, plentiful.
- Nostoe commune**, *Vauch.* Not common.
- N. verrucosum**, *Vauch.* Abundant in streamlet flowing into Saints' Bay Valley from La Fosse.
- Cylindrospermum macrospermum**, *Kutz.* In a water trough at Le Casrouge.
- Oscillaria tenerrima**, *Kutz.* Petit Port, at base of cliffs.
- O. tenuis**, *Ag.* In a water trough in Saints' Bay Valley, and in one near St. Peter's Church.
- O. limosa**, *Ag.* Roadside near St. Sampson's Bridge.
- O. nigra**, *Vauch.* In a water trough at Le Casrouge.
- O. Frohlichii**, *Kutz.* Grande Mare.
- Lyngbya vulgaris**, *Kirch.* Common on damp earth and shaded walls in the autumn.
- Tolypothrix coactilis**, *Kutz.* Grande Mare.
- Rivularia granulifera**, *Carm.* Base of the cliffs at Petit Port.
- Gloitrichia natans**, *Thur.* In pools, Grande Mare.
- G. pisum**, *Thur.* Adhering to submerged plants in pools, Grande Mare.
- Chantrania chalybea**, *Kutz.* On stones in a rivulet behind Les Vaux-belets.
- Batrachospermum moniliforme**, *Roth.* Grande Mare.

DESMIDIACEÆ.

- Leptocystinema Kinahani**, *Arch.* I once found this singular desmid in considerable abundance in a trickling streamlet in the Saints' Bay Valley.
- Cosmarium tetraophthalmum**, *Kutz.* Grande Mare.
- C. margaritiferum**, *Meneg.* Grande Mare.
- C. Botrytis**, *Meneg.* In a water trough at the Corbière. Very scarce.
- Doeidium truncatum**, *Breb.* Grande Mare.
- Closterium Lunula**, *Ehr.* Grande Mare, not uncommon. Saints' Bay Valley.
- C. acerosum**, *Ehr.* Not uncommon in water troughs and wells.
- C. Ehrenbergii**, *Meneg.* With the last, rather common.
- C. Dianæ**, *Ehr.* Grande Mare. Water trough at King's Mills.



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