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JOURNAL

OF THE

Trinidad Field Naturalists' Club.

NATURA MAXIME MIRANDA IN MINIMIS.

VOLUME I

APRIL 1892——FEBRUARY 1894.

MIRROR OFFICE, PORT-OF-SPAIN.

GENERAL INDEX.

ANIMALS, PLANTS, &c. REFERRED TO IN REPORTS OF CLUB MEETINGS.

Vol. 1 – No. 2

Vol. 1. AUGUST, 1892. **No. 3.**

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REPORT OF CLUB MEETINGS.

SEVERAL members of the Club having expressed the opinion that the JOURNAL should contain reports of the Club meetings from its commencement and that the proceedings should always be published in the pages of their official organ, the Publication Committee were very glad when Mr. F. W. Urich offered to furnish the JOURNAL with a synopsis of the work of the Club since its formation. Mr. Urich has performed his task admirably and deserves the thanks of the members for the valuable service he has rendered.

10TH JULY, 1891.

This meeting was held at Mr. Caracciolo's residence for the consideration of the formation of a Society for the study of Natural History. Present: Messrs. H. Caracciolo, R. R. Mole, W. E. Broadway, F. W. Urich, T. J. Potter, G. W. Hewlett, P. L. Guppy, A. Taitt. Mr. Mole was proposed and took the chair. It was decided that a Society for the study of Natural History should be formed, and that it should be called "The Trinidad Field Naturalists' Club." The following 8 Rules were adopted provisionally: 1, One dollar entrance fee; 2, Two shillings monthly subscription; 3, Officers to be elected annually; 4, Papers to be read and criticised; 5, Interesting specimens to be submitted at meetings; 6, Meetings to take place first Saturday in each month; 7, Have field excursions; 8, Candidates for election to be proposed, seconded and carried

by majority of members present. The following officers were unanimously elected: Mr. H. Caracciolo, President; Mr. A. Taitt, Secretary and Treasurer.

5th August, 1891.

Present: Messrs. H. Caracciolo (President), Broadway, Mole, Urich, Potter, Guppy, Scott, Hewlett, Taitt (Secretary) and Professor Vrass as a guest. An excursion to Morrison's Valley, Maraval, on the 22nd instant was announced. The following gentlemen were admitted to the Club: Messrs. H. Ganteaume (corresponding member), C. Walker, W. V. Wilson (ordinary members), Professor E. Vrass (honorary member). A Committee consisting of Messrs. Mole, Urich and Taitt was appointed on Mr. Mole's suggestion for the purpose of getting a place for the meetings. Mr. Urich read a letter from the Secretary of the Zoological Society, London, acknowledging receipt of some snakes and lizards Mr. Mole and himself had sent to the Gardens. It was agreed to subscribe to the Entomological News and the Zoologist. It was decided that notices with respect to the formation of the Club be inserted in the local papers. The following papers were read: "On the Metamorphoses of Insects" by the President. "On the Preservation of Entomological Specimens" by Mr. P. L. Guppy. Mr. Mole exhibited a peculiarly marked lizard from Fort George, which seemed to be an undescribed species at least so far as Trinidad was concerned.

7th September, 1891.

Present: Messrs. Caracciolo (President), Urich, Mole, Broadway, Guppy, Potter, Walker, and Taitt (Secretary). It was agreed that in future meetings should be held at All Saints School-house. Rev. R. H. Moor was admitted as a member. An excursion to Tunapuna on the 21st instant was announced. The following papers were read: "On the Classification of Insects" by Mr. Broadway. "Notes on a Young Constrictor" (Epicrates cenchris) by Mr. Mole, who exhibited the snake in question and fed it before the meeting.

2nd October, 1891.

Present: Messrs. Caracciolo (President), Broadway, Urich, Rev. Moor, Potter, Guppy, and Taitt (Secretary). Mr. Frank St. Claire Gray and Mr. J. R. Murray were admitted as members. Mr. Potter read a paper on the "Habits of the Honey Bee." Rev. Moor described some types of butterflies and moths from the East Indies closely allied to ours. Mr. Guppy exhibited a painting made by him of the Papilio cresphontes. Correspondence relating to specimens forwarded for determination to the

British Museum and the best means suitable for future despatch was read and discussed, when it was finally agreed that all specimens should be sent through the Secretary. Mr. Broadway announced his capture of a dragon fly which was found to be a new genus by the British Museum authorities.

13th November, 1891.

Present: Messrs. Broadway, Mole, Urich, Guppy, Scott, Wilson, Hewlett, and Taitt (Secretary). In the absence of the President Mr. Broadway took the chair. A Committee consisting of Messrs. Caracciolo, Broadway and Mole was appointed for the purpose of framing rules for the guidance of the Club. Mr. W. G. Smith, of Grenada, was admitted to the Club as an honorary member. Mr. Urich read a paper on the "External Anatomy of Insects." An excursion to the Caroni river was announced. Messrs. Mole and Urich placed on the table several copies of an interesting extract from the "Proceedings of the Zoological Society of London" on some snakes and lizards presented by them to the Society, with notes on their habits. Mr. Guppy exhibited a fine collection of butterflies, in which figured some beautiful Heliconier, caught at Matura, and Mr. Mole a large living specimen of the so-called Tarantula, but more properly Mygale, which he stated was very partial to small lizards and cockroaches, and he described its methods when shedding its skin.

4th December, 1891.

Present: Messrs. Caracciolo (President), Mole, Guppy, Urich, Broadway, Hewlett, Wilson, Potter, Murray, and Taitt (Secretary). Professor Warming, of Copenhagen, and Mr. E. Bock, as guests. The following gentlemen were admitted to the Club: Messrs. J. Petersen and J. Hobson as ordinary members, Professor Warming and Messrs. E. Bock, Leomson and Lassen as honorary members. Mr. Caracciolo read a paper on the Urania Leilus and the Prionus Cervicornus. Mr. Urich exhibited a young Epicrates Cenchris, which took mice when presented to it in the fingers. A young Venezuelan Boa Constrictor, shewn by Mr. Mole, killed and devoured a full grown male rat. The process of swallowing greatly interested the members.

23rd December, 1891.

Present: Messrs. Caracciolo (President), Broadway, Mole, Urich, Petersen, and Taitt (Secretary). The following gentlemen were admitted to the Club as members: Messrs. J. Nairn and C. G. Archibald. The draft Rules for the guidance

of the Club were read. It was decided that the Rules should be submitted to the members, and, if assented to, published as early as possible.

8th January, 1892.

Present: Messrs. Caracciolo (President), Mole, Urich, Broadway, Potter, Walker, Scott, Petersen, Hewlett, Nairn, and Taitt (Secretary). The following gentlemen were admitted to the Club as members: Mr. Syl. Devenish, M.A., Professor Carmody and Mr. F. E. Eagle. The draft Rules were read a second time, amended and passed. It was decided to print 100 copies. The Secretary read a letter from the Hon. C. B. Hamilton with reference to a humming bird which had built a nest on a palm (Latania Barbonica) in his drawing room. Letters were also read from Professor Warming and Mr. W. G. Smith of Grenada thanking the Club for their election as honorary members. Mr. Mole announced that he had found a Peripatus Edwarsii in the St. Ann's Valley and Mr. Urich stated that he also had found a specimen of the same species at Arouca. Mr. Hewlett read a paper on the Metamorphoses of Insects (Chiefly Butterflies). An excursion to the St. Ann's Valley on the 23rd instant was announced.

5th February, 1892.

Present: Mr. Caracciolo, Professor Carmody, Messrs. Devenish, Broadway, Potter, Urich, Petersen, Eagle, Archibald and Mole. In the absence of Mr. Taitt Mr. Mole acted as Secretary. The following standing Committees were appointed: Publication: The President, Professor Carmody, Messrs. Devenish and Mole; Finance: The President Messrs Taitt and Broadway. The following gentlemen were admitted to the Club: Mr. J. H. Collens, as member, the Hon. C. B. Hamilton as honorary member. A letter from Mr. J. H. Hart, covering a communication from a London Analytical Chemist, was read. Mr. Devenish made some verbal communications on several curious occurrences connected with Natural History, which he had noticed in his numerous travels about the Island. A discussion on a banana disease ensued, and it was said to be caused by the larva of an insect, in which Messrs. Potter, Urich, Caracciolo and Broadway took part. Mr. Potter produced a specimen of the Trap-door spider with its nest, also a chrysalis found on a cocoa tree. Mr. Broadway exhibited some specimens of Frangipani and Tobacco moths and made some remarks on them. Mr. Petersen showed a collection of snakes. Mr. Potter read the continuation of his paper on the "Habits of the Honey Bee" and the President one on "Some Instances of Protective Mimicry in the Calligo Illioneus and other Lepidoptera" and

illustrated it by prints of the wings of different species. Mr. Carmody showed some specimens of two Sugar Cane Borers and explained several points of interest in connection with them. Mr. Devenish also made some remarks on them.

4th March, 1892.

Present : Messrs. Caracciolo (President), Broadway, Urich, Potter, Murray, Scott, Hewlett, Wilson, Walker, Mole. Petersen, Hobson, Nairne, Eagle and Taitt (Secretary). Mr. E. Gerold was admitted as a resident member. It was decided to send reports of the meetings to the two leading papers of the Island. The President read a letter from Mr. Oldfield Thomas of the British Museum congratulating the Club on the start it had made and offering to compile a list of the Trinidad Mammals as represented in the British Museum for the Club. Mr Thomas' offer was thankfully accepted. Mr. Oldfield Thomas was elected an honorary member. Mr. Broadway exhibited a case of Orthoptera, also a few cocoons of the Ver Palmiste or gru-gru beetle. The President exhibited four Trinidad bats determined by Mr. Oldfield Thomas. Mr. Broadway read a paper on the Mole Cricket (Gryllotalpa Vulgaris) and illustrated it by a case of these insects in all stages of development. Mr. Mole read some extracts on the Huillia (Eunectes Murinus), a living specimen of which was exhibited. A long discussion took place on the Small Sugar Cane Borer in which the President, Messrs, Hobson, Murray and Urich took part. The President finally appointed a Committee consisting of Messrs. Hobson, Murray, Urich, Petersen, and Potter to investigate the question.

1st April, 1892.

Present : Messrs. Caracciolo, Devenish, Carmody, Urich, Scott, Potter, Broadway, Mole, Eagle, Collens, and Taitt (Secretary). A letter was read from Mr. J. H. Hart enclosing a letter from Mr. T. Wardle, of Leek, asking for specimens of Attacus Bolivar. Mr. Urich read a paper on the "Internal Anatomy of Insects." The price of the Journal was fixed at 6d. a copy. Mr. Broadway exhibited a case of parasol ants including winged forms, and a case of dragon flies. Mr. Eagle exhibited a case of rare Trinidad moths, including one that had developed from a caterpillar found on cabbage brought from the United States in a recent ice vessel. Mr. Taitt said that he had that day seen a piece of mahogany from a tree which had been destroyed by a borer which was identical with the sugar cane borer. Mr. Devenish made some remarks relative to a pest which was destroying banana and plantain trees, not only in Trinidad, but in Barbados and in Venezuela. The President exhibited several specimens of a bamboo borer.

6th May, 1892.

Present: Messrs. Caracciolo (President), Broadway, Urich, Eagle, Scott, Petersen and Mole. In the absence of Mr. Taitt, Mr. Mole acted as Secretary. Letters were read from Mr. T. A. D. Cockerell, Jamaica, Professor A. Morgan, Mr. H. Skinner, M.D., Lieut.-Colonel D. Wilson, C.M.G., and the Hon. H. Fowler, all congratulating the Club on the issue of its first journal. The following elections were made. His Excellency Sir F. N. Broome, Messrs A. Lamy, C. J. Thavenot as members. A letter was read from the Secretary to the Commissioners for the Columbian Exposition asking the Club to collect typical specimens of Insects for sending to the Chicago Exhibition. It was decided on the motion of Mr. Scott that the President should endeavour to obtain the use of a room in the Victoria Institute for the Club. Mr. Broadway exhibited a case of beetles and some water snails. Mr. Mole asked whether the time had not arrived to make arrangements for the Conversazione which it was first intended should take place in August. The President postponed this matter to the next meeting.

(To be continued.)

CLUB PAPERS.

EUNECTES MURINUS.

The snake before you was purchased from a Spaniard by Mr. Urich and myself about a fortnight ago. He is, or more probably she is, a young one, and came from Venezuela. The species, however, is found in Trinidad and is known here as the Hcillia. In Brazil it is called the Anaconda, a name which is applied by the Cinghalese, from whom the Portuguese got it, to any large snake, whether of the Old or New World. It is known in some parts of South America as El Troga Venado—"the deer swallower." The Anaconda is only found in South America and Trinidad and there are some highly exaggerated tales about its ferocious habits and enormous size. A French writer says the Anaconda is of brownish tint with a double series of colours extending from the head to the tail; the sides are covered with annular spots with white disks, surrounded by blackish rings: Seba has represented this creature lying in wait for mice. But this is probably the prey of the young Anaconda.

Sir Robert Ker Porter sent the following description with the specimen he presented to the United Service Museum : - " This species is not venomous, nor is it known to injure man, at least not in this part of the New World. However the natives of the plains stand in great fear of it, never bathing in waters where it is known to exist. Its common haunt, or rather domicile, is invariably near lakes, swamps, and rivers, likewise close to wet ravines, produced by inundations of the periodical rains. Animals which repair there to drink and even fishes are its prey. The creature lies watchfully under cover of the water and while the unsuspecting animal is satisfying its thirst suddenly makes a dash at its nose and with a grip of its back reclining range of teeth never fails to secure the terrified beast. In an instant the sluggish waters are in turbulence and foam, The whole form of the serpent is in motion, its huge and rapid coilings encircle the struggling victim and but a short time elapses ere every bone in the body of the expiring prey is broken." A description follows of the manner in which the dead body is lubricated by the serpent's saliva but this is an error, as it is only covered with saliva in the passage down the snake's throat. One of the main differences between the Boa and the Anaconda is that the former has its head covered with scales while the Anaconda's is furnished with irregular plates. They last long, indeed many months, without food. In that delightful book, At Last, Canon Kingsley thus wrote of the Anaconda—"We were anxious too to see, if not to get a Boa Constrictor of one kind or other. For there are two kinds in the Island which may be seen alive at the Zoological Gardens in the same cage. The true Boa which is here called the Mahajuel is striped as well as spotted with two patterns, one over the other. The Huillia, Anaconda, or Water Boa bears only a few large round spots. Both are fond of water, the Huillia living almost entirely in it, both grow to a very large size and both are dangerous, at least to children and some animals. That there were Huillias about the place, possibly within fifty yards of the house there was no doubt. One of our party had seen with his own eyes one, 27 feet long, killed with a whole kid inside it only a few miles off. The brown Policeman crossing an arm of the Guanapo, only a month or two before, had been frightened by meeting one in the ford, which his excited imagination magnified so much that its head was on the one bank while its tail was on the other,—a measurement which must I think be divided by three. But in the very spot in which we stood some four years since, happened what might have been a painful tragedy. Four young ladies whose names were mentioned to me, preferred, not wisely, a bath in the still lagoon to one in the surf outside, and as they disported them-

selves one of them felt herself seized from behind. Fancying that one of her sisters was playing tricks, she called out to her to let her alone, and looking up saw, to her astonishment, her three sisters sitting on the bank and herself alone. She looked back and shrieked for help, but only just in time, for the Huillia had her. The other three girls to their honour, dashed into her assistance. The brute had luckily caught hold, not of her poor little body, but of her bathing dress and held on stupidly. The girls pulled—the bathing dress, which was luckily of thin cotton, was torn off, the Huillia slid back again with it in his mouth into the dark labyrinth of the mangrove roots and the girl was saved. Two minutes delay and his coils would have been round her and all would have been over. The sudden daring of these lazy, stupid animals is very great. Their brain seems to act like that of the alligator or the pike, paroxysmally, and by rare fits and starts, after lying for hours motionless and as if asleep. But when excited they will attempt great deeds. Dr. de Verteuil tells a story, and if he tells it it must be believed, of some hunters who wounded a deer. The deer ran for a stream down a bank but the hunters had no sooner heard it splash into the water than they heard it scream. They leaped down to the place and found it in the coils of a Huillia which they killed with the deer, and yet this snake which had dared to seize a full grown deer could have no hope of eating her for it was only seven feet long."

With regard to the specimen before the meeting, it lives all day long, and all night too, it might be said, in a tub of water with only its nose and eyes above the surface. You will notice the prominent position of the small eyes and also that the nostrils are placed on the tip of the nose, unlike the position which those organs occupy in most snakes. We believe this snake is a female as it has passed some whitey, stringy substance, which is probably the remains of undeveloped oviaries which were injured in the reptile's capture. It has been tried with fowls and pigeons, but hitherto has refused to eat anything. Its length is about 7 feet 4 inches.

4th March, 1892. R. R. MOLE.

FIFTEEN HUNDRED DOLLARS FOR A BUTTERFLY.

A young man camping in the Sierras discovered and captured a butterfly of an unknown species. He sent it to the Smithsonian Institution at Washington, and received therefor a check for fifteen hundred dollars, with the request to make careful search for others of the same kind. It was an individual of a fossil species, supposed to be extinct, and great was the excitement among the scientists at the discovery that one of the race had been recently alive. Although diligent search has been made by men paid for the service, no other specimen has been found.

UN CAS DE LARVES

de Lucilia Hominivorax dans les fosses nasales d'une femme.

Les mefaits de la Lucilia Hominivorax sont bien conus dans la science. Cependant c'est toujours un spectacle curieux et quelque peu surprenant que de voir sortir des vers, des larves, du nez d'une femme ou de celui d'un homme.

Un fait de ce genre s'est presenté à mon observation vers la fin du mois de mai dernier. Une dame encore jeune, arrivée récemment d'Europe, me fut presentée, qui offrait un ecoulement abondant, sanieux et fetide des deux narines.

La face etait rouge, gonflée, les yeux larmoyants injectés, toute la tête douloureuse. Il y avait de la fièvre et les nuits etaient sans sommeil.

Quand je pus examiner l'intérieur du nez avec un speculum, je vis, a travers les mucosités purulentes qui encombraient les fosses nasales, surtout la gauche, des corps en saillie, blanchâtres, qui remuaient.

Je retirai un de ces corps avec une pince. c'etait un ver.

1 2 3

1 Adult fly. 2 Mandible magnifie l. 3 Larva.

Un ver grisâtre, long à peine de 4 ou 5 millimètres, dont le corps etait parsemé de saillies annulaires rugueuses.

Il me fut facile de reconnaître la larve d'une mouche, appelée par Coquerel, qui à fait de cet insecte et de ses mefaits une etude particulière, Lucilia Hominivorax. On n'a qu'a ouvrir un livre d'histoire naturelle ou de pathologie médicale pour y trouver des observations nombreuses où cette mouche malfaisante a déposé ses œufs dans la fosse nasale d'un être humain, qui bien souvent à succombé aux accidents inflammatoires ou infectieux produits par les larves de cet insecte.

Le cas que j'ai observé à eu une terminaison heureuse.

Il est probable que la personne atteinte, venant d'Europe avec un certain degré de Coryza, a été attaquée par la mechante bête à la Martinique, où elle avait sejourné plus de 36 heures dans d'assez mauvaises conditions, et qu'elle est arrivée à la Trinidad, l'intérieur du nez déjà énvahi par les larves de la mouche.

Quoiqu-il en soit, aussitôt que le genre d'affection, à eté reconnu, un traitement approprié fut applique pour detruire les larves et réparer les desordres produits. Tout ce que je pus enlever doucement fut tiré dehors avec des pinces, puis je fis de grands lavages avec de l'eau phéniquée suivis d'insufflations d'une poudre composée d'Iodoforme et d'Oxide de Zinc. Tous les jours on retirait ou il sortait spontanément un certain nombre de vers, lesquels grossissaient à vue d'œil. Parmi les derniers obtenus figurent ceux que Mons. le President H. Caracciolo a presenté a la Société. Ce sont des larves adultes ou l'on retrouve tous les caracteres assignés aux produits de la Luc. Homin. la couleur noire qu'elles presentent doit selon moi être attribuée à une imbibition d'Iodoforme ou d'Iode, celui-ci resultant de la decomposition de celui-la.

Après 4 jours d'expulsions ou d'extractions successives, on ne vit plus de larves et je tâchai de remédier aux desordres quelles avaient determinées et qui ne sont pas encore complètement réparés aujourd'hui, après plus d'un mois d'un traitement actif et regulier.

J'espère néamoins que par le moyen de topiques variés qu'on peut appliquer pour ainsi dire à ciel ouvert par le moyen d'un speculum nasi et d'un bon éclairage, la guérison définitive ne se fera pas attendre longtemps.

A. L., M.D.

Clarence Street,
le 7 juillet, 1892.

[TRANSLATION.]

THE LARVÆ OF THE LUCILIA HOMINIVORAX IN THE NOSTRILS OF A WOMAN.

Though the ravages done by the LUCILIA HOMMINIVORAX are already well known to Science, it is at times interesting and even curious to see worms extracted from a man or woman's nose.

I attended one of these cases about the end of May.

A lady, comparatively young and recently from Europe was presented to me; she had an abundant flow of sanious and

fœtid matter from the two nostrils. Her face was flushed, eyes bloodshot and weeping, she suffered from headache, had fever, and spent sleepless nights.

When I was able to examine the interior of her nose with a speculum I saw traversing the purulent mucus which blocked the passage, especially in the left nostril, projecting bodies which moved about.

I extracted one of these bodies with a pair of tweezers ; it was a worm.

A greyish worm 4 or 5 millimetres in length. The body was spangled with rugose annular rings.

I readily recognized the larva of a fly named by Coquerel, who made a special study of this insect, Lucilia Hominivorax. One need but open any book on Natural History or Medical Pathology and he will find many instances where this fly is known to have deposited its eggs in the nostrils of human beings who very often have succumbed from inflammatory accidents produced by their larvæ.

The case I had on hand was attended with success.

It is probable that the person affected, coming from Europe and suffering from Coryza was attacked by this insect in Martinique, where she had spent some thirty-six hours in rather unpleasant conditions : arriving here the interior of her nose was already invaded by the wicked fly.

Be that as it may, as soon as I recognized the affection I applied myself towards killing the larvæ and repairing the evil done.

All I could extract without difficulty were extracted by means of the tweezers. I then washed copiously with a carbolic lotion followed by insufflations of a powder composed of Iodoforme and Oxide of Zinc. Every day I extracted a number of worms and many came away of themselves. They grew rapidly.

Among the last removed were those that the President, Mr. H. Caracciolo presented to the Club, these were full grown.

I am of opinion that the dark tinge they presented was due to the Iodoforme and Iodine which they imbibed, the latter being produced by the decomposition of the former.

After four days constant work, no more larvæ were to be seen, and then I tried to remedy the disorders attendant on their presence, which, up to this day, are not yet completely repaired after one month's active and regular treatment.

I hope, however, by means of topical remedies which can be applied with the naked eye by means of a speculum nasi and a good light, that she will very shortly recover.

A. L., M.D.

July 7th, 1892.

CANNIBALISTIC HABITS OF THE CRICKET.

In the "Canadian Entomologist," vol. xxiii, p. 137, Mr. Wm. Brodie cites several cases of cannibalism that came under his notice. My attention was first called to the cannibalistic habits of the cricket some four years ago while bass fishing in the upper Delaware River. Wishing to make an early start, I had taken the precaution to secure my bait the evening previous; part of the bait consisted of about fifty large crickets, which I placed in a good-sized tin-box; the next morning I was surprised to find only thirty-five live crickets in the box, with the legs, heads and other parts of the missing fifteen. The day selected for fishing turned out to be a rainy one, so our trip was postponed; the box of crickets was laid aside, and the next morning on examining the contents of the box I was not surprised to find about ten more missing. I now determined to use the remaining crickets for an experiment; I kept the box in my room, and on several occasions on approaching the box very carefully and peeping in, I would be rewarded for my trouble by sights of cannibalism. In a week or ten days I removed the contents of the box, which consisted of some eight or ten large, fat crickets, and an innumerable mass of legs, heads and other hard parts of crickets. In this case it was no doubt the survival of the fittest (or fattest), the stronger overcoming the weaker.—PHILIP LAURENT.—*Entomological News*, Nov. 1891. —[I also have observed the same habit in the *Pertinax Pertyn.* In August, 1891, I captured a few specimens of the above which I placed in a bottle and left them for a few hours, when I returned to remove them, one specimen had his friend's head neatly clipped off and was marching triumphantly about with his trophy. I tried to separate them but to no purpose. I starved it, a cruel experiment no doubt, but interesting under the circumstances, and it breathed its last without releasing its prey.—HENRY CRACCIOLO.]

THE ICHNEUMON.

The ICHNEUMONIDAE are readily recognized by their long and slender form. The head is usually square, with long and slender antennae; the maxillary palpi are five to six jointed, while the labial palpi are three to four jointed. The abdomen is inserted immediately over the hind pair of trochanters, and usually consists of 7 visible segments. The fore wings have from one to three subcostal cells. The larvæ are soft, cylindrical and footless grubs, and the rings are smaller than in the other families. The ichneumons in lieu of a sting have an auger, and deposit their eggs into the skin of caterpillars.

They prey on certain coleoptera and hymenoptera and even on the larvæ of water beetles. This subject (Fig. 1), I have referred to the genus ophion and term it ophion macrurum, which, according to Packard "Study Entomology" page 193 attacks the American silk worm. This species, he says, is honey yellow in colour. My specimen was discovered escaping from the cocoon of the Attacus Bolivar.

In January, 1891, I received this cocoon, together with many others, and thinking they were void of chrysalides or already hatched, I placed them in my drawer until May this year, when I hunted them up for the purpose of forwarding them to Mr. Thomas Wardle. Before doing so, however, I opened four, which I found alive. I forwarded two and kept the others in my breeding cage, after exposing them in a damp place for two days on a shelf in the yard. A week afterwards I saw a beautiful Ichneumon flying in the cage and on the following day saw another coming out of the cocoon. They had destroyed the chrysalides completely, and I lost two specimens of the Attacus which I had greatly prized.

But I was fortunate enough to receive a caterpillar on the 26th May, presented to me by Rev. Father Simeon of the Belmont Orphanage with a branch of the tree on which it was found. The tree was determined by Mr. Broadway as a species of Duranta. It was full grown and fed up to the 30th June, when it spun a beautiful cocoon, and on the 16th July I was happy to find that it produced a beautiful Attacus Bolivar. This confirms my investigation, published in the report of the Royal Botanic Gardens, 1890.

H. CARACCIOLO.

Internal Revenue Problems.—Truth is often much funnier as well as stranger than fiction. An important public officer of Duisberg, in Germany, is an ardent entomologist, and made a costly purchase of rare butterflies in Holland. The collection arrived in due time at the Duisberg custom-house, where the inspectors were at a loss to know whether the insects were dutiable or not. They finally came to the conclusion they were and that, inasmuch as they had wings, they must be classed as poultry, and much explanation and expostulation were required before they could be induced to regard them in any other light.

CROTONS AFFECTED BY SCALE INSECTS.

Our Crotons are generally attacked by a species of scale insect, Orthesia, which very soon ruin them, but there is a natural enemy, the Aphis lion, frequently following them. This Aphis lion (fig. 2 *a*.) is a deadly enemy of the scale insect as its eggs (fig. 2 *b*.) are laid in their immediate vicinity. These

c

FIG. 2.

(*a*) Aphis lion. (*b*) Eggs.

eggs are very much like the pistils of flowers, and are deposited on the leaves. It is popularly known as the golden eyed lace wing fly, and belongs to the neuropterous genus chrysopa.

There is another enemy, the "Brachyacanthara Ursina" (fig. 2 *c*.), a minute rounded beetle, which, when pursued, affects death.

H. CARACCIOLO.

A BULLET EXCAVATED BY A LARVA.

We reproduce, from "Insect life," the figure of a bullet which has been excavated by the larva of an insect which usually bores wood. This bullet must have been fired into an oak tree, probably during the war of Secession. When this tree was felled it was found that the larva of an ORTHOSOMA had penetrated it. This larva had evidently commenced its attack in the concave extremity of the bullet, had gone through two-thirds of its length and escaped sideways.

This specimen was found by Dr. Eversfield in Maryland.—LE NATURALISTE.

GUAVA ATTACKED BY ALEYRODES.

The Guava is attacked by a species of Aleyrodes. ALEYRODICUS COCOIS CURT., which is the only genus of the family ALEYRODIDÆ intermediate in systematic position between the plant lice or scale insect (COCCIDÆ). If you observe the leaves of the guava thus attacked, you will find the young, filed in order along the nerves of the leaves, and a species of ant PRENOLEPIS LONGICORNIS LATR. busily engaged attending to them. These ants derive their sustenance from sucking the honey dew emitted by the Aleyrodicus. The knot-like projections on the guava leaves (fig. 3 *c*.) are the females of a very common cosmo-

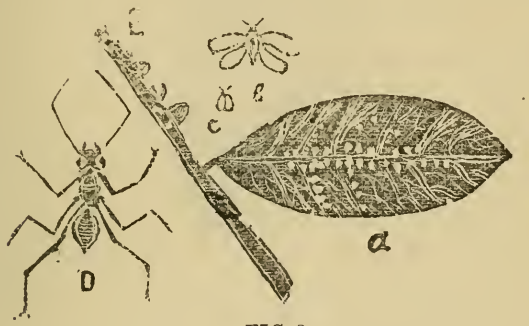

FIG 3.

(*a*) Leaves attacked by insect. (*b*) Adult insect magnified.
(*c*) Gnat size, (*d*) Prenolepis longicornis. (*e*) Lecanium hemisphæricum

politan scale insect known as LECANIUM HEMISPILERICUM TARG. It can be readily killed, as well as the aleyrodes, at the proper time of the year by spraying with dilute kerosine emulsion made as follows :

Kerosine	...	... 1 gal.
Soap	...	... 1 lb.
Water	...	... 2 galls.

By beating the above properly it forms an emulsion ; mix one part of the emulsion with 18 parts of water. This solution can also be used with success for crotons and guava trees thus affected.

H. CARACCIOLO.

ORANGE DISEASES.

Our Orange and Lime trees are attacked by several enemies. The small white specks as seen (fig. 4 1) on the bark of the orange tree are the male scales of the CHIONASPIS CITRI, a scale insect which does considerable injury to these trees; and the large white and green blotches are lichens (fig. 4 2). In fact

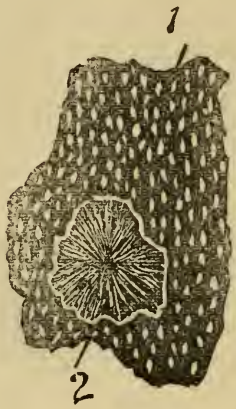

FIG. 4.

1. Male scales "chionaspis citri." 2. Lichen.

the orange and lime trees have very many enemies, some more injurious than others. The above do more material injury as by being placed on the trunks and limbs of the tree they render it sickly. Other pests such as the PAPILIO ANCHISAIDES, PAPILIO ANDROGOES, do injury by eating the leaves. The former, like the scale insects, can be destroyed by spraying with a weak solution of kerosine, water and soap.

H. CARACCIOLO.

HOW TWO INSECTS TALKED.—A Parisian chemist has caught two little insects in the act of nocturnal "spirit" rapping. They were found about four inches apart on opposite sides of a piece of heavy wrapping paper. Each tapped loudly with the head about six strokes a second, one answering as the other finished.

GYNANDROMORPHISM, OR THE UNION OF BOTH SEXES IN LEPIDOPTERA.

ANGERONA PRUNARIA.

Phal Geom. prunaria (Lonneus).

Hipparchus prunaria (Leach. Samdu Curtis).

Angerona prunaria (Duponchel).

We have been induced to figure this interesting specimen of a well-known European geometrine moth for the purpose of exemplifying a phenomem, perhaps more frequently observed among this tribe of insects than any other, viz., what is called Gynandromorphism, or the union of both sexes (at least in external features) in the same individual.

In this instance the whole right side is that of a male and the left that of a female, insomuch that one would say some person had been amusing themselves by attaching the wings in this manner; but the impossibility of observing the suture at the point of junction soon convinces us that there has been no artifice in the case, and that Nature alone has produced this anomalous union. In truth such occurrences are not very rare, and various lists of different kinds of Gynandromorphism have been published by authors.

The example here figured is called semi-lateral gynandromorphism, and is the most common kind of it.

In Angerona Prunaria the abdomen was dried up in consequence of the specimen having been long preserved, so that it was impossible to determine whether the peculiarity extended to the internal organization.

In a specimen of Melitea didymus, however, which admitted of dissection, the male organs were found complete, and in their usual condition, and there was an ovary placed on the left side, having no connection with any other organ.

Another kind of Gynandromorphism is called *superimposed*, the sexual characters not being disposed transversely, but according to the longitudinal axis of the body, whence two combi-

nations result, the male parts being anterior, and the female posterior, or *vice versa*; this is of rare occurrence, and has been noticed only in a kind of ichneumon.

Crossed Gynandromorphism is when each side of the body presents at the same time the characters of the two sexes. This combination is rare, although much less so than the preceding. It has been observed in a Bombyx. Castrensis, in which the left antennæ and the right wings were female, and the right antennæ and the left wings male.

The foregoing is an extract read by Mr. F. E. Eagle at the Club meeting of June 7th.

ŒCODOMA CEPHALOTES.

The Parasol or Leaf Cutting Ant.

It may be interesting to members of the Club, to learn that I have two Parasol Ants' nests on a table in my house, and that I have fed them for some weeks. The nests have therefore been easy of supervision, and very accessible for observing these ants' habits and their method of life.

I propose in this paper to refer only to the treatment the leaves receive, after they have been carried into the nest.

We in Trinidad, who are interested in such subjects, well know the hurried manner with which a parasol ant returns to her (all leaf cutting workers are females) nest, bearing erect in her mandibles, the portion of leaf she has herself just cut off, and is apparently running home with it in triumph.

These foragers, for they are the ones who supply the household, carry their portion of a leaf well into the nest, drop it, and return for another piece, nor do they cease doing so, till the supply is more than those in the nest require.

I could not induce the ants in one of my nests, "B," after its capture, to carry any leaf whatsoever into the nest, till one day I coaxed a small worker to do so, as she entered she was caressed by those in the nest, who stroked and patted her with their antennæ. The small piece of leaf she had brought was at once taken by one of the larger workers, to go through its various processes, while she returned for more, and she continued to bring in pieces till late in the evening. Strange to say, none of the others followed her example. Even now, four weeks later, only two or three carry in any portions of leaf, indeed the nest is very inactive on that score. It may be that there is no queen as she was accidentally killed while taking the nest.

The other nest "A" has a queen, and with it there has been no trouble, for they have kept themselves well supplied from whatever I have offered them on their feeding ground, whether rose leaves, plumbago or quis-qualis.

Each forager drops her portion of leaf in the nest, which is taken up as required by the small workers, and carried to a clear space in the nest to be cleaned. This is done with their mandibles, and if considered too large it is cut into smaller pieces. It is then taken in hand by the larger workers, who lick it with their tongues. Then comes the most important part, which almost always is done by the larger workers, who manipulate it between their mandibles, mostly standing on three legs. The portion of leaf is turned round and round between the mandibles, the ant using her palpi, tongue, her three legs and her antennæ while doing so. It now becomes a small, almost black ball, varying in size from a mustard seed to the finest dust shot, according to the size of the piece of leaf that has been manipulated. The size of the piece of leaf is from an $\frac{1}{8}$ by $\frac{1}{8}$ of an inch, to $\frac{1}{4}$ by $\frac{1}{4}$ of an inch.

I do not wish it to be understood that only one class of workers manipulate the leaf, for all seem to take to it very kindly on emergency. Even the smallest workers will bring their tiny ball to where the fungus bed is being prepared.

These balls, really pulp, are built on to an edge of the fungus bed by the larger workers, and are slightly smoothed down as the work proceeds. The new surface is then planted by the smaller workers, by slips of the fungus brought from the older parts of the nest. Each plant is planted separately and they know exactly how far apart the plants should be. It sometimes looks as if the plants had been put in too scantily in places, yet in about 40 hours if the humidity has been properly regulated, it is all evenly covered with a mantle, as if of very fine snow.

It is this fungus they eat, and with small portions of it the workers feed the larvæ.

J. EDWARD TANNER.

Port-of-Spain, Trinidad,

30th July, 1892.

TRINIDAD FIELD NATURALISTS' CLUB.

Mr. Oldfield Thomas, of the British Museum, an Honorary Member of the Trinidad Field Naturalists' Club, has personally written to the President informing him that he is framing a catalogue* of the mammals of Trinidad, a copy of which he intends presenting to the Club for publication in its Journal, and requesting its assistance in its compilation. A Committee is now at work collecting specimens of the Mammals, and will be glad to receive the assistance of the public in this matter. The undermentioned members will be glad to receive specimens, and will either forward them for identification in the name of the collector, or will purchase them on behalf of the Club.

HENRY CARACCIOLO, Steamers' Warehouse,
F. W. URICH, c/o F. URICH & SON, South Quay,
T. J. POTTER, Crown Lands Office,
ALFRED TAITT, All Saints,
R. R. MOLE, 3, Abercrombie Street,

The Animals wanted are Bats, Field Rats and mice, Otters to be found in rivers (locally known as water dogs), Mangrove dogs, Tiger Cats, Tatous, Ant Eaters, Sloths, Porcupines, etc., alive or recently killed.

* The Catalogue arrived by the Mail of August 3—this week.

DESCRIPTION OF A NEW BUTTERFLY FROM TRINIDAD.*

By W. F. KIRBY, F.E.S.

Tithorea Flavescens.—Expanse from $2\frac{1}{4}$ to $2\frac{1}{2}$ inches. Dark brown, with yellow markings, more or less tinged with tawny, especially towards the base. Fore wings rather pointed, the hind margin slightly oblique, very slightly sinuated, and not convex, hind wings with the hind margin regularly rounded and slightly sinuated. Fore wings dark brown, with the principal nervures orange towards the base, and in the yellow portions of the wing; from the base run two yellow stripes, the first curves through the cell till it descends on the median nervure, after which it is slightly interrupted before meeting a large yellow band divided by the nervures, which crosses the

* This article is taken from the *Entomologist* for June. 1889, vol. XXII, No. 313. The butterfly described is the common "sweet oil" (local name of Trinidad), and was included in a set of insects sent by Mr, W. E, Broadway to the British Museum for determination in 1889. As will be seen, although extremely common with us, it was unknown to science.—P.C.

end of the cell towards the hind margin. Just beyond the cell is a large oblong black spot, and there is a smaller one between the second and third branches of the median nervure, which are generally surrounded with yellow. Below this point are two submarginal yellow spots, the upper one irregular, and the second round, above the hinder angle of the wing. The lower basal streak is divided by the sub-median and first branch of the median nervure, and extends to about four-fifths of the length of the wing. Towards the tip is an oblique row of four yellow spots; the uppermost, above the sub-median nervure (which is here black), is a mere streak. Hind wings yellow, with all the borders brown, and a brown band dentated beneath towards the extremity, runs from the middle of the inner margin, nearly across the wing, but ceases before reaching the border. Under surface similar, but the yellow markings are paler and rather more extended, most of those on the fore wings being confluent; hind margins with a row of submarginal white spots between the nervures, mostly arranged in pairs; hind wings with a curved subcostal basal stripe. Head spotted with white, orbits white; antennæ fulvous, black towards the base. Thorax with fulvous hairs above; the sides spotted with yellow; legs black, femora streaked with white, abdomen black above and yellow beneath.

This species belongs to the group of T. Harmonia Crom., but is of a much paler colour than any of its allies. It is abundant in Trinidad, and is extremely constant in its markings. I have never seen it from any other locality; and like Papilio Cymochles, Gray, and one or two other species, it appears to be peculiar to that island, which, however, is so close to the neighbouring coast of South America, that its insects properly belong to the fauna of that continent, and not to the West Indian fauna.

Zoological Department, Brit. Mus. (Nat. Hist.) S. Kensington, April, 1889.

A COCOANUT PEST.

The United States Consul at Santiago de Cuba has made a report to the Secretary of State in regard to a mysterious disease prevailing in that country which at one time threatened to annihilate all the plantations producing cocoanuts for market and export. Small shipments of cocoanuts are constantly leaving Santiago for the United States, and the Consul says he has sought to discover the origin of the disease which has effected them. Opinions of scientists differ as to the cause and nature of the disease. The consul says that it has been at last definitely ascertained that the destroyer of the cocoanut tree is an insect of diminutive size, barely visible to the naked eye, and probably a Coccid. Prof. Gundlach, of Havana, recommends that all cocoanuts received in the United States be dipped into boiling water upon arrival, and that the bags they are shipped in be destroyed.—E. M. Aaron.

ELEMENTARY ENTOMOLOGY.

SECOND PAPER.—THE GENERAL STRUCTURE OF INSECTS.

In those papers of this series which treat of the anatomy of Insects in general, we have largely drawn, with the author's permission, from Prof. J. H. Comstock's excellent "Introduction to Entomology."*

Thanks to the kindness of Prof. A. S. Packard, we have also made use of his well-known "Guide"† and his valuable "Entomology for Beginners."‡

As stated in the first paper the body of an Arthropod, and consequently that of an Insect, is made up of a series of rings or *segments*, within which are the vital apparatus and muscles. Confining our attention to insects, it is to be noticed that even young larvæ§ just hatched from the egg show this segmentation of the body. If such a young larva be examined¶ the jointed appearance of the exterior will be seen. The skin of this young larva is quite soft, but becomes harder as the larva grows. This hardening is due to the deposition in the outer layer of the skin (called the *cuticle*) of a horny substance—*chitine*. The chitine is deposited in the cuticle of the different segments, but there is left a narrow space around the body between each segment, in which there is little or no chitine. These narrow rings of unaffected skin divide the segments from each other, and are termed *sutures*. Remaining soft, the sutures permit a freedom of motion of the hard segments upon each other.

In larvæ the sutures are usually wider than in the corresponding imagos. Very often the sutures themselves become hardened by chitine, so that the line of separation between two segments disappears. Such an obliteration of sutures occurs very frequently in the head and fore-parts of imagos, and less frequently in the hind parts.

We have spoken of the segments as hard, but the hard part of any one segment is not a continuous ring. On the contrary, the hard part a segment consists of several pieces which are more or less free to move upon each other. These pieces are the *sclerites* (from the Greek *skleros*, hard). Some of the soft cuticle remains between the sclerites, and this separating portion also receives the name of *suture*, and like an inter-segmental suture may also become "obsolete" (*i. e.* obliterated).

The skin, originally soft, but now with its cuticle hardened in the segments, the hard part of each segment consisting of several sclerites, forms the *body-wall* of the Insect.

The reader of this series already knows that all an insect's growth is completed in its larval state. As a larva grows quite rapidly, and as chitine

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* An Introduction to Entomology by John Henry Comstock, Professor of Entomology and General Invertebrate Zoology in Cornell University, and formerly United States Entomologist. With many orginal illustrations drawn and engraved by Anna Botsford Comstock. Ithaca, N. Y. Published by the author 1888, pp. iv, 234, 201 figures. Price 2.00 dollars.

† Guide to the study of Insects and a treatise on those injurious and beneficial to crops for the use of Colleges, Farm-schools and Agriculturists by Alpheus S. Packard, M.D., with fifteen plates and 670 woodcuts; ninth edition. New York, Henry Holt & Co, 1889. 715 pp. (first edition, 1869. Salem.)

‡ Entomology for Beginners. For the use of Young Folks, Fruit-growers, Farmers and Gardeners, by A. S. Packard. M.D., Ph. D.; second edition, revised. New York, Henry Holt & Co., 1889, 367 pp. 272 figs.

§ It is hardly necessary to remind the reader that an Insect is an Insect, whether it is an unhatched egg, a growing larva, an apparently lifeless pupa, or a flying or creeping imago. Imagos being so much more conspicuous than the preceding stages, have naturally received both common and scientific names first.

¶ The student cannot be too strongly reminded that he should compare these papers with some insect, say a grasshopper.

is being constantly deposited in the cuticle, the cuticle thus hardened loses its elasticity and is soon too small for the increasing size of the body. Consequently it splits along the middle line of the back, and through this fissure the insect withdraws itself from its chitinous coat. Or, in other cases, the cuticle comes off gradually in thin shreds. The "new skin" contains very little chitine as yet, and being quite elastic, stretches to accommodate the size of the body. This skin (cuticle) in turn becomes hardened, is likewise cast off, or *moulted*, and succeeded by others, varying in number in different species of insects. Very often there are changes in the shape, color, etc., of the larva after successive moults.

Technical names for the process of moulting are *ecdysis* and *exuviation*, and for the moulted skins, *exuviæ*.

In the case of those insects passing through a complete transformation, when the larva moults for the last time, it becomes a pupa, usually of quite dissimilar shape from the larva, and usually quiet, that is, does not move from place to place. The last moult of the insect's life is when the cuticle of the pupa splits open and the imago emerges, and, after a short period, spreads its wings and begins its aerial life.

Where the insect undergoes but an incomplete transformation, when the nymph moults for the last time, the imago state is entered at once.

Hitherto, in speaking of the segmented form of an insect's body, reference has been made solely to the body-wall. So far as the internal organs are concerned, the muscles, the nervous, circulatory and respiratory systems, at least, are more or less arranged in correspondence with the segmentation of the body-wall.— P. P. C.—*Entomological News*, June, 1890.

"I RECOLLECT some ten or twelve years ago, one Sunday, whilst collecting in a neglected field, near Bernard's dam, that the proprietor of the ground, or of some neighbouring territory, a pleasant, hale old gentleman, came down in his shirt sleeves to gratify his curiosity in regard to my doings. He first approached with the proper caution due to nearing an equivocal animal, but assuring himself by the placidity of my countenance, doubtless, that there was no apparent danger to be dreaded, he approached me, and in the Pennsylvania German dialect asked what I was doing. I showed him my collecting-box and its contents, my net, etc., and as at that moment a large female of the EPHESTION butterfly flew near, I joined example to precept by capturing and killing and pinning it in my collecting-box in his presence. The most difficult part to make the old gentleman comprehend, was what the things could be used for after they were caught. I attempted an explanation. Whether I was successful in doing so to his satisfaction I still doubt, however, he seemed pleased, and by way of explanation said, as he departed, 'Ich haab dich gasayn for ein bar Suntaag here und durt so rum springe un ich hab gaydenkt du waarst so ein kaerl wo nicht gons recht in kopf war, aber' ('I have seen you running around here for the last couple of Sundays, and I thought you were one of those fellows who were not quite right

in the upper story, but'——). Here he paused and looked puzzled, and I fear to this day the worthy old husbandman (bless his kindly face) is still, if living, in a state of suspense as regards my being responsible for my actions before the Lord and my fellow-man."—*Ent. News*, May, 1892.

THERE ARE EXCEPTIONS.—"A beetle cannot fly with its elytra removed." F. H. Wenham, Aerial Locomotion, Smithsonian Report 1889, p. 318. A few days ago along a sunny river-bank I found CICINDELA HIRTICOLLIS abundant. Examples were taken and the elytra removed; every one flew away instantly, on being released, with a speed that defied the eye to follow. "Insects are killed quickly by putting them into a bottle containing lumps of cyanide of potassium covered by plaster of Paris." So every body says. To this I note three exceptional cases. One June day, I happened to be collecting where many species of Phalænidæ were abundant. Examples of several species taken were all killed quickly in my cyanide bottle except one, that of CORYCIA VESTALIATA (sex not noted). To my surprise it was found some time after its imprisonment alive and struggling to escape. To test the matter, other moths were put into the bottle, all of which were quickly overcome, but C. VESTALIATA still lingered, having withstood the fumes more than an hour. The second instance is similar; the species was CABERODES CONFUSARIA. It was active more than thirty minutes by the watch, and, to make it sure, the prisoner was resisting death, contrary to all reason, crickets, grasshoppers, wasps, moths and butterflies introduced to the same space, all responded as they should. The third case occurred a few weeks since the same species as the preceding exhibiting similar behaviour. Have others observed similar behaviour by any insect? What explanation occurs to any one? —D. S. KILLICOT.—*Ent. News.*

OLD MAIDS THE CAUSE OF VARIETY IN PLANTS.

A Professor at Ann Arbor, says the *Entomolgical News*, was discussing the process of fertilizing plants by means of insects carrying the pollen from one plant to another, and told how old maids were the ultimate cause of it all. The bumblebees carry the pollen; the field mice eat the bumble bees; therefore, the more field-mice the fewer the bumble-bees and the less pollen and variation of plants. But cats devour field-mice, and old maids protect cats. Therefore, the more old maids the more cats, the fewer field-mice, the more bees. Hence, old maids are the cause of variety in plants. Thereupon a sophomore, with a single eyeglass, an English umbrella, a box-coat, with his trowsers rolled up at the bottom, rose and asked: —"I sa-a-y, Professah, what is the cause—ah—of old maids, don't you know?" "Perhaps Miss Jones can tell you," suggested the Professor. "Dudes!" said Miss Jones, sharply, and without a moment's hesitation.

'OBER, 1892. **No. 4.**

r dans leurs écrits toute personnalité,
les limites de la discussion la plus
.—LABOULBÈNE.

Naturalists' Club,

MIRANDA IN MINIMIS.

n Committee :
LO, ESQ., *President.*
SYL. DEVENISH, ESQ., M.A.;
.E AND F. W. URICH.

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Vol. 1. OCTOBER, 1892. **No. 4.**

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Trinidad Field Naturalists' Club,

NATURA MAXIME MIRANDA IN MINIMIS.

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JOURNAL

OF THE

Field Naturalists' Club.

VOL. I. OCTOBER, 1892. No. 4.

REPORT OF CLUB MEETINGS.

7TH JUNE, 1892.

Present: Messrs. Caracciolo (President), Devenish, Carmody, Hobson, Potter, Scott, Mole, Urich, Broadway. Petersen, Hewlett, Eagle, Wilson, Murray and Taitt (Secretary). The following gentlemen were elected members of the Club: Hon. H. Fowler, Hon. J. E. Tanner, Messrs. Erick Bock, F. J. Maingot, J. G. Reed, Dr. A. Lota, Messrs. L. de Verteuil, R. Dumoret and C. W. Meaden (country member). Different amendments to Rules were discussed and agreed to. Mr. Broadway proposed that the office of Patron be created and that the Governor be asked to fill it, seconded by Mr. Potter and carried unanimously. His Excellency Sir F. N. Broome was thereupon unanimously elected Patron of the Club. Mr. Mole read the draft report of the committee appointed to investigate the sugar-cane borer. A long discussion ensued on it and it was decided that it should be published in the Journal. The President having to leave at this stage the chair was taken by Mr. Syl. Devenish, M A. The Secretary exhibited, on behalf of the President, a few larvæ of the *Lucilia hominivorax* sent by Dr. Lota, who extracted them from the nose of a lady here. These larvæ are produced by the above fly, and commit great ravages in Cayenne among the convicts. Two beetles, one a *Calandra palmarum*, the other *Sphenophorus hemipterus*, were sent by Mr. Ludovic de Verteuil, with the information that these beetles were found in the sugar-cane, which they entered from the roots. A black ant with two

lateral spines on each side of the head and one on each side of the thorax and mezothorax, *Mutilla* sp? This ant was invariably observed to frequent the purlieus of the parasol ants' nest. A specimen of the *Mutilla armata* captured by Mr. Mole, who was severely stung by it. A species of *Dorylus* and two females of parasol ants were also shown. Mr. Eagle exhibited a case of moths, amongst which figured conspicuously six beautiful specimens of *Philampelus linnei* bred by him, together with a fine assortment of microlepidoptera. Mr. Broadway exhibited a fine specimen of *Papilio argesilaus* caught at Ariapita Valley, St. Ann's. He said it was very rare in Trinidad. Mr. Taitt showed a beautiful humming bird's nest. Mr. Broadway reported having seen the first *Urania leilus* for the year flying on the 23rd May. Mr. Eagle read an extract on the Gynandromorphic sex of insects in external appearances. The Conversazione spoken of at the last meeting was, on Mr. Carmody's motion, postponed to a later date at the end of the year.

1st July, 1892.

Present: Messrs. Caracciolo (President), Reed, Eagle, Potter, Broadway, Mole, Meaden and Urich. In the absence of Mr. Taitt Mr. Urich acted as Secretary. The following gentlemen were unanimously elected honorary members of the Club: Dr. Gunther and Mr. A. G. Butler, both of the British Museum, and Mr. H. F. Wilson. Several books were presented to the Club by Messrs. Eckstein, H. K. Collens and R. R. Mole. These were thankfully received, and will be kept to form the nucleus of the Library. A letter was read from Mr. D. Morris, Assistant Director of Kew Gardens, in which he says: "The first issue of the journal is very promising. The Trinidad society has an excellent field for investigation and the start it has made promises well. I wish it every success." Mr. Meaden said that in the last Journal of the Club he saw that amongst other things the Trinidad otter was very much wanted at the British Museum. He stated that a few years ago he shot two specimens at Chaguanas, which he was almost sure were the animals in question, but, unfortunately, the skins being left in the open air to dry, were lost. Since then he has never come across any other specimens. The head of one was sent to the British Museum, but he never heard anything of it.* Mr. Broadway asked whether any of the members could procure him some of the large centipedes found at Monos and whether they were very venomous.—Mr. Potter said their bite caused fever, but he never heard of any death resulting from it.– Mr. Eagle said that he

* Since the above meeting Mr. J. S. Greenidge of Tacarigua, has presented the Club with a fine skin of this rare animal.

had been bitten by one (about six inches in length) behind the ear, he was in great pain for about six hours, ammonia, laudanum and several other things were applied to the bite but without avail, the pain passed off suddenly by itself.—Mr. Meaden said he did not know of any case of a centipede bite, but he saw a coolie stung by a scorpion show the first symptoms of epilepsy eighteen hours after the sting. At the same time he had seen men that were stung without any bad effects following, except a short temporary pain. The President said he had received a letter from Mr. Wardle, President of the Silk Association of Great Britain, congratulating him on his discovery of the *Attacus Bolivar* here and he hoped that the correspondence would be kept up, as it was very interesting to him.—The President exhibited an Ichneumon *Ophion macrurum* found in a chrysalis of the *Attacus Bolivar*. He also showed mounted slides of the four following small insects which are all enemies to the *Xyleborus perforans* :—They are (1) *Typhoea fumata*, (2) *Rhizophagus impressicolis*, (3) *Canoletus conicus*, (4) *Carpaphilus dunidatus*. The *R. impressicolis* especially is the sworn enemy of the cane borers, as it follows them into the burrows and destroys the eggs and larvæ. Mr. Broadway exhibited a case of different beetles and a moth nicely mounted which were (1) cigar beetle, *Lasioderma testacea*, very destructive to cigars; (2) Linseed beetle, *Trilobiuna ferrugineum*; (3) Bamboo borer, *Sitophilus oryza*; (4) Two different species of *Crepidodua*, one injurous to the leaves of the egg plant, *Melogenes* ; the other found on a sapindaceous plant at Caledonia Island, doing much damage to the leaves on which it feeds in its larval and perfect state ; (5) *Notarcha silicalis* —moth—larvæ destroys the leaves of ramie fibre and *Bois Canot*.—Mr Potter exhibited a curious hairy *Bombyx* caterpillar from Guapo.

FIRST ANNUAL MEETING.

8TH AUGUST.

Present : His Excellency, Sir Frederick Napier Broome, K.C.M.G., Patron, Henry Caracciolo, Esq. (President), Hon. J. E. Tanner, Messrs. W. E. Broadway. F. W. Urich, R. R. Mole, P. L. Guppy, J. Nairn, R. Dumoret, J. Petersen, J. G. Reed, C. W. Scott, C. W. Meaden, L. de Verteuil, H. F. Wilson, T. J. Potter, Syl. Devenish, M.A., J. H. Collens, F. Eagle, and A. Taitt, (Secretary).

The Hon. S. H. Gatty, Acting Chief Justice, Mr. Justice Lewis and Mr. W. Miles, B.A., were present as guests.

After some preliminary business the Secretary and Treasurer read the following report :—

As required by Rule 6, I beg to report on the first year's operations of the Trinidad Field Naturalists' Club as follows :—

1 —*Meetings.*

The first formal meeting was held on the 8th August, 1891, at Mr. Caracciolo's residence, since that date there have been 13 meetings.

2.—*Members Elected.*

The Society consisted of nine Resident Members at the first meeting, and at the present time there are :

Town Members	... 29
Country do.	... 4
Hon. and Corresponding do. ...	... 11
Total	... 44

the majority of whom were elected during the last six months.

At the monthly meeting in May the members had the honour of electing His Excellency the Governor as a member, and on the 18th of the following month His Excellency was pleased to accept the office of Patron.

Among the list of Honorary Members will be noticed the names of Dr. Gunther, Mr. Oldfield Thomas, and Mr. A. G. Butler, all well-known Naturalists.

I append a list of members, showing the dates of their elections, etc.

3.—*Finances.*

The total receipts for the year amount to	... $197.79
and the expenditure	... 147.92
leaving a balance of	... $ 49.87

to the credit of the Club.

4.—*Journal.*

At a meeting held in February it was decided that a bi-monthly Journal should be issued, containing the Papers read by members at the meetings. In April the first Journal was issued, 150 copies of which were distributed. Of the next issue in June 250 copies were disposed of. In both cases the demand being far greater than the supply.

The members will, I am sure, agree with me in stating that success, far greater than even the sanguine and energetic pro-

moters (Messrs. Caracciolo, Broadway, Mole and Urich) expected, has attended the first year's existence of the Trinidad Field Naturalists' Club.

ALFRED TAITT,

Hon. Secretary & Treasurer.

MEMBERS OF THE TRINIDAD FIELD NATURALISTS' CLUB.

Town Members.

Name.	Date Elected.	Name.	Date Elected.
Broome. H.E. Sir F.N., K.C.M.G.,	May 6, '92	Murray. J. Russell,	Oct. 2, '91
Patron	June 7. 92	Mole. R. R.,	July 10, '91
Bock. E.,	June 7, '92	Moor. Rev. R. H.,	Sept. 7, '91
Broadway. W.E.,	July 10, '91	Maingot. F. J.,	June 7, '92
Caracciolo. H.,	,,	Nairn. J.,	Dec. 23, 91
Carmody. Prof. P.,	Jan. 8, '92	Potter. T. J.,	July 10, '91
Collens. J. H.,	Feb. 5, '92	Petersen. J ,	Dec 4, '91
Deveuish. S., M.A.,	Jan. 8, '92	Reed. J. G.,	June 7, '92
Dumoret. R.,	June 7, '92	Scott. C. W.;	July 10, '91
Eagle. F.,	Jan. 8. '92	Thavenot. C. J.,	May 6, '92
Fowler. Hon. H.,	June 7. '92	Taitt. A.,	July 10, '91
Gray. F.,	Oct. 2, '91	Tanner. Hon. J. E.,	June, 7, '92
Gerold. F.,	March 4. '92	Urich. F. W.,	July 10, '91
Hewlett. W. G.,	July 10. '91	Wilson. E. Y.,	Aug. 8, '91
Lota. Dr. A.,	June, 7, '92	Walker. C. W.,	,,

Country Members.

de Verteuil. L.,	June 7. '92	Hobson. J.J.,	Dec. 4, 91
Guppy. P.L.,	July 10. '91	Meaden. C.W.,	June 7, 92

Honorary and Corresponding Members.

Butler. A. G.,	July 1, '92	Smith. G. W.,	Nov. 13, '91
Ganteaume. H.,	Aug. 8, '91	St Vraz. Prof. E.	Aug. 8, '91
Gunther. Dr. A.,	July 1. '92	Thomas. Oldfield,	March 4. '92
Hamilton. Hon. C.B.,	Feb. 5, '92	Warming. Prof.,	Dec. 4, '91
Lassan, —	Dec. 4, '91	Wilson. H. F.,	July 1, '92
Leomsen. —	,,		

Elections up to 19th August last.

Gatty. Hon. S.H.	(Town M'mb'r)	Aug. 19, '92	Carr. A.B.,	(Country Member)	Aug. 19, '92
Miles. W.,	,,	,,	Guilbert. J.,	,,	,,
Rake. Dr. Beaven,	,,	,,			

Mr. Mole then read the following

REPORT OF PUBLICATION COMMITTEE.

The Publication Committee have very little to report as to their proceedings, owing to the fact that they have been pretty fully dealt with by the President in his address. The following items, however, may fill up the blanks in the details of their work which have been untouched by that ably written document.

The Publication Committee was only formally constituted at the meeting of the 5th February this year, but it has always existed in an informal way.

The first notice it gave of its existence appeared in the *Port-of-Spain Gazette* of the 11th September, 1891, when a paragraph appeared, contributed by the members, announcing the formation of the Club. On the 9th October the same Journal kindly published a report by the President of the meeting of the 2nd October. Since then reports of the monthly meetings have regularly appeared in either the *Gazette* or *Public Opinion*. The Committee, on behalf of the Club, thank the Editors of these papers for the kindness which they have shewn the Club in placing their columns at the Committee's disposal.

The Publication Committee, as has been previously stated, was formed on the 5th February and has since then made itself directly responsible for the reports in the newspapers which have appeared from time to time, and also for the three numbers of the official organ of the Club. The Committee are inclined to be very proud of the Journal, for the reason that their effort has met with unqualified success. The first number, 150, was soon out of print and the second number of 250 was found insufficient to meet the demand for copies of it; the third has been equally successful. The Committee are also pleased to be able to place on record their gratification at the Journal having received complimentary notices from the three leading newspapers of the Island—the *Port-of-Spain Gazette*, *Public Opinion* and the *Catholic News*.

In conclusion the Committee thank the members for the loyal assistance they have received, and venture to express a hope that they will in the future be assisted in their labours, not only with original articles, but also with any extracts and cuttings bearing upon the subject of Natural History which the members of the Club may find in the course of their studies.

(Signed) H. CARACCIOLO.
SYL. DEVENISH.
R. R. MOLE.

The undersigned members of the Committee cannot allow this opportunity to pass without acknowledging the debt which the *Journal* owes to the President of the Club, who has not only contributed so many able articles to its pages, but has further added to its interest by several wood cuts of the subjects which those articles treated of. Mr. Caracciolo has never had any training as an engraver, and the members feel sure that the Club highly appreciates the talent, perseverance and ingenuity he has shewn in cutting the block of the Inca Beetle, which lends so much attractiveness to the cover of the Journal and the various other cuts which have appeared in the last two numbers. The undersigned regret the absence of Professor Carmody, the absent member of the Committee—he would, they are sure, have heartily endorsed their opinion in this matter.

(Signed) SYL. DEVENISH.
R. R. MOLE.

Both reports were unanimously adopted.

According to the rules the election of officers for the ensuing year took place. Mr. H. Caracciolo was unanimously re-elected President and Mr. A. Taitt, Secretary and Treasurer. —Mr. Mole informed the members of the steps which had been taken at an extraordinary meeting about the collection of Trinidad mammals. Mr. Devenish moved that any expenditure incurred in collecting these specimens be sanctioned by the Club. Seconded by Mr. Petersen and carried.

At 9 o'clock His Excellency the Governor, accompanied by the Hon S. H. Gatty, the Hon. J. E. Tanner and Lieut. Clerk, A.D.C., arrived and were welcomed by the President and the Committee. After His Excellency had taken his seat at the head of the table the President read the following address:

Your Excellency and Gentlemen of the Trinidad Field Naturalists' Club,—It was in the year 1890 I recollect making an attempt to found a Natural History Society, and as a preliminary step made a list of the names of a few of those gentlemen I thought likely to join in this good work. Messrs.

Broadway and Potter must both remember this futile effort, which from pressure of work and want of time I failed in carrying out. I can assure you my disappointment was deep. It was with great pleasure, however, that a few months later I received a letter from Mr. Mole, on behalf of Messrs. Broadway and Urich, proposing the formation of this Society. I needn't tell you how ready I was to accept his invitation, and accordingly on the 10th of May, 1891, a preliminary meeting consisting of himself, Messrs. Urich, Broadway and myself, was held at his residence for the purpose of considering the scheme, and it was there decided that the Club should be called the "Trinidad Field Naturalists' Club."

Having done that much we applied ourselves to the task of procuring members: this, I must say, was attended with great success from the very first, and on the 10th July another meeting was called at my residence. Amongst those present were Messrs. Urich, Mole, Broadway, Guppy, Hewlett, Potter and Taitt, and it was then I was honoured with the post of President, a distinction which I highly appreciated, but which I felt I had no claim to and never anticipated.

Since then I have used all my endeavours to promote the objects of the Club, and I am vain enough to think that our united efforts have been crowned with no mean success.

Mr. Taitt was appointed Honorary Secretary and Treasurer, and to him we owe a great deal of our success. You will all join me in thanking him for the indefatigable attention he has paid to the affairs of the Club and the great interest he has taken in it.

Our next meeting, which took place on the 10th August, we reckon to be our first regular meeting. At that meeting a few rules were framed for our guidance, which were later on re-considered, and a new set, based on those of the Entomological Society of Philadelphia, were framed and passed. From that date, in accordance with these rules, monthly meetings have been held. We were for some time at a loss for a place of meeting, but at length we were offered this school-house, and I take this opportunity, in the name of the Club, to thank the Rev. A. Taitt for his kindness in placing this room at our disposal.

Reports of our meetings have been regularly published in our local papers, and our thanks are due to the Editors of the *Port-of-Spain Gazette*, *Public Opinion* and *Catholic News* for the publicity they have given to our proceedings. I may point out we have subscribed to the *Entomological News*, an American monthly, which, with some books presented by Messrs. Eckstein,

H. K. Collens and R. R Mole, together with exchanges, form the nucleus of the library which the Club one day hopes to possess.

With regard to the work of the Club Mr. Urich has given us an elaborate paper on the External Anatomy of the *Enceladus gigas* (Bonnett), illustrated with dissections beautifully mounted on glass. Messrs. Urich and Mole have placed at our disposal the copy of a paper written by them and read before the Zoological Society of London on several snakes and lizards presented by them to the Society's collection, two of which, a Machete *(Herpetodryas carinatus)*, and a Plica lizard *(Uraniscodon plica)*, were new to the collection.

A new species of butterfly *(Tithorea flavescens)*, has been captured by Mr. Broadway, and a new bat *(Vampyrops caracciolæ)*, by myself. Mr. Broadway has also made one of those discoveries that few men have the opportunity of doing. He found a new genus of dragon fly which has not yet been described. Mr. Broadway is to be complimented on his find. Mr. Mole has given us a most interesting paper on the boa *Epicrates cenchris*, and all will be pleased to learn it has been criticized most favourably by Mr. Morris of Kew.

Mr. Guppy has shown some beautiful paintings of butterflies done by himself and other paintings and prints of the complete metamorphoses of some have been shown by myself, the wings of the butterflies being reproduced by a process in which alum, sugar candy and salt are the principal agents employed. Mr. Potter has treated us to an able paper on bees, which must have proved interesting to the most indifferent to the study of Natural History. Mr. Hewlett has given us a thoughtful paper on the metamorphoses of insects and Mr. Eagle on *Gynandromorphism*, or the union of both sexes in *Lepidoptera*—two most valuable papers. Mr. Guppy, in one of our first excursions, was fortunate enough to capture the largest moth known here, which probably belongs to the genus *Thysania*. This moth was about nine inches across the wings.

In another Mr. Mole secured a fine specimen of the Peripatus, *Edwardsii*, which is very rarely to be met with even where it is most common. Two other specimens have been captured by Mr. Urich at Aronca.

With regard to these creatures it may be interesting to mention that in the year 1883 a German scientist, Dr. Von Kennel, crossed the Atlantic for no other purpose than to procure specimens of the Peripatus, the life history of which is still involved in considerable mystery. The group of *Peripatidæ* is perhaps equivalent and allied to the *Myriapoda* or centipedes, with some affinities to the *Tardigrades* or bear animalcules,

which are microscopic insects and true hermophrodites. He searched for some weeks and only secured one or two specimens, until one day near Laventille he turned over a log and found no less than sixty of the commoner kind *Edwardsii*, which is a native of Venezuela. This was a most extraordinary find, and can only be attributed to the fact that the weather was exceedingly dry and the Peripati had retired to the log for the sake of moisture, which is essential to their existence. I may here mention that Trinidad is more continental than insular in its physiological character, and has nothing in common with the West Indies proper; and I am of opinion that exchanges with Venezuela would be very profitable for the purpose of making comparisons. He also found the Peripatus *torquatus*, which is a much larger species, and it is left to us now to find the Trinidad species, *Trinitatis*, which has been solicited from me by Dr. Gunther since the year 1889. The Club has also determined to make Economic Natural History a feature of its researches. The most important work done by the Club in this direction is the investigation of the habits of the small sugar-cane borer, which was undertaken by a committee appointed for that purpose. This report, I am glad to say, has been well received by the public who were kind enough to compliment us on our success. Mr, Hart, the talented and energetic Director of the Royal Botanic Gardens, has kindly endeavoured to put the Committee right on one or two points; but after some lengthy correspondence he was found to have been labouring under a series of misapprehensions as to the precise ground taken up by the Club, and as the further continuance of the correspondence did not promise any fresh light on the subject other than thrown by the Committee's report, it was decided to bring it to a close. The Club has received complimentary letters on its inauguration from many of the leading men of the scientific world—amongst them I may mention Dr. Gunther, Mr. Oldfield Thomas, Mr. A. G. Butler, of the British Museum, London; Professor Warming, Director of the Botanic Gardens, Copenhagen; Mr. Morris, of Kew; Professor C. V. Riley, Entomologist of the U.S. Department of Agriculture; Professor A. Morgan, and Mr. T. D. A. Cockerell of the Jamaica Institute. Amongst the Club's honorary members figure: Dr. Gunther, Messrs. Oldfield Thomas and A. G. Butler, Professor Warming and Professor Kirby.

So great was the encouragement received by the Club, that it was decided to apply to the Editor of the *Agricultural Record* asking whether our Papers could be published in the *Record*, which was the only journal of a scientific nature in the Colony. We regretted at the time that we were denied the

privilege on the plea that the *Record* was purely an agricultural paper. This was our first disappointment, but we have since been very glad that the *Record's* pages were closed to us, as it has manifested the fact that the Club was one of the hardiest of the institutions of this Colony. At the very next meeting we decided upon publishing our own journal. Accordingly the first number appeared in the month of April, the second in June, the third this month, the second and third appearing with illustrations. On the first number our critics, with the exception of an anonymous one, complimented us on our venture. Our second number contained our draft report of the small sugar-cane borer *(Xyleborus perforans)* which I before referred to, with an illustration of the *Inca*, an insect we have adopted as the typical one of our Club, with a motto, *Natura maxime miranda in minimis*.

Our second issue of the Journal circulated 250 copies and the third 350. I may mention that in accordance with the desire expressed by the members I had arranged to propose to the Committee of the Victoria Institute that the section of Natural History, comprising Zoology in general, should be given in charge to the Trinidad Field Naturalists' Club, who were willing to place their collections in the building of the Institute and go on increasing them, forming complete collections of all the mammals, reptiles and insects of the Colony; but as the Building is not yet taken over, I have not had an opportunity of moving in the matter. I think that the large collections we have in hand already and the means we have to increase them would be a guarantee to the Committee that in a very short time the Colony would possess a pretty good representative collection.

I think the Club may congratulate itself upon the fact that it is paying its way through the *esprit de corps* of the members, who not only subscribe to the Club funds, but also pay for their copies of the Journal.

Now, gentlemen, we are not without cause when we say we are proud of the work we have done; *not because we pretend to have produced work of high scientific value*, but because it has been the first of the kind undertaken on a similar basis; and without being presumptuous we hope that this Club will be of great service to science and of very great benefit to agriculturists and the country generally. We have every reason to congratulate ourselves on the success and continued progress of the Club, but it is well to bear in mind that we have many difficulties still to overcome, so distant are we from the scientific world. It will therefore be necessary to struggle on and on until we can accumulate that amount of knowledge necessary to create a position for ourselves. It is to be hoped that we will receive,

as we have already done, every assistance from agriculturists and others interested in the welfare of the country and the Club. Only two mails ago I received letters from Mr. A. G. Butler and Mr. Oldfield Thomas, of the British Museum, telling me that numbers of insects from Trinidad were yet undetermined. The latter, an honorary member to whom we are indebted for a catalogue of the mammals of the Island in the British Museum, says : " Extraordinarily little is definitely known of the mammals of your Island." Short notes of original observation are of immense value and will always be received with pleasure by the Club.

Our gardens, plains, mountains, rivers, in fact every corner of our island swarm with insects, reptiles and mammals of all descriptions, a good many of which are quite new to science. Our principal staples and fruit trees are all attacked by insects which we must seek to exterminate, and the only way to do so is by continual observation and applying ourselves to seeking the remedies to get rid of them. Already the Club has done some good work in saving the *(clusia alba)* trees planted in the Almond Walk, which were being ruined by a scale insect *(Icerya montserratuensis)*; and in our last Journal we drew attention to the attacks on Guava, Crotons and Orange trees, recommending remedies for same. It is in most cases necessary to employ artificial means, but as everything in Nature has its counterpoise, we know instances in which the natural enemy is near at hand and often multiplied in order to effect the cure; such is the case with the scale insect attacking crotons, which harbours two enemies as related in our last Journal.

What else can we desire when we have such treasures before us ? Should it not be a labour of love to develop them all ?

If we only look upon the magnitude of the work before us, we may be struck with amazement and exclaim : Oh ! we shall never achieve anything; this is too stupendous. But there is a beginning to everything, and remembering the old adage ' Rome was not built in a day,' take heart of grace and go forward.

In conclusion, I repeat, whatever we read or whatever comes to our notice let it be very carefully done, and done in earnest. Dates, descriptions, locality, mode of living, etc., are essential in the biology of insect and animal life.

To illustrate my meaning you will allow me to relate a tale told of Mr. Henry Ward Beecher, which will no doubt be interesting. It happened that he had made it a rule of his life, whenever he saw anything done, to give it his fullest attention, hoping that if one day he were called to do the same thing he would be able to do it well. In this instance he had stood by whilst his horse was being shod and noted carefully how it was

done. Passing some time after, a small village, his horse cast a shoe; he went into the blacksmith's shop, and finding that the owner was away he lighted the fire and shod his horse. He then drove about ten miles and reached another village; upon passing by a blacksmith's shop he thought he would have his work examined to see if it were well done. The smith scrutinized it closely, saw how the nails were clinched and how it fitted generally, then turned round to Mr. Beecher and exclaimed: "Look here, mister, if you made that shoe yourself and put it on, as you say, you had better give up preaching and take to smithing."

Gentlemen, allow me to thank you for the attention you have paid to my address; let us hope that our efforts will be crowned with success; that the Club will go on progressing, and that, assisted by scientists and scientific institutions in Europe and America, from whom we have hitherto received every encouragement possible, we will become a useful institution of the Colony.

To His Excellency, Sir Frederick Napier Broome, who was kind enough to accept the position of patron to our Club, we owe a great deal of encouragement, and it is to be hoped that the Club will continue to thrive successfully under his patronage.

His Excellency the Patron said he was sure they had all listened with great interest to the address which had just been read, giving an account of the first year's operations of the Trinidad Field Naturalists' Club. As he took it, the primary object of such a club as this was to give pleasure to its members by observation of animal, insect, and plant life in Trinidad. They did not aspire, he took it, to be a Scientific institution or to render great services to the Colony. He thought it would be a mistake if they aspired to that. All clubs of this description were formed for mutual amusement, recreation and interest, and they had round them a field which certainly could afford most boundless occupation and study with the greatest profit, interest, and pleasure to all their members. If he would venture (for he was a totally unscientific man himself) to make any remark on the address, it was this—that he thought it was penetrating to too high ambition and too scientific aims. Do not let them try to be severely scientific, let them be amateurs, ordinary colonists—citizens of the island of Trinidad—interchanging their ideas, observing with all the aids they could the manfold life about them, interesting themselves in the wonderful phenomena and processes of nature, and feeling that the aims and objects of their existence as a club were fulfilled in the pleasure that they themselves derived from this glorious field of nature about them. He was sure there were few spots on

earth where a field naturalists' club had more abundant material at its hands than Trinidad. He never took a walk in the evening without noticing something to interest him in plant or insect life, and if this was the case with a most unlearned observer, what must it be with such learned naturalists as his friend Mr. Gatty, or the Member who had just read the address, or other Members of the Club such as Mr. Devenish. What simple amateurs wished to do, was to learn from experienced Members of the Club the proper methods of observing and appreciating that which lay under their feet and before their eyes, and he was sure that the various objects collected and exhibited there that night, and at other times by this Club, and the papers read by its Members could not be but of the greatest benefit to them. Let their key-note —according to his humble judgment—be as unscientific as possible; not to aim so much at having a scientific society, as to have a society for mutual recreation and enjoyment in the open air. The most valuable branches of effort of a club like this he took to be excursions by its Members to the woods and waters of the dominion around them. He did not know whether this Club had yet made any such excursions; he rather thought it had. He was sorry to say he had not been able to join in them, he wished he had. Again, his Excellency impressed upon the Members the object of a Naturalists' Club, which was to give delight to its Members, and not to indulge in scientific matters. They were too exalted for them. There was one point which pleased him more than anything else in the annual report, and that was that the Club was established on a sound financial basis. Depend upon it. whether they dealt with business, science, or pleasure, the first point to be considered was the finance. That was the key-stone of any such institution as this. He congratulated the Officers of the Club for paying great attention to the financial department, and exhorted them to collect the subscriptions severely, and not to give away a single copy of their magazine except such as were given to learned societies, and he would not have so much to do with learned societies if he had anything to do with it. If th ey were careful and economical they would prosper. He had m uch pleasure in accepting an invitation to join the Club, for this reason, because he wished in his humble way to interest himself in all that he thought it behoved the youth and the manhood of Trinidad to interest themselves in. He wished to try and set a good example, and he felt he could identify himself as Governor of the Colony with no more healthful and self-rewarding organization than a Field Naturalists' Club. In conclusion he wished the Club every success.

The Hon. S. H. Gatty said he was there unexpectedly that night. The truth was that he was a little hurt at the Club not having asked him to become a member, but, at any rate, he had subscribed to the magazine, and he should be only too glad to be a member if they allowed him. (Applause.) He had heard also of another ardent naturalist in the Colony who was asked to be a member and said he would be, but he had never been elected or he would have been there that night—he alluded to Dr. Rake.* So that they had not yet got all those in the colony who took an interest in natural history among their ranks. He had belonged all his life to natural history societies, and field naturalists' societies, he thought, were most excellent institutions. As His Excellency had pointed out—and he had covered almost all the ground—no one could have a more healthful occupation than studying the ways of nature in the manner these clubs did. What they ought to be on the look-out for was that the work they did was not entirely thrown away; that was to say, that they should work on proper lines. He was in correspondence with a gentleman who was collecting insects from all parts of the world and who assured him that he did not want so much the specimens as careful notes of the actual habits of the insects; that was where science was most at fault. They who were on the spot could see in their living state and watch the specimens sent home, and in this way amateurs could do, by their observations, as much as most eminent scientists. He had some of his correspondent's letters there—he had brought them down, having put them in his pocket at the last moment, because he only heard of this meeting before he sat down to dinner, and his correspondent wrote him that a great many of the insects here were South American; some of them, he said, which were commonly thought to be the greatest triumphs of their captors, the large and showy Morphos, Caligos and Papilios were not rarities, but there were things that were vastly more interesting to him, the small whites and Theclas and Skippers and Simonidæ, which were less known; then, he said, "I wish you would sit down some day and write what you have observed." Well, he could not say that his observations were accurate enough; in fact, he had not the time to make notes, but he thought he had got in him—probably inherited from his mother, who was a great naturalist all her life—the right sort of instinct of observation, and he wrote about those butterflies a short story of how they flew, and so on, and his correspondent said it was most valuable. He told him that the cracklers only crackled when

* The election of Dr. Rake and several other gentlemen had been postponed, as some amendments with regard to the election of members were being made, Dr. Rake has since been elected.

they were together—he never observed them crackling alone. That was a curious thing. Then his correspondent said, "tell me about their colours," and he wrote him about them, and he observed that there was a tendency to albinism among the butterflies that flew in the shade under the cocoa trees and the curious fact that so many happened to be of the colour of chocolate. Probably that particular colour enabled them to conceal themselves from their enemies. He also sent his correspondent a tiny creamy butterfly with spots of metallic gold upon it, as if a little piece of gold leaf had been placed upon it, and he had written to ask him where did the ancestors of that creature of natural selection see a golden guinea-piece to enable it to take that gold. The metallic green they saw on the Urania had been laid down by recent scientists as being the last and most perfect colour developed by natural selection, and in writing to his correspondent he said "this gold beats your green into fits!" His correspondent had not yet answered that question. But all these sorts of things were interesting, and it was about them that they wanted to know. Of the caterpillars and chrysalis he had not had much success in tracing the life history out here. Perhaps his sight was not sufficiently keen, but he believed their President had succeeded in making a drawing, showing the different stages and metamorphoses of a number of Trinidad insects. But there were other things besides insects, and he should like to say a word in favour of botany. In regard to that he had been disappointed. He knew European botany very fairly well, and even once, when a boy, found a microscopic fungus which was new and got into Mr. Cooke's book and he thought it was a great triumph; but when he came out here he thought it a great pity that persons whose lot was cast out here had no means of learning the botany of the place. There was no handbook, so far as he was aware, published in Great Britain, within the ordinary means of a person, which taught you even the natural orders of tropical botany, and he thought it would be a very good thing for that institution—if it could not be done at the Botanic Gardens—to institute a series of lectures where they could learn the natural orders of the trees out here. He was quite ashamed when people came out from England and asked him the scientific name of some plant, to find that he had never had the opportunity of studying it, and unless you purchased a big book like Hooker's Genera Plantarum there were practically no means of knowing it. Mr. Devenish, for instance, might give them a lecture on the flowering trees of Trinidad, and there should be classes at which students could have flowering plants before them to dissect and classify. He thought they ought to inform themselves a great

deal more in botany than they had done. Of course, insect life here was very interesting. An American naturalist told him there were some forty thousand species of lepidoptera, and he had not the least doubt that there were a vast number of insects which were not yet known to science. His friend had been preparing a list of Trinidad insects and had sent him a draft list which he had not yet had time to go through and compare with lists published in the colony, but he had sent him a list of the insects that had been sent from Trinidad, and there was not at all a complete list made yet and published anywhere. So that there was an immense amount of work before them—(The Governor: Some pleasure too)—and plenty of pleasure too. He took that for granted. (Laughter.) He could not imagine anyone not liking to dabble in natural history, and he quite endorsed His Excellency's remark that it was healthy occupation. He could not imagine anyone having hard brain work which tried his temper, in this hot climate, not feeling relief in going out in a flannel suit and enjoying himself with a butterfly-net or in collecting plants. He did not know much about the animals, but he saw one* in the room which he once hoped would prove to be the natural enemy of the parasol ant, if they could find the natural enemy of the parasol ant he thought it would be a great thing to do. He agreed with His Excellency that to pretend to be a highly scientific society and lay down the law too quickly would be a great mistake. But they could name their species. and pursue scientific methods, and work towards an end which was capable of bearing good fruit, and if they could only make one discovery and find out for instance the natural enemy of that parasol ant, they would have done a good deal. The thing to cultivate, if they meant to do any scientific work, was to learn in the first place how to do it. The next thing was how to preserve their specimens, and to try and make the right observations, but they must be accurate and not allow their observations to run away with them, and whatever conclusions they came to, they should have some evidence in support of them. They all had to get it into their minds to take accurate notes. If they could keep away from imagination they might do good work, although they might be nominally pleasing themselves. They ought to meet together no doubt for mutual recreation and not aspire too much to being able to determine the enemy of the cane-borer or parasol ant. It would probably take one or two generations to find that out. In the meantime if there were excursions he should probably go out and he should thoroughly enjoy himself, as he thought every one with any sense must do, if they would only take part in them. (Applause.)

* Armadillo.

Mr. Meaden then read a paper on the so-called Mosquito Worm and Mr. Potter a few notes on the Banana disease.

His Excellency, accompanied by the Club's guests, then went round the room inspecting the collections, Mr. Caracciolo, the President, giving what explanations were necessary. A young Boa (*Epicrates Cenchris*), was placed loose on the table, and, to the surprise of most of those present, took a mouse offered to it by one of the members and devoured it without any display of bashfulness. The process of swallowing seemed to interest the visitors very much. Mr. Caracciolo exhibited a collection of all the known bats of Trinidad, amongst which figured a very fine specimen of the fish-eating bat (*Noctilio leporinus*), he also exhibited snakes and lizards in spirits and stuffed alligators and armadillos. Mr. Broadway had on view some very nicely arranged cases of the *Lepidoptera*, *Coleoptera*, *Orthoptera* and *Hymenoptera* of Trinidad. Mr. Eagle some cases of *Lepidoptera*, amongst which a case of Trinidad *Sphinges* attracted attention by their beauty. Mr. Guppy was to the front with his beautiful water colour paintings of a good many of our butterflies and moths; he also showed some cases of Lepidoptera amongst which some rare kinds of *Heliconiæ* and a large moth (*Thysania* sp ?), caught at Morrison's Valley, Maraval, were conspicuous. Mr. Petersen showed a fine collection of snakes in spirits. Messrs. Mole and Urich showed the following live snakes: 1, a large *Boa Constrictor* 10 feet long. 2, two young specimens and a half-grown one of *Eunectes Murinus*. 3, a half grown *Epicrates cenchris*, which was much admired for its iridescent coat. 4, a young Tree Boa (*Xiphosoma hortulanum*). The above 4 species formed a complete set of the constricting snakes indigenous to Trinidad. 5, a green Machete (*Herpetodryas viridissimus*). 6, a fine specimen of a beautiful Tree snake (*Dipsas* sp). 7, a common Cribo (*Spilotes corais*). 8, a Diamond Rattle-snake (*Crotalus horridus*). Two Mats (*Tejus teguexin*). A large specimen of the bird-eating Spider (*Mygale*), wrongly called Tarantula here. Mr. Mole also showed the prepared hyoid bone of the red howling Monkey, which, by its large size and hollowness, enables these animals to produce the loud roaring noise they do.

CLUB PAPERS.

THE SO-CALLED MOSQUITO WORM.

Evidently this form of insect life is incorrectly named, and its origin practically unknown. The progress of the mosquito into existence is well known, but it does not at all coincide with that of the insect under view. Most Members of the F.N.C. are more or less acquainted with the Mosquito Worm, and in writing this short paper, my hope is that some of our Members will find opportunity to give attention to this insect, and bring to light some means of dealing with it, for in the country districts it cannot be considered less than a pest. We may take it for granted, that a fly of some unknown kind is the founder of the mischief, and in its search for a house for its reproduction

attacks alike both man and animal, and apparently no epidermis is strong enough to resist this desire.

Only one egg is laid at a time, I think, because I have seen many instances where the body has been punctured in several places, and only one worm produced in each.

The fly appears to be mainly confined to forest land, and those living on the borders are the chief sufferers. At certain seasons, June and October, the fly is hardest at work, and all parts of the human or other body exposed is made an abode for the egg. Wild animals are severely attacked, especially the agouti. The amount of suffering this little rodent goes through while the eggs are incubating must be enormous, for I have shot them when they have been simply a mass of sores caused by the worms forming, and thus rendered quite unfit for food. Lapp suffer in a similar way, but hardly so severely; deer in a lesser degree on account of their heavier and closer-haired skins. In one case I extracted four worms from the head of a young unfledged bird, known as *griere*. Domestic animals are often sufferers.

How or when the egg is deposited has perhaps never been ascertained. The worm is brought forth in the manner of an abscess forming, and the pain of such is increased by the continued movement of the worm. This movement causes the spot to inflame, and the skin to become thin, and easily broken for the insect's departure for fields afresh and pastures new. I think it has never been found into what state the worm passes on leaving its birthplace*; this is what ought to be followed up. I have tried to breed the worm, and trace its after life, but failure attended my experiments. I suggest here that a way of obtaining this object would be to place the worm in fresh pork, the meat to be kept at about the temperature of the human body. From this could be watched the after stages of existence the worm takes.

The worm at its full growth is often three-quarters of an inch long, with a small brown head, round serrated body, ending with a sharp point of white colour. When a worm is discovered the best treatment appears to poultice the place to increase the heat, and so hasten the entrance of the worm into its next stage. Iodine injected will kill the worm, but as the foreign matter remains under the skin, bad after effects may ensue, which may prove worse than the cure.

In hunting, I have often been shown a large black mosquito which the hunters asserted was the parent of the worm. I call

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* Like other species of parasitical flies it is probable that the worm leaves its unwilling host to go into the earth and turn into a chrysalis.—P.C

it a mosquito of an aggravated form, and it looks and bites formidably enough to be responsible for such a pest as the worm, but I cannot support it as the originator, and at the same time can give no better theory for its existence.

In conclusion, I shall be most happy to work with any Member of the F.N.C. in trying to solve this problem in economic natural history.

August 8th, 1892. C. W. MEADEN.

BABICHE SHOOTING IN THE CARONI.*

After a few preliminary remarks, in which he explained that his M.S. was originally written for an entirely different use to that which he then intended to put it, and expressing a hope that its reading might do something towards reviving the somewhat declining interest in the Club's excursions, Mr. Mole read the following paper :—

A lovely tropical morning just before the close of the dry season, the last quarter of the moon fading away in the South-West, while over the verdure clad hills of Laventille—beautiful even after months of scorching heat—and the Church of Our Lady of the Mount, which crowns one of the highest peaks of the range, the bright rosy tints of dawn herald the approach of day's great luminary, giving a peculiarly enchanting aspect to the tree-tops, now slightly swaying on the crest of the hills under the morning breeze. Beneath, where the shadows of night still linger as if reluctant to depart slowly roll masses of dense mist as if searching for hiding places in the hollows in the hill-sides but soon to be dispelled by the rapidly rising sun. Away to the Westward the ships are lying on the usually placid waters of the Gulf now slightly ruffled by the rising breeze. Yards and rigging are silhouetted against the sky. A slight column of distant smoke on the horizon announces either the approach or departure of a steamer. To the south lie a number of sloops aboard of which few signs of life are visible at this early hour. A boat winds its way in and out between the sleeping craft, as it approaches the market on the wharf bearing the silvery victims of the fisher's night-long toil. Beyond, on the left the al-

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* For the scientific names of the trees, mammals, birds and reptiles noted in this article Mr. Mole desires us to state he is indebted to a List by Mr. Prestoe, a Catalogue by Mr. Oldfield Thomas, Dr. Leotaud's Catalogue, Book and Collection of Birds, Dr, Court's Catalogue of Reptiles, and the London Zoological Society.—P.C.

most interminable line of green mangroves, over which at a great distance can be descried an estate's tall chimney pouring out volumes of inky smoke. Further still the heights of Montserrat begin to peer through the mist. More southerly San Fernando Hill like a dark cloud appears to lightly rest upon the waters; to the south again dark dots indicate the coast line to Icacos Point. How wonderfully clear the atmosphere appears as we look southward. Such is the scene presented to us as Urich and myself stand on the Queen's Wharf Jetty superintending the packing of our provisions and other impedimenta on board a pair oared boat. The clocks are just chiming six as we settle ourselves down in the sternsheets and directly afterwards we are being propelled as fast as two pairs of strong arms can pull towards the mouth of the Caroni. The time occupied in covering the distance, which cannot be more than three miles is busily employed in getting cartridges ready and arranging a cunningly devised wire snare on the end of an eighteen foot bamboo. The estuary of the Caroni is almost imperceptible to the stranger owing to the many bends in the river and the long stretch of mangrove swamp through which it meanders, presenting an apparently almost unbroken coastline for many miles. It is, however, sufficiently well marked out to the boatmen who take shooting parties thither and to the mangrove woodsman whose search for daily bread induces him to pass half his days in the swamps cutting fire-wood and making the charcoal indispensable to Trinidad cookery. These people steer by the marks afforded by the mud stranded logs and tree trunks, the bare and weather beaten branches of which afford comfortable resting places to gull and pelican gorged with fish caught about these mud banks. Such a scene as this is rather dispiriting but it is soon left far behind as our oarsmen row straight for the shore in which an opening gradually appears and, suddenly almost, we find our boat has entered a smoothly flowing muddy stream about twenty yards wide, the banks of which are invisible for the mangroves which grow in the shallow water. Up this stream we slowly but easily make our way. The sun is shining brightly and now and again his rays are reflected from the scaly sides of huge fish* as they leap out of the water and descending with resounding splashes send little wavelets rippling over the muddy water in far extending circles. Again and again the fish leap as if in mere playfulness and joy, inspired by the freshness of the morning, or are they feeding on the numerous insects which are flitting over the surface near the banks? "Could they not be taken with a fly?" I ask, "such

* Called by the French Creoles *Grande Ecaille.*

monsters would surely afford good sport." "No" is the reply, "it has been tried many times without success." "Dey get too much to eat here, dey don' care for bait sah," volunteers a boatman. Now and again the line of mangroves is broken by a young palm or the creeper clad relict of what was once a stately ceiba* or silk cotton, as it is more commonly known here. Over every thing, the mangrove roots and the dead trees which they surround grows a vine-like plant which is in places, almost covered with a cup shaped flower, bringing back vividly to our minds the convolvulus to be seen on old neglected garden walls at home. As we get higher up the river the banks become visible, the mangroves give place to solid walls of a small palm† covered with long brittle black bristles which are exceedingly painful when they pierce the skin. At their roots are numberless holes, the homes of the crabs‡ which often stand outside grotesquely defiantly waving abnormally large pincer claws, the companions to which are as small as the others are great. These creatures are constantly to be seen gesticulating with their claws and now and again a pair may be caught in the entrance of a hole, clashing their formidable weapons against each other in what may be presumed to be mortal combat. Again the pickmock palms are varied by lofty clumps of bamboos‖ the older stems forming graceful arches while the younger ones with green feathery tops almost sweep the sky. Now and then a palmiste¶ adds further beauty to the scene. A large blue heron rises in front of us and with heavy flight reaches the withered arm of a dead silk-cotton, but not for long, an unsuccessful shot sends him slowly flapping away to warn his friends that unusual dangers haunt the river this fine March morning. "Look out for mangrove rats,"§ says my companion—"they have long spine-like bristles in their fur; we may as well have one if we get the chance," but only the boatmen saw one and he escaped among the bushes ere a gun could be seized. A squirrel ° with a bundle of moss in his mouth, runs down a tree and vanishes, reminding us by his shape and thick handsome brush, if not by his colour, of the merry little acorn storer of our English woods. No one would raise a hand to harm him here, far away as he is from cocoa or nutmeg tree. Ah! there's a splash! "Babiche!" cry the boatmen and there sure enough we see in yonder clump of water weed a pair of prominent eyes, a narrow forehead and the nose of the babiche peering at us from close to the bank he has just dived from. A momentary pause—a loud crack, a throwing up

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* *Eriodendron anfractuosum.* † *Bactris* sp.

‡ *Gelasimus vocans.* ‖ *Bambusa vulgaris.*

¶ *Oreodoxa oleracea.* § *Loncheus guianæ.* ° *Sciurus æstuans.*

of the water and a short convulsive struggle. We row rapidly to the place and the boatmen pick up, very cautiously, a fine young alligator,* three feet seven inches in length, with a bullet hole under the left eye. He is hoisted in and the men prepare to batter his head to pieces. This, however, is forbidden, but although the babiche looks dead enough, yet as every one knows, his kind have a trick of temporarily recovering from their wounds and snapping right and left, As this one has particularly long and ugly teeth his jaws are tied up before depositing him in the recess forward. We proceed more slowly and within the next few minutes a lovely heron† falls a victim to my companion's marksmanship, but some distance in shore. This entails a stoppage of some duration, it being neccesary to cut a path with a cutlass to where it lies before it can be secured. Shortly afterwards another bird of the same kind is espied, this time on a dead trunk a little way in the bush and we back water to get a better view. "M-m-y Fa-der!" An exclamation of horror from the men—a shout of delight from ourselves. "Shoot him Sah—he bad fellow," cries Seaton, the bow oar, who precipitately rises from his thwart to come aft out of harm's way—"Him bad, shoot him." "Shoot him! Not I," replies Urich, "a pretty innocent thing like that—besides, we are after the heron." But the heron has disappeared. The men appear to be hardly able to move and cannot withdraw their eyes from that slender streak of pale yellow which is hanging from the topmost branch of yonder pick-mock palm; slowly and gracefully it turns its small head and brilliant eyes this way and that as if admiring its exquisite colouring of bronze green and yellow, its symmetry of form mirrored in the water beneath it. Surely the serpent chosen by the Evil One as his disguise when he tempted our Mother Eve was a Yellow Machete‡ the progenitor of the perfect beauty before us and not the clumsy heavy boa usually represented in the paintings and drawings of that unfortunate event—no other snake would have been listened to for a moment by our Universal Mother. But the snake has to be caught and our reflections as the Tempter and Eve and all the rest of the Biblical narrative vanish under the thought of the difficulty of such a feat. "Now then you two, come aft and mind you do as your told; don't bother about the snake—he is our concern. We are going to catch it," says Urich decisively. "Oh, no, Sah, look at trouble noo; we came to shoot babiche Sah. an' no catch snake sah; him 'ting yo' Sah; bes' way shoot he Sah," half

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* *Alligator sclerops* Court. † *Ardea cœrulea.*

‡ *Herpetodryas carinatus*—now alive and well in the Zoological Gardens, London.

blubbers Seaton. " I'll jump overboard Sir, if he comes aboard, Sir," chimes in his companion. " Then I hope the babiche will eat you " is the unfeeling retort, " that will be ten times worse than any injury the snake can do you." By this time we have changed our places the men having got into the stern with a celerity which was truly remarkable, while we stand up in the bows with the bamboo noose ready to snare the snake which despite all the noise which has been made, is so engrossed with itself that it is unconscious of our presence. The terrified boatmen, after many threats, commands and expostulations are induced to send the boat slowly forward towards the bush, but hesitate about driving her straight into it. The reptile which is a good specimen of a rather rare snake, enjoying an utterly unfounded but terrible reputation for " wickedness," climbs its own body, regains the branch and retreats along the boughs in easy graceful curves. " He come go 'way Sah ! Yo' nebah catch he noo, Sah," says Seaton. But this weak attempt at discouragement is of no avail for it only leads to his being told to land one of us with the view of cutting off the machete's retreat and driving him back to the water. This is speedily accomplished, but none too soon, for the snake in a second or two would have quickly reached another bush and would then probably be lost for ever. As it happens he is turned and the boat having, after a good deal of shouting on our part and prodigious grumbling by the boatmen, been brought to the water side of the bush, the machete finds itself taken front and rear. He again turns to flee towards the bank but Urich, who is in the boat, seizes him by the tail. The snake immediately winds the fore part of his body round the branch. The men's excitement by this time is intense and it is with difficulty they can be dissuaded from jumping overboard. At length being reassured by the snake's passive resistance in simply clinging to the branch they are induced to keep the boat up. It is fully two minutes before Urich can get hold of the machete's neck and disentangle him from the bough, all care being exercised because a bite from these reptiles. though not dangerous is not pleasant, just as any wound however inflicted is disagreeable. The capture is doubly difficult, owing to the large quantity of pick-mock to be encountered. Once more we push out from the bank and then we leisurely pick out the thorns the snake has got in the struggle and secure him in a bag. Then we remove those in our hands and arms while the boat proceeds on her way. Another small alligator or babiche, shortly afterwards falls a victim to our rifle and we vow not to shoot any more and to devote all our attention to the capture of a small boa which is frequently to be found in the trees on the banks of this river. Knowing

the boatmen will be more afraid of this snake than they were of the machete, we do not talk about the object of our search. we simply row close along the banks and peer up into the foliage, closely examining anything which looks like a bundle of dried leaves in the forks of the branches. We have retained our forward position, and the men are in the stern slowly paddling the boat along. As she passed under some arching boughs, Seaton, who is thoroughly demoralized for the time being, suddenly catches sight of a richly-coloured iguana* basking on a branch. He dashes head foremost forward, and in doing so butts against my chest as I rise to catch the sleeping lizard, knocking me down into the bottom. The iguana, roused from its siesta by the unwonted commotion, leisurely makes its way out of reach. Expostulations with the unfortunate Seaton have no effect; in vain he is told that his own people consider the iguana a delicacy, he only wishes he was home safe once more, for he will never come on such a hazardous expedition again. Several alligators are now in sight, and some of them must be very large ones, judging by the size of their eyes and the distance from the tip of the nose to the crown of the head, for this is all the alligator vouchsafes to the world of his presence, except when he is enjoying a bask on the mud. Now and again one slides silently from the bank at our approach, and is lost to sight immediately, a ripple on the waters being the only indication of his exit from our view. As we ascend the river higher and yet higher, the scene becomes more lovely. The tall graceful palms overtop all the surrounding dense, matted tangle of bush, tree and creeper. Now we pass a ceiba which extends a mighty arm over the river, but a hundred feet above it; from it depend rope like creepers† in huge festoons. In these other plants have grown, and though the leaves are not so bright as doubtless they are in the wet season, yet the whole is very picturesque, forming a huge curtain to the river, of which it is, certainly, one of the most beautiful sights. Overhead, in the clear blue sky, the black vultures are wheeling in untiring circles; over there a frigate bird is describing his bold curves, the opening and closing up his scissor-like tail, can be seen as it is silhouetted against the blue. A large hawk rises from a tree top, and wings his way slowly westward. On ahead, resting on the arm of a dead tree, watching the water, is a snow white-heron,‡ but he, too, disappears as our boat comes in view. Gorgeously winged butterflies flit around. One or two big greenish-blue fellows,‖ usually near the tops of the

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* *Iguana sapidissima.*
† A liane.
‡ *Ardea candidissima.*
‖ *Morphos.*

highest trees are flying about. Others of brightest scarlet,* with bands of sombre hue, and some with simply black velvet and orange spots and tips, flit here and there. Dragon-flies in plenty skim to and fro. Now and again, a covey of tiny bats spring up from the bushes on the bank and flit out into the sunshine for an instant, to settle again—a living Jacob's ladder—head downwards on the stem of some tall reed, their noses all turned inquisitively towards the boat, while their colour, a dark ash-grey, matches their resting place so well, that had we not seen them fly to it, we should pass them by as being only dead leaves on the stem, the colour of which they so closely assimilate. A Qu'est ce qu'il dit† in a gorgeous yellow vest and brown coat, eyes us from his ærial seat, and, vigorously sharpening his strong black bill on the bough, impertinently asks us, "What do you say?" A loud discordant cry, and amongst the branches lower down we see three or four mel corbeaux‡ or black tick birds hopping about, and balancing themselves with their long tails while they erectly hold their heavily billed and clumsily formed heads, watching our approach. A small iguana, asleep on a sun-lit spot of baked mud-bank, is shot dead, and is a prize, for the new growth of tail proves what has been doubted by some one, that these lizards, like the others, reproduce their caudal appendages. More civilized regions are reached at length, and a cocoa estate borders the right bank. A pretty Hindoo girl stands on a log to look at us as we pass, the bracelets on her shapely arms shining in the sun, and the wind streaming her long veil out behind her—a capital picture. Near her is her mother, a withered old woman, dressed exactly like her daughter, squatting on the earth, hardly lifting her eyes from some task she is engaged in. A chubby little coolie calls our attention to "a duck" on the opposite bank. After some trouble, a movement in the bush is seen, and a shot directed towards the spot is the death of a handsome bird,‖ the small head, long legs, and disproportionately great toes of which forcibly remind us of the water hen or coot of our English lakes and ponds. A little further, and on a long spit of mud where the Caroni makes a wide sweeping bend, and a small rivulet, from the direction of St. Joseph, joins it, lie several huge logs, which suddenly become endowed with life, we find out to be alligators, as they slide into their watery retreat. A little grey striped bird, like a snipe,¶ is not so wise, and falls a victim to his intre-

* *Heliconiæ.* † *Saurophagus sulphuratus*, Lin.

‡ *Crotophaga Ani.* ‖ *Rallus longirostris.*

¶ *Gallinago wilsonii.*

pidity. A few hundred feet further, and we surprise a pair of teguexin lizards,* each about two feet long. They are in first-rate condition, and their scaly mail of yellow and black shines iridescently in the midday sun as they greedily discuss the head and fore-part of a large fish, which has either been stranded on the mud, or forms the remains of the repast of some fishing hawk or perhaps of that rare beast, the Trinidad otter, which Mr. Oldfield Thomas of the British Museum is so eager to examine. Such a chance of good specimens is not to be missed. "You take the one on the left, I'll look after the right," I say. One rolls over, the other lies still astonished at the noise, but unwounded, as owing to something having gone wrong only one gun was fired. We row to the place. The unwounded "mat" scampers off and the other one tries to follow suit, but he is too much hurt and is easily taken and deposited in the bottom of the boat.

Shortly afterwards we pull up to the bank and moor our boat while we refresh ourselves. But on such an excursion as this the time seems wasted unless every moment is taken up with watching land and water, tree, bush, and air. We therefore launch forth again and drift down with the stream on our homeward journey. A bird, like a water fowl, having very sharp spurs on the wing—probably the jacana† so fully described by Waterton in his "Travels," is secured, likewise an alligator which presented a tempting shot on the bank. On and on we drift, the boatmen just keeping our craft in mid-stream. A mass of foliage hanging over the river calls for unusual scrutiny and Urich quietly remarks "there's our *Xiphosoma*." The boat is stopped but peer as I may I cannot see the brute so skilfully has he hidden himself. I see a snake's slough or cast skin in the branches, but that is all. The boat is got into a favourable position and with a long bamboo Urich turns aside the leaves and there sure enough, are the loose coils of a yellowish brown snake. "Garamightee Mr. Urich, he Cascabel Dormillon, yo' nebah hold him" says Seaton. "If you bring that one into the boat Sir, I am going ashore," exclaims Crooks, his *confrere*. "He deadly poison if he 'ting yo'; shoot him sah." "Now don't you twe make asses of yourselves, he won't bite any more than a baby; you do as your told and keep the boat up so that we can snare him. The snake is lying in a thick mass of foliage some ten feet above our heads. The boat is brought up and we two stand in the bows, the one with the snare—a wire noose on a long stick—and the other with a simple bamboo to stir up the snake with. "Ugh! there he is," and Seaton in an agony of

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* *Tejus teguexin.* † *Parra jacana.*

fright sends the boat beyond the mark and against the bank. "What are you doing ? keep the bow just about three feet from under him," we cry. We get into position and a good hearty poke is administered to the snake to make him wake up. The result is a rapid uncoiling and a pair of widely distended pink coloured jaws, bristling with teeth, are launched violently at the stick. "He comin' Sah ! Shoot him befo' he 'ting ahwe dead Sah !" and before we know it the boat has drifted down stream twenty or thirty feet. Then we rise and mildly expostulate with and rebuke those misguided men, and a sultriness flavoured with a slightly sulphurous odour, taints the breezes playing o'er the surface of the river, which it is impossible to describe on paper. At length we get back into position and there is three feet of snake hanging out of the tree waiting to receive us. A blunt spear shaped head is turned towards us watching our proceedings and a forked tongue flicks in and out in a threatening manner. "Oh Golly dere he am again. For Heaven's sake shoot him Sah, yo' nabah catch him," implores poor Seaton. "Oh ! shut up can't you ?" is the inelegant reply, "don't look at the snake ; you can't do two things at one time ; only keep the boat up, we'll do all the rest." But away we float. "Oh go home, you venerable old dears; keep the boat up, can't you ? The beast is getting away," and sure enough seven feet of snake is slowly ascending upwards towards giddy heights from whence nothing but a gunshot can bring him down. A dexterous prod, however, so hurts the creature's dignity that down he comes again to wreak vengeance upon the insult to his ophidian dignity. "Now's your chance." The snare approaches his head ; it's over and pulled tight, but alas ! the snake moves a little and a dead branch is caught instead. It is easy enough to catch a branch, hut it is not so easy to let it go again and a desperate struggle ensues to get the wire down. At last it breaks, but not before the snake has made many wicked snaps at it, each one eliciting a loud exclamation of horror from the men, interspersed with invocations for every imaginable blessing upon their heads if they don't keep the boat up. The noose is repaired and again we try, but the snake a second time commences to retreat. He is again brought back and presently the noose slides easily over his head and is drawn tight. The men by this time are half out of the boat, and the conversation becomes unusually animated on our part. Our rhetorical powers at last get the men to control themselves a little and a gentle strain is put on the snake. The other pole is brought to bear on his back and he considerately throws a coil or two round it which helps us a good deal. Then the last twig which he is holding with his tail breaks and we have him at the end of our poles, while

the boat drops into mid stream. Both men stand up in the stern and should the snake come near them it is evidently their intention to jump into the river and swim ashore. The creature is brought into the boat gently and by a dexterous feint with a soft cap his attention is attracted and then his neck is seized and the wire is loosened. He is a fine specimen of the tree boa constrictor* seven feet long. Before we place him in the bag we raise him aloft and give a cheer which may be heard half a mile off. But the day's excitement is not yet over. Something rushes from under the thwart. Seaton is over the side in the twinkling of an eye. Crooks rushes toward us and drops terror-stricken in the stern; the boat is nearly capsized. In our wake we see a little black head swimming on the surface. It is the wounded mat which was thought to be dead. He is soon recovered, however, and put *hors de combat*, and Seaton returns to his oar, vowing by all that is holy he will never come with us again. We feel we have done enough for one day, and beyond an occasional shot at an alligator, do nothing to interfere with our further progress towards the sea. Just before we reach the river mouth an alligator four feet and a half in length is shot (with No. 3 this time). In his mouth we find the tail of an iguana. On opening him the body of the lizard is discovered. As we have three alligators already we hew off this last victim's head with a view to preserving it and allow his body to drift away. Beyond a temporary check caused by the boat sticking on a mud bank for a few minutes, nothing further occurs and we land on the Queen's Wharf as the clock strikes six, having enjoyed a day's fun on the Caroni, which it falls to the lot of few to obtain.

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* *Xiphosoma hortulanum*, now, or very recently, in the Zoological Gardens, London.

R. R. MOLE.

2nd Sept., 1892.

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Vol. 1. DECEMBER, 1892. No. 5.

J'engage donc tous à éviter dans leurs écrits toute personnalité, toute allusion dépassant les limites de la discussion la plus sincère et la plus courtoise.—LABOULBENE.

Trinidad Field Naturalists' Club.

NATURA MAXIME MIRANDA IN MINIMIS.

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JOURNAL

OF THE

Field Naturalists' Club.

VOL. I. DECEMBER, 1892. No. 5.

REPORT OF CLUB MEETINGS.

19TH AUGUST.

Present: Messrs. H. Caracciolo (President), Syl. Devenish, M.A., W. E. Broadway, T. I. Potter, F. Eagle, F. W. Urich, R. R. Mole, C. W. Meaden, W. G. Hewlett, E. V. Wilson and A. Taitt (Secretary).—This meeting was entirely of a business nature. Several amendments to the Rules were discussed and adopted.—A Committee was appointed to draw up the conditions under which the collections belonging to the Club should be placed in the Victoria Institute.—The following gentlemen were elected members: Messrs. A. B. Carr and J. Guilbert, as country members; the Hon. S. H. Gatty, Dr. Rake and Mr. W. Miles, B.A., as town members.

2ND SEPTEMBER.

Present: Messrs. H. Caracciolo (President), Syl. Devenish, M.A., W. E. Broadway, R. R. Mole, Dr. Rake, F. W. Urich, F. Eagle, G. W. Hewlett, Reed, E. V. Wilson and A. Taitt (Secretary.)—The following gentlemen were elected members: Mr. W. F. Kirby (British Museum), as honorary member; Messrs. Henry Tate, C. J. Clerk, E. D. Ewen, S. Eagle, G. Vahl, as town members; S. Wells (Grenada), as corresponding member; Hon. R. Guppy and Mr. J. S. Greenidge, as country members.—A letter from Mr. T. D. A. Cockerell and some Notes from the Jamaica Institute were read.—A Report on Cane

Borers in the West Indies by W. F. Blandford, from the Director of Kew Gardens was placed on the table. The following papers were read : Mr: R. R Mole : " Babiche shooting on the Caroni " ; Mr. Urich : Notes on a South American Rattlesnake (*Crotalus horridus).*—An excursion to Diebé valley on the 11th September was announced.—After some miscellaneous business of little importance, the meeting adjourned.

7th October.

This meeting took place at the Victoria Institute. Present : Mr. Syl. Devenish, M.A., Professor Carmody, Dr. Rake, Rev. R. H. Moor, Messrs. W. E. Broadway, F. W. Urich, J. H. Collens, T. Potter, F. Eagle, G. W. Hewlett, F. J. Maingot, C. J. Thavenot, A. B. Carr, E. D. Ewen, R. Dumoret, R. R. Mole, and A. Taitt (Secretary). In the absence of the President Mr. Syl Devenish took the chair.—The minutes of the last meeting were read and confirmed.—The following gentlemen were elected members of the Club : Lieut. Col. Wilson, C.M.G., Messrs. C. Libert, O. C. Malcolm, as ordinary members ; Dr. A. Woodlock and Messrs. J. S. Wilson and F. J. Mahoney as country members.—The Secretary read a letter from Mr. J. Robson, Editor of the *British Naturalist* with regard to the Journal, and a communication from Mr. T. D. A. Cockerell about the lace wing insects and the cane fungus.—Mr. Mole stated that Mr. Urich and himself had recently forwarded under the charge of Mr J. Hoadley, a number of snakes to the Zoological Society of London for identification. They had all arrived safely but one. He would give their Trinidad names and the English and scientific names by which they were known to the Society : 1. Tigre—South American Rat Snake—*Spilotes variabilis*. 2. Cribo—Yellow Tailed Snake—*Spilotes corais*. 3. Machete Couresse—Boddaert's snake—*Coluber boddaerti*. 4. Ratanero (the local name of this snake had been given him by Mr. A. B. Carr at that meeting ; hitherto this name had been erroneously applied by him to the *Epicrates cenchris*)—Crowned snake—*Scytale coronatum*. 5. High woods coral—Royal snake—*Liophis reginae* 6. Two Beh belie chemin—Black backed snakes—*Liophis melanotus*. The three last species, Dr. Sclater had informed him, were new to the Society's collection. The snake which died was locally called Mapipire corde violon, but in reality it was a very harmless kind, never attempting to bite and its name was given as *Leptognathus nebulosus*. In a recent number of the *Graphic* an illustrated article had appeared in which allusion was made to several remarkable creatures in the Society's collection and amongst them appeared a picture from a photograph of a lizard which Mr. Urich and himself sent to the Society, viz., the

Uraniscodon plica—he did not know the local name. The portion of the text of the article which was supposed to apply to the picture had reference to another lizard altogether, viz., the *Polychrus marmoratus* which they had also sent to the Society later in the year.—Mr. Carr said the local name for the Plica lizard was "Old Man" (laughter).—Mr. Potter exhibited a curious hairy *Bombyx* caterpillar found at St. Ann's, a specimen of the *Castnia licus*—local name : Cane sucker—a moth, bred by him from the larva which he said lives in the trunk of the banana plant and completely destroys it. He also showed a caterpillar belonging to the family of *Psychidae*, which carry about sacks made up of little pieces of wood and sticks in which they are transformed into pupæ.—Dr. Rake said that as the question of the so called Mosquito Worm had again cropped up he thought a letter he had received upon the subject, four years ago, would be interesting to the Club. A friend of his about that time went to Venezuela and while there he got a swelling in the cheek. He came back here and he (Dr. Rake) treated him. The swelling burst and one of these worms came out. He (the speaker) put it into spirits and sent it to the British Museum. He received this reply :—

British Museum (Nat. History),
Cromwell Road —London S.W.,
February 6th 1888.

My dear Sir,—The larva you send is undoubtedly that of a species of *Dermatobia*, I will not venture to say that it is *D. noxialis* although that is possible. Your specimen agrees very well with the figure given by Grube (Arch. f. Naturgeschichte 1860 t. 1 f. 4) and Grube considered his distinct from *noxialis*. It is however a difficult question to settle as the figure given of *noxialis* in the Ann. d. Sci. Nat. 1845 t. 4a. f. 5, is not a good one, and so the differences may be due to bad drawing and the original may belong to the same species. The question then stands thus : your larva is the one *known* under the name *Dermatobia noxialis*, but there is not at present sufficient evidence to prove that it is the same insect as was *originally* described under the name *noxialis*.

I am, dear Sir,

Yours faithfully,

CHAS. O. WATERHOUSE.

Mr, Mole expressed a hope that inasmuch as the gentleman who presided over the Royal Botanic Gardens had discredited

the statement of the President of the club that the "Mosquito worm" was of the *Dermatobia* species, that Dr. Rake would permit the letter he had just read to be copied or at all events an extract taken from it for publication in the minutes of the meeting. Dr. Rake said he had placed the letter at the disposal of the club to make what use of it they thought proper. There was a postscript attached to the letter with reference to the *Peripatus* which he saw mentioned in the last number of the *Journal*;—"If you know any one interested in zoology, we should be glad if you would ask him to look out for *Peripatus* in Trinidad. It has not so far as I know yet been found there, but it is not unlikely to occur. *Peripatus* is usually found associated with centipedes in rotten wood, in dark places. I enclose enlarged sketch.—Chas. O.W." The sketch added, Dr. Rake, was four times natural size and was of the *Peripatus capensis* from South Africa. In answer to Dr. Rake. Mr. Urich stated that two species of *Peripatus* were found here 9 years ago by Dr. von Kennel, one of which he described as new and gave it name of *P. Torquatus*. The other was *P. Edwardsii*, a well known species, which is also found in Venezuela. *P. Torquatus* is 15—16 centimétres long, of a dark brown color with 41—42 pairs of legs. It has two bright yellow longitudinal stripes on the back. He did not know whether this was the *P. Trinidadensis* asked for a short time ago by Dr. Gunther.—Dr. Rake then read a most interesting paper on his recent visit to India and illustrated it by a map, with the places he visited marked, and some beautiful photographs.—Mr. Potter proposed a vote of thanks to Dr. Rake which was seconded by Mr. Maingot. The Rev. R H. Moore and Mr. Ewen, as old Anglo-Indians, also begged to thank Dr. Rake for his interesting paper.—Mr. Ewen said that in the last number of the *Agricultural Record* he saw a note by Mr. J. H. Hart F.L.S., on the Secua Nut, *Fevillia cordifolia* (Sir.) In writing that note Mr. Hart had not stated the most valuable qualties of these nuts, not being perhaps aware of them. Dr. Crüger had stated that besides, the rust preventing qualities of the oil, the seed in large doses was a drastic purgative. But the most important virtue of these seeds was the fact that the infusion of them is an absolute antidote to several of the most virulent obeah poisons, not slighting the repute it was held in as an antidote to snake poisons. Professor Carmody said that this was the first meeting the Club had held at the Victoria Institute and that he was sure all present would join him in thanking the Rev. L A. Taitt for having allowed the Club to hold its meetings at the All Saints' School House; seconded by Mr. Potter and carried unanimously.—The meeting adjourned at 10.30.

4TH NOVEMBER.

Present : Mr. Caracciolo (President), Col. D. Wilson, C.M.G., Professor Carmody, Hon. R. Guppy, Messrs. E. D. Ewen, G. Vahl, F. Eagle, R. R Mole, G. Reed, H. Tate, W. E. Broadway, W. G. Hewlett, C. J Thavenot, F J. Mahoney, Syl. Devenish, M.A., Jean Petersen, T. I. Potter, O. C. Malcolm, V. Wilson and F. W. Urich.

In the absence of Mr. Taitt, Mr. Urich acted as Secretary. The minutes of the last meeting were read and confirmed. The following gentlemen were elected members of the Club : The Hon. J. B. Smythe and the Hon. Edgar Agostini, Mr. Til. Sorzano and Dr. Woodyatt.

Mr. Mole said that in a recent number of the *Illustrated London News* there was a woodcut of and an article on a *Mygale* spider from Trinidad presented to the Zoological Society of London by Mr. Terry. There seemed to be some doubt as to the effect of its bite—whether it was poisonous—and he would be very glad if any of the members present could give him any information on the subject His own opinion was that it was not, or at any rate only slightly so. A short discussion ensued in which the President, Messrs. Devenish and Potter, and Col. Wilson took part, with the result that as far as the knowledge of these gentlemen went, it was ascertained, that they had never heard of any death taking place from a *Mygale's* bite, although it was very painful, causing fever and severe local inflamation.

The following papers were read : Mr. Urich : "Biological and Faunistic notes on Trinidad" from the German by Dr. J. von Kennel ; Mr Potter : "Notes on Cane Borers."

Mr. J. Mitchell of Tacarigua having presented a fine adult female of the *Galictis barbara* to the Club, the animal was exhibited by the President, who said it was shot a few weeks ago by the donor on his estate Mr. Broadway proposed a vote of thanks to Mr. Mitchell for this really valuable gift, seconded by Mr. Devenish and unanimously carried. Mr. Urich said that this animal was found all over tropical South America and, as our fauna was more continental than insular it was also found here pretty frequently. Its habits were much the same as those of the marten It was carnivorous and exhibited a marked liking for fowls. It was said that in some localities it was kept like a cat in the house to catch rats and mice. The male had a prettier fur and a more bushy tail than the female.

Mr. Mole exhibited on behalf of Mr. J. Guilbert, a country member who was unable to be present, some earth containing a fungus, said to be very injurious to cocoa and ground provisions. The President said he would send it away for identification.

Mr. Mole also exhibited the larva of a beetle found by Mr. Guilbert on the east coast.

Mr. Broadway said that at the Annual Meeting, Mr. Gatty stated it as his opinion, the members of the Club should inform themselves more in Botany than they had done, and in order to try to give this idea a start he had brought a few specimens of dried plants collected by Mr. Urich and himself at Diebé to show how such specimens were mounted and prepared for the Herbarium. Some people had told him that when they went out they only saw bush, which was not worth while collecting. If they only took the trouble to collect the bush as they termed it and looked at it a little closely, they would soon find out that it was far more interesting than they first thought. The plants exhibited, presented a very neat appearance and excited the admiration of all the members present, especially when Mr. Broadway explained various points of interest in connection with some of them. The specimens had been dried by the kind permission of Mr. Hart and mounted at the office of the Royal Botanic Gardens. Mr. Hart had also kindly named some of them. The following is a list of the plants collected :—

Brassica alba, L. var.—Wild mustard, probably an introduced plant.

Miconia multiflora, D.C.,

Rudgea Hostmanniana, Benth.

Eupatorium macrophyllum, *Sw. (Hebeclinium macrophyllum D.C.,)* " Herbe Chat."

Cestrum sp.

Solanum verbascifolium, L. ?

Cestrum sp.

Phytolacca icosandra, L. " Poke weed."—A ubiquitous plant ; native of various countries.

Dorstenia Contrajerva, L.—" Contrayerva Root."

Urera baccifera, Gaud.—Stings severely. A large nettle the leaves of which were completely " riddled" by black hairy caterpillars.

Calathea Allouya, Lindl.—" Topie tambour" of markets of Port-of-Spain.

Hedychium Gardnerianum.—(Wild ginger of Jamaica.)

Dichorisandra Aubletiana, R. & S.,

Philodendron sp.—Common in Trinidad, but apparently undescribed.

Panicum stoloniferum, Poir.

Panicum lasianthum, Trin.

Blechnum longifolium, H. B. K.,

Aspidium trifoliatum, Sw. var.,

Gymnogramme calomelanos, Kaulf.—Common throughout the West Indies. Some varieties bright yellow, some much whiter than above.

Mr Urich read a few notes on the insects collected during the excursion to Diebé Valley on the 26th August, and showed some of the specimens taken which had been prepared by Mr. Broadway. Amongst these figured some good *Morphos*, two specimens of Tiger beetles viz. *Odontocheila bipunctata* and *margineguttata* and other insects all of which were well known. Mr. Urich also said that some of the *Morphos* were caught in the act of feasting on rotten fruits, which they did with such avidity that it was quite an easy matter to bag them. On a field on the side of the road the butterfly *Actinote pellenea* was found in all stages of development, i.e., eggs, caterpillars, pupæ and perfect insects. The caterpillars were feeding on a species of *Eupatorium*.

Some of the Locusts which were recently present in great numbers at Erin and doing some damage there were placed on the table. It seems that they were blown over in large numbers from Venezuela during the storm which occurred early in October. Colonel Wilson said that they were of the same species as those which were found at Patos and Chacachacare some time ago.

Mr. Ewen read some notes on the Cassava poison and its reputed antidotes. Professor Carmody and Mr. Devenish took a lively part in the short discussion which ensued.

The meeting adjourned at 10.15.

CLUB PAPERS.

NATURAL HISTORY NOTES IN INDIA.

By Beaven Rake.

India, which now includes the whole of Burma, may be stated roughly to be equal in area to the continent of Europe without Russia. It must also be remembered that in it are included a number of countries as dissimilar in physical geogra-

phy, in temperature, in inhabitants, and in fauna and flora as are the different countries of Europe. It is therefore evident that all I can attempt to-night, is to record a few of the general impressions which were derived from a more or less rapid journey over the peninsula, and the annexed Burmese territory.

On the 17th November, 1890, after a voyage of twenty-five days on the P. & O. Steamer *Sutlej*, we were greeted on waking by the fantastic outline of the Ghats against the morning sky. The outline of the hills is most remarkable. So absolutely flat do the summits appear, that the impression is conveyed that each original peak has been levelled by human agency. In a short time we had entered the fine natural harbour which well deserves the name of Bom Bahia given to it by the early Portuguese colonists.

The natives of India are not slow to recognise new arrivals, and we had not been long in the Apollo Hotel before we were besieged by jugglers, snake charmers and the rabble which is always waiting to entice baksheesh from the luckless European. Decidedly bad tempered cobras were produced from baskets, and mongooses issued from bags. For a certain sum the mongooses were allowed to attack the snakes, and a further payment was demanded if the battle was to proceed to a fatal issue. This however, we did not feel incline to countenance, and after watching the tricks of the conjurors, some of which were decidedly clever, seeing that they were done on the public pavement with properties of the most limited description, we were glad to escape to our rooms on the fourth floor, and look down on the city at our feet, with its stately University and other buildings, and its picturesque surroundings of sea and mountain.

That afternoon we drove over to Malabar Hill and visited the Towers of Silence, in which the Parsees leave their dead. We looked in at the door of a little temple in which the sacred fire is kept ever burning, but were not allowed to enter. We then came to a large over-grown garden in which were the famous towers. Seated in long solemn rows on the walls were the vultures awaiting their gruesome repast. It is forbidden to Europeans to climb the walls and look at the ghastly remains below, but from a model preserved in the gardens, we were able to gain some information as to the arrangement of the interior of the towers. In each is a platform formed of four slabs sloping down to a central opening from which a vertical channel leads to a chamber beneath. The bodies are placed on the sloping sides of this funnel shaped platform. The vultures descend and remove the flesh of each new victim. Liquids run down to the chamber beneath, while the bones remain on the platform and dry in the sun. They are removed from time to time by the attendants of

he place and disposed of. This process though inferior to cremation, is in some respects better than the ordinary method of burial. It is however, well nigh impossible to overcome the repugnance excited by the flocks of unclean birds always to be seen in the garden, which simply live on human flesh. Our vultures in Port of Spain seem delicate feeders in comparison.

Another bird which soon makes himself known in Bombay, and indeed throughout the plains of India is *Corvus Splendens*. He is, as his name indicates, a handsome fellow. His back is a rich grey and he is strongly suggestive of an enlarged English jackdaw. As he is bigger physically, so has he twice the impudence of his English cousin. He seems to be absolutely ignorant of fear. He is to be seen wherever man is found. On the roofs of the houses, in the railway stations, inside hospital wards or dwelling houses, his discordant croak is constantly to be heard, as he watches ever on the alert for fragments of food which he darts down to dispute with dogs, fowls or whatever comes in his way. No kind of food is safe. In the Madras Club I have seen one of these crows enter the large dining room and drop down to help himself from the table, when he thought he was unobserved.

Bombay is the seat of a vigorous Natural History Society. We were most kindly received by Mr. H. M. Phipson, the Honorary Secretary, and shown the Museum which he has formed in part of his business premises. He is an ardent naturalist and spends all his spare time in collecting and preserving specimens. Not the least interesting objects in the Museum were several glass cases of live snakes, with which Mr. Phipson seemed to be on terms of great familiarity. Indeed the way in which he taxed the temper of the cobras by stirring them up with a stick, made us feel that we were not initiated in the mysteries of snake charming, and we kept our distance accordingly.

One of the greatest curiosities in the Museum was a crow's nest made entirely of short pieces of telegraph wire. Whether the birds picked up the fragments or broke them off is a question, but on looking at the thickness of the wire, I should incline to the former hypothesis. The Society issues an excellent journal, two numbers of which I have placed on the table this evening.

During our stay in Bombay our work took us to various places in the immediate neighbourhood, and the flora presented points of similarity and contrast with our western tropical vegetation. Instead of the cabbage palm which is rare in India, groves of Borassus or Toddy Palm were everywhere to be seen. The natives collect the juice from the spathe and this when

fermented forms their favourite drink. A tree after several tappings often dies.

A sight which I had never seen in the Western Hemisphere was an old tank covered with the most lovely bright pink water lilies. These were smaller and deeper in colour than the large pink lotus to which I shall refer later.

On the other hand the thick hedges of Adamsonia, the prickly Emphorbias, the ubiquitous bananas, mangoes and bamboos, and especially the plants and shrubs in the gardens of Bombay, all served to remind us that though the west has borrowed largely from the east, the process has probably been to a certain extent reciprocal, and that many genera if not species are common to the two hemispheres

In this connection may be mentioned three plants which the traveller in India can hardly fail to notice. They have all been introduced and they have all become readily naturalised. The first is the *Argemone Mexicana* which as its name implies originally came from Central America. It is now a common weed throughout India. As members are probably aware it occurs in Trinidad, but far more sparingly than in the east. The second of these guests is a somewhat unwelcome one; it is the Lantana, which some lady admiring introduced from Ceylon. It is now a veritable pest in India, and all efforts to keep it down seem unavailing. Wherever land is not kept under cultivation thickets of lantana spring up and choke it. The third plant which especially struck me was the Datura. Originally a native of America it seems to make itself at home everywhere, and I can say almost without exaggeration that in no part of the world have I failed to find it. Unfortunately the natives of India know its properties only too well and datura poisoning is by no means uncommon. Even here in Trinidad I have seen two cases amongst coolies, who had probably brought the seed from India.

An afternoon was pleasantly spent in visiting Elephanta, one of the numerous small islands which dot the harbour of Bombay. A passage of an hour or two in a small steam launch brought us to a quaint little jetty of rough stones running out into the mud. As we jumped from stone to stone to gain the land, it was amusing to watch the myriads of little hermit crabs scuttling away across the mud. We were soon besieged by small boys who wished to sell us pendulous nests of the oriole closely resembling those of the familiar Icterus of Trinidad. They also brought brilliant metalic green and gold beetles apparently belonging to the *Chrysomelida* Ascending a steep flight of stone steps we entered the famous caves of Elephanta. These were carved by the early Hindus out of the solid rock, and contained colossal bas relief figures of Siva, Vishnu and Gunpoti.

Unfortunately Mahommedan vandalism has mutilated most of the figures, but the caves even in their present imperfect condition are a striking record of early religious feeling. Throughout India, as in Europe, the remarkable decadence of art as shown in the modern temples and shrines is only too evident. It was a bright sunny afternoon and brilliant butterflies were flitting over the herbage. The number of species however, was not great. This scarcity of species is noticeable throughout the plains of India. Vegetation there is very scanty, and it is to the hilly and wooded districts of the Nilghiris, and of Sikkim, Assam, and Burma that the collector turns for entomological treasures.

It was soon time to leave Bombay, and we ascended the Ghats by one of the mountain railways so successfully carried out in India. As we went slowly up the steep gradients, we looked back on beautiful and varied scenery. Around us was a tangled mass of trees, bushes and flowering creepers. In the distance were the outlines of the strangely truncated hills, while far below was an occasional peep of a smiling valley, with its rice fields, roads and little hamlets, and here and there a few natives and oxen engaged in ploughing or other agricultural work. I was forcibly reminded of similar valleys on the Semmering Railway between Vienna and Gratz. There was however, this important difference that in Austria at the time of my visit a thick layer of snow covered the ground, while on the Ghats everything pointed to the fact that we were in a tropical climate.

Half way up the ascent we stopped for a few minutes at a reversing station, and when the necessary change had been made we passed two or three small stations used as sanatoria for the troops, and by those who wish to escape for a short time from the heat of Bombay. We soon afterwards emerged on a fine expanse of table-land, and entered Poona.

The people of Bombay are fortunate in being able to regulate their temperature more accurately than is usually the case in India. When the weather is too hot in Bombay there is an exodus to Poona, and when even Poona becomes insupportable they go higher to Mahableshwar.

Poona possesses a fine College of Science under the superintendence of Dr. Cooke, who most courteously showed us all his class-rooms, museums, and workshops Here every branch of technical science is taught, and students are prepared for the examinations of the University of Bombay. In one part of the buildings is a complete iron foundry, where casting is done and complicated machinery made by the students in a way which compares favourably with work in Europe. A well equipped

astronomical observatory has been fitted up, while a part of the grounds has been laid out as a botanic garden of medicinal and economic plants. In the museums we found students busily engaged in drying, mounting and labelling plants collected during their field excursions in the neighbourhood. At a short distance from the College of Science is the affiliated Veterinary Laboratory where I found Mr. Lingard, whom I had previously met in London, working out the bacteriology of *Surra* an imperfectly known disease very prevalent amongst horses in India.

During our stay in Poona we made a two-days excursion down to Belgaum, a small but interesting station on the plateau of the Deccan. We were most hospitably received and were driven about the town in a curious little box on two wheels, innocent of springs, and drawn by two bullocks. This novel mode of locomotion, which added much to the enjoyment of the visit, seemed to be almost peculiar to this part of India. I certainly did not meet with precisely similar conveyances anywhere else. It is conceivable however, that a long day's journey in one of these vehicles might have its disadvantages.

On our way to Belgaum we passed old deserted Mahratta forts, monuments of the fierce and warlike people who used to dispute this part of India. In Belgaum itself is a well preserved specimen of this form of architecture. The picturesque old bastions and moat remain almost uninjured, but inside, instead of the savage chieftains of former days, a British regiment is peacefully quartered. Two interesting old Jain temples, somewhat dilapidated and greatly overgrown with bushes, but still presenting the characteristic pillars and roofs are also within the walls of the fort, happily spared by modern vandalism.

From Poona we went to Bijapur, one of the most interesting cities in India. It is not as well known as it ought to be for situated as it is, a little out of the beaten track it is often neglected by the globe trotter, or cold weather visitor to India. Leaving the great Indian Peninsular Railway at Hotgi, we changed into one of the carriages of the Southern Mahratta. It is a somewhat remarkable fact that in a country in which there is a recently developed system of railways, there should be no uniform gauge. This however, is the case. The Southern Mahratta is one of the narrow gauge railways, and the trains are, I think the slowest I have ever travelled in. So deliberate was our progress that I often felt inclined to step out of the carriage and collect a few botanical specimens, catch a butterfly or two, or try a chance shot at an occasional fine old black buck who would stand up in bold relief against the horizon and stare inquiringly at us, quite innocent the while of possible danger.

At length after some fifty or more weary miles which we took several hours to cover, the domes and minarets of Bijapur rose against the arid and sparsely cultivated plain. This old city of Aurang Zeb is now a city of the dead. Green parroquets fly screaming about the walls, and make their nests in holes which time has hollowed in the richly carved cornices of the mosques. Little bright eyed squirrels, grotesquely striped with black and brown run hither and thither over the ruins, jerking their long tails and chattering to themselves about the intruders who dare to dispute their possession of such classic ground. For this city is a lasting relic of the glory of the great conqueror Aurang Zeb. Turning out or destroying the original inhabitants he built his own magnificent Mahommedan shrines and tombs, and for a time flourished in oriental splendour. His dynasty however passed never to be replaced.

Sitting in the moonlight at the door of an old mosque, now converted to the modern uses of a traveller's bungalow, we could not but be influenced by the solitude and grandeur of the scene. A few yards in front of us rose the Gol Gombaz, an enormous tomb raised to the memory of a former ruler. We had climbed up to the dome in the afternoon, and had found there a whispering gallery equal to that of St. Paul's. The diameter of the dome itself is only a few feet less than that of the English cathedral, while it is greater than the diameter of the dome of St. Peter's in Rome. When it is added that the height of this pile is in proportion, some idea will perhaps be conveyed of this gigantic monument to the memory of the comparatively unknown man, whose bones rest beneath a modest slab in the centre of the floor. Such is an example of the buildings of Bijapur, erected in a time when might was right, and rulers ordered their subjects to work without hope of recompense or reward.

In spite of the baying of pariah dogs and the scampering of rats we slept soundly in our strange quarters. The next morning we visited the chief mosques and ruins, and were more than ever impressed with the utter desolation of the place. Except a few squalid natives and a handful of English officials, no human beings tenanted the empty streets and courts. Everything was thickly overgrown with cactus, lantana and other bushes. A tamarind tree here and there lent a grateful shade, and its graceful foliage formed a fitting accompaniment of the

delicate domes and minarets of the mosques. In some parts of the city, sad to relate, nineteenth century barbarism had transformed the ancient buildings into government offices of various kinds. There is now, however, a vigorous movement for the preservation of antiquities in India, and, where proper discretion is used, much is done to prevent old buildings from falling into decay, without interfering with their original design.

We passed a picturesque old tank, containing green, filthy looking water. At one side bullocks were walking up and down an inclined plane, alternately drawing up and letting down by a rope a bucket into the water. The water when drawn is emptied into a canal and thence distributed over the land. A public tank is attached to almost every village in the plains of India, and serves as a place for washing, for drinking, and often as a receptacle for refuse of various kinds. No wonder that when cholera invades a district it works such fearful havoc amongst the native population. Strange to say, at other times the people habitually drink this filthy water apparently with impunity.

They showed us a quaint old bronze gun, grotesquely fashioned at the muzzle to represent the head of a fish. The maker had given it the rather pretentious name of "Malik i Maidan," or Lord of the Plain. Doubtless it had been a terror in its time, and as it lay neglected on the forsaken ramparts, it seemed unkind to compare it with the more prosaic artillery of of modern days.

We had received through Dr. Lawrie a kind invitation from the Nizam's Government to visit Hyderabad. This was accordingly our next halting place. Leaving the Great Indian Peninsular Railway at Wadi, we entered the Nizam's Dominions passing through undulating country, covered more or less with short scrubby bush, which we were informed sheltered cheetahs, and other large game. Hunting with tame cheetahs is a favourite sport in this part of the country, as is also falconry. On the platform at Wadi we saw Shikaris carrying about falcons ready equipped with hood and jess for the chase. This was one of the many instances in which during our travels we were suddenly brought in contact with the past. Old sports, old customs and old arts survive in India with a wonderful vitality. This is especially noticeable in the bazaars, where, with the most primitive tools, objects of the most cunning workmanship and of high artistic merit are daily manufactured.

(To be continued.)

SECUA NUT.

Fevillia Cordifolia (Ser.) Antidote Cacoon : Secua (Trd. Sp.) *Avilla (sp.)* Nhaudiroba (? Port.) *Liane a calebasse, a savonette, Contre-poison* (fr.)

This plant is referred to in the last number of the *Agricultural Record* by Mr. J. H. Hart. He says he was informed by Mr. Syl. Devenish that the oil of the seeds preserved steel from rusting and having tried it on some instruments found it most effective. In writing that note Mr. Hart has not stated the most valuable qualities of these nuts, not being perhaps aware of them.

Mr. Crüger stated that besides the rust preventing qualities of the oil, that the seed in large doses was a *drastic purgative.* Long says : " The seeds are largely impregnated with an oil " which is extracted by pressing, and burnt in lamps. The " negroes burn the seeds themselves ; they fasten a number of " them upon a skewer, and setting fire to the uppermost, it " descends very gradually to the bottom. They are extremely " bitter " (but less so than Cedron seeds)" and when grated and " infused in rum or other spirits a small dose *opens the body* and " *provokes an appetite.* The infusion is also made with " Madeira Wine, and taken to relieve *pains in the stomach.* The " oil gives a fine clear light when burned in lamps, and emits " no disagreeable smell.'

" The kernel sliced and infused in rum with orange peel and " a little wild Cinnamon, is an excellent *bitter and opening medicine*.....Good in all *cold poisons.*" (Dancer).

" The seeds are said to be good for *dropsy, swellings* of the " *face, feet &c.* The following is the receipt. Take 8, 10 of " the kernels, scrape and bruise them in a mortar : Put the same " into a bottle pouring thereon a pint of old rum or brandy and " a like quantity of water, let it remain in the rum for 2, 3 " days, shaking the bottle frequently. Take a wine-glass full " every morning fasting, using moderate exercise before breakfast." (Lunan).

According to Renato De Grosourdy, the alcoholic tincture of these seeds is the basis of a very effective Anti-Rheumatic balsam, used in Puerto Rico.

But by far, the most important, and interesting virtue of these seeds is the fact that the infusion of them is an absolute antidote to several of the most virulent obeah poisons, not slighting the repute it is held in as an antidote to snake poisons,

and many vegetable ones, such as those of Bitter Cassava, Manchioneal, Nux Vomica, &c.

One of the most terrible of these obeah poisons, is the milky juice of the Yellow Savannah flower *Urichites Suberecta* (J. Müll.) From which Mr. Bowery, F.C.S., of Jamaica has isolated the principles "Urichitin" and "Urichitoxin" in experimenting with the former of these, Mr. Bowery gave a cat 1-1000 of a grain every day for six weeks, on the last day of which period the animal was seized with violent convulsions and died; evincing the cumulative power of the poison.

However there are at least half a dozen cases of poisoning with Yellow Savannah flower juice, on record, in which the tincture of Secua kernels proved its beneficent potency. In addition to this, De Grosourdy relates that "Dr. Drapiez having "poisoned animals with Nux Vomica, *Rhus Toxicodendron* and "Cicuta (Hemlock) saved their lives by giving them Secua "scrapings softened with water: And experiments made by Dr. "Hamilton confirm that conclusion."

The fat is said to form 56-60 % of the composition of these seeds, but that is probably too high an estimate, and it would form an item of interesting investigation to acertain whether when instruments, &c. are dressed with the fat they are not also rendered strongly *antiseptic* at the same time owing to the antidotal qualities already commented on.

E. D. EWEN.

7th October.

BIOLOGICAL AND FAUNISTIC NOTES ON TRINIDAD.

From the German by Dr. von Kennel.

Few remarks on the higher animals of Trinidad will suffice, as we possess very exact descriptions and illustrations of most of the mammals and birds of South America. But what strikes the observer of the higher fauna of Trinidad most is the comparatively

large number of animals living on trees. Amongst the mammals, the monkeys, sloths, porcupines, pouched rats and ant eaters, which have prehensile tails, and claws, live entirely on trees ; a small cat (*Felis pardalis*) and one or two squirrels can also be classed among the arboreal animals, so that only a deer, a boar, a few rodents (agouti and laps) and an armadillo are exclusively confined to the ground and amongst these nearly half can be considered amphibious.

I cannot say what is the cause of the comparative want of land animals, but it seems to me that the large tracts of virgin forests and the want of any extensive plains are the cause of this selection. The forests of the northern chain of hills show more favourable conditions for larger animals, but being steep only the deer, which can climb about them like a goat, finds an existence there. The rest of the forests are so thick, that in their shade no grass and very little undergrowth can grow. Besides the ground is often swampy and therefore only suited for those animals that are half amphibious. In consequence of this the animals seek their food on the crowns of the trees ; the vegetable eaters are fructivorous and the carnivorous ones feed on birds, reptiles and insects. Of the mammals living on the ground the deer is the only one that eats grass ; the rest live principally on roots.

As few inferior animals live in the woods on the damp ground, we also find amongst the reptiles many which are mostly carnivorous, living on the trees. A few species of lizards and a tortoise are terrestrial. Amongst the Amphibia most of the frogs live on the trees.

From the above remarks it can be seen that not much is to be found in the forest. Even the invertebrate animals which live in rotting trunks of trees are mostly found in the cocoa estates ; it is not to be understood that these animals prefer the cocoa estates, but the number of hiding places they have in the forests among the fallen leaves and in the dead branches, cause them to distribute themselves more. Besides the *Erythrina* trees that are

used for shading the cocoa seem to be preferred by insects, worms and snails on account of their soft wood.

There is much to be done in Trinidad, in the sweet water fauna, as this subject, is nearly untouched. I shall now make a few remarks on it, keeping the different forms of water distinct according to their character, as these have much influence on their inhabitants. There are four forms of water in Trinidad, which with the exception of some widely distributed species have their special fauna viz: 1. The mountain rivulets. 2. The canals with slow-flowing water, principally on sugar estates 3. Ponds. 4. The larger rivers as Caroni, Ortoire etc.

1. The mountain rivulets take their origin high up the northern chain of hills and there are a good many of them. Their water is clear and comparatively cold and their course is rapid, forming little cataracts in many places. Most of them flow to the South and fall into the Caroni. They are inhabited by few species of animals; there are several species of small fish, some cray fish, belonging to the gems *Atya*, which live under stones and under the plants growing on the banks, insect larvæ and few worms; I have never seen snails in them. Most of the animals living in these rivulets protect themselves against the strong current either, that they choose the washed out holes in the beds of the stream (as the fish and cray fish) or they keep themselves behind and under stones, or that they have special organs of suction with which they attach themselves to the stones. A *Plecostomus* species (Mamam Cascaladou) especially does this, and it sticks on so firmly to the stones that it can hardly be detached without injury. Some insect larvæ have suction valves on their ventral surface, with which they stick on to the stones over-grown with *algæ* on which they feed. The worms are represented by some *Clepsines* and few *Planaria*. I would like to call attention here to a small fish, that occurs in every form of water without exception. It is a small *Cyprinodonte* about 5 cm. long, generally smaller. The males are very pretty during the breeding season; on the brown green ground

colour they have 4—6 irregular spots, some grass green, others orange, a third, fourth, fifth sky blue, chrome yellow or an iridescent color. This little fish is to be found anywhere where there is water, in the drains in the street, in the rivers, ponds, etc. It is curious to note the degree of heat it can stand.

2. The canals, that are made on sugar estates for drainage, flow very slowly and the temperature of the water generally rises high during the day. The bottom is generally muddy. In many places the surface is covered with large leaved water plants especially *Nymphaeaceæ*, grass and moss or *algæ*, under all these a rich fauna lives. Here is the home of a large number of *Cyprinodontæ*, innumerable larvæ of insects (*Libellulidæ* and *Ephemeridæ*) small water beetles, *Clepsines*, small *Rhabdocœlous Turbellaria*, but above all several kinds of *Ampullaria*, a few small snails also occur.

The *Ampullaria* are uncommonly lazy animals. They lie in the bottom of shallow water half out of their shells in large numbers, few specimens crawl about slowly, and seem to have a comparatively great want of breathing directly in the air and this is why they prefer shallow water, as they can get to the surface quicker. Besides the *Ampullaria* one sees dragon fly larvæ, *Annelides*, spawn of snails, now and then a *Clepsine* or *Planaria*. Among the *algæ* and moss *Agrion* and dragon fly larvæ are carrying on their blood thirsty life; now and then a water beetle shoots to the bottom, some tadpoles come to the surface to gasp for air—everything as in Europe on the banks of some brook. Many canals run into the sea and lose themselves in the mangrove swamps, and here the picture and fauna changes considerably. The aquatic plants disappear and the banks consist of very soft black mud which is perforated with countless holes, into which a number of crabs take refuge and it is astonishing how they climb about on the Mangrove roots. Among the fish that live in the swamps, I will only ennumerate the cascaladou belonging to the genus *Callichthys*, the flesh of which is considered such a delicacy that a proverb has been

derived from it saying : " He who once eats Cascaladou must die in Trinidad" or words to that effect. The *Callichthys* belongs to those fishes that can live in the mud with very little water.

3. The ponds that are generally dug out on estates to form reservoirs during the dry season are thickly over-grown with water plants, grasses etc. Their fauna is recruited from the other two forms of water, but naturally those that have not any organs to contend against strong currents thrive best here. Whatever forms occur here are present in large numbers as there is no chance of their distributing themselves widely. With the exception of a small alligator or a large Ameiva, one finds the same type of animals as in Europe. The ponds are the Eldorado of the tadpoles which occur in large numbers; there are many kinds of insect larvæ such as dragon flies, *Agrion*, *Æschna*, *Ephemera*, gnat larvæ and pupæ. Many kinds of water snails are also seen as *Planorbis*, *Physa*, *Ancylus*, small *Cyclas* and *Pisidæ*; their well known parasite, *Chætogaster Limnæi*, or at any rate a species very similar to it is also found. *Hydra viridis* and *fusca* also unexpectedly strike the eye. I cannot find any specific differences between the Trinidad *Hydra* and the European ones, although they are larger than the Trinidad kinds. It is a strange fact that the inferior Trinidad sweet water fauna as far as I have known consists of smaller specimens than the corresponding European specimens. Among the *Rhabdocœlous Turbellaria* I found representatives of the genera *Mesostomum*, *Microstomum*, *Prorhynchus* and several others. There are several kinds of *Annelides* which belong to the genus *Dero*. The *Hirundinea* are represented only by the genus *Clepsine*, which like their European cousins carry their brood on their ventral surface. Amongst the Microscopic animals the *Rotataria*, *Daphnides* and *Cyclops* etc , were not wanting.

F. W. URICH.

4th November.

(To be Continued.)

ŒCODOMA CEPHALOTES.—SECOND PAPER.

In my former paper on the *Œcodoma Cephalotes*, I gave merely the treatment the leaves receive after they have been carried into the nest, and I believe it to be the first record of any observations of what takes place in the interior of a Parasol Ant's nest.

In "The Naturalist on the Amazons" by H. W. Bates, an interesting description is given of the leaf carrying ants, Vol. I., pp. 23 to 33, (original edition). At page 26 the author writes: "It has not hitherto been shown satisfactorily to what use they apply the leaves" and concludes they are used by the Ants to thatch the domes which cover the entrances of their subterraneous dwellings.

In "The Naturalist in Nicaragua," by T. Belt, is another interesting description of the leaf cutting Ants, pp. 71 to 84, (original edition), on p. 80 this author writes: "Notwithstanding that many columns of the Ants were continually carrying in the cut leaves, I could never find any quantity of these in the burrows, and it was evident, that they were used up in some way immediately they were brought in." On p. 79 the author stated: "Some naturalists have supposed that they use the leaves directly as food; others, that they roof their underground nests with them. I believe the real use they make of them (*i.e.* the leaves) is as a manure, on which grows a minute species of fungus." It is therefore evident that although Bates had not arrived at what the Ants did with the leaves when first brought in, he was the first to suggest that these Ants were "mushroom growers and eaters"—although he had never seen them actually eat the fungus.

That there are two different species of Parasol Ants in Trinidad I feel certain and for the present I am inclined to believe there is a third. The Sauba Ant mentioned by Bates is the one known here as mostly belonging to the high woods, while those mentioned by Belt are, I believe the ones we find in

our gardens, and may be also those that we find housing themselves under masonry walls. The Sauba Ant is *Cephalotes* indeed, while the others though certainly big-headed compared to other Ants, are but mildly so, when compared with the Sauba Ant.

I had not intended to have written again on Parasol Ants, until I was prepared to have given a full account of them and their habits from the egg till the winged ones (males and females) escaped from the nest. But owing to the destruction of my nest without a queen, spoken of in my last paper, as the "B" nest. I offer the following results obtained during the last four months regarding the Eggs, Larvæ and Pupæ.

The eggs when laid are almost microscopic in size, soon after they become enveloped with a pearly white fluffy growth and increase in size for the next ten days (about). this growth is then removed by the smaller sized workers, and the egg then measures on an average 1-100 of an inch in length, is about one half of its length in diameter, and is rounded at both ends. The eggs while enveloped in this fluffy growth have a tendency to adhere to one another, and it is not uncommon to see an Ant while moving the eggs from one part of the nest to another carrying four or six sticking together. Judging from the solicitude the nurses have in moving the eggs in the nest, one is led to suppose, that it must be to protect them from draught, especially as in the earlier stage, the eggs are so often carried beneath the fungus bed, but are returned, it may be in a few hours.

The egg after being cleaned becomes very soon the larva an exceedingly minute helpless grub, both legless and blind. The larvæ are usually placed on the top of the nest and are constantly attended by the smallest workers—the nurses—who separate them into divisions according to their size.

At first it seemed a mystery, how these minute grubs could be fed, so systematically, knowing that each individual larva was only one among so many, yet certain it was, that all were

equally attended to. Further observations showed that nature had provided most efficiently for them to ask for food when they required it. This the larvæ do by pouting their lips; on this notification of their requirement the first nurse who happens to be passing stops and feeds them. The nurses are continually moving about among them with pieces of fungus in their mouths ready for a call for food. The nurses feed the minute larva, by merely brushing the fungus across their lips showing that the spores alone are sufficient for its food at that period of its life. But it is not so when the larvæ have increased so much in size, that the pout can be seen without a glass, for then the whole piece after having been manipulated by the nurse's mandibles into a ball, in the same manner as the leaves are served when they are first brought into the nest, is placed in its throat and if that is not sufficient the pout continues when the next one and even the next passing proceeds with the feeding, till tho pout is withdrawn, showing that it is satisfied. No further notice is then taken of it by the feeders, until it again asks for a meal by pouting later in the day.

All who have studied the habits of Ants know the affection they evince towards the young ones in their different stages, this is fully borne out when the larvæ have arrived at the stage of being deprived of their skins. It is a most interesting sight to watch the careful way in which the skin is gently removed, for it is quite a busines for some 4 or 6 workers and occupies them about an hour.

The resulting pupa is a perfectly smooth doubled-up representation of the Ant it is to be, almost like a piece of polished marble. I may mention that Ants all start in the world full sized, and never grow afterwards, nor are they fed during the pupa stages. On the second day a thick white growth commences to cover the pupa, when this coating is complete the pupa, resembles a sculptor's roughed-out figure in white statuary marble, having one might consider gone back a stage. During the next eleven days the eyes have become black and the pupa is turning brown. On the twentieth day, it has turned quite brown, has to be again cleaned, and is ready then to be opened out by the workers.

This is perhaps the prettiest operation to watch during the whole process, most carefully four or five workers, large and small, proceed to pull out a leg, which undergoes massage, then another leg or one of the antennæ. Each limb is treated separately. The workers seem satisfied, so soon as their patient

moves the limb they are operating on. At last the patient is set upon its legs, and no further notice is taken of it. It is now a very pale coloured Ant, moves languidly about the nest for some time, then it begins to feed itself on the fungus, and the next day is busy at work in the nest, which it does not leave till it has acquired the proper Ant colour, and can no longer be distinguished from the others.

My "B" nest had neither queen nor male when it was set-up on the 4th July, a few larvæ and pupæ were put into the nest at starting. The last of these became an ant on the 14th August, 41 days after capture.

The first eggs were seen 19 days after the capture, viz., on the 23rd July. Very many small, medium sized, and large ants were matured from these eggs before its destruction on the 6th November, in periods of from 57 days for the smallest to 74 days for the larger ones. On the 20th October a male was matured, on the 3rd November there were 25 males On the 2nd November a queen was matured, and another on the 5th, three days later, and their period was about 84 days. Thus, there are about 10 days for the egg, as a larva it varies from 27 days for the smallest workers, 44 days for the ordinary workers and 54 for males or queens, and 20 days for the pupa stage.

To prevent these flying ants escaping from the nest, I put a small mosquito net over it, which, whether from the wind, or by accident, touched the upper part of the nest. On the morning of the sixth I found that Foraging Ants had entered the nest and completely destroyed it during the night. The marauders had entered at the point where the net touched, by eating a hole through it, and must have trooped in, in considerable numbers as most of the ants had been carried off Curiously the exact number of wings of both males and queens were left in the nest. I counted them carefully and found 108 wings, or four for each winged ant Four parasol ants of the larger size, although dead, were still holding on to four of the foraging ants. There were still in the nest 21 others which had been left behind when the army retreated The fungus bed was scattered here and there, as if it had been done by some malicious person.

I have not yet been able to name the foragers, but they are the ones that live in orchids, having a black head and body with an almost transparent abdomen.

When the nest was destroyed there were still four queens and two males as pupæ to mature, besides a vast number of larvæ and pupæ of the various sized ants.

It is therefore as far as this experiment goes conclusive, that workers, taken as these were from a nest which had been living in community with males, do lay eggs, and that from them they can produce males and queens.

J. EDWARD TANNER.

21st November, 1892.

BITE OF THE TARANTULA (MYGALE) SPIDER.

At the last meeting of the Club, Mr. Mole in speaking of this Spider, stated that there was some doubt as to the effect of its bite. The following of which I was an eye-witness may be of some interest. Early in the year I had a gang clearing some land after burning, and on visiting them one afternoon I saw a black tarantula dart from a heap of bush and deliberately bite one of the prisoners on his heel and then scamper away which it did with safety to itself, for chase was made after it. The spider doubtless was in an angry mood at being disturbed in perhaps a favourite haunt for food and shelter. The bite was given in all earnest and drew blood, about two or three drops. We know the thickness of the skin of a labourer's foot, it will almost resist an auger, yet the spider managed to penetrate, so it may safely be asserted it was in earnest. Immediately the bite was given a shout went up "the man is bitten by a big black spider, a tarantula." This made the bitten one almost frantic with fright and he cried piteously, "Me God, me go die in gaol, me God," &c. I took him to the infirmary some 300 yards distant and the sufferer carried his heel in his hand, *i.e.* hopped all the way. I had his foot fomented with hot water and applied Spirits of Ammonia with the addition of a little liquid Ammonia, and gave him a dose of Ether mixture. I endeavoured to calm his feelings and made him lie down. About 2 hours afterwards he ate his dinner heartily and slept well at night. He complained of no pain in the morning and went to work as usual. There was no local swelling or inflammation and but little pain at any time. Fright was the only ill effect.

It would not do to draw the conclusion that all bites would terminate as in this case. The spider was evidently irritated and bit hard, and the full effects of any venom ought to have been seen but there was none, I think. Perhaps had the wound inflicted been on a vein, or in a more tender part than the heel, worse effects than the foregoing might have ensued.

C. W. MEADEN.

22nd November, 1892.

THE STUDY OF NATURAL HISTORY.

The study of Natural History has always had its votaries even in the earliest times, indeed the account of the first Man, as related in the Biblical story, implies that Adam was an ardent Naturalist. In fact it is difficult to understand how primitive Man could have been otherwise than a naturalist. Endowed with an intellect of a higher order than any other created living thing, deprived of all the ordinary food, healthy and unhealthy, which modern civilization affords the mind in such abundance, primeval Man, unconsciously perhaps, made Nature his book, and there read, in order to provide food for his ever-hungry brain. Weaker than many scores of the monstrous animals which roamed through the forests and grazed on the plains at a time when time had not begun, so to speak; when marsh, swamp, river and sea teemed with voracious reptiles, compared to which St. George's fabled dragon or the most formidable crocodile of to-day is almost as harmless as the tiny anoles which chase each other on our garden walls, or spring from bough to bough in pursuit of the flies which constitute their food; Man, threatened by dangers such as these in the woodland and the savannah, in the water and the air; in the earliest stages of his history, in order to obey his first instinct—self-preservation—was forced to study the habits of the appalling brutes which menaced the existence of his species with extinction from all sides, and so became a Naturalist. The necessity of supplementing his food supplies from the vegetable world taught him how to distinguish among the roots, berries, leaves and grains growing around him those which were deleterious to his well-being from those which might be eaten with advantage, and

so he was initiated into practical botany. The brutes which constituted his enemies being more powerfully armed with teeth and talons than he, to meet them on equal terms he fought his battles with them armed with a stone. Experience shewed he got more force into his blows if he lengthened his weapon, and he substituted it with a club. The blows were heavier, yet he found if the heaviest end of the club was farthest from his hand, they were more effectual still, the stone he formerly used now attached to the end of the stick, would be just the very thing; the gradations by which he reached the stone axe were then easy. Then he discovered that wounds caused by a sharp pointed instrument were the most deadly —he devised the stone dagger or knife. Very often the dying animal inflicted severe wounds as he administered its *coup de grace*—if he could give the death-blow at a greater distance, so avoiding danger to himself, was the next thought, and a long stick sharpened at one end was the result, and became his spear or lance. Even then the occupation of hunting was extremely dangerous, and then he threw his javelin; next the bow and arrow were invented. This led, ages afterwards, to the development of the enormous artillery of the present day, by which man can throw bursting shells into his enemy's habitations twelve miles distant. Such illustrations could be enumerated by the dozen, proving that all arts and sciences are the outcome of the efforts of early Man to enable him to meet on equal terms with warring nature, and that thus he was of very necessity a Naturalist. But as time wore on, and when Man was more able to take care of himself, and became numerous enough to unite against and overcome the unreasoning brutes which formerly endangered every footstep, the study of Natural History from motives of self-preservation was neglected, and Men found in the arts and commerce occupations which have at last led to Art supplementing Nature. But in every age Men of Letters and Poets have been fond of drawing leaves from the now neglected book of Nature in order to give point to their morals and adorn the page of history. But here contrast the difference between the first Naturalists and those of later days. The first observed for themselves, the second very often copy from each other, but in order to embellish their observations with an appearance of originality, add some little imaginary detail here and there and thus some most surprising stories have come to be regarded as facts by the world. Even in those countries where the animals about which they are told are found, we find persons who are even accurate observers of Nature in other respects, following in the same old paths of error. As an illustration of this, we need go no further than our own island. The pelican is one of our commonest birds, yet in a book, now long since out

of print and copies of which are exceedingly scarce,* which is full of beautiful descriptions of Trinidad and the West Indies, in connection with a highly romantic—we suppose the proper term now-a-days would be "thrillingly interesting"—story, the late Mr. Maxwell Philip, makes allusion to the "solitary bird" , ... "which will open its vein and make its parched young ones drink its life-blood," and this too in a book which is full of sketches which are otherwise true to nature. But that book was written fifty years ago, and since then the study of Natural History has been taken up largely. Instead of being looked upon, as it was, even in the writer's boyhood, as the sign of a weak intellect, not to say anything worse, we find it being taught in the schools, and children are encouraged to pursue its study as a healthy recreation. Every day new societies for its cultivation are being started all over the world, and the numbers of papers and magazines existing solely for the purpose of chronicling observations in Natural History, are legion. We may therefore take it that the men and women of the next generation will be as much more enlightened on the subject of the workings of Nature as the present generation is with regard to the preceding one.

* Emmanuel Appadocca.

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Vol. 1. FEBRUARY, 1893. **No. 6.**

J'engage donc tous à éviter dans leurs écrits toute personnalité, toute allusion dépassant les limites de la discussion la plus sincère et la plus courtoise.—LABOULBÈNE.

Trinidad Field-Naturalists' Club.

NATURA MAXIME MIRANDA IN MINIMIS.

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JOURNAL

OF THE

Field Naturalists' Club.

VOL. I. FEBRUARY, 1892. No. 6.

REPORT OF CLUB MEETINGS.

2nd DECEMBER.

Present: Mr. H. Caracciolo (President), Drs. Woodlock and Woodyatt, Professor Carmody, Messrs. C. J. Thavenot, E. D. Ewen, E. V. Wilson, R. R. Mole, F. Eagle, T. I. Potter, W. E. Broadway, G. Vahl, Syl. Devenish, M.A., G. Reed, F. W. Urich, Jean Petersen, J. H. Collens, W. G Hewlett and A. Taitt (Secretary). The minutes of the last meeting were read and confirmed The following gentlemen were elected members of the Club: Mr. P. Chalmers Mitchell, Christ Church College, Oxford (honorary member) and Mr. J. Mitchell, Tacarigua, (country member). Letters were read by the Secretary from Dr. Woodlock, Mr. W. F. Kirby (British Museum), Mr. S. Wells (Grenada), Mr. J. Mitchell (Tacarigua), Mr. Oldfield Thomas (British Museum). The last named gentleman acknowledged the receipt of some mammal skins from the Club and announced the discovery of a new bat by Mr. J. H. Hart, F.L S. (Applause). Letters were also read from Mr. T. D. A. Cockerell (about the sugar cane fungus), Professor C. V. Riley (U.S. Depôt of Agriculture) and Mr. Harris Ganteaume (Bolivar). The Secretary placed on the table the following Indian curiosities, received from Mr. Ganteaume, viz., 1 Blow-pipe and quiver with poisoned arrows, 1 Bow and arrow, 1 tiger cat skin, 1 Book of Tabari bark and read the following extract from Mr. Ganteaume's letter relative to these curios:—"The

" blowpipe and quiver are from the Indians 'Maquiritare' of " the Upper Orinoco. The arrows are tipped with curare and " are therefore to be handled with care. The bark on the " upper part of the quiver is from the Marima tree; this bark " peels off in large sheets and all of one piece from 4 to 8 yards " long and 3 to 4 wide and is used by the Indians for bed covers " or blankets. The resin on the lower part is the Paranian, " well known to the druggists here, who sell it as an antispas- " modic, applied as a plaster. The piece of twine in the middle " is for passing round the head or forehead; the Indians always " carry their quiver in this manner, so as to leave their arms " and hands free. The Tabari is also the bark of a tree and " when peeled off green is beaten into separate leaves as you " will see; these are used in lieu of cigarette paper. The skin " is from a Tiger cat, killed in my yard in the suburbs of this " city (Bolivar)." Mr. Devenish said that Mr. Ganteaume's curios were a valuable contribution to the Club collection and he proposed a vote of thanks to the generous donor, seconded by Mr. Potter and carried unanimously. Mr. Devenish also made some remarks about the differences in colouring of the tiger cats found in Trinidad and Venezuela. The Secretary exhibited the skin of a Huillia *(Eunectes murinus)* 18 feet long also sent by Mr. Ganteaume as a present to the Club collection. Mr. Potter exhibited a curious Millepede from Santa Cruz and made some remarks thereon—Mr. Mole on behalf of Mr. Charles Libert placed two snake skins on the table one of which was of the Mapipere Zanana, *Lachesis mutus* and the other of the Fer-de-Lance, or as it is called here Mapepire Balsain, *Bothrops lanceolatus* and said that these skins were those of Trinidad snakes. He would call attention to that of the Fer-de-Lance which is found here because a few years ago, when a Fer de Lance, imported by Mr. Leon Centeno from St. Lucia gave birth to young ones, a paragraph appeared in the *Port-of-Spain Gazette*, in which fear was expressed that this poisonous reptile might be introduced into the Island. It was not generally known but it was a fact that the Fer-de-Lance was indigenous to the Island and he had seen two specimens in Mr. O'Reilly's collection (one from the Caroni, captured by Mr. Andrew Graham) and the other about 3 feet in length which was from Caparo and the only difference between the Trinidad specimens and the one from St. Lucia was that the colouring of the Trinidad snake was lighter than that of the foreigner.—Mr. Caracciolo mentioned a curious fact in connection with the parasol ant. A gentleman from Venezuela had told him that when the Indians on the Orinoco want to get rid of a parasol ants' nest they took the earth that is brought up by the ants of another nest and put it

round the nest they wished to destroy. The inmates of the nest so treated quit their home and seek fresh fields and pastures new. The gentleman did not tell him whether the earth was taken from another parasol ants nest or from the nest of another species of ant. It would be interesting if someone tried this experiment here.- Mr. Petersen read a paper on the part mosquitoes play in spreading certain diseases. Mr. Devenish laid on the table a drawing of the *Peripatus capensis* which he said was given him by the late Bishop Rawle.- Mr. Caracciolo brought the following curious fact to the notice of the Club. Dr. Morton had told him he had often noticed when a train passed a certain thicket a number of small birds flew away which were immediately pounced upon by a hawk which was waiting for them in a neighbouring tree. The circumstance showed the hawk had acquired the habit.—Dr Woodlock did not think this was a habit acquired. It was a display of intelligence on the part of the hawk. The hawks of Europe had been noticed doing the same thing. Birds were endowed with far more intelligence than they were generally credited with.—The meeting adjourned at 10 o'clock.

6th January 1893.

Present : Messrs. Devenish, T. I. Potter, W. E. Broadway, F. Eagle, Jean Petersen, C. W. Scott, R. R. Mole, Dr. Rake, J. Russell Murray & F. W. Urich, (Acting Secretary)—In the absence of the President Dr. Rake was elected to the Chair. The minutes of the last meeting were read and confirmed. The following gentlemen were admitted to the Club as ordinary members : Sir J. T. Goldney, Mr. R. J. Lechmere Guppy, F.L.S., F.G.S., C.M.Z.S., Messrs. J. Goode & J. O. Scott.

Letters were read from Dr. A. Gunther (British Museum) acknowledging receipt of some Mammal skins, Mr. B. T. Galloway Chief of Division of Vegetable Pathology of the U.S., Dept., of Agriculture, about a fungus, which seems to be new, sent by Mr. Caracciolo on behalf of Mr. J. Guilbert, a country member ; Revd. M. Horsley ; Mr Charles Whitehead ; and Mr. E. D. Ewen about the Seeua nut. Dr. Rake showed some specimens of Trapdoor spiders found at Maraval together with the galleries they make in the ground. Mr. Potter made some remarks as to how the galleries were constructed.—Dr. Rake also showed some bees found at Maraval, which belonged to the genus *Trigona*.—Mr. Broadway placed the following Trinidad *Bombyces* on the table ; they were bred by him from caterpillars and had been determined at the British Museum. They were :- 1. *Automeris Janus*, Cram ; a fine female specimen. 2. *Automeris* sp. near *metea*, male and female specimens. 3.

Ammalo helops, Cram, male and female specimens. 4 *Arsenura armida*, female specimen. Mr. Petersen showed a snake poision antidote in the shape of a dark powder, he had received from a friend in Surinam. He said that his friend had seen an Indian, who had been bitten by a rattlesnake, and already showed symptoms of the poison taking effect, recover on the application of this powder. Mr. Devenish said it would be interesting to try some experiments with it. The meeting adjourned at 9.45.

3rd February.

Present : Mr. H. Caracciolo (President), Dr. Rake, Professor Carmody, Messrs. Syl. Devenish, T. I. Potter, W. E. Broadway, C. W. Scott, J. O. Scott, J. R. Murray, C. Libert, O. C. Malcolm, J. H. Collens, F. W. Urich and R. R. Mole. Messrs. Urich and Mole acted as Secretaries in the absence of Mr. Taitt. The minutes of the last meeting were read and confirmed. A letter was read from Mr. Oldfield Thomas (British Museum) about some Mammal skins forwarded by the Club. Mr. Caracciolo showed a fine specimen of a little lizard, which looked very much like the *Seps tridactyla*, and which had been presented to the Club by Dr. Knaggs. These little lizards are frequently found at Santa Cruz and in the heights of Arouca in damp places under rotten logs of wood, and stones. Like all the *Brevilinguiae* their bodies are snake-like with four very small legs. They belong to the Family *Scincoideae* of which the well known *Anguis fragilis L* or blind worm of Europe is also a member. Mr. Broadway showed two kinds of Mangrove, and a plant called 'old man's beard' from the Blue river. He said that wherever the latter was growing birds had built their nests in it. He also showed some shells and a Cocoon of *Attacus Bolivar* from the same locality. Dr. Rake produced an insect he believed to be related to the ant-lions *(Myrmelcontidae)*. He had not found in Trinidad the pits which the larvæ of these insects construct to catch their prey, but he had seen them in Southern Europe and the East. The present specimen looked like the one figured in Kirby although the markings were different.—Mr. Potter said that he had seen a similar insect at St. Ann's. Mr. Mole, in a short paper, introduced to the meeting the live Racoon recently acquired by the Club, and the animal's grotesque movements and somewhat rough friendliness towards everyone was generally admired.—Mr. Caracciolo read an interesting paper on some *Rhynchophorous* beetles of Trinidad and showed some mounted specimens of these beetles in illustration of his paper. Mr. Mole read a description of an Excursion to Blue Basin, after which some business of minor importance took place and the meeting adjourned at 10 p.m.

CLUB PAPERS.

NATURAL HISTORY NOTES IN INDIA—*Continued.*

By Beaven Rake, M.D., (Lond.)

The country round Hyderabad is uneven, the low hills being crowned with rocky peaks. On these summits are often immense boulders piled one on the top of another, as if some giant had been striding through the land and building toy houses only to knock them down again. We noticed this curious conformation over a wide area of Southern India, from Hyderabad to beyond Madras. The rocks afford shelter to many jackals, which form excellent substitutes for foxes, and afford many a morning's sport to those who ride after them.

We noticed another strange physical feature of the country near Hyderabad. The sides of the hills flake off in thick slabs, which are much used for paving or building. When the native workmen want a supply of these slabs, they light large fires on the sides of the hills, and the heat makes the stone split in this convenient manner.

Dr. Lawrie had very kindly prepared five tents for us in his compound, and here we encamped amidst a perfect paradise of trees and flowers, fully enjoying the rest after our late precarious life. In the morning we were greeted with the most unearthly sounds. At first we thought it was some street cry in the city, but it soon turned out that the author of this discordant noise was a huluk or howling monkey. Many of these had been caught out in the country, and brought into Hyderabad to assist the labours of the chloroform commission which had preceded us by a few months. A sole survivor had escaped, and established himself in Dr. Lawrie's garden, where it seemed as if he were trying to avenge his deceased brethren by making day hideous.

Several days were very pleasantly spent in Hyderabad, which is probably the most typical native city in India and the least influenced by European civilization. The native officials are now beginning to adopt some of the English manners and customs, but when we looked at the tawdry oleographs displayed on the walls of their princely houses, and the accumulation of rubbish which they were pleased to consider ornamental, we could not but regret that they had abandoned their rich Eastern art, for such western atrocities.

Dr. Lawrie was a most genial host, and nothing could exceed the kindness we received from him, and from the Nizam's

government. The neighbourhood of Hyderabad is rich in beautiful lakes, and we also visited an old and deserted fortress called Golconda It is not the famous Golconda, rich in precious stones, but, apparently, it has been named after that celebrated place, for even to this day it is believed to contain hidden treasure, and so jealous are the natives of the possible discovery of this treasure by unauthorized persons, that considerable difficulty is experienced in getting a permit to visit. We found the gate guarded by soldiers, but when at last we were admitted and had passed up the rugged pathway to the summit of the hill, within the fortress, we saw little else but a tangle of weeds and bushes We passed through subterranean chambers and passages, all more or less dilapidated, but felt no temptation to dig for treasure amongst the heaps of bricks and mortar, or beneath the rank overgrowth outside.

But it was now time to leave Hyderabad, and we once more settled down to a long, hot dusty railway journey. Little occurred to break the monotony of the route. Fields of cotton, or of rice, corn and other cereals, were interspersed with waste land covered with prickly cactus, and mimosa trees Gorgeous rollers sat on the trees or telegraph posts, or flashed their brilliant blue and brown plumage in the sun, looking like enormous jays, while the quaint little drogon shrike, or king crow, as he is familiarly called, with his glossy black plumage and forked tail, found a happy resting place on the telegraph wires. Delicate green bee-eaters flitted from bush to bush in search of food. I may mention here that I found these three birds generally distributed over the plains of India, and through Burma. Three of the most striking, they seemed at the same time to be three of the commonest birds in the country. In the irrigated rice fields we passed labourers ploughing with oxen, in the mud and water and closely attended by white egrets, and other wading birds, on the look out for food, much as the rook follows the plough at home. An occasional snipe would get up from the rice, and it may be remarked here that enormous bags of snipe are often made in a single day in these paddy fields Two or three species of snipe occur. The commonest is identical with the English species, *Scolopax gallinago*, and, as we had often occasion to prove, is quite equal in plumpness and delicacy to its European representative. Teal are also very common throughout the plains, and form a welcome dish in the winter months.

At length we reached Madras tired out and covered with dust, and glad of a plunge in the fine swimming bath belonging to the Club. Quarters had been provided for us in the Club

house, and we soon found ourselves living in clover in the finest Club in India. Madras is often spoken of in other parts, of the Empire as the benighted presidency, but there was nothing benighted in the hospitality and kindness we received on all sides while we were in Southern India.

The chief attraction to the naturalist in Madras is its fine Museum. We spent some time amongst its collections of butterflies, from which some idea could be gained of the entomological wealth of the neighbouring Nilghiris. I regretted that time did not allow a visit to these interesting hills. Birds and nests were fairly represented, but the chief feature of the natural history side was the magnificent collection of minerals. Until this collection has been seen, it is almost impossible to conceive the mineral richness of India. It would be out of place to do more than mention the valuable and interesting collection of antiquities and modern art to be found on the other side of the Museum.

Our work kept us fully occupied in Madras and as soon as it was done we went on to Conjeeveram. Here we visited some interesting Hindu temples, with richly covered gateways or gopuras fifty or sixty feet in height. We were surrounded by Brahmin priests and the usual attendant rabble of loafers. Chains of flowers were hung round our necks and we walked about the court yards feeling like animals ready for the slaughter. However a moderate baksheesh satisfied our captors, and after the same had been extended to a sacerdotal elephant who had been instructed to come up and beg from strangers for the good of the temple, we were allowed to depart in peace.

At Trichinopoly vegetation became more tropical. The brushwood was thicker and more luxuriant, and cocoanuts and bamboos occurred in greater quantity. We began to realise that we were getting towards the southern extremity of India. We visited an immense Hindu temple at Sriringam, covering an area of about a quarter of a square mile. Its gopuras resembled those of Conjeeveram and other South Indian temples. We also climbed the famous Trichinopoly Rock, gallantly captured by the English at the beginning of the century. From the top we looked down on the squalid town at our feet, while beyond the river rose the gopuras of Sriringam half hidden by cocoanuts, palms and other trees.

Cholera had appeared in Trichinopoly, so we were not sorry to move on to Tanjore. A feast was evidently in progress, and as we walked under the magnificent gateway of the temple, a native band struck up a salute of the most discordant music. This, however, we were fain to accept in the spirit in which it was given. The temple of Tanjore possesses an immense number

of shrines to Siva placed in little recesses all round the court yard. The surrounding walls are covered with frescoes illustrating scenes in his life. In the middle of the court is a colossal sacred bull, carved out of a single block of stone. A curiosity unique in India, is the head of an Englishman covered with the conventional bowler hat, carved in one of the niches of the great tower, and looking very incongruous amidst the surrounding Hindu gods and goddesses.

We visited the rajah's palace with its costly collection of jewels and its interesting old library stocked with many rare and antique books, and afterwards walked out into the country. It was amusing to watch the ant-lions (*Myrmeleon*) each waiting at the bottom of his tiny pit in the sandy waste, for any unhappy insect which might be passing. The native boys catch these ant-lions very cleverly, letting down pieces of string into the pits and jerking them out when the creatures in a moment of mistaken identity have taken firm hold.

We now reached Madura, the southernmost point of our journey. Work was plentiful here, but we found time to visit the Madura temple, the finest of its kind in India. The architechture is similar to that of the temples of Conjeeveram, Sriringam and Tanjore, but the designs are far more daring. Huge monolithic columns from ten to twenty feet in height are elaborately carved to represent horsemen and horses trampling on their foes. The great gopura far exceeds in height that of any other temple. We also went into the old palace, and were amused to hear a Bengali babu recount the tale of his fancied wrongs, and descant upon the good time coming when the National Congress should give self government to the down trodden people of India. It may, perhaps, be as well to mention here that it is only necessary to go into one or two Indian native states to appreciate how vastly superior is the condition of the lower classes under British rule, to their lot when governed by their own rajahs.

Besides the great temple there is little of interest in Madura. There is no cold weather, and the sun is desperately hot, so that no European cares to expose himself to the rays, more than is necessary. The blanched faces of English women and children testify to the number of hours which have to be spent daily in the darkened houses. Madura is not one of the favoured spots on this earth.

Hitherto all five members of the Commission had been travelling together, but we now decided to divide in order to cover more ground in the time at our disposal. Surgeon-Major Barclay and Mr. Kanthack accordingly proceeded to

Calicut on the Malabar Coast, while Surgeon-Major Thomson, Dr. uckmaster and I returned to Madras.

Christmas was close upon us, and it became a question where we should spend Christmas Day. The Madras Club would be comparatively deserted, for all who could get away would be spending their holidays in the cooler air of Utacamund or some other station in the Nilghiris We, therefore, agreed to visit Mahabalipuram and its seven Pagodas described by Southey in the 'Curse of Kehama.' Southey by the way was never in India, nor was Moore in Kashmir, but this is a detail.

Mahabalipuram lies about thirty miles south of Madras on the sea coast. It is however best reached by an artificial canal, which runs from Madras past the pagodas. On Christmas Eve, accompanied by two of our servants and liberally provided by the steward of the club with food and drink, not forgetting some Christmas cheer, we embarked in a most curious house boat, apparently built expressly for navigating the canal. Long, narrow, and with little keel it nevertheless carried a fair sized mast and sail forward. The hull was almost filled by a series of low rooms for eating, sleeping and cooking, all under one flat roof. We soon found that we were not undisputed tenants of this strange craft, for on going below to test the merits of an excellent plum cake which the club steward had given us on starting we discovered some half dozen cockroaches busily engaged upon it. This was rather a shock to my companions, for cockroaches are not as common in India as out here I was more hardened by sad experience, and succeeded in killing and throwing overboard most of the invaders. It was however not pleasant to think of the myriads which might rise during the night from the unknown depths of the hold, beneath the floor of our room, so Buckmaster and I elected to sleep on the roof, Thomson preferring cockroaches to a possible chill. All went well for a time. It was pleasant to lie on the flat roof in our pyjamas, looking up at the stars and fanned by the soft night air, listening the while to the muffled dirge of the coolies as they walked along the tow path pulling our boat. Sleep gradually fell upon us, but there was a rude awakening. A deluge of water accompanied by loud and excited talking on the part of the boatmen drove us below half asleep, but sufficiently awake to feel that any berth was preferable to the one we had left. We soon found that we had left the canal and entered a shallow lake. The boatmen had hoisted the sail, but a sudden squall of wind and rain from sea-ward had for the moment rendered our ship unruly, and disturbed our slumber. Order was soon restored, and before long we had crossed the miniature lake and

entered the canal again. We slept soundly on the floor of our tiny cabin, and the cockroaches were good enough not to disturb us.

When we woke the next morning large flocks of wild fowl in the flat marshes near the canal made us regret that we had not come prepared for sport. A swim proved refreshing though the water was not as clear as could be wished. Soon after a low line of sand hills and the outlines of two or three pagodas told us that we had reached our journey's end.

It was delightful on that bright Christmas morning to step out of our cramped quarters on to the short crisp turf, studded with tiny flowers of wonderful beauty. Butterflies were flitting in the sunshine, Papilios, Junonias and many other genera which I failed to identify. But there was no time for collecting. Some of the most wonderful archæological remains in India claimed us, and butterflies and flowers had to be passed more or less regretfully.

We had not gone many paces before I lighted on a species of *Drosera* growing on the short turf. At a rough glance it seemed to be almost identical with our English species of sundew which grows in bogs on peaty moors. It was therefore a matter of surprise to find this Indian species on dry land close to the sea. But there it was—tiny beads of dew glistering on its concave leaves, and captive insects entangled in its fringes of viscous hairs. Ascending a gentle slope we cautiously made our way through a thicket and came to a little pond in which were growing delicate pale blue water lilies. We passed other pools in which were growing commoner white waterlilies and other aquatic plants.

We now reached the first of the strange series of temples which we had come to see. But even were this a fitting place, time would fail me to describe these wonderful Hindu shrines. Suffice it to say that every advantage had been taken of the peculiar conformation of the country. On the sides of the ridge caves had been carved out of the solid rock, with life-like bas relief in their interiors representing battle scenes and other subjects. The huge boulders, already mentioned as occurring in the south of India, had done good service here. In places their steep sides had been fashioned into colossal frescoes, while some of the isolated rocks had been cut into perfect temples of great beauty. We walked on through a grove of casuarinas, almost the only tree which condescends to grow in the dreary waste of sand-hills which fringes the shore. The roar of breakers below us warned us that we had reached the sea, and the next moment we were on the beach. We climbed up to a stone temple built on a small rocky promontory, and

literally washed by the sea, as the festoons of sea weed about its base testified. From this romantic outlook, we saw in front of us an uninterrupted expanse of sea stretching away to the horizon, and breaking on the rocks at our feet, while on either side the coast line was marked by a desolate waste of yellow sand-hills in sharp contrast with their dark fringe of casuarinas. Seldom have I experienced a scene so picturesque, but at the same time so utterly lonely.

We picked our way amongst the slippery rocks and collected a few of the many species of shells with which the beach was lined. Unfortunately they had been sadly damaged against the rocks, and were of little value as specimens, but they conveyed some idea of the richness of the sea which washes this coast, and of the plentiful harvest which might be derived from a dredging expedition. Retracing our steps we stumbled through the loose sand, stopping from time to time to look at queer little families of frogs domiciled in pools of water which had collected in deep conical pits. We now came to a temple which had been built on a rocky peak, sufficiently high above all the others to command the neighbouring coast and sea. This the Government had utilized as a lighthouse, and it now warns vessels from that dangerous coast. Climbing the steep steps to this beacon, we were rewarded at the top by a magnificent panorama. East of us was the sea and the long line of sand hills. To the west stretched for miles a low lying marshy tract of land, intersected by the thin line of the canal down which we had come. Below us lay the broken rocky country we had lately been exploring, with here and there a pagoda standing amidst stunted borassi and prickly palms and bushes of various kinds.

But it was time to return to our boat, so we reluctantly turned our backs on this strange district, interesting alike to the archæologist, to the naturalist and to the sportsman. The journey back to Madras was accomplished without mishap, except that one or two of the surviving cockroaches avenged their slain comrades by biting my face as I slept. On our arrival in Madras we parted, Buckmaster going to join the other party in Calicut, while Thomson and I crossed the sea to Rangoon.

October 7th, 1892.

CASTNIA LICUS, A BANANA PEST.

By Thomas I. Potter Esq.

When the peasant cultivators in my district see a banana tree backward in growth, they say that it is the worm which always attacks the banana sucker when planted at a "bad moon." On

the 15th May I resolved to find out what this worm was, and examining a sucker in a backward state, I discovered traces of a boring insect which had entered at the base of the sucker and almost on a level with the soil. It had bored upwards and almost into the heart of the plant, and the channels it had made were filled with decomposed vegetable matter. I did not succeed in finding the insect, but traces of its recent presence were unmistakeable. A few days after this, I inspected another plant in a condition similar to the last one. Again I was unsuccessful in discovering the culprit, for it had evidently bored through the root stock and emerged from the plant. On a more recent occasion I examined another affected plant and this time was successful in capturing a specimen of the borer. I found it was the larva of some lepidopterous insect, about 3 inches long and about $\frac{3}{8}$ of an inch in diameter. Its head was light brown, with darker brown mandibles, and its body was whitish with a transparent skin. Its presence in the plant is readily indicated in the early stages of its attack by an exudation of a transparent mucilaginous fluid from the hole through which it effects an entrance. The only cure I have tried is to destroy the insect and cut out the affected part when the enemy makes its first attack, but nothing can save a plant which has been affected for some time. On the 10th July, 1892, I found a caterpillar boring into a banana sucker; on the 18th August it spun a cocoon and changed into a mahogany brown chrysalis, and on the 24th September a fine specimen of the *Castnia licus* emerged. This moth flies in the day and I have often caught it in banana patches, but I little dreamt that it did such harm to the plants in its earlier stages. A short time after I observed one of these moths depositing its eggs. It selected the base of a banana sucker for this purpose, and laid a single egg just inside a dry and withered leaf-stalk. The local name of this moth is cane-sucker.

17th Novr., 1892.

A FEW NOTES ON ALLIGATOR SHOOTING IN TRINIDAD.

By Syl. Devenish Esq., M.A.,

Mr. President, and Gentlemen,

I have promised you, with your kind permission, to relate to on some anecdotes on alligator shooting in Trinidad.

The following are a few plain reminiscences of an old

sportsman, and do not approach in the least the poetically descriptive article by Mr. Mole, "Babiche Shooting in the Caroni," which has graced the October number of the Field Naturalists' Club, nor do they possess the slightest tinge of anything scientific, which, I must confess, renders them, therefore, not quite in keeping with the interesting and valuable reports and lectures which have already enriched our young *Journal*

So many scientific notes as well as startling incidents, almost verging on the fabulous, on the subject of these Saurians, can be found in books of natural history and travels, such as "Waterton's Alligator Riding," that I will simply confine myself to what my experience of their habits has brought to my personal knowledge.

I may preface this, however, by giving here the real derivation, perhaps not generally known, of the name "alligator" *(Alligator sclerops)* which is very naturally traced to the old tars of the adventurous and unfortunate Sir Walter Raleigh, who at the latter end of the 16th century, on hearing those great lizards called by the Spaniards in the Orinoco and its caños, *El Lagarto*, that is "*The* Lizard," soon corrupted the name into its present form

All etymologies are not, unfortunately, as clear as this one, and as that of the baracouta, which is rather too coarse, however, to be indicated here.

I must begin with a description of the eggs, which are about the size of those of the turkey, of a dirty white colour, and with a rough surface They are generally found deposited in a conical nest, about 2 to $2\frac{1}{2}$ ft. high, by $1\frac{1}{2}$ to 2 ft. diameter. built of mud and rushes or sprigs, near the water-side.

There is a belief amongst the people here, that if any one attempts to touch the nest, he runs great risk of being attacked by the mother alligator, who is always on the watch to defend her progeny.

I remember, whilst surveying on the left bank of the Caroni, coming once upon one of these curious constructions, and so frightened were my eight men at my going to examine and demolish it, that they all ran away to a distance of at least 20 yards, warning me of the danger of the *Maman Caiman* which was sure to attack me.

However, having besides my bowie knife at my side, my cutlass in hand, I prepared for defence, and quietly demolished with perfect impunity the large nest, in which I found, I think, a dozen or two eggs.

Unfortunately, I cannot put my hand now on my field book in which I made on the spot a sketch of the nest, and took its

dimensions, as well as the number of eggs found therein. It was not without some difficulty that I at last got my people to come and help me to bring the spoil to the boat.

I must confess that when warned of the danger I was rushing to, I could not help recollecting, with some sense of anxiety, that when I was a little boy on our old "Peru Estate," in Mucurapo, my uncle coming from bathing in the sea, at the mouth of a little ravine called "Quimbois," was, before he had time to put on his clothes, chased by a good sized alligator, or babiche, and had to run pretty hard to make his escape, actually *in naturalibus*.

But to return to the eggs, a few were blown by me for my collection, and the rest left to hatch near a little fountain in my garden, in Clarence Street.

After a few days the hatching took place, and it was as curious, as interesting to see the little alligators, still adhering to the shells by their umbilical cords, briskly showing fight when approached, dragging the shell behind them and rushing with open jaws at any thing presented to them and madly biting it.

After this perhaps too long digression, I must come to some of my alligator shooting expeditions and experiences.

In the year 1854, whilst with a party of seven friends shooting parrots in the great Oropouche Lagoon, then abounding in wild birds, I, for the first time, had a chance of witnessing the fearless impudence of our alligators. Clouds of deafening screeching parrots, (how different now!) flying over our boat, in the middle of Godineau's Canal, there was of course an interrupted volley of shots from our eight double barrel guns, when to our amazement, in spite of the rattling noise, and of our presence in the boat, we saw a fair sized alligator quietly slide from one of the banks, and deliberately make for a wounded parrot which had fallen in the water between the boat and the shore.

All our guns were, at once, simultaneously levelled and discharged at the bold intruder, which apparently unmoved, sunk in time, and diving under the parrot coolly snatched it down and disappeared with it.

A similar feat was witnessed by me in 1861, in the Caroni River.

Having been requested by His Excellency the Duke of Newcastle, then Secretary of State for the Colonies, to make a report on the possibility of canalising the Caroni River, I took with me my friend Lieut. Le Mesurier, (now Colonel) of the Royal Engineers.

We were in a bumboat, in the middle of the stream, at one of its broadest bends, when Le Mesurier having shot a "Tchoque"

which fell in the water within about 50 feet from the boat and from the bank, a large alligator, as demurely and coolly as his brother of Oropouche, swam from the bank where he had been quietly sunning himself, and in the same way dodging our repeated shots, made for the wounded bird, dived under it, and disappeared with it, perfectly unconcerned at our firing opposition.

The most curious incident however, in my long years of alligator shooting occurred to me in the same year also in the Caroni River.

Young Lord M.....just from England, paid a tourist's visit to Trinidad where he was the guest of Governor Keate, having expressed his wish to have some alligator shooting, His Excellency, as pretty usual on such occasions, asked me, to act as his aide-de-camp, and take charge of an expedition with the young nobleman in the Caroni river.

Besides his noble guest, the Governor had also asked Capt. Grattan Bushe (Inspector of Police) and two officers of the Garrison to accompany the young Lord.

We got a fine roomy bumboat, well stored of course with prog and drinkables (amongst the latter the first samples of the Hungarian "Voslaüer" wine) ever imported to Trinidad, and quite new to Lord M ..... who swore he would never be without a stock of it in his cellar.

Going up the river with the tide, and after shooting a few small alligators, we at last, came upon the largest one I had ever seen here, about 8 feet 9 inches long as we found out a little later. In spite of my objections, I was given the privilege of having a shot at it, and the rifle bullet hitting it in the left ear went right through its head, and we got the beast into the boat, to all appearances as well dead as could be.

As it was very heavy and an incumbrance in the boat, at about 9 a m. we hung it with some lianes to a branch of a tree overhanging the right bank of the river, with the intention of taking it with us on our way back to town.

We then proceeded on our shooting errand as far as Curepe Estate, and having secured a few more alligators and enjoyed a hearty breakfast, retraced our course so as not to miss the tide.

At about 2.30 p.m. we took down the hanging big fellow and laid it at the bottom of the boat, with its head towards the bows.

We were jollily going down stream, still shooting a few more alligators, when, on a small one being thrown into the boat on the back of the large monster fellow, some one remarked that he saw the latter slightly move, and that therefore it could not be quite as dead as it seemed.

To finally despatch it and guard against any dangerous return to life on its part, I drove my long Boston bowie knife deep into both its eyes, and thought I had made sure that it must be thoroughly lifeless by this time, and that it certainly could never see its way out any more.

We had reached the last bend of the river when all of a sudden we heard a loud snapping of the alligator's tremendous jaws, and to the terror of all on board, particularly of Captain Blunt who was forward right over the brute's snout, and ready to jump in the water, we saw the animal turn round and making for the stern sheets, fiercely snapping its jaws all the time, right and left, scramble over the gunwale and slide into the water, to our immense relief.

When we related the incident, on our return home, of course, everyone took it as a mere joke and jeered us about our wonderful "yarn."

The event appeared certainly incredible, but I easily reconciled myself to the fact, when I remembered having seen Professor Boitard, in his lectures at the *Jardin des Plantes de Paris*, completely scoop out all the brain substance from the craniums of some Greek turtles, which nevertheless when replaced in water, for some time swam about almost apparently unconscious of the serious operation performed on them.

I remembered, also, how often when school-boys we used to cut off the heads of common flies which would still go on flying about for a few minutes.

Our alligators, or babiches differ in many points from the much more powerful and ferocious crocodiles of the Orinoco and its tributaries.

I recollect, many years ago, my old friend Miguel Peña relating to me the following horrid scene, which he witnessed from the shore of one of the Orinoco's caños.

A black sailor and a little boy had been left alone on board of a schooner at anchor in the stream, when the brutal sailor ill treated and beat the poor boy to such an extent that the distressed child jumped overboard. Scarcely had the splash of his body in the water been heard, than a huge crocodile or caiman suddenly appeared, seized his victim, who with a heart-rending shriek was instantly carried out of sight by the monster.

For hours an earnest and careful search was made all round the surrounding banks for his body, but no trace of it could ever be found.

I may remark here, that if these curious saurians are known to be fond of human flesh, they, in their turn, are not without offering an object to the appetite of human beings,

particularly Africans and Indians, who delight in eating a grilled "babiche," with a lime and pepper sauce.

In fact, whilst coming down the Caroni river, in a couriale, some years ago, with His Excellency, Sir Arthur Gordon, from the Compensation Estate, a distance of about 22 miles to the Embouchure, we saw, a little below Porto Grande, hanging in a hut near the bank, a young alligator roasted entire, of which, at my suggestion, Sir Arthur, with his usual pluck did not hesitate to taste a piece of the tail, dressed as above, which he pronounced to be "not at all bad"

I am afraid, gentlemen, I have extended to too great a length this little gossiping about my meetings with alligators, and I must apologize and crave your indulgence for having thus given way to the pleasure of bringing back old fond recollections of my young sporting days.

If agreeable to you, I may give you later some similar ones of my snake and fishing experiences, but I must now thank you for the attention with which you have so patiently listened to this very tame and unadorned narrative.

6th January, 1893.

SOME PECULIAR TYPES OF TRINIDAD RHYNCHOPHOROUS BEETLES.

By H. Caracciolo, President.

Amongst the insects most injurious to vegetation are the weevils. They do an immense injury to man, and represent the largest number of species of any of the other orders here. They attack our plants in various ways, some living on the sap, some on the flowers, and others in the fruits themselves. Almost every fruit tree is subject to the attack of one or more of these weevils. The large trees are not spared, and our garden plants, corn, peas and other grain are greatly exposed to their ravages. The larvæ of some of these beetles are internal feeders, while others like the bright caterpillars of *Lepidoptera*, live quite exposed and even form network cocoons. The antennæ of these beetles are generally short though there are some few exceptions, whilst some are covered with spikes, knobs and sharp edges, and exhibit some very quaint figures. There is a peculiarity, however, which I have not observed, but which is recorded by Mr. T. W. Wollaston as being so interesting that I thought you would be pleased to hear it. He says that during

a yachting voyage in 1859 at Teneriffe he observed a peculiar stridulation from the genus *Acalles Schoon.* His servant brought him eleven specimens of *Acalles Argillosa*, collected in the rotten stem of a Euphorbia, which at the time he thought very little of, and was about to dispose of them when he heard a loud, grating, almost chirping noise, on looking closer for the mysterious cause, he observed that it emanated from one of the beetles. He kept them for some time for the purpose of discovering how this noise was caused. At length his eye was arrested by a minute vibration of the apical segment of the abdomen. You may have observed the same music from many of our *longicorn* family, in fact most of them possess that means of making themselves heard. In the case of the *longicorns*, this noise is produced by the friction of the thorax, by rubbing the posterior saddle-shaped unflexed overlap of the prothorax on the front edge of the suture of the mesothorax.

You can easily observe this, by taking an *Acrocimus longimanus* between your fingers, and you will follow these movements very easily. The family to which the weevils belong is called *Rynchophora* from the Greek word which signifies "beak bearer." I will here describe the most peculiar and interesting types we possess, some of which are attacking the sugar cane. The first is a very curiously shaped beetle, the *Rhina barbicomis* (fig 1). This species is rather uncommon here, and though I have one in my collection, I never captured any myself. According to Mdme. de Merian it is found on a species of convolvulus. The trunk is black and adorned with hairs, the elytra are punctured and striated. It is a very striking insect. The head is slender, long and the end is flattened, shaped somewhat like an axe. The antennæ are placed in the middle of the rostrum and this is surrounded with a quantity of hairs radiating from the head, these hairs are of a dirty yellow colour.

FIG. 1

On the elytra there are numerous rounded pits parallel to each other, in which there is a sort of white dust buried, some of

these pits are free from it, the use of this dust has not yet been discovered. My specimen was found at Chaguanas.

Next comes a most peculiar insect which for its similarity to a violin has been locally called, "violon." This is the "*Brenthus Anchorago* (Fig 2) a beetle belonging to the family *Brenthidæ*. This beetle is elongated and black and the markings slightly different in the two sexes. The antennæ are very moveable and retain this mobility when the insect is dead or dry. You can take one of these insects and move it about in any direction and the antennæ will move in the same direction. In the female the thorax is somewhat contracted in the middle and in both sexes it has a groove extending from the middle, to the base. The elytra are deeply grooved near the suture and marked with punctured lines on the side, having two stripes of yellow on each side. The anterior legs are furnished with a small tooth on the under side. This insect like all the species of this genus lives under the bark of trees. Our species live in communities. I once found 25 together in the trunk of a decayed tree, and my friend Mr. Hobson kindly sent me one of quite a large number caught together in a log of decayed wood. This genus is confined almost to warm climates, only one species, viz., *Arrhenodes coronatus* existing in Europe.

FIG. 2.

The next interesting species and rather a common one, which is multiplying considerably is the *Rynchophora palmarum*. Fig 3 This beetle is found at all times of the year in the decayed or decaying trunks of the palm trees, but may be attracted by any incision made in a healthy tree. As soon as a favourable condition of the tree is obtained the weevil appears and deposits its eggs in the point of attraction. The eggs develop and produce the much appreciated "gru-gru" worms, a highly palatable and *recherché* morsel for the gourmet. In order to procure a large supply of these worms, it is customary to fell the tree and make

FIG. 3.

several incisions in the trunk. Within a period of 15 days, the larvæ are hatched and fit for eating. The grub in its infancy is quite white, but as it grows older or attains the age of maturity it assumes a somewhat faint yellowish colour. The head is horny and the body rather inflated in the centre, it feeds on the heart of the tree during a period of 20 days when it proceeds to prepare its habitation for its third stage viz., that of chrysalis. This consists of the fibres of the tree which the grub diligently weaves together forming a light egg-shaped cocoon in which it undergoes its metamorphosis. But as the beetle which is to make its exit is not possessed of strong mandibles to cut away an opening one of the ends is more thinly webbed than the other, a fact no doubt anticipated in the larva stage, thereby showing as in the case of innumerable species, that the larva is possessed of sufficient instinct to provide for its welfare when it becomes a perfect insect, though so totally dissimilar both in its form and mode of living. Stedman relates that the Indians of Surinam called it the "Toecoema," and made butter from these worms which he tasted and found excellent. It is noteworthy that these large beetles attack the cane by making an entrance from the roots. It appears that the injury done is far less in proportion to that done by the cane borer *Xyleborus*, but I may be allowed to remark that perhaps the extent of the injury has not been calculated, or may be at times attributed to some other cause. It is therefore well to provide against them, for every stool attacked really means a loss to the planter, though apparently little.

Next in order comes another species *Sphenophorus saccharri*, which is in my opinion one of the most injurious pests of the sugar cane. It is perhaps $\frac{1}{3}$ the size of the former, and peculiarly shaped, differing in markings and colour, the first being completely black and this species being brown with pale yellow markings on the thorax and elytra. This beetle, strange to say, is also found on the palm tree, which seems to indicate that the insects which find a means of subsistence on one of these two plants is singularly attracted to the other. My friend Mr. Urich has also found the small borer in the palm, which confirms me in my opinion The *Sphenophorus* makes its entrance near the footstalks of the leaves, works its way to the centre of the plant, deposits its eggs, the eggs hatch and the larvæ work

Fig 4.

upwards. The yellowish sickly appearance of the leaves in a cane field is almost in every case indicative of the presence of one or two of these borers.

The larvæ being one inch long and in form very similar to the palm worm, are very voracious and will perforate and make large cavities in the cane which soon brings about the total collapse and decay of the plant.

When the larva is ready to effect its transformation, it envelops itself in a sort of shroud of fibres, mixed up with its excreta and other decayed matter glued together tightly ; there it passes its chrysalis stage and in 18 to 20 days becomes the perfect insect.

February 3rd 1893.

DESCRIPTION OF A NEW BAT (Mr. J. H. HART'S) OF THE GENUS ARTIBEUS FROM TRINIDAD.

By Oldfield Thomas, Esq.

In a small collection of bats recently presented to the Museum by Mr. J. H. Hart, the Superintendent of the Botanic Gardens, Trinidad, there is a single specimen of an *Artibeus* closely allied to *A. bilobatus*, Peters, but clearly representing a new species of this interesting genus. I propose to name it in honour of its discoverer, to whom the Museum is indebted for many additions to its collection of Trinidad animals :

Artibeus Hartii, sp. n.

Size rather smaller than in *A. bilobatus*. Colour, so far as can be made out in a spirit-specimen, dull brownish grey, the bases of the hairs decidedly lighter than the tips; upper and

under surfaces of apparently just the same shade; no white markings on face or back. Nose-leaf very short and broad, the breadth of the upright portion almost equal to its height; horizontal portion entirely bound down to and continuous with the muzzle in front, on the sides notched in the position of the extra lobes in *bilobatus*, but without the lobes themselves. Ear short, rounded, the notch behind the antitragus scarcely perceptible, but a marked emargination in the outer edge of the ear just above the tip of the tragus.

Skull, when viewed from the side, lower in the muzzle and more abruptly elevated above the orbits than in *A. bilobatus*.

Dental formula as in *A. planirostris* and *bilobatus*, *i.e.* $\text{I.}\frac{2}{2}$, $\text{C.}\frac{1}{1}$, $\text{P.}\frac{2}{2}$, $\text{M.}\frac{3}{3} \times 2 = 32$, this formula characterizing the subgenus *Uroderma* of Peters. Median upper incisors broad, pointed in the centre of their cutting-edge. Canines short and stout, their tips not projecting downwards beyond those of the posterior premolars. Shapes and proportions of molars very much as in *A. bilobatus*, except that the postero-internal angle of $\underline{\text{m.}1}$ projects inwardly some way beyond the inner edge of $\underline{\text{m.}2}$, while the two are about level in that species. Lower teeth also as in *A. bilobatus*, except that the posterior premolar is as short horizontally as the anterior, and is therefore decidedly shorter than $\overline{\text{m.}1}$.

Dimensions of the type (a slightly immature* male in spirit):—

Head and body 52 millim; nose-leaf, height of lancet 5·5, breadth of lancet 4·2, breadth of horseshoe 5·5; height of ear 12·5; forearm 38; third metacarpal 35; tibia 13·6; foot 9·5.

Skull: basal length 16·8; distance from front of canine to back of $\underline{\text{m.}2}$ 7·0; breadth of palate outside $\underline{\text{m.}1}$ 8·2; vertical length of upper canine 2·9.

* The epiphyses of the limb-bones are not fully ossified, but the teeth are all up and in use.

This species is only the third known member† of the subgenus *Uroderma*, and may be readily distinguished from the other two, *A. planirostris* and *bilobatus*, by its nose-leaf being bound down to the muzzle in front as well as by the detailed differences in external structure and dentition above described. —*Annals and Magazine of Natural History*, Ser. 6, Vol. x., Nov., 1892.

† According to Dobson's Catalogue; but I strongly suspect that Peters's *A. concolor*, considered in that work as a mere variety of *A. planirostris*, ought properly to be reckoned as a distinct species, equally distinguishable with that animal, however, from *A. Hartii* by the characters of its nose-leaf. It is also somewhat larger, having, as Dr. Matschie, of the Berlin Museum, kindly informs me, the second skull-measurement above given 7·5 millim., and the third 9·9 or 10; its forearm measures 47 millim.

INSTITUTE OF JAMAICA.—NOTES FROM THE MUSEUM, (NO. 33.)

THE GRAPE RUST AGAIN.

By T. D. A. Cockerell Esq.

The grape-rust continues to attract attention, and since last writing Mr. Arthur Hylton has sent me some cuttings of vines badly infested by this fungus.

Mr. Morris, of Kew, has written me a very interesting letter on the subject, from which it appears that the fungus was collected years ago by H. W. Ravenel in South Carolina, U.S.A. Ravenel's specimens from the United States were described by Thumen in 1878, but the account then given was somewhat imperfect. This record had been put altogether on one side, because Lagerheim, who went into the matter in 1890, came to the conclusion that Thumen's species (*Uredo vitis*) was not only different from the grape-rust of Jamaica, but was, in fact, not a fungus at all! This decision has now

been altogether upset by Mr. Morris of Kew, who has compared a Jamaica specimen with a portion of Thumen's type, which is in the Kew Herbarium. The result of this comparison is, that *Uredo vialæ* is identical with *Uredo vitis*, and that the species is found in the United States as well as the West Indies.

Mr. Morris writes that directly he saw the specimen I sent, he remembered having obtained a similar fungus from vines at King's House, through Mr. Hart, many years ago. This, as Mr. Hart has already explained (see note No. 32), was the first known occurrence of the grape-rust in Jamaica. Mr. Morris adds :—My impression at the time was that the rust had come from the United States either with vine cuttings or on some American black-berries. These latter had a large crop of rusty leaves soon after their arrival, but they were destroyed before I had secured a specimen for identification. The disease should be dealt with by collecting the leaves and burning them as soon as they show signs of being affected. A dusting of a mixture of sulphur and lime might be tried at short intervals while the leaves are in a growing state, but this would be useless when the leaves are already attacked."

Jany. 21st. 1893.

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Vol. 1. APRIL, 1893. **No. 7.**

J'engage donc tous à éviter dans leurs écrits toute personnalité, toute allusion dépassant les limites de la discussion la plus sincère et la plus courtoise.—LABOULBÈNE.

Trinidad Field-Naturalists' Club.

NATURA MAXIME MIRANDA IN MINIMIS.

CONTENTS:

"MIRROR" Office, Port-of-Spain.

JOURNAL

OF THE

Field Naturalists' Club.

VOL. I. APRIL, 1892. No. 7.

REPORT OF CLUB MEETINGS.

3RD FEBRUARY.

THE following item was omitted from the Report of this meeting appearing in the last number of the *Journal*, page 134: "The Hon. D. B. Horsford was elected a Member of the Club."

3RD MARCH.

Present: Mr. H. Caracciolo, President, Mr. Robert Guppy, M.A., Dr. Beaven Rake, M.D., Mr. Syl. Devenish, M.A., Sir John Tankerville Goldney, Messrs. J. H. Collens, W. E. Broadway, C. Libert, J. L. Guppy, T. I. Potter, Jean Peterson, C. W. Scott, W. G. Hewlett, Henry Tate, F. W. Urich, R. R. Mole and Alfred Taitt, Hon. Secretary and Treasurer. The minutes of the last meeting were read and confirmed. The following gentlemen were elected honorary members of the Club: Professor Carl Vogt, Geneva; W. M. Crowfoot Esq., M.B., F.R.C.S., Lieut. H. V. Eliott, R.N., and W. G. Jeffreys Esq., Mr. Taitt briefly stated the financial condition of the Club, showing a balance in hand.—A letter was read from the Danish Consul (Mr. C. O. Bock) covering a communication, from Professor Warming, Director of the Botanic Gardens, Copenhagen, accompanying a botanical work on Lagos Santa in the Brazils, which he desired should be placed in the Club's Library. The Secretary was directed to acknowledge Professor Warming's kindness.—A letter was read from Father Joseph Marie Belon of Paris, requesting the Club's assistance in his studies of

minute coleoptera.—Mr. Mole, on behalf of Mr. A. B. Carr, presented the Club Museum with the skin of a *Boa constrictor* from Caparo. The reptile when alive was 11½ feet in length and was one of the largest Mr. Carr had ever seen. According to the text books these snakes rarely reach the length of 12 feet. The largest seen by Waterton was 14 feet. This one was a female and contained 41 eggs. It was explained that the creature would have been taken alive but Mr. Carr who was very far from home hunting when he caught it, found it was too bulky to carry. The skin had stretched in drying and was now 13 feet 1 inch in length. It was compared by the members with the skin of *Eunectes murinus* (from the Orinoco) with considerable interest. The president announced that the fine ocelot lately owned by Mrs. Newsam had, after rather lengthy negociations, been purchased by the Club. The animal was now in Mr. Potter's charge and could be seen by members at his residence, St. Anns. Mr. Potter announced that Messrs. Broadway, Urich and himself had made the ascent of Mount Tucuche. The flora was very rich and varied and a good many rare specimens were collected, on the other hand very little animal life was noted during the excursion, but a few ants and beetles were taken, some peculiar worms were captured, also some terrestrial leeches. After a few questions had been asked and answered respecting the excursion, Mr. Broadway read a most interesting and carefully prepared paper upon the *Compositæ* or daisy family. The paper was illustrated by a large collection of living plants, herbarium specimens from the Botanic Garden's collection, (with Mr. Hart's kind permission) seeds, parts of plants, products, etc. The president proposed a special vote of thanks to Mr. Broadway for his excellent paper. Mr. Mole seconded and in doing so, hoped that in the near future some member of the Club, would take the course recommended by Mr. Gatty at the annual meeting and give them a lecture illustrated with dissections of flowers and plants, which would enable those members who did not understand botany to learn the parts of plants and flowers and their uses in vegetable economy.—Mr. J. H. Collens read a short paper on the Trinidad Manatee, which, he said was now nearly extinct, and described in graphic language his first exciting chase after one of these animals. To illustrate his paper, Mr. Collens laid on the table some photographs of female specimens killed in the river Matan, drawings of the skeleton, showing the similarity of the bones of the flippers to those of the human hand, and one or two of the rib bones. On the motion of the President, seconded by Mr. Potter, who said he did so with very great pleasure, Mr. Collens was accorded a

unanimous vote of thanks for his interesting paper.—Mr. Broadway said that they had all heard with regret the sad bereavement which had been recently sustained by two of their members, Mr. Syl. Devenish and Dr Woodlock—the one in the loss of his youngest daughter the other in the death of his wife. He thought the Club should show its sympathy by a vote of condolence, and he proposed they should pass one. Mr. Potter seconded the motion and the President supported it in a few well chosen words. The vote was passed in silence. Mr. Devenish replied in suitable terms and thanked the Club on behalf of himself and Dr. Woodlock.—The Hon. Robert Guppy then addressed the Club stating that as had been his custom when the scientific association was in existence, he proposed to invite the Club to visit his house at San Fernando and to take part in a picnic on the Hill on the 19th March next. In giving this invitation he hoped it would be understood that he invited every member and that all the members would be welcome. (Applause). Mr. Devenish, on behalf of the Club, thanked Mr. Guppy in the warmest terms for his hospitality.

VISIT TO SAN FERNANDO.

On March 19 the Hon. Robert Guppy entertained the members of the Trinidad Field Naturalists' Club at The Hill, San Fernando. Owing to several unfortunate occurrences the town members were not nearly so numerous as they were expected to be. They were met at the railway station by several carriages and conveyed to Mr. Guppy's residence where they found, besides their venerable host, Mr. W. S. Robertson, Mayor of San Fernando, Captain R. Johnstone, Warden and Magistrate, Mr. S. J. Fraser, S.J.P., Mr. VanBuren, Mr. Fitzgerald, Mr. Watson, also Mr. Lechmere Guppy, Mrs. and Miss Walter and Mr. P. L. Guppy. After a capital breakfast the party ascended the Hill and enjoyed the fine view which it commands Here a few insects were taken In the afternoon there was lunch, at which Mr. Caracciolo, President of the Club, proposed the health of the Hon. Robert Guppy, and in doing so referred at length to his long and disinterested services to the country in every way which was calculated to procure its progress. He alluded to Mr. Guppy's visit to West Africa and his report on African immigration, and also to the fact he was the first man in Trinidad who conceived the idea of propagating

the sugar cane from seeds, a suggestion which was severely criticized at the time. He concluded by saying that Mr. Guppy had always taken a prominent part in literary and scientific associations—he had always shewn himself far in advance of his time and he could be justly styled the Grand Old Man of Trinidad.

The toast was enthusiastically received.

Mr. Guppy responded and thanked Mr. Caracciolo for all the kind things he had said of him. He pointed out that the aim of societies of the class of the Trinidad Field Naturalists' Club was to get at the truth of everything they enquired into; after congratulating the Club upon what it had done and pointing out what it might do in the future, he in very graceful and appropriate language proposed the toast of the Club.

The toast was duly honoured, after which the members took their leave in order to catch the evening train for town having spent an exceedingly pleasant day.

CLUB PAPERS.

A PRELIMINARY LIST OF THE MAMMALS OF TRINIDAD.

By Oldfield Thomas, Esq., F.L.S., *British Museum (Natural History.)*

The present list is only written to form a basis on which a complete scientific list of the Mammals inhabiting Trinidad may be founded, and to show members of the Society how extraordinary little is definitely known of the mammals of the Island. By known, of course, I mean scientifically known in the sense of being published to the world, for I have no doubt whatever that many members of the Society could off-hand add to the list many animals well known to them and other inhabitants, but neither hitherto mentioned in scientific publications nor represented by specimens in the British Museum.

And even those mentioned have for the most part been determined by observers who were not specialists on the subject,

so that many of the determinations are open to very great doubt, even in the case of common species. For example the Howler Monkey, probably known to everyone in the island, appears never to have been scientifically determined, although there are some five or six species found on the continent, any one of which the Trinidad Howler might prove to be. The same remarks are applicable to the Capuchin Monkey (*Cebus* sp.) and even to the Deer (*Cariacus* sp.) Still more is this the case with the smaller and less noticeable animals, such as the rats and mice, agoutis, etc., etc.

Now for the clearing up of these questions, all persons interested in the Natural History of the Island are earnestly begged to do what they can to obtain specimens and to transmit them home for identification.* It need hardly be said that in any future list full credit will be given to anyone who will take the trouble to do this, and there can be no question that every collection made at present is sure to contain species new to the island, even if not, as in the case of two of the bats I recently received from the island, altogether new to science.

In this connection I would specially draw attention to the good service which our President, Mr. Caracciolo, has rendered to science by sending home to the British Museum so large a number of the mammals of Trinidad, and I trust other members of the Society will follow his generous example. To Mr. Hart also we owe a considerable number of specimens, many of them obtained for the first time in Trinidad.

Mammals may be made into skins, and their skulls preserved either *in situ* or sewn up inside their bellies, or the smaller specimens, and especially bats, may be preserved entire in spirits. Particulars such as date of capture, exact locality, altitude, weight when freshly killed, etc., etc., should be carefully recorded on the labels.

Of previous lists of the mammals the first is that given by Ledru† in 1810, in which ten species are mentioned, and these form of course the first record of the species in Trinidad. But the most important list is that by Dr. de Verteuil‡ in his well known book on the island. From this list many of those in the present one are taken, but owing to its not having been made up by a systematic mammalogist many of the animals are quite unrecognizable under the names which he has applied to them.

A list of nine species of bats collected by Dr. D. Huggins at

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* The Trinidad Field Naturalists' Club has kindly offered to receive and forward specimens intended for the Museum.

† Voy. Ténériffe, et la Trinité, I. p. 256, 1810.

‡ Trinidad, 2nd edition, page 360, 1884.

San Fernando was given in 1866 by Prof. Peters,§ and these are also for the most part the first records of the species in the island. As will be seen by the present list the exertions of our President, Mr. Caracciolo, and of Mr Hart have increased the number of bats to 27. but this is certainly not more than a half, and possibly not more than a quarter or a fifth of the species which actually occur.

Primates—Monkeys.

There appear to be only two species of Monkey in Trinidad, but as already noted the proper scientific name of neither of them is certainly known; skins of wild killed specimens are, therefore, particularly wanted. Enquiries should also be made as to the presence of Marmosets or other Monkeys in the forests of the interior.

1. Mycetes sp. (probably *M. seniculus*) the Howler.
   Simia seniculus, Ledru.

   Mycetes barbatus, de Verteuil. First record in Trinidad —Ledru, 1810.

2. Cebus sp. First record—de Verteuil. Capuchin monkey.

Chiroptera—Bats.

The Bats of Trinidad form the greater part of its Mammalian Fauna, and the number of them here given will no doubt be largely increased in the future. It would be of great interest if observers would try and find out if there is any migration of bats between Trinidad and the Mainland according to season, a migration which is known elsewhere, and is supposed to be induced by the different times of the ripening of different sorts of fruit, the presence or absence of insects, and similar causes. Specimens of each species should be obtained if possible at different times of the year to prove their presence at the various seasons.

FAMILY VESPERTILIONIDÆ.

Of the Vespertilionine group of bats, to which the majority of the European bats belong, only two have as yet, been found in the Island, although some half dozen more might be expected to occur there. These bats are distinguished by having no exfoliations or "nose leaves" on the muzzle, and by having their tail contained in the interfemoral membrane, and continued just to its hinder edge, the tip alone projecting. The Trinidad species are :—

3. Vespertilio nigricans, Wied. *Vespertilio parvulus*, Temm. Peters. First discovery in Trinidad—Dr. Huggins.

4. Thyroptera tricolor, Spix. First discovery—Mr. Caracciolo, Jan. 1893.

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§P. Z. S. 1866, p. 430.

FAMILY EMBALLONURIDÆ.

The members of this family are characterized by their simple muzzle without nose-leaf, by their tail being partially free, either perforating the interfemoral membrane, and appearing on its upper surface, or produced far beyond its posterior margin. The family is more largely represented in the Neo-Tropical region, to which Trinidad belongs, than the VESPERTILIONIDÆ and there are, therefore, four known, and probably many more unknown species belonging to it.

5. FURIPTERUS HORRENS, F. Cuv. First discovery—Dr. Huggins (Peters l.c.)

6. SACCOPTERYX BILINEATA, Temm. First discovery—Mr. Caracciolo, 1889. Also received in 1891 from Mr. J. H. Hart, who obtained it in the Botanic Gardens.

This is a very pretty brownish bat, with two white lines running down the sides of the back. It has also, as have the next two species, a very peculiar little pouch or sac, nearly large enough to hold a pea, in the wing membrane in front of the arm. Definite observations on the use of the pouch, which is only present in the male sex, might be of service.

7. SACCOPTERYX LEPTURA, Schr. First discovery—Mr. Hart, 1892 (Botanic Gardens.)

8. SACCOPTERYX CANINA, Wied. First discovery—Mr. Caracciolo, 1892-

9. RHYNCHONYCTERIS NASO, Wied. Proboscis Bat. First discovery—Mr. Caracciolo, 1893.

10. NOCTILIO LEPORINUS, Linn. Fish-eating Bat. First record, de Verteuil. Specimens in Museum from Sir Wm. Robinson, Jan. 1889 (Cave in First Boca.)

These specimens are those from whose examination Mr. Harting definitely showed the Fish-eating propensities of this widely spread species.

11. MOLOSSUS RUFUS, Geoff. First discovery – Mr. Caracciolo, 1891. Also sent by him in 1893.

12. MOLOSSUS OBSCURUS, Geoff. First discovery—Dr. Huggins, 1866. Also sent by Mr. Hart in 1892 (Carrera) and by Mr. Caracciolo in 1893.

FAMILY PHYLLOSTOMATIDÆ.

This family consists of the leaf-nosed bats of America, and is represented in the tropical parts of the continent by a very large number of different

forms, differing among themselves very much in size and appearance, but all agreeing in the possession of a nose-leaf, whose length varies from longer than the head, as in LONCHORHINA AURITA to a mere narrow rim, just raised above the level of the snout.

To this family belong the most prominent and interesting species of the island, and it is among its members that we may most hope to discover further new and curious forms.

13. CHILONYCTERIS RUBIGINOSA, Wagn. First discovery—Mr. Hart, 1892 (Botanic Gardens.) Also sent by Mr. Caracciolo, 1893.

14. CHILONYCTERIS DAVYI, Gray. First discovery—Mr. Caracciolo, 1891. Specimens in Museum.

This rare species is distinguished from all its allies by its wings being attached to the centre of the back instead of the sides of the body, and by the back being entirely naked.

15. MORMOPS MEGALOPHYLLA, Peters. First discovery—Sir William Robinson, 1889. (Point Gourde Caves).

16. LONCHORHINA AURITA, Tomes. First notice—Tomes, 1863. Specimen in the possession of the Netley Hospital Museum.

This remarkable species, which has a nose leaf as long as the head, has since been received from Venezuela and neighbouring localities, and there is therefore little question that the locality "Trinidad" assigned with some doubt to the typical specimen, was really correct, and that the species is a native of the island. Definite information on the subject would however be very welcome.

17. MICRONYCTERIS MEGALOTIS, Gray. First discovery—Mr. Caracciolo, 1889.

18. PHYLLOSTOMA HASTATUM, Pall. First discovery—Dr. Huggins, 1866.

This is by far the largest bat known to occur in the island, its forearm attaining a length of over 3 inches.

19. HEMIDERMA BREVICAUDATUM, Wied. First discovery—Dr. Huggins, 1866. Specimens in Museum from Sir William Robinson, 1889 (Cave in First Boca), Mr. Caracciolo, 1889 and 1892, and Mr. Hart, 1890 (Botanic Gardens.)

This is evidently by far the commonest bat in the island and indeed throughout tropical America.

20. Glossophaga soricina, Pall. First discovery—Mr. Caracciolo, 1892, and again sent by him in 1893.

This also is a very common species in all parts of tropical America. It represents, with its much rarer ally, the next species, a group of bats characterized by their exceedingly long tongues, which project considerably from their mouths, and are used for licking out the insides of fruits, berries, etc.

21. Anura geoffroyi, Gray. First discovery—Mr. Hart, 1890 (Botanic Gardens.) "Caught in a butterfly net while sucking flowers of Eperua falcata, the Wallaba tree."

22. Artibeus perspicillatus, L. First discovery—Mr. Hart, 1892 (Botanic Gardens.) Also sent by Mr. Caracciolo, 1893.

23. Artibeus planirostris, Spix. First discovery—Mr. Caracciolo, 1889.

24. Artibeus hartii, Thos. First discovery—Mr. J. H. Hart, 1892.

The type and only example as yet known of this interesting new bat was obtained by Mr. Hart in the Botanic Gardens during the course of last year. Like the other members of the genus Artibeus it has a short thick head, with a remarkably broad muzzle, but it differs from most of them by having a uniformly brownish colour without white stripes on the forehead. It is a rather small bat, with a forearm only about an inch and a half in length.

25. Artibeus quadrivittatus, Peters. First discovery, Dr. Huggins, 1866 (San Fernando.)

This is a very pretty little fruit-eating bat, with four prominent white stripes running down its face.

26. Vampyrops caraccioli, Thos. First discovery—Mr. Caracciolo, 1889. Also received from Mr. Hart, 1890 (Botanic Gardens.)

Science is indebted for the original discovery of this handsome species to our President, in whose honour I named it, on

receipt of the specimen he sent home in 1889. It is a medium sized species, with a forearm about 2 inches long, and has its face, as in the last species, conspicuously striped with white, and there is also a white stripe running down the centre of the back. Further specimens of this interesting species would be of much service.

It would be interesting for observers on the spot to try and find out what service, such as assimilation to surrounding objects, is rendered by the peculiar white striping so marked in this and many of the other allied species.

27. Chiroderma villosum, Peters. First discovery—Dr. Huggins, 1866. Also sent by Mr. Caracciolo, 1893.

28. Sturnira lilium, Geoff. First discovery—Dr. Huggins, 1866.

29. Desmodus rufus, Wied. Blood-sucking Bat. First discovery—Mr. Caracciolo, 1892, and again sent in 1893.

This, the common blood-sucking bat of tropical America, has no doubt long been known to inhabit Trinidad, but Mr. Caracciolo's specimens are the first that have actually been sent from the island.

Carnivora.

The Carnivora of Trinidad afford a good example of our extreme ignorance scientifically of the fauna combined with a general knowledge of the animals popularly. Thus, although every resident member of the Society could probably say at once that such and such beasts of prey inhabit the island, yet scarcely a single carnivora can be said to be definitely determined as a native there. De Verteuil's names are almost unidentifiable, scientifically, and the popular names are practically valueless. Thus whether the "Chat-tigre" of Ledru, the "Tiger-Cat" of de Verteuil is Felis pardalis the Ocelot F. tigrina, the true Tiger-Cat, it is impossible to say, or whether both occur in the island. Again is de Verteuil's "Viverra vittata" the Grison or the Skunk, and what is his "Gulo or Glutton." Skins and skulls sent home for determination, can alone settle these and other similar questions.

30. Felis, sp. The Ocelot or the Tiger-Cat. "Chat-tigre of Ledru 1810.

31. Galictis barbara, L. The Tayra. First notice—De Verteuil. Skulls in Museum from Mr. C. W. Meaden, 1890) and Mr. H. Prestoe
(1891) ("Woods of the Interior.")

[Galictis vittata, Schr. The Grison. This may or may not be De Verteuil's "Viverra vittata," and I do not know if the species occurs in the island.]

32. Lutra insularis, F. Cuv. Otter. First record—F. Cuvier, (1823.) A specimen in Museum from Mr. R. J. L. Guppy, (1874).

This animal has long been a puzzle to Zoologists, as the original specimen was insufficiently described and Mr. Guppy's specimen is unfortunately without a skull. Should any members of the Society be able to obtain a Trinidad otter they would be doing a very great service, if they would send at least the skin of the head and the skull, or better still, *the whole head in spirits* to London for proper examination and description. Skulls alone would also be by no means valueless.

33. Procyon cancrivorus, Cuv. Racoon. First record.—De Verteuil.

34. Cerceleptes caudivolvulus, Pall. Kinkajou. First discovery—Hon. A. Gordon, by whom two specimens were presented to the Zoological Society of London.

Rodentia.

Of all the groups of Animals found in Trinidad, the Rodentia are those which demand the greatest attention on the part of collectors and observers, for not only are the species very numerous as with the Bats, so that there is every probability of absolutely new forms being discovered, but, owing to their inability to fly, their geographical range is usually much less extended than those of the aerial Mammals and therefore great interest attaches to those inhabiting isolated localities such as Trinidad. Special attention is drawn to the rats and mice which are sure to exist in the forests of the interior, but which are as yet absolutely unknown. Skins (with skulls) or spirit specimens of these are special desiderata.

35. Sciurus cestuans, L. Squirrel—First discovery Dr. Denny, a specimen sent by whom was received by the Museum in 1880. This specimen had been for some years in the collection of the late Mr. G. R. Waterhouse, so that I do not know at what date it was sent from Trinidad, also recorded by de Verteuil.

36. Holochilus squamipes, Bts. First discovery—Mr. Caracciolo 1889.

This is a large water-rat, and is perhaps the "Mus pilorides" of Ledru's list (1810).

37. Heteromys anomalus, Thomps. Pouched Mouse. First discovery—Thompson, 1812. Original specimen in

Museum and also one sent by Mr. Hart in 1891, Botanic Gardens).

38. Loncheres guianæ, Thos. First discovery—Mr. Hart, 1890, (Botanic Gardens).

This interesting spiny rat was first obtained in Demerara and the present is only its second known occurrence.

39. Echimys, sp.

De Verteuil mentions two species of spiny-rat, E. chrysurus and E. rufus, but he does not give enough particulars about them to enable me to determine which species of Echimys are really referred to, and whether there are really more than one in the island. Specimens of all these spiny-rats are urgently needed.

40. Synetheres prehensilis, Couendou or Porcupine. First record—Ledru, 1810.

("Hystrix cristatus" corrected by Sonnini on page 292 to H. prehensilis.) Sent by T. F. N. Club, 1892.

41. Dasyprocta aguti L. Agouti. "Cavia aguti," Ledru. Chloromys acuti. de Verteuil. Sent by T. F. N. Club, 1892.

42. Cœlogenys paca, L. Paca or Lapa. First record, Ledru, 1810. Sent by the T.F.N. Club, 1892 (St. Ann's.)

Artiodactyla.

43. Cariacus, sp. "Gouazoupita." Biche. Ledru, 1810. Cervus simplicicornis. de Verteuil.

A young specimen apparently belonging to Cariacus (Coassus) nemorivagus was sent to the British Museum by the T. F. N. Club in 1892, but an adult male would be needed before the species could be certainly determined.

44. Dicotyles tajacu, L. Collared Peccary. First record —de Verteuil.

45. Dicotyles labiatus, Cuv. White-lipped Peccary. First record, de Verteuil.

Edentata.

46. Cholœpus didactylus, L. Two-toed Sloth. First record—Ledru, 1810. Not mentioned by de Verteuil.

47. Myrmecophaga jubata. Great Ant-eater. First record —de Verteuil.

The account De Verteuil gives of his *Myrmecophago tridactyla*, renders it evident that this species is intended.

48. Tamandua tetradactyla, L Tamadua. First discovery —T. F. N Club 1892 at St. Anns. Information is much needed as to whether the colouration of the four-toed Ant eater is variable or constant within the limits of the island.

49. Cyclothurus didactylus, L. Little ant-eater. First record— De Verteuil.

50. Tatusia novemcincta, L. Cachicame. First record, Ledru 1810 *Cachicamus novemcinctus*—De Verteuil, also sent by the T. F. N. Club, 1892 (St. Ann's.) I am unable to determine what de Verteuil's *C. septemcinctus* is.

Marsupialia.

51. Didelphys marsupialis, L. Common Manicou—First discovery Dr. H. Denny, whose specimen is in the Museum, where it was received in 1880. Also sent by the T. F. N. Club in 1892 from St. Anns.

52. Didelphys philander, L., Philandre Opossum. First record, Ledru, 1810. Specimens in Museum from Mr. Hart, 1891 (Botanical Gardens).

Trinidad Mammals.

(English and Local Names).

1. Mycetes seniculus, Red Howler, Red monkey, Macaque rouge.
2. Cebus (sp.), Capuchin monkey, Matchin.
29. Dismodus rufus, Vampire Bat.
30 Felis (sp.), Ocelot, Tiger-Cat, Chat-tigre.
31. Galictis barbara, The Tayra, Wood dog, Chien bois.
32. Lutra insularis, Otter, Chien d'leau, Water dog.
33. Procyon cancrivorus, Racoon, Mangrove dog, Chien mangue.
35. Sciurus cestuans, Squirrel, écuriel.
38. Loncheres guianæ, Spiny rat.
40. Synetheres prehensilis, Couendou or Porcupine, Porc é pic.

41. Dasyprocta aguti, L., Agouti.
42. Clogenys paca, L., Paca or Lapa, Lappe.
43. Cariacus (sp.), Gouazoupita, Deer, Biche.
44. Dicotyles tajacu, L., Collared Peccary, Quenk.
46. Choloepus didactylus, Two-toed sloth.
47. Myrmecophaga jubata, Great Ant eater.
48. Tamandua tetradactyla, L., Ant eater, Mataperro, *i.e.* dog-killer. The natives call it matapel, a corruption of mataperro.
49. Cyclothurus didactylus, L., Little ant-eater, Ai Paresseux and "Poor me One."
50. Tatusia novemcincta, L., Armadillo, Tatoo.
51. Didelphys marsupialis, Common Manicou.
52. Didelphys philander, Philander Opossum, Manicou gros yeux.

MOSQUITOES & DISEASES IN THE HUMAN BODY.

Translated by Jean Petersen, Esq.

The well known scientist Dr. H. von Ihering of Rio Grande do Sul writes as follows in the *Cologne Gazette* on this subject :—"For several years the Mosquito has been accused of being the agent by which intermittent fevers are distributed, but the allegation has not yet been satisfactorily proved, especially as the cause of fever has not yet been definitely ascertained. It is probable that the gregarine-like organisms which live in the blood and attack the blood-corpuscles are the cause, but there still remains something to be found out with regard to their multiplication and distribution. When that is done we shall be able to judge of the part Mosquitoes play in the spread of fever and disease. The able Italian Zoologist Grassi has proved that flies pick up the eggs of the human thread worm, also fungus spores, and they are likely to drop them again, in their excrement, in a vivifiable condition. If they exercise such an important part in the distribution of the thread worm is it not probable they also distribute the germs of contagious diseases? M. Ranvier in 1887, before the French Acadamy of

Science, proved that flies were the infection-carriers of tuberculosis. Experiments have shown that flies absorbed tuberculosis bacilli from the expectorations of consumptive patients. These bacilli were distributed partly by means of the insects' excrement and partly, as the flies soon afterwards died, by their decaying bodies. The expectoration of consumptives should therefore be deposited in covered vessels and destroyed, The part which the Mosquito plays in the history of *Filaria sanguinis hominis*, Lewis has been proved. This worm which is several inches long, lives in the tropical zones—India, China and Brazil. It is found in the human blood and in the lymphatic glands. It is the cause of many painful diseases—tumours, elephantiasis, bloody urine. &c. According to one authority, Patrick Manson, the history of the worm is as follows: Its small eggs are deposited in the blood where they develop into embryos. Strange to say they live during the day in the heart and great arteries. It is only during sleep they invade the small veins of the extremities. Every drop of blood taken from the finger or the ear during sleep will then contain a number of embryos. They are also found in the urine and the tears or secretions of the lachrymal glands, and, consequently, it can be easily understood how they reach water. Mosquitoes also carry them to water. The female Mosquito when filling itself with blood from its sleeping human victim also absorbs with the blood a number of these embryos. Having filled herself with blood she flies to to her home, the water, in the vicinity of which she spends her time slowly digesting her meal and in maturing her eggs of which she ultimately lays about 300. The embryos while in the Mosquito undergo a change and in a period of from six to seven days attain a length of $1\frac{1}{2}$ m.m. As soon as the Mosquito thus infected has deposited her eggs she dies, and her body falling into the water the worm embryos are set at liberty. They remain in the water awaiting their arrival at their perfect state which is only attained when they have been introduced into the human body. This shows how necessary it is in the tropics, never to drink water unless it has been first filtered or boiled. It is now generally understood that our studies in disease germs are as yet only in their primary stage, but undoubtedly the germs of many diseases depend largely for their propagation and distribution upon the medium of blood-sucking insects. Facts such as these have brought many different Flies and Mosquitoes under the notice of medical men and students of hygiene in a light which the Zoologists who have studied these insects have never viewed them.

2nd December, 1892.

THE TRINIDAD MANATEE.

By J. H. Collens.

So far as I know this shy but interesting animal is now only to be met with in one part of Trinidad, viz., the upper part of the Mitan or Nariva River in Bande de l'Est, though it is fairly well known in other tropical and sub-tropical parts of the Western Hemisphere, as also in some of the western rivers of Africa.

Its creole name *Lamantin* is probably a corruption of the words *la manatin*, but it is better known to the outer world as the Sea-cow, while in Demerara it goes by the more romantic name of Mermaid. Old authorities on Natural History used to classify it among the Cetaceae, but modern savants are disposed to put it, in company with its near relation the dugong of Australia, under a new order the *Sireniae*. It varies from eight to twelve feet in length, its head is rounded, the eyes are small and deep-set, eyelids imperfectly formed but capable of contraction, lips covered with bristles, no dorsal fin, the fore-limbs or flippers paddle-shaped and terminating in something like nails. The manatee has no posterior limbs, although in fossil specimens of the *Sireniae*, there have been found rudimentary ones. Unique among mammals in one respect it has but six neck vertebræ. The mouth is peculiar, in that the inner cheeks are hair-covered, and the hard horny palate above and below is specially adapted for the bruising and pulping of its vegetable food. For the manatee is a strict vegetarian whose idea of elysium is to lie prone in the beds of tangled river grass, where he can bask in the sunlight and munch the tender green herbage at his leisure. He is mild of disposition, lazy and inoffensive in manners; when attacked he does not dream of resistance, but seeks refuge in flight, and considering his clumsy and unwieldy bulk his locomotion is tolerably rapid.

I had several times essayed to get a glimpse of the manatee during one of my holidays spent at the Nariva Cocal, but always in vain, though I frequently observed traces of him amongst the aquatic plants where he had been feeding. At last, one day when Mr. R. Edwin Legge and myself were being paddled up the Mitan in a little corial or dug-out, by one of the Cocal labourers, my patience met with due reward. This stream always has a great charm for me, and I have spent many a lazy hour drifting along with the current, improving my acquaintance with Dame Nature, who is ever ready in these lonely parts to

display some novel or unfamiliar phase. On the occasion in question we were stealing as noiselessly as could be up the stream, our course occasionally hindered by enormous snags which barred the way. On either side giant mangroves, whose lofty tops seemed to touch the heavens, were reflected vividly in the placid water beneath. Piercing shrieks issuing from the highest branches of the trees betrayed the presence of parrots who would not otherwise have been discernible from the green foliage surrounding them, while ever and anon corn-birds less timid than the noisy parrots darted across to their ingeniously constructed pendant nests, uttering comically discordant notes *en passant* as though mildly protesting against intrusion. In the distance could be heard more and more plainly every minute, the howl or roar of the red monkey, and we were evidently approaching a small colony of simians when suddenly our paddler, who by the way blessed with only a single optic, had yet made better use of his one than we of our pair,—called out "*Gardez lamantin, m'sieu,*" when a small dark object a few yards ahead resembling at first sight a discoloured coco-nut or a foot-ball, caught our eyes only to disappear from view almost immediately with a mighty splash awakening the echoes all around, and startling the myriads of mangrove crabs into bustling flight. Hurrying towards the scene of the commotion we saw the same football-like substance on the surface again about twenty yards ahead. Unfortunately we had not provided ourselves with harpoons, but I let fly with some No. A. shot, the result of which was another convulsion of the water even more vigorous than the first. Down plunged the manatee again torpedo fashion, and away we followed as frantically as ever John Gilpin rode, one of us at least trembling with excitement. This went on for several minutes, but how long history telleth not, for I must confess I lost all count of time. The animal true to its name of Siren continued to lure us on after the manner of the three celebrated sisters till at length over a mile perhaps having been covered, the muscles of our willing boatman gave out, when it finally disappeared. We must have hit it for we fired several shots, but the small leaden pellets had no more effect upon its thick ponderous hide than the pellet of a popgun would have had upon the iron plates of H.M.S. *Blake.*

A few days after this incident a female manatee about nine feet long was successfully harpooned at almost the identical spot where we had met the former one. I have here a photograph of it which was taken by my friend Mr. Legge who had the creature cleaned out and stuffed as well as local appliances and circumstances would permit.

Some years ago a young one from Surinam was sent to the Zoological Gardens in London, and that genial naturalist Frank Buckland in his "Curiosities of Natural History" gives an amusing account of its frolics;—how its guardian Mr. Bartlett had to wade knee deep in the tank to perform the duties of wet nurse by aid of a large bottle, and how, the serious business of feeding accomplished, a good romp ensued, in which nurse and baby bowled each other over in a fashion altogether unknown in an ordinary well-conducted nursery.

A young male was last year domiciled in the Botanical Gardens of British Guiana, and I am pleased to learn from the *Argosy* of that colony. dated February 11th of the present year, that he has been supplied with a mate. It will be interesting to wait the issue of events, and to note whether these being in captivity will propagate. Apparently attempts made in this direction in Europe have hitherto proved a failure.

The mammæ of the female are in close proximity to the arm-pits, if one may be allowed to use the term. She sometimes hold her young under her flipper while it is drawing its nourishment, and it is perhaps this habit which has gained for her the appellation of Mermaid. The flesh is not bad eating, and bears some resemblance to fat pork. The oil obtained is very abundant in quantity, and in quality is not unlike cod liver oil, in fact the dugong oil of Australia is prepared for export as a substitute for that obtained from the cod. The Indians of South America though not averse to eating manatee meat, still hold the animal in a sort of superstitious reverence, it being to outward appearance a fish,—and yet so remarkably unfish-like in its habits and propensities.

As may be gathered from the rough sketch I have made, the skeleton is exceedingly massive, particularly the bones of the skull and ribs. It will be seen that the conformation of the bones at the extremity of the flipper, is very much that of the human hand—with its five digits.

In concluding these brief and I am afraid faulty notes upon one of the most interesting of our Trinidad wild animals, but one which unfortunately threatens soon to become extinct, I would remind my hearers that they are simply the ideas roughly and imperfectly put together of a thoroughly unscientific member of our Field Naturalist s Club.

3rd March, 1893.

PRELIMINARY LIST OF TRINIDAD BUTTERFLIES.

By W. M. Crowfoot, M.B.

[From Specimens Collected by The Hon. S. H. Gatty, Q.C., and Beaven Rake, M.D.]

1 Danais erippus, Cr.
2 ,, gilippus, ,,
3 Lycorea atergatis, Doub. & Hew.
4 Cercetinia fenestrella, H.-w.
5 Mechanitis utemaia, Peak.
6 Ithomia pellucida, Weym.
7 Heterosais (Ithomia) ocalea, Doub and Hew.
8 Hymenitis lagusa, Hew.
9 Æria (Ithomia) agua, Godrix and Salv.
10 Napeogenes ?
11 Melinœa tachypetis, Feld.
12 Tithorea flavescens, Kirby.
13 Pierella dracontis, Hubr.
14 Euptychia ocirrhoe, Fab.
15 ,, penelope ,,
16 ,, sosybius ,,
17 ,, annus ,,
18 ,, cephus ,,
19 ,, celmis, Godh.
20 ,, junia, Cr.
21 ,, libye.
22 ,, erichtho.
23 ,, belle
24 Taygetis virgilia, Cr.
26 ,, echo ,,
26 ,, andromeda ,,
27 ,, penelea.
28 ,, cleopatra, Feld var.
29 Morpho peleides, Koll.
30 Opsiphanes cassiæ, L.
31 ,, crameri, Feld.
32 Caligo eurylochus, Cr.
33 ,, ilioneus, Cr.
34 Eryphanis automedon, Cr.
35 Dynastor darius, Fab.
36 Actinote (Acræa) anteas, Doubl.
37 Heliconius melpomene, L.
38 ,, near metalites, Butl.
39 ,, ricini, L.
40 ,, erato, L
41 ,, antiochus, L.
42 Eueides aliphera, Godt.
43 ,, isabella, Cr.
44 Colœnis pherusa, L.
45 ,, julia, Fab.
46 Dione juno, Cr.
47 ,, vanillæ, L.
48 Phyciodes lucinde, Cr.
49 ,, leucodesma, Feld.
50 Hypanartia lethe, Fab.
51 Junonia genoveva, Cr.
52 Anartia jatrophæ, L.
53 ,, amalthea, L.
54 Temenis ariadne, Cr.
55 Dynamine mylitta, Cr.
56 ,, agacles, Dalm.
57 ,, egœa, Fab.
58 Callicore marchalii, Guer.
59 Catagramma codomannus, Fab.
60 Hæmatera thysbe, Doubl & Hew.
61 Gynœcia dirce, L.
62 Ageronia feronia, L.
63 ,, ferentina, Godt.
64 ,, amphione, L.
65 ,, arethusa, Cr.
66 Didonis biblis, Fab.
67 Cystineura hypermnesra, Hub.
68 Megalura peleus, Suly.
69 ,, chiron, Fab.
70 Victorina steneles, L.
71 Hypolimnas misippus, L.
72 Adelpha iphicleola, Bates.
73 ,, cytherea, L.
74 ,, plesaure, Hub.
75 Preponia demodice, Godt.
76 ,, demophon, L.
77 ,, antimache, Hubr.
78 Agaristhos odius, Fab.
79 Anœa phidile, Hub.
80 Siderone ide, Hub.
81 ,, isidora, Cr.
82 Protogonius ochraceus, Butl.
83 Dismorphia amphione, Cr.
84 ,, ?
85 Eurema nise.
86 ,, marginella, Feld.
87 ,, albula.
88 ,, gratiosa, Doub & Hew.
89 ,, palmyra, Poey.
90 Pieris monuste, L.
91 Tachynis ilaire, Godt.
92 Daptoneura eurymnia, Feld.

93 Catopsilia eubule, L.
94 ,, statira, Cr.
95 ,, hersilia, ,,
96 ,, philea, L.
97 Papilio polydamas, L.
98 ,, ænoides, F. sp.
99 ,, cymochles, Doubl.
100 ,, theramenes, Feld.
101 ,, polycaon, Cr.
102 ,, thoas, L.
103 Mesosemia cippus, Hew.
104 tenera Westw.
105 ?
106 Cremna eucharila, Bates.
107 Lymnas jarbus, Fab.
108 xarifa, Hew.
109 Isapis agyrtus, Cr.
110 Helicopis
111 Anteros formosus, Cr.
112 Emesis fastidiosa, Men.
113 Symmachia ovidia, Fab.
114 Mesene phareus, Cr.
115 ,, sagaris, Cr.
116 Charis avius, Cr.
117 Echenais aristus, Stoll.
118 Lasaia meris, Cr.
119 Thisbe irenæa, ,,
120 Nymphidium lamis, Cr.
121 lysimon, Stoll.
122 azan, Doubl.
123 Theope thootes, Hew.
124 Zeonia chorinens, Cr.
125 Riodina lysippus, L.
126 Lycæna hanno, Stoll.
127 ,, cassius, Cr.
128 Thecla regalis, Cr.
129 ,, hemon, ,,
130 ,, marsyas, L.
131 ,, phaleros, L.
132 ,, pelion, Cr.
133 ,, meton, ,,
134 ,, linus, Sulv.
135 ,, argiva, Hew.
136 ,, palegon, Cr.
137 ,, beon, ,,
138 ,, ortygnus, ,,
139 ,, ziba, Hew.
140 ,, echion, L.
141 ,, tephræus, Hubr.
142 ,, hesperitis, Butl. & Druce.
143 ,, ergina, Hew.
144 ,, venulius, Cr.
145 ,, mulu-ha, Hew.
146 ,, thius, Hubr.
147 ,, stagira, Hew.
148 ,, albata, Feld.
149 Thymele simplicius, Stoll.
150 ,, catillus, Cr.
151 ,, proteus, L.
152 ,, protillus, Hen. Schaf.
153 ,, dorantes, Stoll.
154 ,, brachius, Hubr.
155 ,, amisus, Hew.
156 ,, undulatus ,,
157 ,, exadeus, Cr.
158 ,, bipunctatus, (Gm.)
159 ,, itylus, Hubr.
160 Telegonus apastus, Cr.
161 ,, anaphus, ,,
162 ,, phocus, ,,
163 ,, fulgerator, Wall.
164 ,, midas, Cr.
165 ,, alardus, Stoll.
166 Proteides evadnes, Cr.
167 ,, ægita, Hew.
168 Erycides palemon, Cr.
169 Pyrrhopyge phidius, L.
170 ,, charybdis, Doubl & Hew.
171 Antigonus erosus Hubr.
172 ,, nearchus, Latr.
173 Achlyodes thrasybulus, Fab.
174 pulcherius, Feld.
175 Helias phalænoides, Hubr.
176 Leucochitonea arsalte, L.
177 Hesperia syrichthus, Fab.
178 ,, rurulis, Boisd.
189 Nisoniades gesta, Hen Schaef.
180 Pythonides tryxus, Cr.
181 ,, scintillans, Mab.
182 ,, cerialis, Cr.
183 Pamphila epictetus, Fab.
184 ,, vibex, Hubr.
185 ,, corades, Feld.
186 ,, remus, Fab.
187 ,, uniformis, Butl.
188 ,, athenion, Hubr.
189 ,, malitiosa, Hen Schaef.
190 Spathilepia clonius, Cr.
191 Æthilla bathyllus, Smith Abbot.
192 Carystus corydon, Fab.
193 ,, minos, Latr.
194 ,, virbius, Cr.
195 ,, cynisca, Swains.
196 ,, phyllus, Cr.
197 Thracydes antonius, Latr.
198 Entheus vitreus, Cr.
199 ,, ebusus, ,,

BIOLOGICAL & FAUNISTIC NOTES ON TRINIDAD.

From the German by Dr. von Kennel.

(*Concluded.*)

4. We now come to the large rivers of the plains. Their fauna is more distinct than that of all the other forms of water. The two large rivers in Trinidad are the Caroni and the Ortoire; the former flows from East to West, and drains the Northern range of hills, the latter takes its origin in the Southern part of the Island, draining the centre and deriving its waters from small rivulets and swamps. Both these rivers are alike, in so far that the current of their middle and lower course is not strong, so that they rise and fall with the tide a considerable distance from their deltas In the dry season the water is brackish a long way up the course, but in the rainy season the strength of the current prevents the sea forcing its way up, so that during that time the water is sweet its whole length. The vegetation, of course, corresponds to this disposition; at the deltas true mangroves are found to about 1-1½ miles up the course. The few animals I refer to in the following lines come from the Ortoire and were captured about 8 miles from the mouth, at a place where the difference of tides is about a foot and a half, but where the water is not brackish. Large banks of *Mytilaceae* of all ages were found on a steep bank which was of a soft kind of stone, covered with mud. A decayed tree that was partly in the water was also covered with these mussels to high water mark. The animals are already conspicuous by being found in sweet water, but it is also interesting to note the heat of the sun they stand at low tide. The same remark applies to a *Phola* species, which lives among these mussels. I also captured an interesting *Lumbriconia* at the same spot. A crustacean, belonging to the genus *Ægа*, was also an inhabitant of the mussel colony, the occurrency of which in sweet water was already made known by Professor Semper. The shallow places near the banks were inhabited by a totally transparent *Palaemonide* and a slightly colored *Atya*. We have to deal here with a marine fauna in sweet water; for even if the representatives of the genus *Atya*. *Palaemonidae* and *Mytiliceae* are nearly all sweet water inhabitants, they still belong to families which are only found in the sea.

On the East Coast of Trinidad so-called lagoons are particularly interesting. They originate from the little rivulets which drain the low hills during the rainy season and flow directly into the sea. As soon as the dry season sets in, the water supply

ceases, the tide overwhelms the current of the river, and forces its way up the course; little by little a barrier of sand is thrown up, which, after a short time, completely shuts out the sea. This water that is now shut off gets a small supply from occasional showers of rain or from the sea at spring tide, so that about February and March the composition of the water of the lagoon is as follows: The lower part consists of a basin of brackish water of about 30 to 40 yards in breadth and 1 mile or less in length, with the corresponding flora and fauna; even miniature mangroves grow here. Towards the hills the bed of the ravine becomes narrower and the water sweeter; and not very much higher up the water is entirely sweet, a fact clearly proved by the fauna and flora. In this water, for which I have no other criterion than the flora and the taste, a curious fauna reigns. Numerous tadpoles cover the bottom and the water plants in black lumps; quantities of dipterous larvæ of different genera are swimming about, dragon flies larvæ and water beetles dart hither and thither, and among these, just as numerous, if not in larger numbers, *Mysis*, *Nereie* and small *Medusas*, together with *Palaemonidae* and a small kind of *Atya*, not to forget the *rhabdocaelous Turbellaria* are to be noted. The *Mysidae* are generally found in brackish water, but here they seem to thrive well in the sweet water, which is proved not only by their large numbers, but also by the fact that many were carrying their eggs about with them. But what is most striking, and is also applicable to the other animals mentioned, is that they are not to be found or at least sparingly in the salt part of the lagoon. The *Nereidae*, a small form of about 15 m.m., was also found in large quantities. Among the plants, the little *Medusae*, of about 2 m m. diameter, were swimming about. I do not think that this *Medusa* is identical with the sweet water *Medusa* described by Ray Lankester; I only found young specimens, so that I could not compare them with those described by Ray Lankester; but it is of importance that they were found for the first time in nature in sweet water, which circumstance gives an idea of the origin of those found in England in a hot house. Strange to say I could not find the hydroid stocks belonging to these *Medusae*, although a very careful search was made. It is curious to note that the inhabitants of the sea were only found in that part of the lagoon where there was no current.

Above I spoke of the small size of the inferior sweet water fauna in comparison with the European one; but it is just the contrary with the Land fauna; the giants of the inferior land fauna are found in the Tropics, such as snails, earthworms, *Myriapodes*, *Arachnidae* and insects; but what is most curious about these is that some of the nearest relations are found only

in water. I mean particularly the land *Planaria*. There is hardly an animal that is more suited to live in water than the *Planaria* with their delicate epidermis, their fine cilia and their soft parenchym, one would think that if they adapt themselves to the land they must lead a miserable and uncomfortable existence, and be unable to produce large and strong forms; but this is not the case in Trinidad where land planaria are found of about 20 c.m. in length and 1 c.m. broad, and these are not uncommon. All the land *Planaria* are nocturnal, hiding themselves under fallen leaves, among moss, etc., where they find the necessary moisture during the heat of the day. They seem to require the dew to be able to crawl about at night. Their food consists of animals that lead the same life as they do, and small snails *(Subulinae)* are generally the victims of their ravenous appetite. It is very interesting to see how these poor *Subulinae* are demolished. The planaria envelopes the shell of the snail with its body, the snail of course retires, as it thinks, into safety, but the intruder puts the opening of his mouth into the opening of the shell and a lively play of his protruded pharynx commences, which can be distinctly seen through the thin shell of the snail. The pharynx makes quick sucking movements, in which act it opens and shuts. But as the *Planaria* cannot suck out and swallow the snail in this manner, it simply digests its victim outside of its body by means of a secretion from the intestine and then sucks in the juice that is thus prepared. An average sized *Planaria* takes about half an hour to eat a *Subulinae*. The pharynx can be protruded into the most narrow spiral of the shell so that it is left clean and intact after such a repast.

INSTITUTE OF JAMAICA.—NOTES FROM THE MUSEUM (NO. 36.)

Scale-Insects Destroyed by a Fungus.

T. D. A. Cockerell, F.L.S., F.E.S.,

It has been known for a long time that certain fungi are to be found on scale insects, instances of this kind being reported from England, North America, New Guinea and New Zealand. Sometimes it is obvious that the fungus only grows on the scale after it is dead, and is in no way instrumental in killing it: but in other cases this is more doubtful, and

occasionally we can feel sure that the death of the scale-insect is due to the fungus. Such fungi, if the scale-insects are doing much damage, must be looked upon as very beneficial.

Mr. Maskell has described how on certain plants in the forests of New Zealand, brown or yellow spots may be commonly observed on the under side of the leaves, which on examination, prove to be fungi. On pulling one of these fungi to pieces, a dead scale-insect will always be found in the middle. If the very young scale-insects are examined, the fungus may often be seen beginning to grow on or within them. In California, Mr. Coquillett has found a fungus on scales of *Lecanium olex*, and although it is not yet proved that it attacks them while alive, it probably does so.

The brown scale *(Lecanium hemisphericum)* is one of the very worst of garden pests in Kingston, so it is satisfactory to be able to announce the discovery of a fungus living upon it. On Jan. 2, I found specimens of the brown scale on *Tabernæmontana* in Col. White's garden at Halfway Tree, which were attacked by a white fungus, which seemed to be the early stage of some *Cordyceps*. I sent some to Mr. J. B. Ellis, who writes that this identification is probably correct. In this case, it would need further observation and experiment to prove that the fungus actually kills the scale-insect, but I am strongly inclined to think that it does so. Such fungi as these are always described from specimens on dead insects, because they certainly mature after the insect is dead; but it is not thereby proved that they do not first attack their host while it is alive.

March 4th 1893.

anges intended for
to the Honorary
ad, B.W.I.

Annual Subscription, 3/.

NE, 1893. **No. 8.**

lans leurs écrits toute personnalité,
limites de la discussion la plus
–LABOULBÈNE

Naturalists' Club.

MIRANDA IN MINIMIS.

'ENTS:—

fice, Port-of-Spain.

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March 4th 1893.

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J'engage donc tous à éviter dans leurs écrits toute personnalité, toute allusion dépassant les limites de la discussion la plus sincère et la plus courtoise.—LABOULBÈNE

Trinidad Field-Naturalists' Club.

NATURA MAXIME MIRANDA IN MINIMIS.

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"MIRROR" Office, Port-of-Spain

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JOURNAL

OF THE

Field Naturalists' Club.

VOL. I. JUNE, 1893. No. 8.

REPORT OF CLUB MEETINGS.

APRIL 7TH.

Present: Mr. H. Caracciolo, President, Sir J. T. Goldney, Hon. D. B. Horsford, Drs. Rake, M.D., Woodlock and Woodyatt, Messrs. Syl. Devenish, M.A., T. I. Potter, W. G. Hewlett, O. C. Malcolm, Charles Libert, J. O. Scott, R. R. Mole, W. E. Broadway, J. H. Collens, F. W. Urich, and A. Taitt, Hon. Secretary.

The minutes of the last meeting were read and confirmed. Mr. L. E. Broome was elected a member of the Club. Letters were read from Mr. Oldfield Thomas (British Museum) about

some mammal skins sent to London; Dr. Knaggs about some beetles belonging to the genus *Anobium*, extracted from book-bindings, specimens of which were forwarded; Mr. Peckam asking for specimens of spiders of the genus *Attidæ* from Trinidad and offering to determine them; and Mr. Frank Chapman.—Sir John Goldney rose and said that he was very much pleased with the account which was given by some of the members of the ascent of one of the highest mountains in the Island—Tucuché. It was as interesting to him as it was to the gentlemen who had made the ascent. He thought some record should be kept of these excursions, say of those made on Bank Holidays. The next Bank Holiday would be Whit Monday and if he might be allowed he would suggest that the members should on that day make excursions into the country, and he would offer a small prize of $10 for the best written journal of any member going on such an expedition, the account to be written in a popularly scientific manner. Such papers would be of great value if they could get members to note down what they saw on the road—it would teach them to observe closely and they would always have great pleasure in referring to their notes in after life. Two of the speaker's uncles—one a great botanist and the other an architect—were in the habit of noting down their observations in this manner and he was in the possession of the journal of the latter. After he had passed through his apprenticeship, as it was called in those days, he travelled through France, Germany, Greece, Egypt and many continental countries and his notes upon what he saw were most interesting. If each member of the Club would try to write in a popular way, what he saw on his excursion, (it was not necessary to undergo any great hardships, it might be only a walk round the Savannah so long as he described what he had seen) he thought such notes would be most interesting. If the President would allow him he would offer a small prize of $10, for the best written journal of an excursion on Whit Monday by a member of the Club. He would propose that a Committee should be formed and the papers be sent in to it and they would select the prize-winner. He hoped his offer would be a small inducement to them to exercise their eyes and brains (A voice: "And pens") and pens (applause.)—Mr. Devenish seconded Sir John's suggestion and said that when, long ago he used to go into the woods with Mr. Crüger that gentleman said he was astonished at him (Mr. Devenish) because he was more enthusiastic as time went on, than he was when he first began.—The President thanked Sir John Goldney for his kind offer and said that he thought there should be a special meeting of the members when the papers

could be read and judged by the whole Club. The President announced that the large hammer-head shark *Sphyrinas zygaena* recently caught in the Gulf had been purchased for the Club and that the skeleton was being prepared for the collection. He also said that 24 ray stings were found sticking in its throat, which clearly showed that these sharks live largely on rays —Dr. Rake read a letter from Mr. C. O. Waterhouse, of the British Museum, saying that the trap-door spiders and bees (*Trigona* sp.) from Maraval were little known, and asking for some more specimens in order to determine them.—Mr. Devenish showed some large specimens of black scorpions from Mr. B. Devenish's estate at Montserrat and said that they were so numerous as to be quite a nuisance. A young girl had died recently from the sting of one of these *Arachnides*. Mr. Devenish mentioned that the best remedy for a scorpion sting was to suck the place stung until blood was drawn. Mr. Potter announced that out of the Silk-worm cocoons of *Attacus cynthia* given him by Mr. Hart two females and a male had emerged. At this stage of the meeting the President left and on the motion of Sir John Goldney, Mr. Devenish took the Chair.—Mr. Urich said that about a fortnight ago, Mr. A. R. Gray called his attention to a tree near the Southern market It was infested by a species of rynchophorous beetle and was dying from their attacks. It was important to report occurrences of this kind, as the beetles or other insects causing the damage might prove injurious to cocoa trees and canes and perhaps spread all over the Island. Insect pests are very easily got rid of if taken in time and Mr. Gray's example should be followed by every one. The Club made Economic Entomology a special feature and its members would be always ready to give their assistance and advice on questions of this kind.—Sir John Goldney considered Mr. Urich's communication a most important one. In Singapore recently that very important industry, the coconut cultivation, was threatened with extinction by the coconut beetle. Roughly speaking, a coconut tree in full bearing yielded a profit of eighteen pence a year and in an estate of 70,000 or 80,000 trees that was a considerable sum. It was necessary, to save the industry, to pass an Ordinance by which the Government gave power to certain officers to inspect and destroy infected trees. Unless insect pests were taken in hand at once, they would soon become very difficult to deal with and they might wake up some fine morning and find the whole cocoa industry gone, He thought matters of this kind should be reported at once to the Club.—Mr. Urich said during the dry season garden plants were subject to insect and fungus attacks. In his garden the rose trees were attacked by the Powdery

Mildew, which is easily recognized by the shoots and young leaves having a withered and shrivelled appearance while their under side is covered by white mildew. Mr. Cockerel of the Institute of Jamaica, to whom he had sent specimens for identification informed him that it seemed to be the *Sphaerotheca pannosa* of Jamaica. The remedy according to Mr. Galloway was to dust flour of sulphur upon the plants after watering or when the foliage was wet with dew. Plenty of watering was also efficacious.—The Secretary announced that Mr. McLaughlin had generously offered the Club a fine live deer, but Mr. J. O. Scott said the deer had since died suddenly. Mr. Mole's motion about the collection of live Trinidad animals were brought up, but after an informal discussion, in which Sir John Goldney took a lively part, was referred to the General Business Committee for estimates, &c. Mr. Urich on behalf of Mr. P. L. Guppy of San Fernando, read an interesting paper on "Some Lepidoptera of the San Fernando Hill and some silk producing moths." The paper which was illustrated by specimens and drawings, was listened to with great interest by the members present. After some business of minor importance the meeting adjourned at 9.50.

MAY 5TH.

Present: Mr. H. Caracciolo, President; Mr. G. W. Smith (Honorary Member) of Grenada, Dr. A. Woodlock, Messrs. Syl Devenish, M.A., J. Russell Murray, G. Reed, J. O. Scott, W. E. Broadway, R. R. Mole, T. I. Potter, L. E. Broome, W. G. Hewlett, Jean Petersen, Charles Libert, Henry Tate, R. L. Guppy, R. Dumoret, F. Eagle and F. W. Urich. In the absence of Mr. Taitt Mr. Urich acted as Secretary. The minutes of last meeting were read and confirmed. The following gentlemen were elected corresponding members of the Club: Mr. T. D. A. Cockerell, F.E.S., F.Z.S., of Jamaica, and Mr. Frank M. Chapman of New York. Dr. R. H. E. Knaggs was elected a country member. Letters were read from Mr. John Goode, Mr. Oldfield Thomas, of the British Museum, and Capt. C. J. Clerk, (asking for specimens of the butterfly *Siderone marthesia* of which a drawing was enclosed), Mr. C. O. Waterhouse of the British Museum (requesting male specimens of the ant, *Cryptocerus atratus*, which were not represented in the British Museum's collection), and from Mr. A. Taitt, resigning the Secretaryship of the Club.—Mr. Mole said that it was with much regret members would regard Mr. Taitt's resignation. Mr. Taitt had done admirable service to the Club in recruiting members, many of whom might, perhaps, not have joined the Club had it not been for his influence. He proposed that a

letter should be sent to Mr. Taitt acknowledging his services to the Club. Mr. Devenish seconded. Mr. Taitt's resignation was formally accepted, and on the President's motion, Mr. Urich was appointed Secretary *pro tem.* A communication was read from Mr. T. D. A. Cockerell about the small grey slug of Europe, *Agriolimax agrestis*, well known as a garden pest, being found in Jamaica on strawberry plants.—The acting Secretary read the report of the General Business Committee upon the scheme for forming a living collection of the animals of the island. The report was adopted unanimously, and on the motion of Mr. Hewlett, seconded by Mr. Potter, it was agreed to postpone this collection until the Museum was in a more advanced stage. Mr. Potter exhibited a fine specimen of the Lantern fly, which he said he had caught at St. Anns. This specimen was the third one which had been taken in that locality, and it was always in the dry season they were found.—Mr. Urich exhibited on behalf of Mr. A. R. Gray, two tortoises and a fine male specimen of the Hercules beetle *(Scarabeus hercules)* captured at Matura, on his cocoa estate. Mr. Urich said that one of the tortoises belonged to the family of *Testudinidæ*, and was known locally as the Galape. This family was recognized by the feet of the different species having distinct digits armed with sharp claws, and united by a membrane or web, and also by having a retractile neck. On the other hand, the second specimen's neck was not retractile, but bent laterally, when the reptile wished to protect it. It very likely belonged to the family *Chelydidæ* which was represented in tropical regions by a large number of small-sized species.—The beetle belonged to the *Lamellicornes* which comprise a vast assemblage of beetles, many of which are celebrated for beauty of form and splendour of colour. The males often differ from the females in having projections on the head and thorax, and in the greater size of their mandibles.—Mr. Guppy exhibited some fine cocoons of the Chinese oak silk worm, *Antheraea pernyi* which had been reared on almond leaves *Terminalia catappa* after having been imported from England. A nearly full grown caterpillar was also shown by Mr. Guppy.—Mr. Mole said that in October last he received a centipede from Mr. Libert, holding its young with the legs of the fore part of the body, and bending its body round to protect them. The centipede was sent to London, but died on the voyage, and only one of the young ones was found in the box. Dr. Sclater, the Secretary of the Zoological Society, had written to the effect that he had made inquiries, but could not hear whether this curious fact in the natural history of centipedes had ever been noted before. As this did not seem to be well known, and the season was

nearing when Mr. Libert found the centipede in question, he would ask Members to look out for such specimens in order that this interesting habit of the centipedes might be better investigated.—Mr. Urich said that all present well knew the centipedes belonged to the *Arthropoda*, of which also *Crustaceæ* (crabs, lobsters, &c.), *Arachnidæ*, or spiders, *Insecta* and *Peripati* formed a part, and as the habit of carrying their eggs and young about with them was well-known with regard to spiders and cray-fish. why should not centipedes do the same? In most natural history books he saw that centipedes were alleged to deposit their eggs singly. leaving them to hatch out by themselves. Mr Cockerell, who was a well-known authority on some of the *Arthropoda*, had informed him that this habit of the centipedes was new to him.- Mr. Devenish exhibited a piece of Manatee skin 100 years old which had been used in tying the rafters of an old roof.—Mr. Mole read a paper on "A day's insect hunting at Caparo," and Mr. Urich illustrated it with some of the specimens captured, amongst which figured some peculiar ants, beetles, &c. A specimen of the *Peripatus edwarsii*, a fine live Tigre. *Spilotes variabilis*, and a large specimen of the shell *Ampullaria urceus* were also exhibited in connection with this paper. The paper was well received, and the President, seconded by Mr. Devenish, proposed a vote of thanks to Mr. Mole for his interesting recital.—After some miscellaneous business the Club adjourned at 10 p.m.

CLUB PAPERS.

NOTES ON A RACOON.

The animal I here introduce is a Racoon, commonly called in Trinidad, "Mangrove dog." It was purchased by Mr. Caracciolo for the Club Collection some two and a half months ago. I have no doubt the Treasurer's memoranda will shew the precise date. As it exhibited certain indications of being of a somewhat more tractable nature than many of the Club's purchases, it was resolved that the fate which usually befalls animals so acquired, should, in his case, be postponed. for the present at least, and

the creature's life preserved, in order that some notes might be taken of its characteristics.

For some time he was kept at the Victoria Institute, but thinking that little would be learned about his habits there, I asked the President to allow me to take charge of him for a few weeks, and for the past month I have had him at my house. I may mention that his transportation from the Institute to Lower Prince Street was attempted at first by nailing him up in a box; but he vigorously protested against such a procedure, breaking away the bars which enclosed him; eventually he was permitted to walk down and although evincing a great desire to lie down in the gutters now and then and an insatiable curiosity as to where drains led to, he on the whole behaved very well. I have been somewhat at a loss for a name for the animal, several have occurred to me amongst them Ananias, and Toby and a dozen others. Two at last were suggested as being pre-eminently suitable—so suitable in fact that I cannot decide which one to choose and I shall leave the matter in the hands of this meeting. His nose "tip tilted like the petal of a flower" ingenious face and the diligence with which he throws over every thing within his reach, gives me the impression that like Wilkins Micawber he is ever waiting for something to turn up. His habit of continually rubbing his hands, or paws, together as if using invisible soap and imperceptible water points to his claim to being a namesake of Uriah Heep. The racoon has been justly described as a "bear like" animal of small size, differing a good deal in external appearance although agreeing closely with the genus Ursus in all essential particulars. Like the bears the racoon is a plantigrade, that is walks on the soles of his feet and anatomically he possesses many of the distinctive characteristics of the family. I find, however, in reading up his natural history that there are two exceptions in this general similitude; unlike the bears the ear drum is largely developed and closely resembles that of the dog. The racoon's molar teeth and especially the hinder ones are also very much like the dog's in appearance. The canine teeth are compressed from side to side and have sharp front and back edges and are also somewhat out standing. Then again the racoon has only 40 teeth while the bears have two more. The teeth wanting are the last upper molars on each side. The racoons as you will notice in this specimen have large heads and prominent cheeks and they use their forepaws very largely, possessing considerable grasping power. As I remarked before the forepaws are in constant motion; frequently the racoon will sit on his haunches in the loose ungainly fashion characteristic of the bears, and while he is looking anywhere but at what he is doing, his forepaws are

wandering backwards and forward over the ground and feeling every thing carefully they come in contact with, sometimes much in the fashion of a pianist, at others, the undecided movements and aimless gestures of its paws remind one of the motions characteristic of the hands in some imbeciles. Now and again his paws touch something or other which he immediately picks up by using the toes of both feet and transfers to his mouth. The specimen before you is apparently tame, but one is never sure of not receiving a sharp pinch from his powerful teeth. He is fond of society and his great delight in the mornings is to play with one's hand and put his inquisitive fore feet right up the sleeve, another trick is to get all four paws round one's leg and give it a succession of very bear-like hugs. At night, before dark, he gambols about in a heavy fashion and worries that very handsome but unbearlike tail, much in the manner of kittens. His eye, although dull looking in the day time is quick, and no matter how much he may appear to be absorbed in his antics he is ever ready to make a sudden rush on the fowl or chicken which trespasses within the circle which his chain limits him to. He frequently stands up on his hind feet and he climbs well and in both actions he is very bearlike. Sometimes, he varies his exercises by turning somersaults and I have seen him try to stand on his head on a rail. At other times he will hold his tail in his mouth and forefeet and leap along kangaroo fashion. One of the peculiarities of the racoons is their fondness of water. This specimen directly he has a bowl of water given to him, puts his fore paws into it and takes a good long drink, lapping like a dog, then he gets into it altogether, but does not sit down, all the while his fore feet are in motion rubbing each other. If he has food given him at the same time he frequently—not always—puts it in the water and in the case of fish he rinses it well before eating it. Very often he upsets the water, in which case he rubs his food in the mud before devouring it, the object being apparently to make it moist. If he is given food without water, he rubs it in the dust and dirt before swallowing it. Another peculiarity is perhaps worthy of notice and that is he invariably, after having washed his food and dabbled for some time in the water, fouls it. Should food be placed beyond his reach he will, having got to the full extent of his chain, turn round and endeavour to seize it with his hind feet and in this way he often succeeds. In this and many other tricks he shews a considerable amount of intelligence. He rarely makes a noise except when frightened, and then it is very low and subdued, although sometimes he will give utterance to a growl when eating. On one occasion when loose he chased a dog double his size out of the yard, but has of late manifested some fear of the same animal.

Fortunately he is omnivorous in his diet or his keep would be expensive. The racoons belong to the *Procyonidæ* and the specific name of the species more commonly known, the one living in the Southern United States, where they are much hunted, is "*lotor*" the washer and the German appellation for it is the Waschbär or washing bear. The Hon. L. de Verteuil in his work on Trinidad gives the Mangrove dog the name *Procyon cancrivorus* which I believe is the name of the crab eating racoon of South America. On the only occasion, however, when I gave Uriah a large crab he smelt it inquisitively, got pinched for his pains and was rather afraid of it afterwards. In conclusion, I may say that when I informed the Secretary I was prepared to read these few notes upon the Club's Racoon, I was under the impression that this identical specimen was a native of Trinidad, but the President now tells me it came from Venezuela but that there is an animal similar to it in every way, a native of Trinidad.

Since the above was written and read at the Club, I have seen the dead bodies of several Trinidad racoons and they agree in every particular with the characteristics of the animal above described.

R. R. Mole.

3rd February.

BLUE BASIN.

In December last a few of the cycling members of the Club met at the Tranquility Tram Terminus to proceed on a visit to Blue Basin. The ride was an uneventful one and the Basin was reached in about an hour and a quarter. As it happened, however, very little was met with which proved of exceptional interest. The plants collected were few, including one or two species of the two following orders *Piperaceæ*, *Melastomaceæ* and solitary specimens of many of the commoner Trinidad orders, maiden-hair ferns stood out rather conspicuously at the falls. Land snails were, as the newspapers sometimes put it, "conspicuous by their absence." Butterflies were represented solely by one or two big morphos and insects generally were limited to the common species which are met with nearly everywhere. Reptiles seemed to have retired to their most secluded retreats, for with the exception of the big Ameivas, which crossed the road in the vicinity of the sugar estates not one was noted. Several

members tried their hands at endeavouring to induce the crayfish with pieces of meat, to leave their rocky fastnesses in the bottom of the basin but the crustaceans were far too wary to allow themselves to be brought to land. Messrs. Urich and Reid having devoted their exclusive attention to the capture of the crayfish and Mr. Broadway to a careful scrutiny of the ferns which tapestry the face of the cliff over which the river precipitates itself into the basin beneath, Mr. Eagle and myself under the leadership of Mr. Hewlett determined to make an effort to reach the top of the fall. Taking the left side of the hollow which forms the Basin, we ascended some twenty or thirty yards and then struck out in the direction of the head of the fall A few yards' progress brought us to what appeared to be an insurmountable obstacle. On the right, the river side, was an immense wall of rock ; on the left a declivity of a gradient which although well covered with bush we did not care to venture on. In front was a dense mass of undergrowth with a swampy soil, through which slowly oozed and trickled slimy water. Not discouraged, Mr. Hewlett, cutlass in hand, led the way and forced a passage, through which we crept on hands and knees. After about ten yards of this uncomfortable mode of locomotion we came to another wall, this time of earth, which we ascended, reptile-like, upon the half rotten trunk of a fallen tree. In some places we could stand, in others we progressed on all fours, pulling each other up at times through the dense undergrowth. One or two ants were noticed, but otherwise we appeared to be the only living things on the hillside. There was not the note of a bird or the chirp of an insect to be heard anywhere. After about an hour's climbing in this fashion we reached the ridge of the hill and could once more hear the roar of the river, which, however, was out of sight. Judging by the noise that we had still some distance to traverse to the left, we commenced the descent in that direction, through rather more open ground than that which we had traversed hitherto. After about twenty minutes of this work we caught sight of the river through the trees and soon afterwards found ourselves upon a little rocky beach forming a smaller edition of the real Blue Basin we had left below. The precipice over which the river here hurled itself was far steeper than that of the Blue Basin proper and the water in falling from a height which is very little inferior to the more widely known fall, formed a perfectly perpendicular pillar of foam of between 50 and 60 feet, measuring from the top to the small basin which received it beneath. The effect of the water had been to make a formation of the hillside similar to that which would be the case if a well were dug 60 feet deep in the top of a hill and then one side of

the hill were excavated so as to carry away one-third of the diameter of the well from top to bottom. Projecting over the fall was the trunk of a huge tree bearing no far fetched resemblance to some extinct monster guarding the river from intrusion. Outside this basin was a larger one formed of precipices of at least 150 feet high. The upper portion of which were covered with ferns. The atmosphere was intensely cold and there was a perpetual drizzle from the huge mass of water which roared so loudly in its sheer, downright descent into the small basin beneath and which necessitated our shouting our loudest to make ourselves understood, although standing close together. In this secluded retreat destitute of empty bottles, matches, or pieces of paper, showing it had not been visited recently, we noticed several of the small yellow-throated frogs common in our mountain streams, but beyond these there were no very noticeable specimens of animal life. We remained some time admiring the fall, which, though not so lofty and not so picturesque as the Blue Basin, is much grander, and more rugged and impressive, until warned by chattering teeth that we had better keep moving if we would avoid severe colds, we left the basin and chambering along the left bank, one moment letting ourselves down perpendiculars 10 and 12 feet deep at others clambering up similar obstructions by means of the roots of the trees we at length reached the top of the Blue Basin Fall and by dint of great shouting we managed to attract the attention of those we had left below. We then commenced the return journey, the first part of which was far more hazardous than anything we had up to then undergone, and finally rejoined our friends having been absent about 3 hours and a half. On our return our muddy and dishevelled appearance was the source of much merriment, but a bathe and a little ingenuity in the arrangement of our toilets (tell it not in Gath, whisper it not in the streets of Askalon—one member of the Club turned his clothes in side out) we sat down to a hearty *al fresco* meal. At five o'clock we returned to the cocoa house (kindly lent by Mr. Lange) where we had left our cycles and were soon afterwards on our way home—certain members of the party were, however, particularly anxious not to reach town before dark and the appearance of a friendly manicou on the road afforded them an excuse to make the signal for a general halt. The unfortunate opposum was treed and many were the frantic efforts to obtain him for the Club collection. One member ascended the tree nearly as nimbly as the marsupial itself, but could not get near enough to it to effect its capture. The frightened beast got to the end of the branches from whence a well directed stone knocked it into a mass of bush some six feet high which

covered its escape. The manicou gone, bicycles were remounted and in a long file headed by Mr. Broadway, who was the only member possessed of a lamp, with bells chiming and clanging we rode rapidly through Peru Village and separated near St. James's Bridge having spent a very enjoyable if not altogether a very profitable day so far as the study of Natural History is concerned. In conclusion, I may say that I do not think the existence of the fall we visited is very generally known except to the inhabitants of the immediate district. It appeared to us that the bush through which we crept with such difficulty was that which grows on land which has once been cultivated, but allowed to relapse again into a state of nature. The size of many of the trees led us to believe, however, that this neglect was of no very recent date.

3rd February. R. R. Mole.

THE NATURAL ORDER OF COMPOSITÆ.—Part I.

Before touching upon the details of this natural order of plants, it may perhaps be somewhat of an advantage to state the way in which I propose to deal with the subject, rather than to enter immediately into technicalities, which it is feared may be viewed in anything but a favourable, or encouraging spirit. I propose, therefore to give an outline of the plans upon which the masters of the science have laboured during past years and thus shew the importance of acquiring an accurate knowledge of the past before original labours of any kind can be undertaken.

So far the subject of botany has received but scant notice at the hands of the Trinidad Field Naturalists' Club, a circumstance which it is hoped will not continue to be the case. There is no reason why such a fascinating, useful, and instructive subject as the study of plant life, should be so neglected and apparently ignored.

Among our members, there are at least four who know a great deal respecting the Trinidad Flora—Mr. Sylvester Devenish, M.A., and Messrs. Russell Murray, T. I. Potter and E D. Ewen. Up to the present time the predominating line of study has been zoological and entomological. Now let me appeal to members and ask if some, at least, will not join me in botanical researches.

There is a vast field for investigation in this lovely island of Trinidad. And there are undoubtedly a considerable number of plants that belong to the Compositæ yet to be added to the Trinidad Flora, although this order is not so abundant here, as some others, the Leguminosæ for instance. But should it not be our lot to make new discoveries, there is yet a constant fascination attached to plants, as seen in their native localities, and also those that have been preserved for the herbarium, which no one can have any conception of except by actual experience. If any of you can be induced to take up the study of botany I will venture to assert that after the first steps have been taken you will not find it so wearisome and uninteresting as it is generally supposed to be, for I can assure you that a discriminating knowledge is all that is required in the first place, and after studies will then decide whether it is worthy of being continued. I am favourable to the opinion that once begun you will not leave it, and my work will not have been in vain. The following remarks are taken from a systematic, economic, and geographical standpoint.

First as to the systematic arrangement. If we look back for a moment to the history of the classification of plants, we find that Linnæus, a Swedish naturalist, was the first to lay the foundation of systematic botany. Previous to his time the science was one of irregularity and chaos. It was his prolific brain that gave birth to the binomial nomenclature, or, in other words, created a generic and specific name for each individual plant. Linnæus' first work—which was written somewhere about 1730—contained the foundation of all systematic botany and was known as the Philosophia Botanica. His Genera Plantarum originated the genera of plants. The Species Plantarum was another of his works, and was written about the same time as the preceding two were, which cannot but shew to either the scientific, or ordinary observer, what a hard working and extremely clever man he must have been. To those who accepted the Linnæan, or as it is often called, the artificial system of classification, great strides in scientific botany was naturally the outcome. A system of classification, which is now the recognized mode of grouping plants together scientifically is that known as the natural system, or classification,

Two celebrated men shine out prominently in bringing this about—John Ray and Jussieu, but the introduction of the natural system into English botany is due to Robert Brown. Sir William Hooker and Dr. John Lindley, for many years two of the leading botanists of England and both voluminous writers on botanical subjects, also adopted and strongly supported the natural classification. The Linnæan system based its arrangement

upon the essential organs of the flower, viz., stamens and pistils, and was dealt with accordingly by Linnæus in creating his Classes and Orders of the vegetable kingdom.

Compositæ occupied Class xix—Syngenesia, a name signifying growing together, as seen by the anthers forming a ring, or tube, in all the Compositæ. After Linnæus, A. P. De Candolle of Geneva began a botanical work called, De Candolle's Prodromus, which included all the known plants from time to time up to 1880, containing principally Dicotyledonous plants, and in which division is included the order under notice this evening. Our present knowledge of botany informs us, however, how useless it is to expect one man to know every living plant, and in consequence modern botany divides itself into sections, the leaders in which take precedence in the study of certain natural orders, or genera. Bentham and Hooker commenced their Genera Plantarum in 1860 (a work which is regarded by all British botanists, and most American, as the standard classification of the present day) and finished it in 1880, covering a period of twenty years. Upon their natural system of classification is based the present paper. Compositæ, as now recognized, is the largest of all natural orders in the vegetable kingdom, but it is more common in temperate than in tropical lands. In Grisebach's Flora of the British West India Islands the author has adopted the word Synanthereæ instead of Compositæ, as used by Bentham and Hooker. Owing to the fact that the flowers of the Composite family are grouped together on a common receptacle, the word Compositæ is used. The corolla consists, as it were, of one petal, upon which are placed the stamens inside the corolla tube. This order is grouped in what is known as the gamopetalous division of the Dicotyledons. Herbaceous and shrubby plants are the rule, and those of tree-like demensions the exception. Notable exceptions are the tree-like Senecios of Jamaica, and Oliganthes condensata, Schultz Bip, a tree of medium proportions, which is to be met with pretty frequently in the St. Ann's neighbourhood of this colony and at the Botanic Gardens a small tree (Stifftia chrysantha, Milk) from the Brazils, belonging to this order, may be seen growing in the flower garden.

The Compositæ is a well defined order, and one that can quickly be grasped, in spite of the very large number of plants —some 10,000—therein contained, thus contrasting in favour of the tyro with the majority of orders. The principal characteristics of Compositæ are the flowers grouped together on a common receptacle, and the whole enclosed within a chaffy envelope, syngenesious anthers, and 1-seeded achenes. The envelope technically known as the involucre is found to differ very materially in some

of the genera. In many genera there may be seen growing among the flowers, and upon the receptacle, scales, which assume various forms, sizes, and textures, and on the contrary are wanting in others. Some receptacles are large, some extremely small. To the uninitiated, a head, or capitulum, often gives the impression of being a single flower, (as has been shewn,) while it really may contain dozens of flowers. Examine a Sunflower, or Chrysanthemum, dissect them, look at each carefully, and then see for yourselves whether they be one flower, or, an aggregation of many. Reverting to the presence or non-presence, of scales upon the receptable, we will examine a few plants for the purpose of illustrating the differences assumed in their form and texture in different genera. In Tridax, as represented by T. procumbens, L., a common weed at the Botanic Gardens, the scales are of rather a firm chaffy nature : in Wulffia stenoglossa, D.C., or the Sunflower (Helianthus annuus, L.,) they are decidedly stiff and firm, whilst in Dahlia they are found to be the contrary, being quite soft, which also characterizes the genera, Zinnia, Wedelia, &c. Emilia, Erechthites, Senecio, Leria, and Sonchus are examples of naked receptacles.

The receptacle may be either flat as in Brickellia, or conical as in Zinnia. The meaning of syngenesious, as applied to the stamens, require no further explanation as that has already been noticed.

As to the stamens, or male organs, they are seen to number five, and because they are attached to the inside of the monopetalous corolla tube, the term epipetalous is applied to their position which consequently places all Composite plants in the gamopetalous division of Dicotyledons. If we take some orders, for instance, Malvaceæ, instead of the stamens uniting together by their anthers, as in the Compositæ, they are seen to be united by their filaments, with the anthers free. Such an arrangement as this is called monadelphous. Now, what is meant by a one-seeded achene previously alluded to as being one of the chief characters of the Compositæ ? An achene is the fruit of this order and contains but one solitary seed, the latter only being able escape from its chaff-like external covering after decay has set in. In this and similar fruits where the covering does not split open and allow the seeds to escape before becoming decayed the term indehiscent is used ; in others as in Malvaceous plants where the capsules, or covering, split open as soon as the seeds are matured, they are designated as being dehiscent fruits. The calyx of the Compositæ assume in many genera a ring of hairs known as the pappus by which means the fruits are blown from one district to another as in the Dandelion, or, of awns, as in Bidens when they are

enabled to cling to the bodies of man and beast and so become distributed, or it may be wanting altogether as in Wulffia, or, Helianthus. It might reasonably be surmised that those plants possessing a pappus have a much greater chance of being more widely spread over a given surface than would those that are minus of such. Blowing the pappus from the heads of the Dandelion is no uncommon boyish practice in many parts of England, as a "time teller" or clock substitute. But as to the correctness of the time told it is not necessary to say. The involucre, or external wrapper to the flower head, is composed of scales of numerous forms and textures. These scales may be arranged in one row only as in Erigeron, two rows as in Wedelia, or of many as seen in Wulffia. Bracts, or scales, form a kind of protection to a great many flowers, especially in the Compositæ. The other kind of plants which possess these bracts are the Cyperaceæ and the Gramineæ. Having now proceeded so far, and before entering upon the way that the order of Compositæ is broken up into tribes, let us examine in brief what are the main differences to notice in a Composite flower.

The most important are the involucre, the kind of flower, the pappus (if present), the shape of the receptacle, whether large or small, scaly or naked, and, it may also be added the stigma. By referring to Bentham and Hooker we find Comsitæ contains no less than the extremely large number of 766 genera. These are divided into the following thirteen Tribes.

Tribe I.—Veroniaceæ—contains Centratherum, Oliganthes, Elephantopus, Rolandra, &c.

,, II.—Eupatoriaceæ—Eupatorium, Mikania, Brickellia, &c.

,, III.—Asteroideæ—Aster, Erigeron, Baccharis, &c.

,, IV.—Inuloideæ—Pluchea, Pterocaulon, Helichrysum, &c.

,, V.—Helianthoideæ—Clibadium, Parthenium, Zinnia, Eclipta, Rudbeckia, Wulffia, Helianthus, Melanthera, Spilanthes, Salmea, Synedrella, Coreopsis, Dahlia, Cosmos, Bidens, Calea, Tridax, &c.

,, VI.—Helenioideæ. Porophyllum, Pectis, Galliardia, &c.

,, VII.—Anthemidideæ. Achillea, Anthemis, Chrysanthemum, Artemesia, &c.

,, VIII.—Senecionideæ—Tussilago, Erechthites, Cineraria, Emilia, Senecio, &c.

,, IX.—Calendulaceæ. Calendula, &c.

,, X.—Arctotideæ.

,, XI.—Cynaroideæ.

,, XII.—Mutisiaceæ. Stifftia, Trixis, &c.
,, XIII.—Cichoriaceæ. Taraxacum, Lactuca, Sonchus, Scorzonera, &c.

The genera given in each of the foregoing tribes, are among some of the more generally known, and also many are enumerated on account of their being found in Trinidad and the West Indies. There is not much doubt, but that among the more widely known genera of the plant world, are the Dahlia, Crysanthemum, Cineraria, Senecio, Lactuca, Helianthus, Zinnia, and Aster. Below is a list of the local Compositæ so far arranged and classified in the cabinets at the Botanic Gardens' Herbarium. As will be noticed, it is not quite a complete set of the recorded plants of Grisebach's Flora, said to be indigenous in Trinidad, but as additions are being constantly made, it is hoped all the species will sooner or later be represented.

Number of species classified in the Herbarium of the Trinidad Botanic Garden—March 1893 :—59, and of genera, 42—

Sparganophorus Vaillantii, G.
Centratherum muticum, Lees.
Veronia tricholepis, D.C.
Piptocarpha Cruegeri, Baker, (Monanthemum Cruegeri, Griseb.)
Oliganthes condensata, Schultz, Bip.
Lychnophora (Lynocephalus tomentosus, Mart.)
Elephantopus angustifolius, Sw.
,, scaber, L. forma (E. mollis, Kunth.)
,, (Distreptus spicatus, Cass.)
Rolandra argentea, Rottb.
Ageratum conyzoides, L.
Eupatorium iresinoides, Kunth.
,, lævigatum, Lam.
,, odoratum, L.
,, macrophyllum, Sw. (Hebeclinium macrophyllum. D.C.)
,, paniculatum, Schrad.
,, cinereum, Gr.
Mikania orinocensis, Kth.
,, suaveolens, H.B.K.
,, scaber, D.C.
,, latifolia, Sm.
,, hastata, W.
Brickelia diffusa, As. Gr.
Erigeron bonariense, L.
,, canadensis, L.
,, spathulatus, V.

Baccharis rhexioides, Kunth.
,, nervosa, D.C.
Pluchea odorata, Cass.
Pterocaulon virgatum, D.C.
Clibadium asperum, D.C.
Parthenium Hysterophorus, L.
Ambrosia artemesifolia, L.
Eclipta alba, Hassk.
Isocarpha atriplicifolia, R. Br.
,, oppositifolia, R. Br.
Wulffia stenoglossa, D.C.
Blainvillea rhomboidea, Cass. "Porter bush."
Wedelia caracasana, D.C.
,, carnosa, Rich.
Eleutheranthera ruderalis, Schultz (Ogiera ruderalis, Griseb.)
Melanthera deltoidea, Rich.
Spilanthes Acmella, L.
S ,, ,, ,, var. uliginosa, Baker.
(S ,, uliginosa, Sw.)
Salmea oppositiceps, Cass.
Synedrella nodiflora, G.
Cosmus caudatus, H.B.K.
,, sulfureus, Cass.
Bidens leucanthus, W.
Calea solidaginea, Kth.
Tridax procumbens, L.
Porophyllum ruderale, Cass.
Neurolœna lobata, R. Br. "Herbe à piqué."
Erechthites hieracifolius, Raf.
Emilia sonchifolia, D.C.
Senecio Swartzii, D.C.
Chaptalia (Leria nutans D.C..)
Trixis frutescens, R. Br.
Lactuca (Brachyrhamphus intybaceus, D.C.)

Grisebach enumerates for the whole of the British West Indies (in his Flora of the B.W.I.) 60 genera and 160 species. This work was published in 1864, or nearly 30 years since. Many additions, as might reasonably be expected, have been made to the West Indian Flora since that date, and possibly among them some of the Compositæ.

Mr. Carr's list of the Trinidad Compositæ—which is left, in arrangement, as received from Mr. Carr's own hands—herewith follows. And I wish to express my thanks to Mr. Carr for allowing me the privilege of embodying so valuable a list in my paper.

SUB ORDER I.—TUBULIFLORÆ.

Sparganophorus Vaillantii, Gr.
Vernonia arborescens, Sw.
,, tricholepis, D.C.
,, scorpioides, Pers.
,, acuminata, Less.
Oliganthes condensata, Schultz Bip.
,, ,, var chacachacarreo, Gr.
Centrathernum muticum, Less.
Monanthemum Cragerii, Gr.
Lychnophora tomentosa, Mart.
Elephantopus mollis, Kth.
,, scaber, L.
,, angustifolius, Sw.
Distreptus spicatus, Cass.
Rolandra argentea, Rottb.
Pectis prostrata, Cav.
,, humifusa, Sw.
,, elongata, H.B.K.
Isocarpha atriplicifolia, R. Br.
,, oppositifolia, R. Br.
Ageratum conyzoides, L.
,, muticum, Gr.
,, mexicanum, W.
Hebeclinium macrophyllum, D.C.
,, ianthium, Hook.
Critonia macropoda, D.C.
,, Dalea, D.C.
,, parviflora, D.C.
Eupatorium punctatum, Lam.
,, lævigatum, Lam.
,, conyzoides, V.
,, odoratum, L.
,, trigonocarpum, Gr.
,, cinereum, Gr.
,, iresinoides, Kth.
,, paniculatum, Schrad.
,, nervosum,
,, ayapana, Vent. cult.?
Mikanea orinocensis, Kth.
,, suaveolens, H.B.K.
,, hastata, W.
,, latifolia, Sm.
,, scabra, D.C.
,, trinitaria, D.C.
,, rotunda, Gr.
,, plechomœfolia, Schreb.
,, scandens, W.
,, umbellifera, Hook.
,, guaco, (non Trin.)
Brickellia diffusa, Asa Gr.
Erigeron canadensis, L.
,, bonariensis, L.
,, spathulatus, V.
,, aparensis, Gr.
,, strictus, D.C.
Conyza sp., Cr.
Baccharis nervosus, D.C.
,, rhexioides, Kth.
Pluchea odorata, Cass. (Guerit toute.)
Pterocaulon virgatum, D.C.
Eclipta alba, Hassk.
Gymnotomia sp., Cr.
Salmea oppositiceps, Cass.
Gnaphalium americanum, Mill.
Clibadium asperum, D.C.
,, erosum, D.C.
Ambrosia artemisifolia, L. (Wormwood.) var trinitensis.
Parthenium hysterophorus, L. (Country wormwood.)
Blainvillea rhomboidea, Cass. (Porter bush.)
Wedelia caracasana, D.C. (Hen's tongue,—langue poule.)
,, carnosa, Rich.
Viguiera sp., Cr.
Melanthera deltoidea, Rich.
Ogiera ruderalis, Gr.
Acanthospermum humilis, D.C.
Wulffia stenoglossa, D.C.
,, havanense, D.C.
Bidens bipinnatus, D.C. (Needle weed—z'herbes aiguilles.)
,, leucanthus, W.
,, coreopsidis, D.C.
Verbesina sp., Cr.
Cosmos caudatus, Kth.
,, sulfureus, Cav.
Spilanthes exasperata, Jacq.
,, Acmella, L.
,, uliginosa, Sw.
,, oleracea, Jacq.
Synedrella nodiflora, Gr.
Chrysanthellum procumbens, Rich.
Clomenocoma montana, Cass. (Trin.?)
Porophyllum ruderale, Cass.
Liabum sp., Cr.
Neurolœna lobata, R. Br. (Z'herbe a piques—halbert weed.)
Calea solidaginea, Kth.
Erechthites hieracleifolia, Raf. var carduifolius, D.C.
Emilia sonchifolia, D.C.
Senecio Swartzii, D.C.
,, lucidus, D.C.
Egletes domingensis, Cass.

SUB ORDER II.—LABIATÆFLORÆ.

Leria nutans, D.C.
Trixis frutescens, R. Br.

SUB ORDER III.—Liguliflorae.	Lactuca sativa, L. cult.
Sonchus oleraceus, L. (Sow thistle)	Scorzonera hispanica. (non Trin.)
Brachyrhamphus intybaceus, Gr.	

W. E. Broadway.

3rd March.

NOTES ON SOME LEPIDOPTEROUS INSECTS

(Collected Principally on San Fernando Hill).

These notes refer to insects collected in the early part of this—or latter part of last—year.

In the early part of the year, when the East wind blows from day to day, and the atmosphere is unusually dry—which has been especially the case this year—butterflies and moths are much scarcer than in the later months, owing to these conditions, which are unfavourable to their development, and the enjoyment of their ephemeral existence, because this period is not conducive to the growth of the fresh young shoots upon which the larvæ feed. There are always, however, some of these insects to be seen in the gardens all the year round, perhaps the most noticeable among the butterflies here is a *Callidryas*, sp. I have been told by collectors, and have myself noticed, that when this species is plentiful, other butterflies also are abundant. Specimens of this *Callidryas* sp. can always be procured here, and, of course, there are some other kinds which are always plentiful. The pupa of *Callydnas* (*enbule*) sp. or *common yellow* is a beautiful pink, the yellow venation of the wings of the imago being all that denotes the colour of the winged insect. The peculiarities in the shape are interesting, the head being prolonged into a tubercle, and the thorax bulging out. The pupæ of many *Hesperidæ* sp. have the head prolonged into a tubercle, but not as long as this of *Callidryas*. The larvæ are green, cylindrical, and slightly covered with down. They were found feeding on *Cassia bacillaris* on March 4th, and pupated March 6th; the imago emerged early on March 17th.

The larva of a Sphinx of the species *Macrosila* was found full-fed in a garden in Port-of-Spain on October 28th feeding on the heliotrope, which it had almost completely denuded of leaves, but which, however, could not have afforded it sustenance

up to the time I found it; therefore, it must have left its natural food plant preferring the heliotrope. This larva is a beautiful green, with oblique lateral purple bands, edged above with white; the length is $3\frac{1}{2}$ ins.; there are a few spines on the caudal appendage; the stigmata are pink. It pupated on Oct. 30th; the proboscis sheath of the pupa is very recurved and corrugated. The perfect insect appeared on the 26th November, 1892.

The imago of *Tithorea flavescens*, of which I saw a description in Vol. I, No. 3 of our *Journal*, under the heading :— "Description of a new Butterfly from Trinidad," by W. F. Kirby, F.E.S. (taken from *The Entomologist*, June, '89, XXII, No. 313, and of which Mr. Broadway was the discover), lays her eggs in a cluster on the top of the leaf of the cockroach plant; these eggs are white, conical, and ribbed longitudinally. They take four days to hatch. The larvæ are soft, fleshy, and pale grey in colour, possessing one pair of vertical tubercles of the neck, and eight pair of lateral tubercles. In the first three segments the tubercles are absent. There is a dorsal band of pale yellow, and at the base of each tubercle is an orange space with a minute dot of black about the centre. They are very gregarious, and feed from the underside of the leaf; in seventeen days they are full fed. The wings of the imago are plainly seen through the transparent pupa case; at first the pupa is a dull yellow, which is the colour of the larva just previous to pupating; a day or two after it becomes like burnished silver, and then golden; this stage lasts ten days. I had a number of them, suspended by their tails from the top of the cage, and they presented a beautiful appearance. I found the eggs in December last. Specimens of these insects may be captured all the year round on the San Fernando Hill.

On Dec. 30th, 1892, I found, feeding on a *Abasnanda cathartica* (the Creole Jasmine) about twenty caterpillars of a moth whose larvæ, when young, are almost black, with lateral white bands; the excessively long recurved caudal appendage is almost as long as the body of the insect. The larva, as it grows, gradually becomes lighter in colour, becoming light brown with darker markings forming patterns, which are divided into bands, dorsal and lateral, by dark lines running from head to tail; the white lateral band becomes tinted with lilac. They pupated between the 3rd and 9th of January, forming a slight cocoon of earth in which the larva remains three or four days before assuming the chrysalis stage. The imago appears after twenty-four days; the primaries are sepia with an indistint light-brown patch just outside the discal veinlets; the secondaries are orange with broad black border. The pupa, which is light red,

has black markings, the venation in the thorax being red on a black ground. As may be seen by the drawing, there are numerous irregular black spots and lines in every segment of the abdomen, each segment being clearly defined by the black belt which runs around the sutures.

On Feb 5th, 1893, I discovered a small geometer, a most remarkable instance of protective mimicry. I was on the point of throwing away a branch of the almond tree or *Terminalia catappa*, when a slight movement, apparently of one of the fresh young shoots, attracted my attention. Looking closer, I discovered that this was really the larva of a geometridus moth, and so closely does the insect resemble the shoot on which it feeds, that it might easily be mistaken for part of the plant. I immediately searched for them, and was rewarded by finding two more. The head of the larva is small and retracted; the body brown, beautifully marked, when closely examined, with fine, vein-like lines which run the same way as those in a leaf; the body is broad in the centre, tapering anteriorly and posteriorly, in fact, producing the leaf-like shape of the young shoots. It has ten legs—one pair ventral pro legs, one pair anal, and, of course, three pair thoracic legs. It extends its body when at rest, holding on by the anal legs. On Feb. 7th, it formed a slight cocoon of bits of leaves and chips and pupated on the 10th. The thorax of the pupa is greenish, gradually turning off into light brown; there are three dorsal rows of dark brown spots. The perfect insect appeared on Feb. 24, '93, having been fourteen days in the pupa stage; it is a beautiful little green moth, with a pale, whitish stripe running from the apex of the fore wing to the inner edge of the hind wing; the wings are edged with a delicate fringe of hair. A male and female specimen appeared.

P. L. Guppy.

7th April.

COCCIDÆ, OR SCALE INSECTS.

By T. D. A. Cockerell, F.Z S., F.E.S, Curator of Museum, Institute of Jamaica.

(From the Jamaica Botanical Department Bulletin.)

The *Coccidæ* constitute a very well-defined family of the order *Hemiptera*. They are related to the *Aphides*, the *Cicada*, the *Phylloxera*; and also, but more distantly, to the plant

bugs, such as *Dysdercus* (the cotton-stainer) and *Blissus* (the chinch-bug). Nearly five hundred species are known, living on a great variety of plants. Some infest the leaves, some the twigs, others the bark, while certain kinds are found underground on roots. Some are naked, others clothed with a mealy secretion, others covered with wax, while very many construct a well-defined scale; it is to the latter that the name scale-insect is more properly applied The *females* have a beak, whereby they extract nutriment from plants; when adult they usually become entirely stationary and unable to move, and very many species lose their legs and antennæ. At no time do any of the females possess wings.

The *males*, on the contrary, are winged in nearly all the species, and are well able to move about. They have legs and antennæ, but no beak; their wings are two in number, after the manner of flies, thus totally differing from all other Hemiptera, which have four wings.

There is an allied family, the *Aleurodidæ*, which might be confounded with the coccidæ, and indeed was in former times. When immature they resemble scale-insects, and the adults look not unlike the males of coccidæ. But an examination at once reveals differences; both sexes are winged, and there are four wings instead of two. In Kingston, species of *Aleurodes* are common on pepper *(Capsicum)* and lignum-vitæ.

Another insect resembling a coccid is the *Cerataphis latanicæ*, which, as the generic name indicates, is really one of the plant-lice *(Aphides)*. Mr. Campbell sent me specimens from Castleton Gardens, found on a palm; and since then I found it quite commonly on a palm in the yard of the Museum, in Kingston. It looks something like an *Aphis*, but is surrounded by a beautiful white waxy fringe.

Destructiveness of the Coccidæ.

Professor Comstock, in his excellent report on Scale-Insects published in the Report of the U. S. Department of Agriculture for 1880, writes--

"There is no group of insects which is of greater interest to horticulturists to-day than that family which includes the creatures popularly known as 'scale-insects' and 'mealy bugs.' There is hardly any shrub or tree but that is subject to their attack, and in certain localities extensive orchards have been ruined by them. The minute size of the creatures, the difficulty of destroying them, and their wonderful reproductive powers, all combine to make them the most formidable of the pests of our orchards and ornamental grounds. It is only necessary to cite the mealy-bugs of green-houses, the oyster-shell bark-louse

of the apple, and the various species of scale-insects destructive to citrus-fruits to establish this fact."

This was written with reference to the United States, but may be taken as applying with even greater force to tropical countries, where the coccidæ are apparently much more abundant. The amount of damage done in any particular case is not always easy to estimate, from various causes. Thus, in the case of the cocoanut, it is probable that those who have attributed the death of the palms to coccidæ have over-estimated the influence of these insects, since we now know from the researches of Dr. Plaxton and Mr. Fawcett that the cocoanut is subject to the attacks of fungous and bacterial parasites, and the probability is, that the scale-insects in this instance only hasten the end inevitable from other causes. On the other hand, I believe the damage done is frequently under-estimated. When a tree or shrub is dotted all over with scales, behind every one of which is an insect living on the sap, the drain on the resources of the plant must be considerable. In the case of small plants, as for example a capsicum attacked by *Diaspis lanatus* (n. sp.), death may speedily ensue; but trees as a rule survive the injury, and finding that they continue to live and bear fruit, we are apt not to reflect that they would do better if protected from the attacks of insects. In order to ascertain accurately the influence of insect pests on any kind of tree, it would be necessary to take several growing in the same locality, and carefully spray some, while neglecting the others. If this were carried on for a number of years, no doubt the difference to be observed would be very marked; and in the case of very seriously attacked plants, it would be a difference between living and dead.

It may be objected, that a drain on the vegetative tissues of a tree is not necesssarily harmful; as we are obliged frequently to check exuberant growth by pruning: but to this it can be replied, that the purpose of pruning is not so much to check the energies of the plant, as to divert them to the production of flowers and fruit; while the coccidæ attack not only the fruiting branches, but the fruit itself, injuring the very parts we desire to protect.

(*To be Continued.*)

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J'engage donc tous à éviter dans leurs écrits toute personnalité, toute allusion dépassant les limites de la discussion la plus sincère et la plus courtoise.—LABOULBÈNE

Trinidad Field-Naturalists' Club.

NATURA MAXIME MIRANDA IN MINIMIS.

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JOURNAL

OF THE

Field Naturalists' Club.

Vol. 1. AUGUST, 1893. No. 9.

REPORT OF CLUB MEETINGS.

2nd June.

Present: Mr. H. Caracciolo (President), Sir John Goldney, Dr. A. Woodlock, Messrs. Syl. Devenish, M.A., R. R. Mole, J. Russell Murray, F. Eagle, W. E. Broadway, T. I. Potter and F. W. Urich (Hon. Sec, pro tem),—Mr. Sucre was present as a visitor.—The minutes of the last meeting were read and confirmed. The Club unanimously directed the Hon. Secretary to send a letter of condolence to Lieut.-Colonel Wilson in his bereavement by the loss of his son.—The following gentlemen were elected members of the Club: Dr. W. V. M. Koch, Town member, Dr. A. W. Wight, Country member, and Dr. Rodriguez (Caracas) Corresponding member.—The following additions were made to the collection: A fine specimen of the "soldado" (a bird belonging to the stork family) from Venezuela presented by Mr. E. Lee; three young Armadiloes, *Tatusia novemcincta*, presented by Mr. J. W.

L. Mitchell; a pair of fish-eating bats, *Noctilio leporinus*, from Monos, presented by Mr. J. J. Hobson; a *Decapod* crab from Monos presented by Mr. J. Guiseppi; a small specimen of a lizard belonging to the *Geckonidæ* from St. Anns, presented by Master J. Mahoney; a fine leech from Guanapo presented by Mr. H. F. Corrie; a Harlequin beetle, *Acrocinus longimanus*, presented by Mr. Charles Maingot of Arima. —Sir John Goldney submitted a list of works he intended presenting to the Library and asked the President to select some of the books as he wished to make a present to the Club. The President thanked Sir John for his generous offer and said that himself and the Secretary would make a selection.—The President described the manner in which the fish-eating bats captured their prey, by throwing it up with their interfemoral membrane. Simultaneously they bent their heads towards their tails to seize the fish as it was thrown out of the water. Dr. Woodlock said that early one morning, at Monos, he distinctly saw the bats in this act and was sure that they caught fish and that the bats were not merely dipping into the water. Besides this there was the evidence of Mr. J. E. Harting in an article in *The Field* in which he proved without doubt that the stomachs of some of these bats sent to him by Sir William Robinson contained fish.—Mr. Urich said that the leech presented by Mr. Corrie was a very fine specimen, and as far as his knowledge went, it was the first time he had seen one like it from this Island. Mr. Devenish said he had seen leeches in the Oropouche lagoon, and when down there once was covered w th these animals.—Mr. Mole exhibited two young crocodiles from the Orinoco kindly lent by Mr. W. K. Williamson, and a young Trinidad alligator. He said that the crocodiles were thrown on board one of the Orinoco steamers by the paddle wheels. He pointed out the differences between the crocodiles and alligators viz., that true crocrodiles had the so-called canine tooth of the lower jaw fitting into a notch or furrow in the outside surface of the upper jaw; the hind legs were bordered by a serrated fringe and the toes were almost completely webbed; on the other hand alligators differed from crocodiles in the canine teeth fitting into a pit in the upper jaw; the hind legs were destitute of fringe and the toes were less webbed. Eight species of alligators were found in South America and they were scientifically known as alligators, caimans and jacares. The jacares differed from the alligators in being smaller and in having a ridge across the face between the eyes. The alligators had a longitudinal ridge on the face and it would seem that the Trinidad specimens he had hitherto seen were jacares and not true alligators. A somewhat lengthy discussion ensued on the species

of Trinidad alligators, during which specimens in the Club collection were compared with the live reptiles. Sir John Goldney and Mr. Devenish took a lively part in this discussion.—Mr. Caracciolo showed a parasitic fly, *Belvoisia bifasciata*, Fabr. bred from the chrysalis of a species of *Cerocampa* moth. He said that this fly was found both in North and South America and the Antilles. There were six pupæ neatly stored in the chrysalis of the moth, imitating very closely some nest of *Hymenoptera*.—It was decided on the motion of Mr. Potter, seconded by Mr. Broadway, that the Club should give a ladies' evening twice a year, the first evening to take place six months hence. The Secretary read on behalf of Mr. Meaden, a country member, a communication with reference to some ticks found on an Iguana.—Mr. Urich read a paper upon "Mosquitoes and how to deal with them." Mr. Urich went into the life history of these insects and exhibited them in the larval and pupal stages. He also showed how their numbers might be appreciably diminished in cess-pits and stagnant water by the use of carbolic acid and kerosine oil and said that where large quantities of water were stored for drinking purposes a small fish found plentifully in Trinidad might be introduced with advantage as it lived largely on the mosquito larvæ. Mr. Urich produced a number of the fish in question and then threw into the vessel in which they were confined a large quantity of mosquito larvæ. The fish at once set to work and devoured the lot in very quick time. Adult mosquitoes and portions of their mouth parts on slides (lent by the Hon. J. E. Tanner and Mr. Broadway) were exhibited through the microscope, and lent additional interest to a capital paper. After some buisness of minor importance the Club adjourned at 10 p.m.

Special Meeting, 28th June.

On Wednesday, June 28th, the members of the Club invited a large number of their friends to meet Sir J. B. Stone, Kt., F.L.S., F.G.S., F.R.G.S., who was paying a flying visit to the island after having been on a visit to Brazil with the British Astronomical Expedition, which proceeded thither to photograph the eclipse of the sun on April 16th. Amongst the members and friends of the Club present were : Mr. Justice Rayner, the Hon. Robert Guppy, Dr. and Mrs. Beaven Rake, Mr. R. J. L. and Mrs. Guppy, the Rev. L. A. Taitt, Mr. Syl. Devenish, Mr. Louis Siegert, Professor Carmody, Mr. John Fanning, Dr. A. Woodlock, Mr. Louis Broome, Mr. E. Lee, Captain Rademaaker, Mr. A. C. Ross, Mr. J. H. Collens, Mr. A. Richards, Mr. C. F. Stollmeyer, Mr. J. A. Donnatien, the Hon. C. F. Cochrane, Mr. Clarence Bourne, Mr. H. S. Billouin, Mr. R. Gervase Bushe, Mr. E. R. Smart, Mr. C. O. Bock, Mr. Chas. F. Bourne, Mr. James Miller

Mr. J. G. Taylor, Mr. Montague White, Mr. F. Urich, Mr. John Hoadley, Mr. Alec Hamlyn, Mr. E. André, Mr. Alfred Taitt, Mr. H. D. Carruthers, Mr. W. G. Hewlett, Mr. J. G. Reed, Mr. R. Dumoret, Mr. Henry Tate, Mr. T. I. Potter, Mr. T. Sorzano, Mr. W. E. Broadway, Mr. W. A. Hosking, Mr. Louis Wharton, Mr. Albert de Crény, Mr. C. J. Thavenot, Mr. H. F. Corrie, Mr. H. H. Hancock, Mr. Jules Anduze, Mr. E. F. Stone, Mr. J. B. Todd, Mr. J. W. Tomlinson, Mr. A. G. Porteous, Mr. James Wilson, jr., Mr. Percy L. Fraser, Mr. E. J. Sellier, Mr. Geo. Goodwille, Mr. C. K. Leotaud, Mr. M. J. Leotaud, Mr. P. Taffy O'Connor, Mr. H. W. Chantrell, Mr. W. C. Nock, Mr. James Wilson, tertius, Mr. James Taylor, Mr. A. F. Mathison, Dr. Doyle, &c., &c., &c.

The room had been prettily decorated with plants, etc., and presented an attractive appearance.

The guest of the evening was introduced by the President (Mr. Caracciolo) who, in a short speech, mentioned the main features in Sir Benjamin Stone's career.—Sir Benjamin Stone then gave an account of the observations of the Brazilian expedition in connection with the eclipse and the great part photography was now playing in the scientific world and the facilities which it gave for extending scientific researches and recording observations. He also gave an account of his experiences in Japan where he had been studying volcanic phenomena.—On the conclusion of Sir Benjamin's interesting speech, Dr. Rake proposed a vote of thanks which was seconded by Mr. Devenish. The Hon. Robert Guppy made a few remarks as to the present political condition of Brazil as referred to by Sir Benjamin.—The vote was unanimously carried.—Mr. Devenish gave a short account of the eclipse of 1861, in the photographing of which he took a prominent part, after which the proceedings terminated.

7th July.

The usual monthly meeting of the above Club took place at the Victoria Institute on Friday, the 7th instant, at 8 p.m. Present: Mr. H. Caracciolo (President) Dr. Rake, Professor Carmody, Messrs. R. J. L. Guppy, Henry Tate, T. Sorzano, T. I. Potter, E. D. Ewen, W. G. Hewlett, G. Reed, C. W. Walker, W. E. Broadway, F. Eagle, R. R. Mole, and F. W. Urich, (Hon. Secretary *pro tem.*) Messrs. T. W. Carr and Sucre were present as guests.—Sir J. B. Stone F.L.S., F.R.G.S., F.G.S. etc., was elected an honorary member of the Club. The following gentlemen were elected Town members: Hon. W. Gordon-Gordon, Messrs. F. M. Bain, Julian H. Archer, Adolphe Borberg and T. D. Arnott. The Secretary announced that at a meeting of the Business Committee it had been decided to hold the second anniversary meeting of the Club's formation on the 19th instant and also that

in order to encourage the study of Economic Entomology amongst its members the Club would offer prizes of $30 and $20 for the two best essays on that subject. Rules for competition and date for sending in essays to be made known at a subsequent meeting. Some other business of minor importance was also discussed.—The following additions were announced as having been made to the Club collection since last meeting: A little ant-eater *Cyclothurus didactylus* and a fine specimen of *Nepa grandis* (locally called "King Cockroach") presented by Dr. A. W. Wight; a little ant-eater and young one presented by Mr. V. A. Marryat; a Great Ant-eater, *Myrmecophaga jubata* from Venezuela presented by Mr. H. Ganteaume; and a peculiar Bombyx caterpillar presented by Mr. Charles Maingot. The Secretary exhibited on behalf of Mr. P. L. Guppy, a country member, a sample of raw silk reeled from cocoons of *Antheræa pernyi* on a home-made machine—the caterpillars of which were reared by him on the Almond tree, *(Terminalia catappa)*, some carded silk of the same moth was shown for comparison. The President said that Mr. Guppy was to be congratulated on having been the first member of the Club who had been successful in rearing silk-worms in this island and it reflected great credit on his patience and perseverance.—The Secretary placed on the table some locusts sent by Mr. Guppy on behalf of Mr. Edgell Johnstone of San Fernando. They were of the same species as those found at Manzanilla and a short discussion arose in which all present took part. The conclusions arrived at were that the locusts which occurred at Manzanilla and other parts of the Island very likely belonged to *Acridiinæ* and were not of the migratory species but it was necessary to destroy them as they seemed to be multiplying every year, and were capable of doing considerable injury to the crops.—Dr. Rake announced that he had seen a few days previously a specimen of the rare butterfly *Papilio argesilaus* at Maraval. He also read a letter from the British Museum authorities with reference to some trap-door spiders and ant-lions from Trinidad. The name of the former was given as *Actinotus scalops* and the latter belonging to the genus *Glenurus*.—Mr. Walker showed a curious spider-crab from the Five Islands.—The President showed a sketch of a female centipede carrying its young between the legs of the anterior twelve segments of its body. He received the centipede from which the sketch was made from Mr. Guiseppi on the 20th June. The creature protected her young in this manner until the 25th June when she altered her position and lay flat over them. On the 30th June she left them but kept an eye on them, when undisturbed the young centipedes formed a heap in which they remained for four days. They then gradually began wandering away from the heap,

one by one, in search of food ; there were about 140 young ones altogether.*—Mr. R. J. L. Guppy read an interesting paper on the "*Microzoa* of the Tertiary and other Rocks of Trinidad," and illustrated his paper by a number of colored diagrams of the strata referred to and specimens of the rock. His beautiful and well-mounted collection of *Foraminifera* were shown to the members under the microscope and excited much admiration by their beauty and variety of form. The paper was well received and was listened to with great attention. On the motion of the President, seconded by Professor Carmody a unanimous vote of thanks was accorded to Mr. Guppy for his interesting contribution, after which the Club adjourned at 10 p.m.

*The Club is particularly anxious to obtain additional evidence upon this curious and hitherto unnoted habit of the centipedes, and would be glad of specimens engaged in thus protecting their young. Such specimens should be sent to the Hon. Secretary, Mr. F. W. Urich.

CLUB PAPERS.

THE NATURAL ORDER OF COMPOSITÆ.—Part II.

GEOGRAPHICAL DISTRIBUTION.

The Compositæ is represented both in cold and hot countries, but is more prominent in temperate and dry climates than in moist and tropical ones. Representatives are found existing in each of the five continents—Europe, Asia, Africa, America and Australia. Europe alone has the very creditable number of about 1,336 species, among which are the well known Edelweiss, of the alpine districts of Switzerland, and the equally well known English daisy (*Bellis perennis*, L.) of England. In tropical countries many species assume an arboreus growth, especially in moist and wet climates, which, perhaps, it is only natural to infer. A brief account of the way many species—not only of Compositæ, but also other natural orders—are transferred from one district to another may not be inappropriate under the above heading. It has already been shewn how well adapted is the pappus of the fruit in numerous genera for being distributed by aid of the wind. Take the dandelion (*Taraxacum officinale*, Web.) for example, and see how extremely easy it is for a merely

moderate wind to carry away the fruits (seeds) of this plant from the original locality in which they grew and matured. Another mode of distribution is by aid of reflexed hooks which some plants possess. When man or beast comes in contact with these, the fruits cling to their bodies and are thus carried from one locality to another. Then again it often happens that seeds are carried from one island to another through the agency of sea-birds, which swallow the seeds, and afterwards deposit them occasionally unharmed, or it may be that man, in his wanderings over the globe, unthinkingly is the medium of distribution, or, again, distribution may be greatly influenced by river and ocean currents. With the knowledge of these several possibilities and means of transfer, it is not surprising to find (as oftentimes it does occur), well known European species appearing, for instance, in America, and *vice versa*. One hundred of the British annuals are supposed to be colonists—introduced—and among these we find at least two Composites, viz,, *Galinsoya parviflora*, Cav., a native of Chili, etc., which escaped from the Royal Gardens, Kew, in 1850; and *Erigeron canadense*, L., a native of our own island, which became introduced into England during the present century. And in the West Indies—Jamaica mountains—the following are recorded as being introduced :—*Pyrethrum parthenium*, Sm. : *Lapsana communis*, L., and *Taraxacum officinale*, Web.

Botanically the Earth is divided into six areas or regions. And in these six divisions Compositæ alone will be dealt with. First then comes what is known as the Palæarctic, the largest of the six, which includes the whole of Europe &c. ; followed respectively by the Oriental Region, which is smaller in size than the preceding, including India, Southern part of China, Java, &c. ; the Australian Region, comprising within its limits, Australia, New Guinea, &c. ; the Ethiopian Region within which are tropical and South Africa and Madagascar ; the Nearctic Region, includes North America &c., being a sort of extension of the Palæarctic Region ; and sixth, the Neotropical Region which embraces the West Indies, and all South America, &c. In the first or, Palæarctic Area, two tribes of Compositæ have their head-quarters—*Cynaroideæ* and *Anthemideæ*. Many species of the genus *Blumea*—about 30—are endemic in the Oriental Region, or, in other words, peculiar to that area. One of the oldest botanical regions known is the Australian. Here we find 39 endemic genera of the Compositæ. The Australian flora has a remarkable affinity to that of the Cape, and among many other orders in this respect that of the Compositæ is no exception ; the genus *Helichrysum* is a striking example. The Ethiopian Region includes the Cape area where the flora assumes a very local

distribution, many being endemic species. The prominent Composite genera of South Africa are :—

Felicia	with	45	species.
Pteronia	,,	51	,,
Helichrysum	,,	137	,,
Cineraria	,,	45	,,

Kleinia (a singular fleshy or succulent genus) with 18 species.

With the Australian, the Ethiopian shares as being one of the two oldest botanical regions known. The Nearctic Region : within the boundary of this area falls North America. The Compositæ of the latter are divided into two groups, viz. :—

1st—United States Sub-Region with 122 genera and 774 sp.
2nd—Mexican ,, ,, ,, 246 ,, ,, 1,330 ,,

Bentham's arrangement of the Compositæ, as represented in the Neotropical Region, is as follows :—

West Indian Sub-Region—			78	genera	and	291	species sixteen being endemic genera.
Andine	,,	,,	145	genera	and	980	species.
Brazilian	,,	,,	124	,,	,,	972	,,
Chilian	,,	,,	116	,,	,,	602	,,

In each of these Sub-Regions endemic genera are present. *Mutisiaceæ*, a tribe of Compositæ, has about 47 genera (several endemic.) And out of all the Composites found in the Chilian Sub-Region two-thirds are said to belong to this tribe.

Curt though the remarks so far made on the geographical distribution of the Compositæ may be, it is hoped something of interest will have been gained therefrom. The number of genera, and especially of species, enumerated, can only be taken in an approximate sense, as new plants are continually appearing from different parts of the world.

Mr. Hart, who has kindly read this paper for me, places in my hands a more recently proposed arrangement which has come to him from the Royal Gardens, Kew, which will probably in the near future be adopted in referring plants to their geographical areas. I herewith lay it on the table for members' inspection.

ECONOMIC.

Under this heading are included, not only plants of a useful and medicinal character, but also those which are esteemed from an ornamental and decorative standpoint. For the medicinal and useful purposes the order of Compositæ is credited with, the following extracts are taken from well known and reliable authorities :—"This order" (Grisebach's "Flora of the British West India Islands," p. 352) "affords alterative, bitter, or aromatic drugs. Guaco *(Mikania)* is a reputed antidote against serpents'

bite: of this genus *M. gonoclada* is used in Jamaica (Pd.), *M. suaveolens* in Trinidad (Sch.)

Alterative, and often aromatic, principles, exist in *Pterocaulon virgatum*, *Parthenium hysterophorus*, *Ambrosia artemisiifolia* and *Pyrethrum parthenium*; a bitter one in *Neurolæna lobata*; and of the resolvent property, *Taraxacum* is a common example. *Eupatorium* is usually aromatic: *E. villosum*, as well as the Guaco, were medicines for cholera, and *E. ayapana* is cultivated as a powerful diaphoretic. *Clibadium Badieri* is poisonous to cattle, and its branches are used for poisoning fish. Cultivated pot-herbs in the West Indies are *Spilanthes oleracea* and *Lactuca sativa*."

The "Treasury of Botany" is responsible for the following notes on the order:—

"The properties of the order are various; but bitterness seems to prevail in it, and this is accompanied with tonic, stimulant, aromatic, and sometimes even narcotic, qualities. *Lactuca sativa*, the common lettuce, and *L. virosa*, supply *lactucarium*, a substance used like opium."

And again, the same work under *Asteracea* (Compositæ) continues:—

"The uses of the order, real or imaginary, are very numerous and conflicting. Some are tonic and aromatic like wormwood (*Artemisia absinthium* and others); or vermifuges like those other *Artemisia* known in foreign pharmacy as *Semen-contra* or *Semencine*. A few are powerful rubefacients, as *Pellitory* of Spain (*Anacyclus pyrethrum*), and various kinds of *Spilanthes* which excite salivation. *Arnica montana* is powerfully narcotic and acrid. Similar evil qualities belong to *Crepis lacera*, a most venomous species said to be no infrequent cause of fatal consequences to those who in the South of Europe, incautiously use it as salad. Nor are *Hieracium virosum* and *H. sabaudum* altogether free from suspicion. Some species of *Pyrethrum* have the power of driving away fleas. Many yield in abundance a bland oil when their achenes or 'seeds' are crushed: such are the sunflower (*Helianthus annuus*), the Til of Ramtil (*Verbesina sativa*) largely cultivated in India, and *Madia sativa*. A purgative resin is obtained from allies of the Thistles; others, as *Aucklandia Costus*, now referred to *Aplotaxis Lappa*, have aromatic roots, and are looked upon by Orientals as aphrodisiacs. Finally, under the name of Artichoke, Succory, Scorzonera, Endive, Salsify and Lettuce, we have some of our most harmless and useful esculents."

On McNab's authority: "Inuline occurs as reserve material in chicory, dahlia, Jerusalem artichoke and other Compositæ"—

(W. R. McNab's Botany: "Morphology and Physiology," 5th edition, p. 93). "A bitter and astringent principle," says that celebrated American botanist, Asa Gray, in the 5th edition of his "Structural and Systematic Botany," pp. 436-438, "pervades the whole order; which in some is tonic as in the Chamomile, the Boneset or Thoroughwort, etc.; in others, combined with mucilage, so that they are demulcent as well as tonic (*Elecampane* and Coltsfoot); in many aromatic and extremely bitter (such as wormwood and all the species of *Artemisia*); sometimes accompanied by acrid qualities, as in the Tansy, and the Mayweed, the bruised fresh herbage of which blisters the skin. The species of *Liatris*, which abound in terebinthine juice, are among the reputed remedies for the bites of serpents; so are some species of *Mikania* in Central America. The juice of *Silphium* and some Sunflowers is resinous. The leaves of *Solidago odora*, which owe their pleasant anisote fragrance to a peculiar volatile oil, are infused as a substitute for tea. From the seeds of Sunflowers and several other plants of the order a bland oil is expressed. The tubers of *Helianthus tuberosus* are eaten under the name of Jerusalem artichokes; *Girasola*, the Italian name of Sunflower, having become Anglicized into Jerusalem. True artichokes are the fleshy receptacle and imbricated scales of *Cynara Scolymus*. The flowers of *Carthamus tinctorius*, often called Saffron, yield a yellow dye, much inferior in quality to true Saffron. The *Liguliflora*, or *Cichoraceæ*, all have a milky juice, which is narcotic, and has been employed as a substitute for *opium*. The bland young leaves of the garden Lettuce are a common salad. The roasted roots of the Wild Succory (*Cichorium Intybus*) are extensively used to adulterate coffee: and the roots of some species of *Tragopogan* (Salsify, Oyster Plant), and *Scorzonera* are well known esculents."

Having completed these somewhat lengthy extracts, I will now notice briefly a few genera of world-wide fame, and also one or two that are well known locally, before closing my paper. *Ageratum*: *A. mexicanum* and its varieties are extensively used in Great Britain for flower garden purposes during the summer time. For the West Indies there are recorded at least two species—*A. conyzoides*, L., and *A. muticum*, G.

Eupatorium: Locally two *Eupatoriums* are alleged to be much appreciated by women in cases of menstruation. In Europe several species are grown for ornamental purposes, viz *E. atrorubens* *E. Weinmannianum.*

Bellis: This claims one of England's typical flowers—the Daisy, *B. perennis*—which is associated with so many of childhood's country rambles and ever-to-be-remembered experiences. Who is there among those who hail from the Old Country who has not

enjoyed that childish delight of plucking "buttercups and daisies"—who is there who has not made nosegays, and necklaces from these simple modest flowers? And who is there who having taken a part in those pastimes of early youth—an open air recreation taken in the first flash of mild weather after the early spring, away from the smoke and din of town,—can ever forget their innocent happiness.

Aster: The Michælmas Daisy genus, containing a large number of species most of which are North American plants. Many are highly appreciated for growing in outside beds and borders in temperate countries. Those annuals known as French, German, or China Asters, have originated from *Callistephus chinensis*, Neis. At many of the horticultural exhibitions held in England these latter formed a few years since, and perhaps do now in 1893, a very important exhibit in the floral sections. *Callistephus chinensis* is a native of China and was known so far back as 1731.

Helichrysum: "Everlastings" have made this a well known genus. The dried flowers are sold extensively for dried bouquet purposes in Europe. The principal species which yields the everlasting is *H. bracteatum* and its varieties; these are found in Australia. Although only of a brown-looking appearance, we have a Composite in Trinidad—*Elephantopus scaber* L. *forma*, (E. mollis, Kunth) which might be used to advantage in a similar way.

Pluchea: Two species are recorded from the West Indies—*P. odorata*, Cass., and *P. purpurascens*, D.C. The former is locally known as "*Guerit toute*" or "Cure All," under which name it enjoys no small degree of notice as a medicinal plant. The Hon. Dr. L. A. A. DE VERTEUIL, in the first number of the Agricultural Record, August 1889, p. 22 writes—"Also a good diaphoretic; used also as a bath." Mr. CHAS. BOISSIERE Snr., Port-of-Spain, informs me it is much sought after for medicinal purposes.

Parthenium: P. Hysterophorus, L., is a common Trinidad plant. Mr. T. W. CARR writes of this—"In look and smell it so recalls Wormwood *(Artemisia)* that I call it in my M. S. flora "Country Wormwood," or "Bitterweed." This is the only species recorded from the British West Indies.

Ambrosia: Although three species are said to be West Indian, one is only present in Trinidad and that as a cultivated plant—*A. artemisifolia*, L. Quoting Mr. CARR, "close to it (*P. Hysterophorus*, L.) is the *Ambrosia artemisifolia* var *Triniteusis* of Finlay—at this, I have the expression 'Cult' (cultivated) in my notes."

Zinnia: A well-known garden genus. Natives of America. *Z. elegans*, Jacq., is the original species of most of the garden

varieties. It is recorded from St. Vincent, but not Trinidad, although there are reasons for believing it may be indigenous also to the latter colony. Zinnias have now become so extensively grown that by many people in Trinidad they are regarded with disdain.

Wulffia : Two species of this are known in the West Indies, but only one is credited by Grisebach to Trinidad, viz, *W. stenoglossa*, D.C., Mr. Carr informs me he found the other *W. havanensis*, D.C., at Monos in October 1869, and at Maracas Bay on Jany. 30th 1869. He adds, "they are interesting to the European observer from their orangy-yellow flowers reminding him forcibly of the Marygold."

Helianthus : This genus contains the well-known Sunflower (*H. annuus*) a native of the Western United States, and recorded as being known in 1596, and the equally well-known Jerusalem Artichoke (*H. tuberosus*) also recorded so far back as 1617. A native of Canada and the United States. Jerusalem (properly Girasola) Artichokes are especially good for flavouring soups.

Spilanthes : of *S. exasperata*, Jacq., Mr. Thos. W. Carr writes—"when one nips off and chews the small close-set orangy capitulum, it agreeably excites the salivary glands and soon fills the mouth with spittle, however dry it may have been just before trying the experiment." Mr. Carr has been a close observer for some forty years of the Trinidad flora and consequently can speak with authority on the subject. This is a very common plant in gutter-banks and damp open places.

Dahlia : A very familiar genus, recorded to have been introduced into England during the year 1789 by the Marchioness of Bute. Subsequently Lady Holland, it seems, interested herself also in the introduction of this popular flower in 1804.

From *D. coccinea*, *D. Merch* and *D. variabilis*, it is said the bulk of the numerous garden forms have sprung. Within the past few years a very enthusiastic fashion has arisen for single flowered Dahlias, up to which time the double forms were chiefly those appreciated for cultural purposes. *D. Juarezii*, the Cactus Dahlia, and its forms, are great favourites.

Large sums of money have been won in the past at the exhibition table by horticulturists after many keenly fought and exciting competitions, as to who could display the best set of cut Dahlias, and perhaps it is so at the present day, although I am inclined not to think so.

Tagetes : The marygold genus, comprising some 20 species, natives of the warmer parts of America. The African Marygold (*T. erecta*) and the French Marygold (*T. patula*) are perhaps the best known.

Anthemis : Respecting this genus, wherein is placed the

Chamomile, the following is taken from the Treasury of Botany: "The Chamomile, *A. nobilis*, is a native of Britain. Its stems are procumbent, or erect, much branched, leafy, furrowed and hollow in the interior. The leaves are downy, pinnately divided into narrow segments. The bitterness of the Chamomile is due to a principle which possesses tonic properties. The aromatic fragrance is due to the presence of an essential oil, which is of a light blue colour when freshly extracted. Both these ingredients exist in larger quantities in the central yellow florets than in the outer white ones; hence the Wild Chamomile is preferred for medicinal purposes, as in the cultivated variety the flowers are apt to become double by the conversion of the yellow tubular central florets into white strap-shaped ones like those of the ray. Owing to the stimulant tonic properties, it is much used in certain cases of weak digestion, and occasionally as an emetic, in the form of an infusion. *A. tinctoria* furnishes a yellow dye."

Chrysanthemum: C. sinense, Sab., a native of Japan, has by the skill of the florist produced many hundred varieties of extremely different forms and sizes. Who has not heard of English Chrysanthemum exhibitions where thousands of people of all shades and grades of society meet to admire this winter queen of flowers? No matter whether it be at the London Aquarium, the Temple, the London Parks, the Crystal Palace, or the provincial towns, there do people go for the purpose of seeing the Chrysanthemum. *C. frutescens*, the Marguerite or Paris Daisy, is also a most useful decorative plant, and so are *C. carinatum* and *C. coronarium*, although perhaps to a less extent. The beautiful *Pyrethrums* are included under Chrysanthemum by Bentham and Hooker.

Neurolæna: a small genus with some two species. *N. lobata*, R. Br., is found commonly in Trinidad, where it is locally known as "*Herbe á Pique.*" Mr. Carr states: "The *Herbe á Pique* (its local name) has an intensely bitter leaf, it has, or had many years ago, a very great reputation in our suburbs and country parts, as a fever cure." The Hon. Dr. L. A. A. de Verteuil, in the *Agricultural Record* for August, 1889, p. 19, writes: "*Calea Lobata* (a synonym of N. lobata)—this plant I regard as a good succedaneum of the cinchona; in fact as good as any which can be mentioned. But so bitter is it that it must be administered in some spirit, rum for instance, or in powder. The whole plant may be used."

Cineraria: From *C. cruenta*, a native of the Canary Islands, have developed numerous varieties of fine horticultural plants, extensively grown in Europe and the United States of America, *C. maritima* has acquired somewhat of a local reputation as a partial cure for cataract of the eye.

Senecio : The Groundsels or Ragweeds belong to this genus, probably the largest of all the genera found in the vegetable kingdom. Here we meet with the groundsel *(S. vulgaris)* whose seed constitutes no inconsiderable proportion of the food on which canaries in England are supported in confinement. Many of the species are ornamental and are grown as such. *S. grandifolius (S. Ghiesbreghtii)* a Mexican species, for instance, assumes a shrubby habit, has large leaves, and big bunches, or corymbs of flowers. In Trinidad we have at least two species, *S. Swartzii,* D.C., and *S. lucidus,* D.C., but the latter species only is recorded as a Trinidad plant by Grisebach.

With these brief remarks on a few of the Trinidad Compositæ, I close what perhaps has been to you a very dry and uninteresting subject ; I trust not so *dry,* however, but that you have been interested at the result of my attempt on the Compositæ ; and that on a future occasion some member of the T.F.N. Club will contribute a paper exclusively on the medicinal Trinidad plants of this vast order.

W. E. Broadway.

1st March, 1893.

MOSQUITOES.

Introduction.

Flies and mosquitoes are two words full of meaning for all of us, for with them are connected certain uncomfortable associations. They remind us of the obstinate house flies, which spot and stain everything about our dwellings and get into the butter, the tea and the cream ; and the blood-thirsty mosquitoes which have caused us so many sleepless nights. Nevertheless I hope you will not object to taking a peep into the life history of the latter for a few minutes, and see how they live and what means we have of getting rid of them.

The Mosquito belongs to the order of *Diptera,* the insects of which are easily recognized by their having a single pair of wings, and are of the family of *Culicidæ* which is distinguishable from the rest of the fly families by long and slender mouth parts, long legs and antennæ. In Europe members of this family are called gnats and in the tropics mosquitoes, which means little fly being derived from the Spanish language. The males can easily be distinguished from the females by their plumose antennæ, or feelers, and more slender body. Of the anatomy of the mosquito I suppose Mr. R. McLachlan's description of the mouth parts in the "Encyclopedia

Britannica" would interest you most. This author says: "No "notice of the mosquito or gnat would be complete without an "explanation of the mouth parts by which it is enabled to cause "such extreme irritation. When these parts are closed one upon "the other the whole looks like a long proboscis, but in reality "this consists of seven distinct slender pieces separated to the "base, viz: the *labium*, two *maxillæ*, two mandibles, the *lingua*, "and the *labrum*. The nomenclature of the mouth-parts "varies with different authors. G. Dimmock *(Anatomy of the "Mouth-parts and of the Sucking-apparatus of some Diptera)*, the "latest investigator of this complex apparatus, states, that the "*labium* has for function for the most part, the protection of the "fine *setæ* which form the true piercing organ of the *Culex*. In "the female of *Culex* the protective sheath is formed by the "*labium* alone. When the mosquito has found a place which "suits it for piercing—for it often tries different places on our "skin before deciding on one—it plants its *labellæ* firmly upon "the spot and a moment later the *labium* is seen to be flexing "backwards in its middle; the *setæ*, firmly grouped together, "remain straight and enter the skin. When the *setæ* have "entered to nearly their full length, its labium is bent double "beneath the body of the insect. . . . . .
"The withdrawal of blood is effected by means of a pumping "apparatus at the base of the mouth-parts. As no investigator "appears to have been able to detect a poison gland, it has been "considered that the irritation caused by the bite of a mosquito "was solely of mechanical origin; but the extreme irritation and "its duration have not caused this idea to be commonly accepted. "Dimmock avows his belief that there is use made of a poisonous "saliva. In the male of *Culex* the mouth-parts vary considerably "from those of the female—a conspicuous point of difference being "that in this sex the mandibles are absent, and the *maxillæ* are "not barbed."

"About 35 species of *Culex* (mosquito or gnat) have been "described as inhabiting Europe, and about 130 from the rest of "the world, but their differentiation is involved in great difficulty "and uncertainty, and it is probable that the number of true "species may be very much less."

So far as Trinidad is concerned I may say I have observed at least ten different kinds of mosquitoes, varying in colour and size, and the bite of some of them is far from being pleasant. In most natural history books you will find something about swarms of gnats which turned up in different places and at different times. The principal abode of mosquitoes is on the banks of rivers, but as you all know at this moment we have a good many about our houses. On the Orinoco, says Humboldt, the first question in the morning

on rising is : "How did the mosquitoes treat you last night?" Continuing, this great traveller says : "Not the dangers of navi- "gation in small canoes, not the wild Indians, snakes, crocodiles "and jaguars that are the terror of travellers on the Orinoco, it "is simply the mosquito."

In a recent number of the *Journal* Mr. Petersen gave us a translation of an article on the part mosquitoes play in spreading the human thread-worm and other entozoic diseases, but although they undoubtedly do some harm they also have their good qualities and some benefit is derived from them. In Brehm's *Tierleben* Professor Taschenberg tells us of a cure a Vera Cruz doctor, named Delacoux, effected on a lady suffering from inflammation of the brain. This lady was in a state of somnolence for twelve hours and showed symptoms of approaching death. The doctor put up the mosquito net and opened the windows, allowing the mosquitoes to bite the patient for two hours. The somnolence disappeared and next morning the moribund was not only among the living but seemed to be much better. Mosquitoes also do some good in their larval stage for in Packard's "Guide to the Study of Insects" I find the following : "The larvæ remain most of the time at the "bottom [of water] feeding upon decaying matter, thus acting as "scavengers and doing great benefit in clearing swamps of "miasma." Another author says some countries would be uninhabitable owing to fevers, were it not for the mosquito larvæ, which clear away the miasma.

LIFE HISTORY.

The early life of a mosquito is spent in water. The larvæ are found in all stagnant pools no matter of what size. It is interesting to watch the doings of these delicate worm-like creatures, as they hang to the surface of the water by their respiratory tubes which are situated at an angle to the last segment of their bodies, with their heads hanging down ; on these the haired mandibles are in perpetual movement causing a small current, which brings particles of decaying matter within reach of their mouths, by which the digestive canal is soon colored black. Many of these larvæ are seen in this position when everything is quiet ; but, disturb the water they are in, and, down they go to the bottom wriggling like so many little snakes ; but they cannot remain without air very long and one by one they take up their former position. But often, without been disturbed, they wriggle down to the bottom of the water and move about, the mandibles hard at work all the time. Such is the life of a mosquito larvæ. Skins are changed three times, at intervals of about a week. At the fourth moult the worm-like larvæ is transformed into a being with a club shaped body with two respiratory tubes

situated on the thorax. They remain near the surface of the water and wriggle up and down by a quick movement of their tails, whereby they shoot backwards in the same style as do the gray fish. Their existence is in this stage limited to a week and on a fine still morning the skin bursts at the back and the mosquito is liberated from the pupa. We see first of all six long black legs working themselves out, and immediately afterwards a slim delicate body follows them, taking up a position on the top of the old skin, which hitherto shut it off from the world. Here it remains for a while until the wings are dry, but should an unexpected gust of wind come, the frail craft is capsized and our mosquito is drowned in the element, in which it spent the early part of its life. As soon as the wings are dry the female mosquito says good-bye to the water and comes into our houses to give us a serenade with her delightful soprano voice and also to make a meal at our expense. Only the fertilized females return to the water to deposit their eggs, after which they die, having accomplished the end of their existence.—Such is the life of a mosquito and any one who wants to observe it for himself has only to take a tumbler full of water from some cistern or the other and carefully watch it day by day. Only the females bite, the males living in retirement in the woods, near their birth-place.—A female mosquito lays about 300 eggs and when you take into consideration that in four weeks these eggs produce mosquitoes capable of laying the same number of eggs, you can well imagine how it is we are visited at times by such swarms of mosquitoes.

After having thus heard something of the zoological character and life history of the mosquitoes we now come to the economic part of the paper, but first of all I would like to be distinctly understood that the following suggestions only apply to towns. We shall now look at

THE CAUSES WHICH TEND TO INCREASE THE NUMBER OF MOSQUITOES IN TOWN.

When the rainy season sets in, and after showers have fallen for some time, little pools of stagnant water are formed all over the country and about the larger gardens of Port-of-Spain, and as you have seen above, these are exactly the conditions mosquitoes require for their existence. A few fine days between the rainy ones is also very conducive to the development of a great number of adult mosquitoes, as these must necessarily have fine weather to escape from the pupa shell. The cesspits about the town, which during the rainy season, fill with water are also good breeding places, the rain water tanks, anti-formicas, and all vessels filled with stagnant water, regardless of size, are also made use of by mosquitoes to deposit their eggs in. It is remarkable what a

small quantity of water the larvæ can live in. On the Tucuchè I noticed numbers of larvæ in the water which collected in the axils of the leaves of certain orchids, *Bromliaceæ* etc., and about our yard I have seen mosquito larvæ enjoying themselves in a broken bottle in about just $\frac{1}{4}$ inch depth of water. So you see, mosquitoes have plenty of opportunities of increasing their numbers in our yards, therefore away with all kinds of broken vessels which may serve as receptacles for water.

REMEDIES.

There are two ways of dealing with insect pests, one is to encourage and rear their natural enemies, either in plant or animal life, for nature always provides these, and the other one is to use insecticides. In Trinidad some species of small bats and dragon-flies, or mosquito-hawks as they are called in the States, rid us of a good many mosquitoes in the evening at twilight. I am sure you are all familiar with those dragon-flies, or mademoiselles as some people call them here, which course up and down in front of our houses between 5 and 6 in the afternoon. They seem to be amusing themselves, but in reality are working havoc among the mosquitoes, which at this time are buzzing about enjoying themselves in the way peculiar to this genus of flies. Mr. Robert H. Lamborn offered a prize of $100 about two years ago for the best means of rearing dragon flies to destroy mosquitoes, but this competition was not attended with any practical results; by far the best mosquito enemy we have here is, in my opinion, a little *Cyprinodonte* about 1 inch in length. This little fish is found anywhere where there is water, in the drains in the street, in the rivers, ponds, etc., and is very hardy, standing a degree of heat which would kill most fishes; besides this it is viviparous, so that a few put into a water-tank would increase without giving any trouble at all. Every tank, antiformica, fountain, etc., ought to have these little fish, they are the sworn enemies of the mosquito larvæ and would not in any way spoil the water in tanks, generally used for drinking. I would strongly advise everybody to keep these fish in their tanks, fountains, etc., as they render us very good services.

The insecticide that would be most useful to destroy the mosquitoes in the cesspits would be to pour about a quart of carbolic acid or kerosine oil into them from time to time,. As far as the other breeding places are concerned kerosine would be the best remedy, and I will give you an extract taken from Mr. Howard's excellent article, in *Insect Life*, entitled "An Experiment against Mosquitoes."

"One of the most reasonable of the recommendations which "have been made from time to time, and which look toward the

" reduction of the mosquito plague during the summer months, " is the application of kerosine to restricted and fishless breeding " ponds. On the 5th of July of the present year (1892) I noticed " for the first time a few mosquitoes on the porch of my " cottage. . . . . One of the surface pools mentioned " was situated upon my own grounds, and upon first noticing " the mosquitoes I walked out to this spot. It was about dusk " and a dozen or more female mosquitoes were found buzzing about " the surface of the water. I immediately sprinkled four ounces " of coal oil upon the surface of the pond. Upon the following " day I measured the little pool and found it contained sixty " square feet."

" The actual good accomplished is shown by the following " facts: All aquatic larvæ, including those of the mosquito were " killed. The kerosine, curiously enough, seemed to exercise no " deterrent effect upon the adult female mosquitoes. They still " continued to attempt to deposit eggs and in this attempt were " destroyed. This is, in my opinion a most important point, and " one which has hardly been anticipated.—On the tenth day " after the application a careful count of the dead insects floating " upon the surface of the water was made over a restricted " portion, and from this count the entire insect surface contents " was estimated, with the following result. Entire number of " dead insects floating on the surface 7,400; number of mosquitoes " 370. The observation, it seems to me, possesses interest not " only as proving definitely the efficacy of the remedy and as " showing that adult mosquitoes are killed as well at their early " stages, but also as affording an indication as to the amount of " kerosine, which will prove effective for a given surface of water " and also as affording some indication of the length of time " for which a single application will be operative. It is true " that upon this last point the observations were not complete, " owing to my departure after ten days, but as already indicated, " the influence of the kerosine outlasted all ocular or odorous " evidence of its presence, and there is every reason to suppose that " it would have continued for at least some days longer . . . . " The economy of the operation is shown by a simple estimate " from the data which I have given, that five gallons of coal " oil will treat 9,600 square feet of water surface. . . . . " With this remedy and with the drainage of swamp lands where " practicable, with the introduction of fish into ponds in which " they do not already occur, and with the careful watching of rain " water barrels and tanks, the mosquito plague in many localities " can be readily and greatly lessened. Where mosquitoes breed, " however, in a long succession of brackish marshes on the sea coast, " remedial work is practically hopeless."

In conclusion, I may say, like Mr. Howard, that it is impossible to cope successfully with the mosquitoes, surrounded as we are by woods and swamps, but I may safely assure you that by using petroleum and keeping the little fish mentioned above, the numbers of mosquitoes will be considerably diminished in the houses in the towns,—the chief aim of this paper.

I may also add a remedy that is used in Bolivar on the Orinoco, where the mosquitoes are very bad at times. It was communicated to me by our President, and consists of hanging Eucalyptus branches before the windows. The smell of this plant is supposed to drive away the mosquitoes.

F. W. Urich.

2nd June.

TICKS ON AN IGUANA.

A short time ago while on a visit to Carrera's Island, to pass away an idle hour we amused ourselves lassooing the iguanas, which came to feed upon the young leaves and buds of a sandbox tree which shades the cottage. Several were caught in this way and their final end was a fricasee, which was evidently enjoyed by the cook and others.—However this has nothing to do with my object of writing, but to record a fact which is interesting to the naturalist.

On the back of one of the largest iguanas caught was imbedded a mass of ticks, one of which was certainly the largest I have ever seen and it might have well stood for the father of all this kind of parasite. It was a shiny light stone colour, three quarters of an inch in length and about half an inch broad, in fact it was nearly as broad as long. It had four hair-like legs on each side of the underpart, as its means of locomotion. This enormous tick had eaten its way through the thick scaly skin of the iguana into the raw flesh which was exposed. It was surrounded by a mass of smaller ticks which gave it the appearance of having a beard. I had to cut away the whole with a pair of scissors, so tenacious was their hold upon the unfortunate iguana.

I much regret that I did not keep the specimen for information, but I was anxious, like the school boy, to see what was inside.—What the result was, proved how much suffering and loss these parasites can inflict on the bodies to which they attach themselves.

The question arises, how did these parasites reach the rocky shores of Carrera's Island? It is quite destitute of domestic animals in whose train ticks usually follow, and the only apparent means of a livelihood they have are the iguanas and a few rats.

It is probable these parasites have a purpose in life and in my mind it is an evil one.—In a recent number of the "Field" there is an account of a sickness amongst cattle in some parts of America, which is described as "Texas Fever."

On investigating the causes of the disease it was almost conclusively proved that contagion was conveyed from place to place and to the animals by ticks, for perfectly healthy cattle were inoculated by ticks taken from diseased ones and the fever at once appeared amongst them.

Happily our domestic animals are free from disease, due primarily to our limited intercourse with other countries, but it will be well to bear in mind the evils this parasite can produce.

C. W. MEADEN.

2nd June.

CASSAVAS.—*Janipha spp.*

Of late, public attention has been drawn to these plants: first, by an article in the *Agricultural Record** by the Rev. Mr. Morton, on the cultivation of Sweet Cassava (*Janipha utilissima*, Pohl) and later, by several letters in the local newspapers on the difference between the sweet and bitter cassavas (*J. manihot*, L.), all of which go to show that for articles of food in such extensive use, a good deal remains to be learnt by the public about them. And the sooner some items thereof are investigated and published, the sooner the recurring accidents of cassava poisoning will diminish.

As to the means of distinguishing between sweet and bitter cassava, two of the above-mentioned letters say that beyond the fact that the stem of the sweet cassava is *crooked*, and that of the bitter, *straight*, there is no certain means of distinguishing the plants botanically or otherwise. Now, though there is some more or less certain means known to cultivators of distinguishing between the plants, the means of distinguishing the *roots* from one

*August and September, 1892.

another,—which, after all, is the most important point for the consuming public to be made aware of,—are these :—

Sweet Cassava.	*Bitter Cassava.*
Roots do not run so large, their skin is *thick and fibrous*, and *peels off in flakes;* if gently broken while raw the *two parts remain bound together by a central ligneous fibre:* Roasted or boiled soft, *the ligneous fibre is always present in the centre of the root.*	Roots run very large, their skin is *thin*, and *must be peeled off like that of a yam or potato.* Broken raw the parts separate, being *retained by no central fibre.* Cannot be boiled soft or pulpy, and *the central ligneous fibre is always absent* from the centre of the root.

The Rev. Mr. Morton raises the question : "Does Sweet Cassava ever become bitter?" and one of the letters informs us that Mr. E. Francis (one of the former Government Analysts) found prussic acid in the (skin) of the sweet cassava as well as in the bitter.

As to this, M. Renato de Grosourdy in his *Medico Botanico Crèollo* (Paris, 1864,) states, that "he was assured that sometimes when the plant was in the flowering or fruiting state the sweet cassava roots turn poisonous, but others denied the fact." While, as it is particularly at that stage that the roots become ripe for use, and they are frequently eaten raw both by negroes and Indians on the Spanish Main, it would seem that the sweet cassava is not in the habit of turning bitter, though *very occasionally the skin* may contain a little prussic acid.

I attribute this exception to the little known fact that cassavas can be propagated from seed, and do so frequently unnoticed, *and therefore are liable to hybridize.* I have sometimes found naturally sown seedlings, and reared them from the seed in Tobago myself. And this fact also may account for the large number of varieties of both sweet and bitter cassava throughout the West Indies,—not only two varieties of the sweet, as Mr. Morton mentions, but about a hundred varieties of each.

It is a common complaint against the cassavas that they will not keep, because, apparently, the simple and effective method of simply slicing the skinned roots and drying them well on a platine, or in an oven, is not generally known. According to Dr. Shier, the dried slices after being soaked in water were almost as good as the fresh roots.

It would detain you too long if I went into any details of cultivation and starch production, but I may mention that i cassava ever becomes an article of staple cultivation, the oil from the seed will no doubt become an important bye product. I

found 23 to 30 per cent. of it in them, and it appears to be very similar in its properties to physic nut oil, viz., drastic purgative.

A very interesting point remains to be alluded to, viz., Bitter Cassava poisoning and its reputed antidotes, which I especially mention as it seems a piece of research for both chemists and medical men, offering great scientific interest to the investigators, and a great probable benefit to the cassava consuming public.

Last year Dr. Peckholt, in analysing bitter cassava, is reported to have isolated, in addition to the already well known prussic acid, *manihotoxin*, a second long suspected poison, as well as a fermentation-hinderer, which he calls *septicolytin*, on which probably depends the antiseptic effects of cassaripe.

Persons or animals poisoned by eating the *roots* do not die before twelve to twenty-four hours after the effects of *manihotoxin*. Persons or animals poisoned by drinking the *expressed* (and fermented) *water* (which ferments very rapidly) die almost instantaneously; as suddenly, some of them, as if struck by lightning—the effects of prussic acid.

The treatment recommended by de Grosourdy in cases of poisoning from *eating* the *roots* is (1) evacuate the stomach by means of emetics (2) give a purgative but not a weakening one, and (3) try Anatto *(Bixa frelliana*, L.) powder by the teaspoonful —more or less—from hour to hour as required, or (4) repeated doses of $\frac{1}{2}$ to 1 teaspoonful of grated Secua-nut *(Fevillia cordifolia*, Sw.) in wine or rum, and if weakness follows, give several glasses of rum or strong wine fortified with cinnamon, nutmeg, or other stimulant; all the while the body should be rubbed all round with warm flannels.

Other reputed antidotes are (a.) *mint water and salt of wormwood mixed* (Browne in Lunan.) The Guiana Indians are said to give (b.) *a mixture of red pepper bruised in rum.* A Brazil remedy is (c.) *first a dose of ipecac, and then the juice or powder of a plant called Nhambu* (? Nhandiroba. Port.—*secua)* (d.) *the expressed juice of fresh arrowroot (Maranta indica*, Juss.) while (e.) the venerable scientist, Dr. Mitchell, C.M.G., tells me he has heard of the expressed juice of the tender shoots of the pigeon pea *Cajanus indica*, Spr.) being given by repeated cupfuls as an antidote.

These antidotes seem to merit a careful experimental trial, and I hope some medical or other member will investigate the matter and give the public a reliable antidote, for this too common source of poisoning accidents.

E. D. Ewen.

COCCIDÆ, OR SCALE INSECTS.

By T. D A. Cockerell, F.Z.S., F.E.S., Curator of Museum, Institute of Jamaica.

(From the Jamaica Botanical Department Bulletin.)

Mr. Bowrey and other observers have noted that weakly plants are those usually attacked, strong ones escaping. It would often be difficult to prove this, as if the facts are stated another way, namely that the plants attacked are weakly, we have but a truism. Nevertheless, it is apparently well-ascertained that plants suffering from other causes do especially harbour scale-insects, and in any case it is perfectly evident that given the same amount of insect-injury in any two cases, the plant which was also injured in some other way would soonest die.

As an instance of the severe way in which some plants are attacked, we may take the genus *Citrus*, which includes the orange, lemon, &c. These trees are attacked in America by four or five species of *Aspidiotus*, one *Chionaspis*, one *Parlatoria*, two of *Mytilaspis*, two of *Ceroplastes*, one *Dactylopius* (mealy-bug), one *Icerya*, and three of *Lecanium*. Of these 14 citrus-scales, eleven appear to be found in Jamaica, though not all as yet on *Citrus*.

The special injury done by the several species will be discussed later on.

While blaming the Coccidæ for their injuries, it must be remembered that certain species are very useful. We have one such in Jamaica, the Cochineal Insect *(Coccus cacti)*, which abounds on the *Opuntia* in the Parade Gardens, Kingston.

(To be Continued.)

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J'engage donc tous à éviter dans leurs écrits toute personnalité, toute allusion dépassant les limites de la discussion la plus sincère et la plus courtoise.—LABOULBÈNE

Trinidad Field-Naturalists' Club.

NATURA MAXIME MIRANDA IN MINIMIS.

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JOURNAL

OF THE

Field Naturalists' Club.

Vol. 1. OCTOBER, 1893. No. 10.

REPORT OF CLUB MEETINGS.

4th August.

Present: Messrs. Syl. Devenish, and R. J. L. Guppy, Prof. Carmody, Dr. Woodlock, Dr. Rake, Messrs. J. G. Reed, W. G. Hewlett, R. R. Mole, T. I. Potter, A. Borberg, P. L. Guppy, W. E. Broadway, Henry Tate and F. W. Urich, Hon. Sec. & Treasurer.—In the absence of the President Mr. R. J. L. Guppy took the Chair.—The following gentlemen were elected members of the Club: Messrs. F. Hernandez and G. Montagu White.—The Secretary read his report for the past year, also that of the Publication Committee, both of which were unanimously adopted. They were as follows:—

Secretary's Report.

According to Rule 6 I beg to submit to the Members of the Club the second Annual Report of the Club's transactions during the year 1892–3.

I took over the Secretary and Treasurerships of the Club in May of this year, Mr. Taitt having resigned owing to pressure of

business. I am sure the members greatly regretted this move and will all join me in again thanking Mr. Taitt for the services he has rendered the Club.

The number of members on the list at the close of the year 1891–92 was 44. There have been elected during the year 17 Town, 11 Country, 8 Honorary and 7 Corresponding members, making a total of 87 members at the end of July; the losses through resignation and other causes have been four. A list of members is appended.

Financially too the Club continues to prosper. The balance in hand of $49.87 from the previous year has been raised to $103.54 although a few subscriptions remain unpaid these it is hoped will be shortly received. The total income for the year 1892–3 was $483.33 and the total expenditure $429.66. A statement of the finances is appended.

During the year there have been thirteen ordinary and one special meeting. The first annual meeting was held at the All Saints School House on the 8th August, 1892. On the 7th October the Club held its first meeting in its new quarters at the Victoria Institute. I am sure all the members of the Club will again join me in thanking the Rev. L. A. Taitt for having allowed the Club to hold its meetings at the All Saints School House prior to the opening of the Victoria Institute. The special meeting was held on the 28th June, 1893, when the Club invited many of its friends to meet Sir Benjamin Stone, F.L.S., F.R.G.S., F.G.S., etc., who was on a flying visit to Trinidad. At the ordinary monthly meetings papers and commnnications of scientific nature have been read and specimens of interest exhibited. The thanks of the Club are due to the gentlemen who thus helped to make the meetings interesting. Members have generally shown their appreciation of the papers read by an increasing average attendance. A General Business Committee was formed on the 2nd September, which has to deal with all business in connection with the Club. This step was taken with the view of so far as possible excluding from the ordinary meetings the discussion of other than scientific matters.

The *Journal* is issued regularly every two months, for details of which I will refer the members to the Report of the Publication Committee. Nos. 1 and 2 are entirely out of print and of No. 3 there are not many copies left but of Nos. 4–9 there are a good many left. Those members who may wish to complete their sets of *Journals* are requested to take notice of this.

I am sorry to say that it has not been possible to form a Library yet, but with the books kindly promised by Sir John Goldney, it is hoped that one may be started with this nucleus.

The following is a list of the publications acquired by donation or exchange during the year 1892–93 :—

"Earthquakes in Japan," "A visit to Bandi-San" *Text and Illustrats.* "A visit to the Active Island Volcano of Oshima Japan," *Text and Illustrats. (Presented by the Author.)* — By Sir J. B. Stone.

"Lago Santa—Et Bidrag tilden biologiske Plantegeografi," af Eug. Warming, Professor i Botanik ved Kjobenhavns Universitet.
(Presented by the Author.)

"Journal of the Institute of Jamaica."
(In exchange.)

"Canadian Entomologist."
(In exchange.)

"British Naturalist."
(In exchange.)

"The Tertiary Microzoic formations of Trinidad, West Indies," by R. J. Lechmere Guppy Esq,
(Presented by the Author.)

"Insect Life," Vol. V., Nos. 1–4.

"Report on the Boll Worm of Cotton."

"The more injurious Locusts of America, North of Mexico."

"Reports of Observations and experiments in the practical work of the Division."
(Presented by the United States Dept. of Agriculture, Division of Entomology.)

"Manchester Microscopical Society Transactions and Annual Report, 1891."
(In exchange.)

"An Ascent of Tucuche (Trinidad)," by Sir F. Pollock.
(Presented by the Author.)

"Bulletin des Séances et Bulletin bibliographique de la Société Entomologique de France."
(In exchange.)

"Notes from the Museum of the Institute of Jamaica."
(In exchange.)

The Club collection was started in October but it has not progressed as favourably as it should have done owing to the difficulties encountered in getting specimens, mounting them, etc. In fact it

was necessary to send away to Europe some of the animals to be stuffed and they have not yet been returned; others were mounted in the colony but some soon went bad. Museum bottles have been imported for the reptile collection, but pending the application of the Club to the Government to obtain spirit free of duty, nothing could be done in the way of putting up this collection. It is hoped that with the help of the Public, who have already been contributing to the collection and that of the members the Club's Museum will be put on a proper footing in the course of this year. The Club has received a great help from the Mammal Committee formed in August, 1892, which Committee has done some good work in supplying Mr. Oldfield Thomas with some material for his Preliminary List of Trinidad Mammals published in *Journal* No. 7. Out of the sum of the $82.22 spent for the Collection during the year $64.74 were for Mammals, $24.84 for the animals and $39.90 for mounting and preparing them for the Collections. Some of the Mammals have been presented to the British Museum others are in the hands of the Taxidermist and the following are now at the Victoria Institute :—

3 Armadilloes—*Tatusia novemcincta.*
1 Wood-dog—*Galictis barbara.*
1 Manicou gros-yeux—*Didelphys philander.*
2 Ant-eaters—*Tamandua tetradactyla.*
1 Squirrel—*Sciurus cestuans.*
2 Little Ant-eaters—*Cyclothurus didactylus.*

The following is a list of donations and the names of their donors for the year 1892–3. The thanks of the Club is due to those who have thus contributed to the collection :—

Mammals.

3 Young Armadilloes—*Tatusia novemcincta.*
1 Wood-dog—*Galictis barbara.*
(Presented by J. W. L. Mitchell Esq.)
1 Otter—*Lutra insularis.*
(Presented by J. S. Greenidge Esq.)
1 Porcupine—*Synetheres prehensilis..*
(Presented by James Wishart Esq.)
2 Fish-eating bats—*Noctilio leporinus.*
(Presented by J. J. Hobson Esq.)
1 Great Ant-eater—*Myrmecophaga jubata.*
(Presented by Harris Ganteaume Esq.)
2 Little Ant-eaters—*Cyclothurus didactylus.*
(Presented by V. A. Marryat Esq.)
Skin of a Tiger cat—*Felis pardalis.*
(Presented by Harris Ganteaume Esq.)

1 Little Ant-eater—*Cyclothurus didactylus.*
(*Presented by Dr. A. W. Wight.*)

Birds.

A Soldado bird from Venezuela.
(*Presented by Elisha Lee Esq.*)

Reptiles.

Skin of large Anaconda—*Eunectes murinus.*
(*Presented by Harris Ganteaume Esq.*)
Skin of Mapepire Zanana—*Lachesis muta.*
Skin of Mapepire Balsain—*Bothrops atrox.*
(*Presented by Charles Libert Esq.*)
A small lizard locally called Vipère—*Scolecosaurus cuvieri* (Fitz)
(*Presented by Dr. Robert Knaggs.*)
A small lizard—*Gonatodes? sp.*
(*Presented by Master J. Mahoney.*)
Skin of a Macouel—*Boa constrictor.*
(*Presented by A. B. Carr Esq.*)
A collection of Snakes and Lizards.
(*Presented by Charles Libert Esq.*)
A Coral snake—*Elaps lemniscatus.*
A Crowned snake—*Scytale coronatum.*
(*Presented by Eugène Wehekind Esq.*)
A Crowned snake—*Scytale coronatum.*
(*Presented by Eugène Lange Esq., Jr.*)

Invertebrata.

1 King cockroach—*Nepa grandis.*
(*Presented by Dr. A. W. Wight.*)

Various insects and caterpillars were presented by Messrs. Charles Maingot, M. J. Leotaud, E. C. Boissière and Dr. Robert Knaggs.
A large fresh water leech.
(*Presented by H. F. Corrie Esq.*)
A Decapod crab.
(*Presented by J. Giuseppi Esq.*)

Miscellaneous.

Indian curios comprising: 1 Blow pipe and quiver with poisoned arrows, 1 Bow and arrow, 1 Book of Tabari bark.
(*Presented by Harris Ganteaume Esq.*)

A piece of Cedar wood from the house of Christopher Columbus at Porto Santo, Madeira.
(*Presented by Antonio Mendez Esq.*)

In conclusion I may heartily congratulate the members upon the continued success of the Trinidad Field Naturalists' Club.

F. W. Urich,
Hon. Sec., pro tem.

Trinidad, 4th August, 1893.

Trinidad Field Naturalists' Club.

Officers and Committees elected for the year 1893--4.

Patron: H. E. Sir F. Napier Broome, K.C.M.G.

President: Henry Caracciolo.

Hon. Secretary and Treasurer: F. W. Urich.

Publication Committee.

H. Caracciolo	R. R. Mole
Syl. Devenish, M.A.	B. N. Rake, M.D.
Professor Carmody, F.I.C.	F. W. Urich

Finance Committee.

H. Caracciolo	F. W. Urich
W. E. Broadway	

General Business Committee.

H. Caracciolo	T. I. Potter
Syl. Devenish, M.A.	F. Eagle
R. R. Mole	W. G. Hewlett
W. E. Broadway	F. W. Urich

Members of the Trinidad Field Naturalists' Club.

Honorary Members.

	Date of Election		Date of Election
Butler, A. G., F.L.S., F.E.S.	1 7 92	St. Vraz, E.	8 8 91
Crowfoot, W. M., M.B. F.R.C.S.	3 3 93	Stone, Sir J. B., F.L.S., F.R.G.S., F.G.S., etc.	7 7 93
Gunther, Dr. A., F.R.S., etc.	1 7 92	Thomas, Oldfield F.Z.S.	6 3 92
Gatty, S. H.	19 8 92	Vogt, C. Professor, M.D.	3 3 93
Hamilton, Hon. C. B.	5 2 92	Warming, E. Professor	4 12 91
Kirby, W. F., F.L.S., F.E.S.	2 9 92	Wilson, H. F.	1 7 92
Mitchell, P. Chalmers	2 12 92	Wells, S	2 9 92
Smith, G. W.	13 11 91	Whitehead, C. E.	7 10 92

Corresponding Members.

	Date of Election		Date of Election
Bock, Erick	2 6 93	Ganteaume, Harris	8 8 91
Cockerell, T. D. A., F.E.S., F.Z.S.	5 5 93	Jeffreys, W. J.	3 3 93
Chapman, F. M.	5 5 93	Lassen	8 8 92
Deyrolle, E.	7 10 92	Leomsen	8 8 92
Elliott, H. V. Lieut. R.N.	3 3 93	Rodriguez, Dr. en Méd.	2 6 93

Town Members.

	Date of Election		Date of Election
Broome, H.E. Sir F. N. K.C.M.G.	6 5 92	Hewlett, W. G.	10 7 91
Agostini, Edgar	4 11 92	Horsford, Hon. D. B.	2 2 93
Archer, Julian H.	7 7 93	Koch, W. V. M. M.B.	2 6 93
Arnott, T. D.	7 7 93	Lota, A. M.D. (Paris)	7 6 92
Broadway, W. E.	10 7 91	Libert, C.	7 10 92
Broome, L. E.	7 4 93	Murray, J. R.	2 10 91
Bain, F. M.	7 7 93	Mole, R. R.	10 7 91
Borberg, A.	7 7 93	Maingot, F. J.	7 6 92
Caracciolo, H.	10 7 91	Malcolm, O. C.	7 10 92
Carmody P. F.I.C., F.C.S.	8 1 92	Potter, T. I.	10 7 91
Collens, J. H.	5 2 92	Petersen, J.	4 12 91
Clerk, C. J.	2 9 92	Reed, J. G.	7 6 92
Devenish, Syl. M.A.	8 1 92	Rake, B. N., M.D. (Lon.)	19 8 92
Dumoret, R.	7 6 92	Scott. C. W.	10 7 91
Eagle, F.	8 1 92	Sorzano, Til.	4 11 92
Eagle, S.	2 9 92	Scott, J. O.	6 1 93
Ewen, E. D.	2 9 92	Taitt, A.	10 7 91
Fowler, Hon. H,	7 6 92	Thavenot, C. J.	6 5 92
Gerold, E.	4 3 92	Tate, Henry, B.A.	2 9 92
Guppy, R. J. L., F.L.S., F.G.S., C.M.Z.S.	6 1 93	Urich, F. W.	10 7 91
Goode, J.	6 1 93	Vahl, G,	2 9 92
Goldney, Sir J. T.	6 1 93	Walker, C. W.	8 8 91
Gordon, Hon. W. G.	7 7 93	Wilson, Lieut. Col. D. C.M.G.,	7 10 92
		Woodyatt, A., M.R.C.S.	4 11 92

Country Members.

	Date of Election		Date of Election
Carr, A. B.	19 8 92	Meaden, C. W.	7 6 92
de Verteuil, L.	7 6 92	Mahony, F. J.	7 10 92
Guppy, Hon. R., M.A.	2 9 92	Mitchell, J. W. L.	2 12 92
Guppy, P. L.	10 7 91	Smyth, Hon. J. B,	4 11 92
Greenidge, J. S.	2 9 92	Woodlock, A., L.R.C.S., (Dublin)	7 10 92
Guilbert, J.	19 8 92	Wilson, J. S.	7 10 92
Hobson, J. J.	4 12 91	Wight, A. W., M.R.C.S.	2 6 93
Knaggs, R. H. E., M.R.C.S.	5 5 93		

TRINIDAD FIELD NATURALISTS' CLUB.

TREASURER'S STATEMENT FOR THE YEAR 1892-3, ENDING 31ST JULY, 1893.

Dr. *Cr.*

	$ c.		$ c.
To Balance from last year	49 87	By purchase of specimens for collection, mounting and preserving same	82 22
,, Members' Subscriptions and Entrance Fees ...	196 10	,, Printing *Journal*	200 64
,, Receipts from *Journal*	208 48	,, Printing and Stationery	28 04
,, Nett proceeds of Promenade Concert ...	78 75	,, Postage	11 37
		,, Expenses incurred at meetings; lighting, including expenses of last Annual Meeting ...	33 40
		,, Subscription of 5 members to Victoria Institute for two years to 24th May, 1894	50 00
		,, Miscellaneous (Porterage, attendants, collecting subscriptions, etc.)	23 99
		,, Balance in hand	103 54
	$533 20		$533 20

Examined and found correct.

F. W. URICH,
Hon. Sec. & Treasurer pro. tem.

H. CARACCIOLO.
W. E. BROADWAY. } *Members of Finance Committee.*

TRINIDAD,
3rd August, 1893.

Publication Committee's Report.

The Publication Committee have the honour of presenting their report of the work for the year 1892--3. Last year the Committee consisted of only four members, but one being away for some time Mr. Urich was appointed an acting member, and his services were so valuable and acceptable that the Committee was by a special resolution of the Club increased to five and he was appointed a regular member.

The Committee have during the year issued five numbers of the *Journal* containing 127 pages of reports and papers. The reports are up to date but there is a slight arrear with regard to the papers. This is owing to the fact that it was not until the third issue of the *Journal* that reports of the meetings were published and it was then thought that accounts should be given of all the meetings from the commencement of the Club and consequently there were considerable arrears to be made up and the Committee have only just completed the series. But in doing this they have encroached on the space which should have been exclusively occupied by Club papers. Fourteen original papers have been contributed by members, two of which—Dr. Rake's interesting sketch of his visit to India and Mr. Broadway's excellent description of the Natural order of the Compositæ,—occupied two numbers each. One of the most useful of the papers published was Mr. Oldfield Thomas's Preliminary list of the Trinidad Mammals and Dr. Rake's and Mr. Gatty's list of Trinidad Butterflies will find equal merit in the estimation of Entomologists.

The Committee have again to thank the Editors of the *Port-of-Spain Gazette*, the *Observer*, the *Daily News*, *Catholic News* and the late *Public Opinion* for their kindness in placing their columns at the disposal of the Committee and also for the very complimentary notices which they have been good enough to publish with reference to the *Journal* from time to time.

The Committee desire to express their sense of gratitude to Mr. Alex. Hamlyn who kindly designed the cover of the *Journal* which has since been engraved. Mr. Hamlyn has on several occasions gratuitously given his services to the Club in matters of this kind and the Committee feel sure the Members will join them in this sentiment.

H. Caracciolo,
Syl. Devenish,
P. Carmody,
R. R. Molf,
F. W. Urich,

The following Rules for the Economic Entomology Competition were unanimously adopted :—

1st Prize $30.
2nd ,, $20.

1. No Second Prize will be given if fewer than six Essays are sent in.
2. Essays to be sent in on the 2nd of July, 1894, signed by a *nom de plume* and accompanied by a sealed envelope containing competitor's card—to be attached to Essay with the *nom de plume* written on the exterior of the envelope.
3. The Essays to be accompanied by collections containing all insects mentioned in them. Good setting and preparation will be taken into account.
4. All Essays and Collections to become the property of the Club.
5. The decision of the Judges selected by the Business Committee of the Club to be final.
6. By Economic Entomology is meant the Study of Insects which are injurious to Agriculture and Gardening, and the methods of destroying them.
7. Essays are to treat only of Trinidad pests.
8. This Competition is open only to Town and Country Members of the Club.

Mr. Lechmere Guppy jr. exhibited a *Gordius* worm found at Princes Town by Mr. C. P. Rojas. This worm lives in its young stage in the body cavity of predatory insects and is provided with a mouth which in its adult state is obliterated. At pairing time they pass into the water, where they become sexually mature. Their color is black. Mr. Guppy also showed a hairy *Bombyx* caterpillar which severely stung one of the members present although this venomous characteristic was doubted a few meetings previously. The Secretary exhibited on behalf of the President a nest of procession caterpillars from Monos living on the almond tree *(Terminalia catappa)*.—The Meeting adjourned at 10 p.m.

Second Annual Meeting.

(18th August 1893.)

Present : His Excellency the Administrator H. Fowler, Esq., Mr. H. Caracciolo (President), Hon. D. B. Horsford, Lieut. Col. D. Wilson, C.M.G., Professor Carmody, Mr. Syl. Devenish, Dr. Woodlock, Messrs. F. J. Maingot, J. Russell Murray, T. I. Potter, W. E. Broadway, Henry Tate, J. H. Collens, Geo. Vahl, Jean Petersen, Lechmere Guppy, jr., R. R. Mole, G. Montagu

White, F. Eagle, W. G. Hewlett, J. G. Reed and F. W. Urich Hon. Sec. and Treasurer.—*Guests:* Messrs. John Hoadley, S. A Cumberland, T. W. Carr, H. D. Carruthers, G. D. Glass, Master Percy Fowler.

Much interest was centred in the exhibits by his Excellency and the visitors. A stork presented by Mr. E. Lee stood like a sentinel at the entrance to the room. The names of the other exhibitors with a description of their exhibits is appended: Mr. E. Broadway: 2 cases of Trinidad insects very well mounted and artistically arranged; a stand of the more common grasses and sedges of Trinidad in their flowering and fruiting stages; a large lantern fly new to the collection, probably a new species; shells and eggs of the large garden snail *(Bulimus oblongus)*; microscopic slides of insects. Mr. T. I. Potter: a large cribo *(Spilotes corais)*; a centipede and some young manicous *(Didelphys marsupialis)*. Mr. Lechmere Guppy, jr.: 3 cases of Trinidad butterflies and moths very well mounted; drawings of the caterpillars and chrysalis of some of the butterflies and moths shown in the cases; Cocoons of *Antheræ Pernyi* Chinese Oak silk moth, bred in Trinidad on the almond tree *(Terminalia catappa)*. Mr. R. R. Mole: 2 Alligator eggs; 1 live racoon; several living snakes; 1 young crocodile from the Orinoco and a Trinidad alligator. Mr. Jean Petersen: A collection of Trinidad snakes in spirits, very well preserved. Mr. F. W. Urich: Artificial nest of the Parasol or leaf cutting Ant, *Atta sexdens*; photographs of the fungus *(Rozites gongylophora)* cultivated by the Parasol Ants, showing the mushroom which ultimately develops from it, taken from Dr. Moeller's work; a microscopical slide showing the part of the fungus the ants live upon. An Indian blowgun, and arrows presented by Mr. Harris Ganteaume, and a piece of wood from Christopher Columbus's house at Madeira, presented to the Club by Mr. Antonio Mendez, were also objects of interest.

The instruments used in an instructive microscopic exhibition were kindly lent by the Hon. Secretary (Mr. Urich) and the Agricultural Board.

After the members and their friends had taken their seats, Mr. Caracciolo, President of the Club, delivered the following address:—

Gentlemen of the Trinidad Field Naturalists' Club,—

It is my duty as your President to give you an account of the progress the Club has made since the last annual meeting; but before doing so I must express my sensibility of the undeserved honour you have conferred upon me by electing me, for the third time, to the presidency of your Society. I thank you

most heartily for the high compliment you have paid me, and I take this opportunity of assuring you that as I have tried in the past so I will endeavour in the future, to do all in my power to promote the usefulness and welfare of this Society. In promising this, however, I must ask you to assist me in these objects and I have no doubt that the loyal support you have given me since the formation of this Club will be accorded me during the ensuing twelve months.

Gentlemen, in addressing you this evening it is my intention to recall to your memories the chief events of interest in connection with the Club since the last Annual Meeting, and, secondly, to endeavour to point out to you the almost limitless ground for amusement and really solid scientific work in connection with the study of Natural History which our island home affords.

Since our last Annual Assembly on the 8th August, 1892, there have been thirteen ordinary and one special meeting, all of which have been well attended, and I think the Club may congratulate itself upon the fact that unlike other societies and also institutions in this Colony, it has never failed to hold a meeting whenever one has been called, through the non-attendance of Members. There is only one kind of meeting which Members seem disinclined to attend, and that is a business meeting. Although this is regrettable, taken from the point of view that Members should be interested in the business of the Club, it is also one which speaks volumes for the confidence which the Club places in its Officers.

Since our last Annual Meeting we have changed our head quarters. During the first year of our existence as a Club we met in the All Saints' School-house, kindly lent us by the Rev. L. A. Taitt, to whose generosity I would again express the grateful indebtedness of the Club. On the completion of the Victoria Institute, the Club appointed a Committee to meet the Institute Committee to arrange about holding our meetings in this Lecture Hall. The Committee was moderately successful in its negociations, and the result is that we are here; but it is still an open question whether it would not be more desirable that the Club should have premises which would be entirely under its own control. Probably this is a point which we shall have to decide in the near future.

The meetings of the Club have been generally of a most attractive character and the number of exhibits on these occasions is evidence that the members are constantly on the look out for objects of interest. One of the most curious of these was a centipede, caught by Mr. Charles Libert, engaged in the protection of its young. The fact was an entirely new one in the known life

history of centipedes and has been brought to the notice of the Zoological Society of London by members of the Club. Unfortunately this particular specimen died on the voyage to London and no additional evidence was forthcoming until a few weeks ago, when Mr. Giuseppi presented me with one engaged in this interesting operation. I was enabled to take a few notes on the subject, but they are necessarily very incomplete and much more has still to be learned with regard to this curious habit. Another object of merit which was first exhibited at a Club meeting, was the fine specimen of *Galictis barbara* shot by Mr. J. Mitchell and presented by him to the collection. Another equally valuable one was a number of plants collected by Mr. Broadway during an excursion with Mr. Urich to Diebé Valley. Mr. Harris Ganteaume of Bolivar, a corresponding member, who has never been able to attend one of our sittings, has manifested the greatest sympathy with our proceedings and has added considerably to the *éclat* of several of them by the valuable objects he has presented the Club, amongst which are the Indian blowgun by which the natives of the banks of the Orinoco kill birds and even many large animals; the skin of an ocelot and an anaconda and a live ant bear which has recently died. Dr. Rake has, on many occasions, contributed largely to the entomological section, notably some bees and spiders which are likely to turn out new species, and so have Messrs. Broadway, Potter, Hewlett and Eagle. A racoon acquired by the Club, some time since was a visitor at one meeting and was apparently as interested in the proceedings as he was interesting to the members. Two small tortoises found at Matura, lent by Mr. Gray to the Club, have demonstrated the fact that our knowledge of the various species found in this Island may be considerably extended. Another exhibit was a pair of young crocodiles from the Orinoco lent by Mr. Williamson, and a leech presented by Mr. Corrie.

During the past twelve months 20 original papers have been read at the Club meetings and published in the *Journal* and these were nearly all illustrated by objects in connection with the subjects on which they were written. Among the most important of these were Dr. Rake's "Natural History Notes in India," Mr. Tanner's second paper on the "*Ægodoma cephalotes*," "some peculiar types of Rhyncophorus Beetles," Mr. Oldfield Thomas's "Preliminary list of Trinidad Mammals." In connection with this paper I am afraid that the British Museum authorities have been misinformed upon some points and that some of the animals sent to them years ago, as being indigenous to the Colony, really came from Venezuela. It will be, I trust, the endeavour of the Club to find out whether this is so or not. The other papers calling for special mention were Mr. Broadway's elaborate description of "the Na-

tural Order of the Compositæ," which was illustrated by a fine collection of plants; Mr. Devenish's "Notes on Alligator shooting," Mr. P. L. Guppy's "Notes on some Lepidopterous Insects," Mr. R. J. L. Guppy's "Microzoa of the Tertiary and other Rocks of Trinidad," which will appear, it is expected, in an early issue of the *Journal*; and finally, Mr. F. W. Urich's really useful, elaborate and interesting paper upon those "terrors" of the tropics—"Mosquitoes."

The Government of the Colony has once or twice lately made efforts to introduce silk worms, but these attempts have not been attended with success. One of our members, however, Mr. P. L. Guppy, has, on the other hand, succeeded remarkably well, especially with *Antheræ Pernyi* or Chinese Oak Silk Worms which he fed on the *Terminalia Catappa*. According to the *Encyclopedia Britannica* this species is the most important of all the *Saturinidæ* and produces the Tusser silk so largely used in Europe. It is a native of Mongolia. Mr. Guppy has also successfully reared the *Attacus Cynthia*, which has also been imported by the Government, and his success with the foregoing has been uniform with his efforts to rear *Callosamia promethea* and *Telea polyphemus*, in all, four species.

The Club was especially gratified to learn that Mr. G. Massee of Kew, in his final and conclusive report upon the cane borer *Xyleborus perforans*, proves that the fungus *Trichosphæria* does attack the young leaves of the cane, yet he says (and this supports the contention of the Trinidad Field Naturalists' Club) in older plants inoculation can only take place when the surface is wounded, which statement coincides with the Club's opinion expressed some time since, that the *Xyleborus* was the primary cause of our planters' losses in the production of sugar.

The members of the Club will be glad to learn that their numbers have nearly doubled since last Annual Meeting, the detail of particulars, however, they will find in the able report of the Secretary, read at the meeting of the 4th instant.

For sometime past it has been felt by many of our members that prizes should be offered for the best work in the various departments of Natural History and it was determined that when our funds were in a more flourishing condition these prizes should be given. At the meeting of the 7th April last one of our new members, Sir John Goldney, very generously made a step in this direction and offered a prize for the best written account of a field ramble on Whit-Monday. Owing to some cause or other the papers were not very numerous, but otherwise the competition was a very keen one and His Lordship the Anglican Bishop of Trinidad, who was the judge selected, in giving his decision wrote that the papers were all good and there was little to

choose between them. Finally Sir John Goldney's prize was awarded to *Microbia.** Since this competition has been decided the Business Committee of the Club has met and, with the concurrence of the Finance Committee, has agreed to offer $50 in prizes for the best essays on local economic entomology accompanied by collections, and it is hoped on the part of the Club that when the period allowed for the preparation of these essays and collections has expired, there will be a fine competition and that the result will be of benefit to the Country generally and Agriculturists in particular, by affording and widely diffusing knowledge as to how to deal with the insect pests which attack our sugar canes, bore into our cocoa trees, destroy our cocoanuts and our ground provisions, work havoc in our flower gardens and prematurely ruin our houses, and inflict such misery upon our domestic animals. I hope the community generally will be interested in this competition and will not be backward in pointing out all the fields for investigation in this direction which offer themselves, so that our young men may have plenty of material to work upon and their efforts may result in lasting benefit to the island, and, may I venture to suggest it? not only here, but to other, and far distant parts of the globe.

The past year I regret to say has seen an almost entire cessation from field excursions by the Club as a body, only two adorning the record—one to Diebé Valley on the 11th September, which was at the last moment changed to the St. Ann's Valley, and a semi-official one which was made to Blue Basin last December. But although the Club as a body has not gone out together, many of the members have made excursions which have been of the most interesting character. Amongst these I may enumerate the two ascents of Mount Tucuché by Messrs. Urich, Broadway and Potter which resulted in a fine harvest of botanical specimens and some new species of earth worms and terrestrial leeches which are awaiting determination, and a number of rare and beautiful insects; the Caroni trip by Messrs. Urich, Broadway, and Mole which although somewhat disastrous in that they spent the greater part of the day bleaching in the sun on the Caroni bar was productive of a rich collection of plants by Mr. Broadway. Another most successful trip made by myself was to *Fondes Amandes* on Whit-Monday and a no less interesting one was a four days visit by Messrs. Mole and Urich to Marmorel Valley.

During the year an attempt has been made at forming a stuffed collection of the animals of Trinidad. Our efforts so far have not been crowned with the highest measure of success, but

*The President thus modestly refers to this paper which was written by himself. *Publication Committee.*

when the animals now in the hands of a first class London Taxidermist have returned to the Colony, I think the Club will congratulate itself upon having formed the nucleus of what I trust will in the near future be a very fine collection of the Mammalia of Trinidad.

Since our First Annual Meeting the Club has received presents of a number of rare and valuable animals, insects, &c., a list of which has appeared in the Secretary's Report. I may here mention that full credit will always be given to the donors of any additions to our collections.

The Secretary's Report also details the books and pamphlets which have been presented to the Club during the past year.

One of the most pleasurable events of the year was the Club's visit to the home of the Hon. Robert Guppy, San Fernando, who, generously entertained the Members with a princely hospitality.

Another equally enjoyable feature was the special gathering to meet Sir Benjamin Stone, on the 28th June, when the Members and their friends spent a very pleasant and instructive evening. Here, I may mention that Sir Benjamin was very favourably impressed with the work which we are doing, and kindly volunteered, if any Member was or is likely to engage in the study of mosses, to identify them in order that a complete list of the Trinidad *Muscineæ* may be formed.

Another gentleman who visited the Colony, and, though he was not able to meet the Club, manifested considerable sympathy with our work, was the distinguished ornithologist, Mr. Frank Chapman of the American Museum of Natural History, New York, who spent some months in the Island in the early part of this year.

Mr. G. W. Smith, the Government Botanist of Grenada, was also present at one of our meetings, and has since proved himself in a practical manner altogether in unison with us in our efforts to promote the study of Natural History.

Gentlemen, when I look back to the humble commencement which this Club made two years ago, and when I look at the position we occupy to-day, I feel proud, but I also feel grateful —grateful to the kind sympathy and support which the Club has received in the Colony ; grateful to the spontaneous offers of assistance which have literally been showered upon us from outside. Men in the foremost ranks of this particular branch of science have come forward to help us. We have received offers of assistance from Dr. Gunther and Mr. Oldfield Thomas, of the British Museum, Mr. Cockerell, late of Jamaica, who is even now working up our scale insects ; Mr. Peckham, of Milwaukee, who is now engaged upon our spiders ; Mr. Tyler Townsend, of

Jamaica, who has offered to determine our flies, and is particularly interested in bot-flies, and there are many others who are constantly doing work for us, and, thanks to whom, we shall soon have a fine collection, if our efforts are persevering and systematic. It is extremely pleasing to me to know that we have such hosts of friends who are so willing to help us in what we cannot do for ourselves, if we will only consult them, and if we work in the future as we have in the past, we shall soon be able to show that we have made considerable strides in our knowledge of the fauna of the Island.

Amongst the friends of the Club which we number in the Island, I will only venture to mention two : one, who is one of our Members—Sir John Goldney—who has promised us a handsome start with our Library, and Dr. de Boissiere, who has undertaken to help us by advocating, from his place in the Legislative Council, our cause in the matter of obtaining from the Government spirit duty free for the preservation of our reptiles, the list of which is now rapidly nearing completion. To these gentlemen, without being invidious, I think I may say our hearty acknowledgments are due.

There is another class of friends to whom I think we should also be grateful, and they are the subscribers to our *Journal*, who enable us to keep it going with very little help from Club funds. It speaks volumes for the progress of the people of Trinidad during the last few years to find that we are able to keep a magazine of the character of the *Journal* running with such an uninterrupted continuity of success.

Gentlemen : I have pointed out in a rapid and inadequate manner a few of the events of the past year in the life of the Trinidad Field Naturalists' Club and now I turn to the work which awaits us. Last year I described the work lying before us as *stupendous*. This year I am more than ever impressed with the fact. As time goes on we shall find out the more we learn how infinitesimally little we really know. The great and wonderful book of Nature is lying open before us, waiting for our perusal. We, with our busily occupied lives—only able to devote a portion of our leisure to snatch a glimpse now and then at its pages—we are as little children trying to spell out a letter at a time a few of her wondrous secrets ; perhaps we may add to our knowledge of the extraordinary and diversified life of the lower creation a little fact here and another one there, but were we able, as many of us would like to be able, to lay aside all other occupations and go into the Fields, the Forests, the Hills, the Valleys, the Rivers, and the Lagoons, and spend a long life-time in the contemplation of Nature's handiwork as it appears in such unbounded profusion on every side, we should find when it comes

to the time when we too have to cross the Rubicon and enter upon the Great Unknown Land which lies beyond, that we have only read the first few lines of the preface to the Great Volume which ever lies open for our instruction, and have hardly grasped their meaning. There is much to be done but how are we to do it? We can obtain a complete list of the Mammals of the Island; We can compile an approximately accurate list of the wonderful birds which adorn our forests and make the welkin ring again with their music and noisy chatter. We can find out the names of all the finny denizens of our streams, our ponds and our swamps; We can compile a roll of our reptiles and our amphibia which may be more or less complete; We can turn our attention to the insect world and attempt to gain a slight idea of the hundreds of thousands which compose it and we can essay arranging them under their orders, their sub-orders, their families and we can even go lower still in the scale of creation and work out our diatoms; and we can gain a fair knowledge of our rich field of botany. But all these things gentlemen are not the objects of our Club. All this can be done from the examination of dead specimens forwarded by collectors to specialists in various parts of the world. Our chief object is a totally different one. As I said last year so again I repeat it this year. Let us gain as much knowledge as we can of the various habits and peculiarities in the animals, the birds, the fish, the reptiles and insects which come under our notice. Let us find out what they are good for; if possible their reason for existence in the great scheme of Nature. Let as throw aside all attempts to become anything more than observers. The truest lovers of Nature do not reckon thousands of impaled insects and scores of dead animals and birds their greatest achievements; it is the knowledge of their habits which constitute their greatest success. He who can with accuracy trace the life history right through from the egg to the caterpillar, from the caterpillar to the chrysalis, from the chrysalis to the gorgeous butterfly which flits, clothed in magnificent beauty, over the surface of our cocoa and bamboo shaded streams, or rushes up into the bright sunshine and chases its comrades backwards and forwards and is in turn pursued back to its cool shady retreats; he who can describe its food, its mode of living, its loves, its life, its enemies, its death, the use of its gorgeous hues and colours; he who can do all this does more for the advancement of the knowledge of Natural History, than he who fills cases upon cases with specimens of which he knows nothing but their bare names. The history of animal life cannot be learned from stuffed skins, from bottled specimens, from impaled insects; but if we observe in the manner I have tried to indicate and, having found out and are sure of the object we are observing, let us endeavour to get

the object determined—keeping duplicates ourselves, so that there may be no doubt in the minds of people at a distance as to what object we are writing or speaking about when we have occasion to refer to it. If we do this we shall be doing good work and in this way we shall not only gain knowledge for ourselves, but be able to transmit to others our knowledge and to place that knowledge indelibly on record, so that when our term of life is done, our little unit of learning gained in the entrancing study of the Great Book of Nature, may not go down to the grave with us, but be treasured up for the instruction and healthful amusement of those who come after us. But above all things let us be accurate and careful in our observations, and remember as I said last year, "dates, descriptions, locality mode of living &c., are essential in the biology of insect and animal life." There should be no trusting to memory, let everything be carefully noted at the time. Then there is another point which I wish to impress upon you and that is systematic work. Nature is so entrancingly interesting that we are all of us tempted to run hither and thither, to examine and make notes of this animal, that bird, this insect and that insect, this or that order of plants, and in the end we may gain a fair general knowledge—but, nothing more. To do real lasting enduring work it is best that each one should confine himself, for a time at least, to the study of some particular order and to make a point of finding out all he can about the individual groups which compose that order—on what they feed, their habits generally, their care or otherwise for their young, their enemies and so on. In this way much more can be attained and more satisfaction felt than in desultory observations which have no connection the one with the other. There is one more point and that is co-operation amongst our members. In the pursuit of our own particular branch of enquiry we shall be constantly coming across specimens and facts which belong to some fellow member's branch. In such cases it is the duty of the members to, if possible, secure the specimen for and at any rate apprize each other of the facts they have accidentally stumbled across. In this way we can form a band of union amongst ourselves which will be beneficial to all alike and which it is the aim of this Club to promote.

Looking once more at the work of the past year I say I consider it very creditable. Looking at the future I can promise those of this Club who love Natural History for the instruction and amusement it affords, an inexhaustible fund to draw upon. "Nothing new under the sun" is an old adage in which there is considerable truth, but to those who delight in the observation of Nature, in attempting to unravel her mysteries, in noting the wonderful and diversified forms of beauty which she

presents, falls the happiness of finding out facts which are at once new and old. Old in that they have perhaps existed for long ages: new in that they have never before been discovered by the human mind, and the more they learn the more impressed are they with the truth:

> " Each moss,
> " Each shell, each crawling insect, holds a rank
> " Important in the plan of Him who framed
> " This scale of beings; holds a rank which, lost,
> " Would break the chain, and leave behind a gap
> " Which Nature's self would rue."

Gentlemen, as one who has from childhood loved Nature, and one who finds in her contemplation the most pure and healthful of occupations in which it is possible to employ the mind, I must ask your forgiveness if I have trespassed too long upon your patience. When many of us present here to-night begin to write of Nature our minds are immediately filled with gorgeous pictures of cloud-capped hill-tops and azure skies; of the rich and variegated shades of vegetation on sunlit mountain-side; of deliciously cool and shady valleys; or roaring mountain torrents, gurgling streamlets and limpid lakes; the air is filled with the busy hum of wings and insect voices; the grand choruses of our birds as they flit to and fro in the morning sunshine; the breezes are heavy with the fragrance of a myriad plants and flowers round which play hundreds of gaily winged butterflies; beetles and flies of brilliant metalic hues present a thousand different aspects as they dart about with lightning speed, or hang poised on quivering wings in middle air, emulating the sheeny glitter of the brightest of Golconda's gems. Strange forms creep in the shade and along the branches, assuming fantastic shapes, but all are exquisitely, wonderfully, varied and lovely—all call for our admiration for

> " Nature hath made nothing so base but can
> " Read some instruction to the wisest man."

(Applause.)

His Excellency the Administrator then rose and said: Gentlemen,—I have much pleasure in moving a vote of thanks to your President for the very interesting and able address he has presented to us to-night. I am sure we have all listened to it with a great deal of attention. I can only congratulate the compiler on the language he has used and the many interesting subjects which he has brought under our notice. I hope that the members of the Club will act upon the suggestions that have been made, that the reputation the Club has secured for itself will continue and that the efforts they are making in the Field of Nature will be appreciated by those who take an equal interest

in Nature in other parts of the world. I am aware societies of this description depend a great deal upon a few who really take a very great personal interest in the subjects with which they deal, a society of this description is bound to succeed. Therefore I have great pleasure in proposing him a vote of thanks for the very able address with which he has inaugurated another year of your Club's existence. (Applause).

Mr. Syl. Devenish in seconding the vote of thanks said that Mr. Caracciolo's remarks about the small amount of time members of the club had to devote to the study of Nature reminded him (Mr. Devenish) of what he had often said at this club and would now repeat—that it was wonderful how the young men after the toils of the day in stores or wherever they were employed, could find courage for the study of science, seeing that the climate and everything was against it. The progress made by the Club was also wonderful, particularly by those who have not had a chance of going to Europe to see Museums and hearing lectures there, but who have actually done their work through pure instinct guided by nature and impelled by the love of science. Their work could not be too much admired, since the country as he said before was against all intellectual recreation after the toils of the day. It was very honourable and praiseworthy of the members of this Club to devote their few leisure hours to the study of nature and he hoped the success of the Club would go on from year to year increasing and popularising the good name this Club has amongst scientific men in Europe and America. (Applause).

The proposition was unanimously carried.

Professor Carmody: Mr. Chairman and gentlemen,—I have been asked to propose a vote of thanks to His Excellency the Administrator for his kindness in coming to this meeting this evening. It gives me very great pleasure to do so and I am sure you all reciprocate that pleasure. The work of this Club, as you know, is carried on in a very enthusiastic manner. What has puzzled Mr. Devenish very much, in connection with this is—that there is so little time left to members who are occupied during the day for devoting themselves to work of this kind after the ordinary busines hours. But it arises entirely from that pure love of study which is ingrained in a great many of our members. Take our President for instance. There is no man I suppose to be found in any part of the world who could throw more enthusiasm and love into his work than he does. (Hear, hear.) Of course, half-a-dozen men like that in any society in any part of the world are sure to make a mark for themselves and their efforts are bound to be crowned with success. It is to that enthusiasm we owe entirely the success of this Club. The Club is doing as you know a great deal of work and among the things it

is likely to accomplish in the near future is some useful practical results. These results have been fore-shadowed in the address which the President has been good enough to deliver to us to-night, and it is to these practical results that we should mainly look. The presence of the Governor or the Administrator on these occasions of course adds very much to the promise of success that awaits us. Without the encouragement of those who are in a position to encourage, our practical work could not be carried on; and the presence of the Governor of the Colony or his representative is of course a very great encouragement to the members of this society. (Applause.) By their presence such persons show that they take an intense interest in the work of the Club and are pleased to see that it is successful, and no doubt when we prove results that will be of practical use to the Colony, we shall get some practical assistance from the Government. That is what the Club requires—they do require some assistance in order to have a meeting room which would be at their own disposal and where their collection could be used as a national collection. We should have a collection of all the subjects to which the club devotes its attention and let them be on exhibition to those who come to the Colony. All the specimens should be included in the collection; it should be complete so that visitors would not be able to come here, go into the woods and find new specimens. This Club ought to be able to show everything, and it is impossible for the club to do that well unless they have a sort of building or museum devoted exclusively to that. They are here on a sort of durance and sometimes there is a little trouble in connection with their exhibits. It arises purely from jealousy I believe, and that is very good—not that there should be jealousy but because it shows the Club is very much more successful, I won't say than it ought to be, but than some people think it ought to be. (Laughter and applause.) Now, I think if this Club goes on working as it has gone on working in the past it might look for some encouragement from the Government in the future—not at present because it is right the Club should first be able to show they are doing practical work, and then go to the Government. Show that you are doing good practical work, work of a national character and the Government won't be slow to give it the support it deserves. I am sure you will all be pleased His Excellency the Administrator has not discouraged us on this occasion. He takes a great interest in the work of the Club. He always speaks highly of it and I am sure that if we have any wants or grievances or anything of that kind, His Excellency will give us his sympathy and possibly his co-operation. (Applause.) We are all very grateful to him for coming here this

evening and hope we shall have the pleasure of seeing him on a good many more occasions. (Applause.)

Mr. Russell Murray in seconding the vote of thanks, said there was a great need of encouragement to collect and preserve the result of the observations of the members of the club and others so that they might at all times be able to refer to them for information. He happened to be mostly interested in the economic section of their work. That was a section that interested him much more than any other, because the results of it were of very much moment to the Colony. He thought they ought to proceed on the lines of the scheme which has been laid down with regard to the Imperial Institute. That Institute was built with the idea that it should be a great centre of knowledge with regard to all the British Colonies. They wanted to centralise all the ideas and information that were to be had in the Colony in the Club. They wanted to get the different classes of food gathered together side by side with the insects and animals that attacked them, and also the fibres, fruit and every economic plant. He thought this Club might do a great deal towards helping the local Imperial Institute Committee in gathering together things that were wanted for the Institute at home.

An inspection of the exhibits brought the proceedings to a close.

1st September, 1893.

Present: Mr. H. Caracciolo, President, Prof. Carmody. Messrs. Syl. Devenish, R. R. Mole, F. Hernandez, W. E. Broadway, W. G. Hewlett, T. I. Potter, and F. W. Urich, Hon, Secretary. Messrs. John Hoadley and S. A. Cumberland were elected Town Members of the Club. A letter was read from Mr. Oldfield Thomas, British Museum, acknowledging receipt of the Bat *Vampyrus spectrum*, Linn., the largest bat of the New World. It forms an addition to the known fauna of Trinidad. The Secretary placed on the table some specimens of male and female Parasol ants forwarded by Mr. J. J. Hobson, a Country Member, and read a letter from this gentleman relative to these pests, in which he made some remarks about their annual swarming. A letter from Mr. Tyler Townsend of Jamaica was read by the Secretary, offering to determine any flies the Club might like to send him, and asking particularly for the larvæ of Bot flies *(Œstridæ)* locally known as Mosquito worms.—The President made some remarks about a collection of fish he had made during his stay at Monos, and Mr. Devenish made some observations on the Morocote fish or Dog tooth trout of the Orinoco, which was a favourite article of food there. The Secretary read on behalf of Mr. A. B. Carr, a Country Member, a most interesting

description of a Quenk hunt and some Notes on the Mapipire *(Lachesis muta)* and its venom. Mr. Devenish gave some anecdotes of his hunting experience and made some remarks on some snake poison antidotes. A Martinique Fer-de-Lance exhibited on behalf of Mr. Cumberland and some fangs of *Bothrops atrox* obtained from a Trinidad snake by Mr. A. B. Carr added to the interest of the paper. After a vote of thanks to Mr. Devenish for having placed his house at the disposal of the Club, the meeting adjourned to Friday, the 8th instant, when the new amended Rules of the Club were discussed.

CLUB PAPERS.

NOTES ON FOUR SPECIES OF SILK PRODUCING LEPIDOPTERA.

Antheræa Pernyi or Chinese Oak Silk Worm.
Telea Polyphemus or North American Silk Worm
Callosamia Promethea.
Attacus Cynthia or Ailanthus Silk Worm.

About two hundred cocoons were sent me from London by a friend on Feb. 15th last. I received them by parcels post, and I may add my friend most likely unaware that any duty would be charged on this parcel of unoffending live-stock, placed a value of £5 on the Customs Declaration; this cost me 6/-, though I applied to have the value reduced, but I failed to produce sufficient evidence to prove that they were not of this value.

The first to emerge were two pairs of *Antheræa Pernyi* or Chinese Oak Silk Worm; they appeared Feb. 26th eleven days after receiving them, between the 26th and 28th Feby. all had emerged; these were five pairs. Immediately after emerging, the moths paired, which they will do in any situation; this is a very good point, the difficulty in some other species of silk producers being that they do not pair easily in captivity. On Monday, the 27th Feb. viz: the day after emerging, one pair had separated, I suppose during the night, as there were a lot of eggs laid when I looked in the cage soon after 6 a.m. The eggs are light brown, circular and flattened at the top which is dark brown. By March 1st. there were eggs laid by all the females,

except an odd one which later laid unfertile eggs. Early on the 8th March, the eggs began to hatch which they all did within a couple of days, thus taking about 10 days to germinate.

It was with the greatest difficulty, and after trying everything I could think of as a substitute for oak, that at last I found that *Terminalia Catappa* would suit them, though they seemed doubtful, as some of them rejected it at first, having for many generations fed on the oak, This can be understood, especially as this species is not nearly so polyphagous as many others, and to quote from a Catalogue Raisonné by Mr. Alfred Wailly to illustrate this :—

"*Pernyi* larvæ may be reared on plum and apple trees, but they do not thrive well on these as far as my experience goes. One of my correspondents in Illinois, U.S.A., however wrote me some years ago that he saw his *Pernyi* larvæ of the second generation leave oak trees of which the foliage had become hard and tough through the great heat and drought to go and feed on hawthorn bushes ; others were found in a garden on apple trees, where they had reached an enormous size."

None of the plants mentioned above grow here ; I tried the larvæ on allied species of these trees, which they would not touch, so my difficulty in finding a substitute may be imagined. The larvæ are for the first eight or ten days, black, covered with bunches of white hair which rise from tubercles ; there are two tubercles to every angulated segment except the last which merges into one. On the 18th March, most of them had moulted and become light green, with a total change of appearance ; after other moults they became very fine looking insects ; the head is light brown, dotted with black, the tubercles being tipped with gold ; there are lateral rows of spots ; one of gold and below that one of purple the bunches of hair become clubbed at the tips and the green light emerald, when at rest they assume a sphinx-like attitude.

Telea Polyphemus was the next species, which made its appearance within a short time of *Pernyi*, one appearing early on the 26th February, two others at mid-day, and two more on February 28th unfortunately all were males, leaving me only two cocoons, one of which (a female) appeared on the 9th March. I cannot account for the lapse of time between the appearance of the males, and the female as they were in the same situation. This female deposited a few eggs on March 13th ; owing to some mishap the ants got into the cage and killed it. Nine of the eggs proved fertile ; parthenogenesis or agamic reproduction in this species has been known to take place, as Packard's work on the Study of Insects gives an instance, although in so few eggs as I possessed it would be improbable ; though the climate

might in a few instances favour this budding process. In *Bombyx mori* parthenogenesis has been known to occur several times.

Telea Polyphemus is the best wild silk worm of the United States, with a closed cocoon like those of the genus *Antheræa*, of which it has all the characteristics. The silk of *Polyphemus* is white, and in quality it fully equals that of *A. Pernyi*, but the cocoon is generally smaller. It is difficult to obtain the pairing of the moths in captivity, and the best thing to do is to place the cages containing the moths in the open air. *Polyphemus* is very polyphagous (from Catalogue Raisonné of A. Wailly.)

On the 7th March a pair of *Callosamia Promethea* emerged—eggs were laid on the evening of the 8th. A week after another female emerged. They do not seem to pair well in captivity, as the males are extremely lively, and flutter about the cages in their attempts to escape, which seems their only object. This last female laid a number of eggs, which, however, are not fertilized there being no males out at the time. On the 24th another male emerged, after the other female had died. I hope the other cocoons will hatch together and pair, as it is rather tantalizing to have the insects out at odd intervals. None of the pairs emerged, as did the *Pernyi*, together; however there are other cocoons of this species, and they may produce better results. "The cocoon somewhat resembles that of *Cynthia*, but it is smaller, and more elongated; the species altogether is smaller." (Catalogue Raisonné.)

Attacus Cynthia. On the 8th March a single male emerged, and another on the 11th. On the 14th a female emerged, which laid eggs and died without pairing. In order to be successful in getting these moths to pair, the male and female should emerge together or within a short time of one another. Up to the 31st March no others have emerged.

"*Cynthia* moths generally emerge about the end of June, and the eggs hatch at the ordinary temperature about a fortnight after having been laid."

"In hot climates this species become bivoltine and even polyvoltine." (Wailly.)

Resumé of the Insects that have appeared up to date—

(2nd April 1893.)

Of *Pernyi* there were eleven cocoons. All hatched successfully.

Of *Polyphemus*, seven cocoons. Five males hatched and one female. On opening the remaining cocoon I found the thorax of the chrysalis sunken in, and upon cutting it open it was quite hollow with a growth of white fungus.

Attacus Cynthia. Two males and one female emerged. Three cocoons produced one large ichneumon apiece, and about three others, small yellow and black ichneumons, *Conura* sp. near *flaricans* Spin, which came out in numbers about the same time as the appearance of the moths.

Callosamia Promethea. About three males and three females appeared. One or two cocoons produced small yellow and black ichneumons.

There remain about 160 cocoons of *Cynthia* and *Promethea.*

LECHMERE GUPPY, Jnr.

San Fernando,
2nd April, 1893.

The above notes were concluded on the 2nd April and the following additions give an account of my progress since that date: On the 16th April, about 5 weeks and 4 days after hatching, the larvæ of *Antheræa Pernyi* started spinning; between the 16th and 26th April the greater number of them had spun cocoons. This operation generally takes four days. The cocoons seemed to be quite equal in every way, if not superior, to those sent me, which were reared on the oak; this opinion has since been confirmed by Mr. Thomas Wardle, President of the Silk Association of Great Britain and Ireland who writes as follows :—"They seem to be very healthy cocoons and if you can "grow them as good as these you send I should think you might "introduce sericulture in Trinidad, but I was not aware they "would feed on *Terminalia catappa.* It is a Chinese oak feeding worm."

"I enclose a cocoon of the *pernyi* from China on which is a "portion of the oak leaf. The cocoons reel very well. Yours "seem much finer and better and the silk much whiter than the "Chinese *pernyi*—(the above was dated 17th July.) In reply to my letter of the 8th August Mr. Wardle writes: "The moths "have just emerged (last week) from the cocoons you kindly "sent, three of them are quite perfect and beautiful, "the other three were deformed. It is an interesting experi- "ment to have fed them on *Terminalia catappa* successfully. "There is an enormous quantity of this silk used in France now, "coming into Lyons both from China and from India, the "Indian kind being from the *Mylitta*, the Chinese from *Pernyi.* "Could you set up a little industry of *Pernyi* gut for fishing "lines?" An interesting fact Mr. Wardle writes is that "a "Madagascar friend has been reeling spider silk direct from the "abdomen of the spiders very successfully." Mr. Alfred Wailly writes in a letter to me dated 24th July: "Yesterday or day before one male moth *pernyi* emerged—the other which is a

female judging from the size of it is still in pupa." These were sent to him early in June and the moths emerged on 23rd July, those sent to Mr. Wardle on 17th May, produced moths about 24th August, in the first instance the moths emerged about 7 weeks before mine appeared here, which must point to the fact that the heat of the present summer in England is greater than we have had it here of late.

The silk possesses a rich gloss; in quality, strength, fineness of texture, and shade of colour it is all that could be desired, and when it is considered that the larvæ were retarded to a certain extent through my having to experiment with various trees and shrubs to ascertain what they would feed on, during which time they went without a supply of food; my progress since has been very satisfactory. These larvæ seem to have no particular time for spinning; cocoons were started at all hours of the day. Two leaves are made use of between which the cocoon is formed, in many instances simply a leaf folded cylindrically; a few were formed against the sides of the cage in any convenient corner. The weight of four picked cocoons is an ounce.

On the 7th September 1893, rather less than five months after the commencement of the spinning, the first moth emerged, a male, and on the 8th a female. They paired in the evening of the same day, and on the 9th and 10th about 80 eggs were laid. I am expecting the rest of the moths to emerge in a day or two.

On the 13th April a male and female of *Attacus Cynthia* emerged, but did not pair till the 15th, between that date and the 20th April, many moths emerged and paired successfully, a great number of eggs being obtained. On the 25th April, the first batch of eggs hatched, thus taking about 10 days to germinate. On the 30th April they moulted for the first time; they were fed on the *Ricinus Communis*, on which they throve very well; some of them also were fed on *Terminalia catappa*, and I have no doubt that if I had had a greater supply of this almond to feed them on, they would have produced much better results than those fed on the castor oil plant and as I had *Pernyi* and *Cynthia* worms to attend to at the same time I devoted much more time and care to the former, numbers of the latter were carried off by wasps through having too large a mesh of perforated zinc, at first I was unable to account for the disappearance of the worms until by keeping watch I perceived a few small wasps at work of course they could only carry off the very small worms this was put a stop to by using mosquito netting. From experiments made feeding the worms on plants protected by muslin sleeves very good results were obtained the heavy rains not having any bad effect, the leaves of the castor oil plant afford a

very safe retreat the large size of the leaves protect the larvæ from the rush of water.

On the 23rd May, and up to 30th May the greater number spun cocoons, these are not, however, as large as the imported ones. I have been informed that when they are acclimatized much better results may be obtained, it is my intention to rear as many as possible of the second generation on *Terminalia catappa* which produced such splendid results with *Antheræa Pernyi*. No moths have appeared up to the 15th September, 1893.

Callosamia promethea.—Up to the 4th April, no fertile ova were obtained and as stated in my former notes they did not pair easily since then I have obtained much better results on the 4th April, there were several moths out and pairings took place up to 23rd April, numbers of eggs were laid from the 15th April, the larvæ hatched in numbers, and though some of them fed on *Ricinus Communis* they did not thrive well and died off at all stages, a few at the spinning period.

LECHMERE GUPPY, JNR.

San Fernando,
15th Sept., 1893.

COCCIDÆ, OR SCALE INSECTS.

BY T. D A. COCKERELL, F.Z.S., F.E.S., CURATOR OF MUSEUM INSTITUTE OF JAMAICA.

(From the Jamaica Botanical Department Bulletin.)

(Continued.)

METHODS OF DESTROYING THEM.

Excellent methods of destroying scale-insects have been devised by the Entomologists of the U. S. Department of Agriculture, and very full details of their experiments have been published. The most useful remedy for ordinary purposes is the Kerosine Emulsion, made according to the formula originated by

Mr. H. G. Hubbard, and usually recommended by Prof. Riley as follows :—

"Kerosine Oil ... ... 2 gallons = 67 per cent.
Common Soap, or Whale-Oil Soap ½ pound
Water ... ... 1 gallon = 33 per cent.

Dissolve the soap in the water by heating, and add the solution, boiling hot, to the kerosine and churn the mixture by means of a force-pump and spray-nozzle for five minutes. The emulsion, if perfect, forms a cream which thickens on cooling and should adhere without oiliness to the surface of glass. Dilute, before using, one part of the emulsion with nine parts of cold water. The above formula makes 3 gallons of emulsion, and when diluted gives 30 gallons of wash."

This is applied by means of a pump and nozzle, and the more finely it can be sprayed on the better. Many different modifications of both pump and nozzle have been brought into use in the United States, and are discussed by Prof. Riley in Dr. Packard's work on Forest Insects (5th Report U. S. Ent. Commission). The best known nozzle is that called the Riley or Cyclone nozzle ; and a modification of it, the Vermorel nozzle, has proved successful in France. The Nixon or Climax nozzle is also said to be very satisfactory, especially where considerable force is required.

Resin washes have been used extensively in California against scale-insects, as also various compounds of kerosine with reisn, &c. In adopting these methods for Jamaica, it must always be remembered, that some remedies which may serve excellently in temperate regions, at times when there is no fresh foliage on the trees or they are bare of leaves, might be extremely injurious in a tropical country, where there is always a quantity of foliage liable to injury. It appears to be the custom in California to apply the resin washes principally in the late summer and autumn ; and no doubt we might do well in Jamaica, by selecting that time for spraying when the affected tree has fruited, and is undergoing a period of more or less rest. * The extent of this resting period in the tropics varies very much among the different species ; thus, the *Poinciana regia*, as every one in Kingston has the opportunity to observe, has a very distinct interval between the successive flowering periods, while the orange of course exhibits flowers and fruit at once. There can be little doubt I suppose that every species of tree has some period when a wash

* It is to be observed that the condition of the scale-insects, whether old or young, &c., has to be also considered ; this is a matter rather to be dealt with under the head of the several species. Sometimes the empty sacs make a considerable show after the insects have left them, but ot course there would be no use in spraying these !

could be safely applied, which would at another time prove injurious.

Pro. Riley writes (5th Report U. S. Ent. Com., p. 37) regarding the Resin washes :—

"Mr. Koebele had good success with the resin compound prepared as follows : Dissolve 3 pounds of sal-soda and 4 pounds of resin in three pints of water above fire ; when properly dissolved, add water slowly, while boiling, to make 36 pints of compound. A very strong solution of this was used on pear trees without injury to the foliage, the solution consisting of 3 pints of the compound to 4 of water. Numerous successful experiments were made with one part of the compound and 8 parts of water, and this strength for most purposes will be sufficient.

"Mr. Coquillett has found the following to be an excellent formula for the preparation of this compound—

Caustic soda	...	...	...	1 pound
Resin	...	...	...	8 pounds.
Water to make	...	...	...	32 gallons.

" Dissolve by boiling the caustic soda in a gallon of water ; add the resin to one half the soda solution and dissolve it by boiling ; add the remainder of the soda solution and boil over a hot fire, stirring constantly. When sufficiently cooked it will assimilate with water like milk, which it much resembles. Add water and strain through a fine sieve.

"An emulsion of kerosine with resin compound was satisfactorily accomplished by taking equal parts of both substances and working them together for two minutes with a pump. The emulsion is not so stable as the emulsion with soap, but it is eminently effective against scale-insects and aphides. At my suggestion the addition of arsenic in the proportion of 1 pound to from 75 to 300 gallons of the resin, or resin and kerosine wash, was made, and this addition was found to greatly increase the efficiency of these insecticides."

Mr. Coquillett's resin wash has been used on Orange and Lemon trees without causing any injury to foliage or fruit. It proves fatal to a large proportion of the black scales, *(Bernardia oleæ)*, but probably some always survive, making it expedient to apply the remedy more than once. The black scale, however, seems exceptionally hard to exterminate, being well-protected by its structure and very prolific, and the kerosine emulsion is also reported to have failed to destroy it. Mr. Ellwood Cooper, of Santa Barbara, California, applies the kerosine emulsion hot (140°) against the black scale and considers it the best remedy.

The kerosine emulsion is the most convenient for use, but it is found that the resin wash is cheaper. One difficulty with the

resin wash is that the nozzle frequently becomes clogged, but Mr. Coquillett found that this could be almost entirely prevented by first straining the solution through a piece of thin tarlatan cloth.

Another remedy now much used in California against the red scale *(Aspidiotus aurantii)*, is hydrocyanic acid gas. Professor Riley thus describes the process :—"The cyanide is dissolved by boiling in water for a few minutes, using 1 gallon of water for each 5 pounds of cyanide. To generate the gas, sulphuric acid is caused to flow upon the cyanide solution in a fine stream, causing the gas to be rapidly given off in the form of a whitish fog. The moisture is taken up by passing the gas through sulphuric acid, which by reason of water taken up becomes diluted, but may still be employed to generate fresh quantities of gas."

"The gas is confined to the trees under treatment by means of a suitable canvas tent or fumigator, of which a number of styles have been patented. They are constructed so as to be lowered over the tree from above or to inclose it from the sides." It is found that the gas must be dried as above described, as otherwise it is injurious to the foliage of the trees. It is also stated by Mr. Coquillett that the trees are less liable to injury when fumigated at night, than when treated in the day-time. The apparatus has lately been simplified, so that it is possible for a planter to fumigate his orchard at the rate of 30 to 40 trees a night. The ordinary commercial fused potassium cyanide is used in the manufacture of the gas, which, it must be remembered, is highly poisonous.

(To be Continued.)

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Vol. 1. DECEMBER, 1893. **No. 11.**

J'engage donc tous à éviter dans leurs écrits toute personnalité, toute allusion dépassant les limites de la discussion la plus sincère et la plus courtoise.—LABOULBENE

Trinidad Field Naturalists' Club.

NATURA MAXIME MIRANDA IN MINIMIS.

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JOURNAL

OF THE

Field Naturalists' Club.

Vol. I. DECEMBER, 1893. No. II.

It is with regret we have to announce the death of a member of the Trinidad Field Naturalists' Club—the Hon. Henry Fowler, Colonial Secretary, who died at his residence, First East Street, on Nov. 25th, after an illness of some weeks' duration. Mr. Fowler was elected a member of this Club on the 7th of June, 1892, and although he seldom attended its meetings he always expressed himself as being in the fullest sympathy with its work. He presided at the last annual meeting and made a few graceful remarks in reply to the Presidential address. Mr. Fowler is the first member the Club has lost through death.

REPORT OF CLUB MEETINGS.

6th October, 1893.

Present: Mr. H. Caracciolo, President, Lieut.-Colonel Wilson, C.M.G., Dr. Koch, Messrs. Syl. Devenish, M.A., F. Hernandez, W. E. Broadway, S. A. Cumberland, W. G. Hewlett, G. J. Reed, R. R. Mole, F. J. Maingot, Geo. Vahl, T. I. Potter, and F. W. Urich, Hon. Secretary. Messrs. Richardson and Baldamus were present as visitors. The following gentlemen were elected Members of the Club: As Honorary Members, Prof. Dr. Boettger, of Frankfurt on the Main, and D. Morris, Esq., M.A., C.M.G., of Kew; as Town Members, Messrs. Edgar Tripp, J. L. de Montbrun and F. H. Spooner; as Country Members, Mr. Geo. Jos. Kernahan and Dr. F. A. de Verteuil. The President drew attention to the animals recently received from the Taxidermist in London; they were *Mycetes seniculus*, Red Howler, male and female, *Procyon cancrivorus*, Cuv.,

Racoon, 2 *Dasyprocta aguti*, L., Agoutis, *Sciurus aestuans*, L., Squirrel, and *Didelphys marsupialis*, L., Common Manicou. A Report prepared by Mr. Syl. Devenish for the Ordinance for the Protection of Trinidad Wild Birds in the year 1875 was read and contained many interesting facts about the bird skin trade and the habits of some species. The author who was present supplemented it with some amusing anecdotes of occurences which happened in the woods while collecting material for this report. Notes from the Institute of Jamaica by Mr. Tyler Townsend were read and those on Ticks excited much interest. Mr. George Vahl made some remarks about the occurrence of these pests in Trinidad. Mr. Urich said that on a leaf he had sent to Mr. Cockerell, on which he thought there might be scale insects a new fungus was found which Mr. J. B. Ellis proposes to name *Asteridium moniliferum*, Ellis and Everhardt. "It is," wrote Mr. Cockerell, "remarkable for its moniliform sporidia. *Asteri-*
"*dium* is stated by Mr. Ellis to be a subgenus of *Asterina*.
"Species of *Asterina* occur in the tropics on leaves of trees,
"looking like a slight mould. Examined with a glass, they are
"seen to present a rather moss-like growth, on which are the
"more or less gobular perithecia containing the axi, which—in
"turn contain the sporidia. Forty three species of *Asterina*
"are known from North America—but of these several are
"doubtful. Two species have lately been described from
"Jamaica by Ellis and Everhardt—see Jr. Inst, Jamaica 1893
"page 248."—Mr. Potter read a paper entitled "An ascent of Tucuche," made early in the year and Mr. Mole read some notes "On the venom of the coral snake and its effects on other snakes and animals." It was shown that this reptile is more venomous than is generally supposed, but, that fortunately, they are only with difficulty prevailed upon to bite. The two species of coral snakes occuring in Trinidad *viz. Elaps lemniscatus L.* and *E. riisei*, Jan were exhibited.

3rd November.

Present: Mr. H. Caracciolo, President, Sir John Goldney, Prof. Carmody, Messrs Syl. Devenish M.A., W. G. Hewlett, G. J. Reid, W. E. Broadway, F. H. Spooner, C. W. Walker, Edgar Tripp, S. A. Cumberland, T. I. Potter, L. Guppy Jr., F. J. Maingot, R. R. Mole, J. H. Collens, Geo. Vahl and F. W. Urich, Hon. Secretary. Messrs. Hosking, J. L. Morgan, Sucre, G. Guppy, and J. Paget were present as visitors. On the motion of the President, seconded by Sir John Goldney, the Secretary was desired to send a letter of condolence in the name of the Club to Mr. Alfred Taitt, late Hon. Secretary of the Club, in his bereavement by the loss of his father. Mr. T. W. Carr was elected a

Town member of the Club. Sir John Goldney placed on the table "Kirby's Entomology," "Bate's Naturalist on the Amazon," "Wood's Homes without hands" and "Hudson's Naturalists in La Plata" and said that these were the first instalment of the books he had brought from England for the Club's Library, the others would arrive shortly. On the motion of the President a hearty vote of thanks was accorded to Sir John Goldney for his present. The President read the paper which won Sir John Goldney's prize, viz., "An excursion to Fondes Amandes Valley." The paper was illustrated by a number of insects, plants, lizards and birds taken or seen on the excursion and was listened to with great interest. On its conclusion Sir John Goldney rose and said he had enjoyed the paper very much, and never anticipated that the small prize he offered would have produced such good results. He would call the attention of the younger members to the quantity of things that could be collected in a short space of time and he hoped that this paper would encourage others to take up the study of Natural History. The Secretary read a letter from Mr. T. Wardle about some silk worm cocoons forwarded to him by Mr. L. Guppy, jr., who exhibited three cocoons of *Antheraea pernyi*, which were conspicuous by their size and the whiteness of the silk. "Notes from the Institute of Jamaica" by Mr. Tyler Townsend were read. The one relative to fungus *Peronsopora trichotoma* attacking the Tannia ,*Colocasia esculenta* was warmly discussed. The Secretary remarked that at the end of last year Mr. J. Guilbert brought to the notice of the Club a fungus attacking ground provisions, but from want of material it could not be identified.—Some stones, which Mr. F. J. Maingot said were composed of a conglomerate of Iron? which had enclosed a softer substance which had afterwards dried and formed a loose kernel, were shown by the President, who said that they were given him by Mr. Blache Fraser.—The President also placed on the table a young saw fish, *Pristis antiquorum* Latii, which was one of a brood of ten taken out of the mother caught in the Gulf a short time ago, also a stuffed "Houton bird" *Momotus bahamensis* Swain, which it is alleged swallows young cocoa pods, but according to Leotaud lives on insects. Mr. Urich drew attention to the skin taken from a large Crocodile 12ft 10inches long, which had drifted alive from the Orinoco to Port-of-Spain, and said that the Trinidad fauna often received additions of the kind. Not long ago a large Caiman and a huge Anaconda were killed at Cedros on the South Coast both of which undoubtedly had come from the Orinoco. The Secretary drew atttention to a case of insects presented by Mr. A. Lamy and two specimens of Coral snakes from Venezuela presented by Mr. H. J. Baldamus, which he

thought might be *Elaps corallinus*. Mr. Maingot placed on the table two stone axes from Venezuela, which he said were remarkable on account of their size the quality of the stone and the marked contrast they exhibited in the graining. Sir John Goldney made some remarks about these flint implements and the manner they were split in some parts of England, and the similarity of ther shape to the iron ones used by the natives of the remote districts of Singapore. After a vote of thanks to the President the meeting adjourned at 10 p.m.

COCCIDÆ, OR SCALE INSECTS.

By T. D A. Cockerell, F.Z.S., F.E.S., Curator of Museum Institute of Jamaica.

(From the Jamaica Botanical Department Bulletin.)

(*Concluded.*)

Very full accounts of the gas treatment, with figures of the apparatus, will be found in the Reports of the U.S. Department of Agriculture and other works, which may be consulted in the library of the Institute of Jamaica. If any one resident in the country is desirous of using these remedies, and wishes for more complete details, I shall be happy to give any information in my power ; but the essential features of the remedies are given above, and doubtless the exact method of working and kind of apparatus used would have to depend in each case on the available facilities, the kind of plant attacked, and so forth.

I shall be greatly obliged to all those who try these remedies, if they will communicate the result to me, so that it may be published for the benefit of the community. The kerosine emulsion has proved very successful on Orange trees near Kingston, but there has been very little experimenting with these remedies in Jamaica.

Natural Enemies.

Nature has methods for destroying scale-insects which are more effectual than anything which can be accomplished by human means. These consist in other insects preying upon them, either predaceous in the ordinary way, or infesting them as parasites. They may be grouped as follows :—

Hymenoptera.

(1.) Family *Chalcididæ*.—Minute four-winged insects, the larvæ or grubs of which are mostly parasitic within the bodies of insects. They can be at once distinguished from the larger

Ichneumon flies, by their wings, which instead of being covered with a net work of veins, have the venation extremely reduced, the most conspicuous part being a short vein ending in a knob or stigma, which extends from near the middle of the upper edge of each fore-wing. They are often beautifully metallic green or blue. Mr. L. O. Howard remarks (Proc. U. S. Nat. Mus., 1891. p. 571) that hardly a species of scale insect can be found which does not have a formidable parasite among the *Chalcididæ*, of the sub families *Aphelininæ* and *Encyrtinæ*. These interesting and important little parasites can be reared by keeping the scales in a closed box with a glass top, which admits of their easy observation. When scales are examined with a hand-lens, they may very often be seen perforated by small round holes, where the parasites have escaped; and in other cases, the parasite will appear as a dark spot or patch within the body of the Coccid. In such cases, by counting the number of infested, and the number of healthy scales, we may estimate the importance of the parasite.

(2.) Family *Mymaridæ*.—These are similar to the Chalcididæ, but still more minute, and Mr. Howard is of the opinion that many, if not most, of those bred from scale-insects are parasite upon the eggs. Considering the minute size of a Coccid egg, it does indeed seem wonderful that these creatures should be able to undergo their metamorphoses within them! When we examine a Mymarid under the microscope, the antennæ are seen to be somewhat different from those of the Chalcids, and the wings are narrow, especially the hind pair, with very long fringes. A few *Proctotrupidæ* have also been recorded as bred from scale-insects; these are very similar to the *Mymaridæ* but differ in some important structural characters. Many writers class the *Mymaridæ* as a sub family of *Proctotrupidæ*. Of the *Braconidæ*, which have distinctly veined wings, one species (*Lysiphlebus citraphis* Ashmead) has been recorded, (Insect Life, Vol III page 60) as bred from a mealy bug.

Lepidoptera.

The caterpillars of some moths live upon Coccidæ and their eggs. No instance of this sort is yet known in Jamaica, but several have been recorded in the United States, and in Australia the black scale (*Bernardia oleæ*) was observed by Mr. Koebele to be kept well in check by the larva of *Thalpochares coccophaga*.

Neuroptera.

Lace-wing flies (*Chrysopa*), easily recognized by their green colour and four finely reticulated wings, have been found to destroy Coccidæ in the United States and Australia. These flies, of which one species breeds abundantly on the lignum-vitæ in

Kingston, are very delicate and harmless-looking creatures, but their larvæ are extremely voracious and as they live upon injurious insects, they are very useful.

Coleoptera.

The many beetles now recorded as attacking Coccidæ belong almost entirely to the family *Coccinellidæ*, or lady-birds. They are great helps to the gardener, and should be encouraged in every way; their appearance is so well known that there is no occasion to describe them.

Diptera.

Two or three species of true flies have been found to be parasitic on scale-insects; but no instance of this sort has been observed in Jamaica. I have, indeed, bred numbers of a new species of Cecid fly (*Diplosis coccidarum* n. sp.) from scale-insects found in Kingston, but I believe that this breeds merely in the secretions and old skins of the Coccids, being thus a guest or inquiline, rather than a parasite.

Hemiptera.

A few species of true-plant bugs are known to prey upon Coccidæ.

Arachnida.

Some species of mites have been found to destroy Coccids. In Jamaica, small mites are frequently found associated with scale-insects, but I have not ascertained that they do them any injury.*

How Coccidæ are spread by human means.

The injuries due to Coccidæ have probably been much more than doubled by the way they have been carried from one country to another on plants. It is a well-known fact that many species of animals and plants thrive more in foreign countries than in their native land; and the reason of this is, that they are, through the change of locality, removed from most of their natural enemies and competitors. The fluted scale, *Icerya purchasi*, is a well-known example. When introduced into California from Australia, it multiplied enormously, and became a far more serious pest than it had been considered in its native country. It was, indeed, attacked in its new home by a few insects, but they were quite insufficient to keep it in check. Mr. Koebele went to Australia to look for the natural enemies of the fluted scale, and found the scale itself quite rare there, being attacked by very important enemies, some of which he brought

* Certain fungi are found on dead scale insects; such as *Microcera coccophila*, Mont; found by the writer associated with *Aspidiotus articulatus* on *Citrus* at Moneague.

alive to California. These were liberated in the infested districts, and one especially, the lady-bird *Vedalia cardinalis*, proved extremely effective, so that the *Icerya*-pests was speedily reduced, and the despair of the fruit-growers gave way to hope as the equilibrium of nature began to be restored.

Mr. R. Allan Wight has written a graphic account of the *Icerya* and *Vedalia* in an Australian paper, the "Garden and Field," which has lately been reproduced in "Insect Life." In New Zealand the *Icerya* is sometimes a great pest, and Mr. Wight gives the following description of the way it is cleared off by the beetle ;—

"Some two years ago everything seemed white around Auckland with the clustering *Icerya*, a great many orange and lemon trees (including one entire lemon orchard), were dead, and the prospect was as gloomy as could be, till *Vedalia* (which had been accidentally imported from Australia) appeared on the scene. Astonishing as it may seem to be, and incredible, within one year hardly any of the scales were left, and the lady-birds had also disappeared. The little beetles are rank cannibals when pressed by hunger, and as no one was able to discover any other food but *Icerya* upon which they will feed, it was feared that, in the absence of *Icerya*, they would become extinct."

If scale-insects, when taken to new countries, were only as injurious as in their native homes, there would be strong enough reasons for not importing them ; but when we see that being freed from their enemies, they may increase to a much greater extent, the necessity for preventing their introduction becomes a very pressing one. The ease with which scale insects may be carried from one part of the world to another is well known. Some of the most interesting scales described in late years have been found on foreign plants in hot-houses in England, where they must have been carried from the tropics. In the West Indies, we have two mango scales, the *Vinsonia* and *Lecanium mangiferæ*, which doubtless reached us on plants from the East Indies ; while quite recently, a New Zealand species, *Chionaspis minor* of Maskell, has been found commonly in Kingston. Various species of European origin have spread widely in the United States, and while some of them, as the black scale *(Bernardia oleæ)*, are now abundant in Jamaica, there are others which do not seem to have reached this Island,—and it may be hoped, will never be allowed to do so.

One of the destructive scales found in other West Indian islands, and in the United States, but not apparently as yet in Jamaica, is *Chionaspis citri*, which affects the orange. The following account of its introduction into Bermuda is from a report by U.S. Vice Consul J. B. Heyl, of that island :—

"This island was clear of insect pests until some time in 1858 or 1859, when a vessel was brought here in distress, with a cargo of oranges, which were sold at auction, and the fruit was carried all over the island, and in a few months our flourishing trees were covered with an insect which gave the trees the appearance of being whitewashed. This insect fed on the bark of the tree, extracting the yellow sap therefrom and causing the bark to curl up. Every device thought of was tried, but the island was soon cleared of nearly every tree. All this came from the distress cargo."

When we import a useful plant from another country, it is almost sure to be attacked by some of our own insects, and if at the same time we import its natural enemies, and these increase abnormally as described above, it is easy to see that we are placed in a position of great disadvantage, so much so, that even though soil and climate are favourable, we cannot hope to cultivate the new plant so successfully as it was cultivated in its own country.

But, on the other hand, if we introduce any plant and *exclude* its natural enemies, it will almost certainly not be attacked so severely here as it was where it came from, and we are in consequence, placed in a more favourable position for cultivating it (always assuming a suitable soil and climate) than those who raised it in its native country. The more the plant in question differs from any of our native plants, the more is this likely to be the case, because there are less likely to be insects here ready to attack it.

It is not proposed in the present article to discuss the measures which should be taken to prevent the introduction of pests ; whether there should be a government quarantine, or the matter should be left to the public spirit and good sense of private individuals. It would undoubtedly be a matter involving a certain amount of trouble and expense, to inspect all imported plants and rid them of insects, but when it is considered that a few shillings thus spent to-day, may save us from a pest which would cause the loss of perhaps hundreds of pounds annually for an indefinite number of years, the subject appears to deserve serious consideration. No doubt, as in the case of human maladies, there will be an occasional leaping of the bounds in spite of much care, but that is no reason for utter recklessness.

Importing the Enemies of Coccidæ.

As a general principle, it is extremely unwise to disturb the balance of nature. The importation of new animals, whether mammals, insects, or what not, is a risky business, very generally attended with unfortunate results, as we in Jamaica have excellent reason to know. But when we have already upset

nature's arrangements by introducing foreign Coccidæ without their enemies, the best remedy is to search out those enemies, and introduce them too, as in the case of the *Vedalia*. Even in such a case, however, care is needed, to ascertain very exactly the habits of the enemy we are importing. It was true enough that the mongoose fed on rats, but it also feeds on poultry and wild birds. The European sparrow, taken to America, has no doubt *some* virtues, but if the introducers of that bird had had a proper knowledge of its habits, they would have been horrified at the idea of inflicting so serious an injury on their country as has resulted from their actions.

Fortunately, however, there are some enemies, including all those really important in connection with Coccidæ, which we can import with perfect impunity, as their habits are well-known, and there is no reasonable possibility of their proving injurious. Such are the lady-birds, and the parasitic *Chalcididæ* and *Mymaridæ*. If we had an extensive Cochineal industry at some future time, it is possible that *some* of these enemies might attack the dye-producing insect so as to interfere with the value and amount of the product, but there seems no likelihood of such an event, and even were it to so happen, the saving to other crops would much more than counterbalance the loss in this direction.

The present writer has lately made some studies of the fauna of Jamaica, the results of which when more complete, will appear elsewhere. The general conclusions arrived at are, that we have two distinct faunæ in this Island; one, very ancient and dating back to the time of connection with the continent; the other, of more recent origin, consisting of species which have reached us from over the sea. The former contains few species, and these highly peculiar,—often representing genera now found nowhere-else. The latter includes species either identical with, or very closely allied to, those found elsewhere. In that grand genus of butterflies known as *Papilio*, *P. homerus* and *P. thersites* belong to the old fauna, and *P. polycrates* and *P. thoas* to the recent.

The majority, at least, of the destructive Coccidæ in Jamaica are allied to or identical with species found elsewhere, and consequently they must be classed with the recent fauna which has come over sea—in this case no doubt in ships.

The importance of this appears when we consider that if the parasites of the Coccidæ have not been imported with them there will be nothing ready to attack them here. In the United States, if you import a *Lecanium* or an *Aspidiotus*, there is almost sure to be a parasite of an allied native scale that will attack it; but in a case where there are *no* allied native scales, there will probably be no available native parasites. Such Chalcids, &c. as belong to our ancient fauna, probably will not attack intro-

duced Coccidæ to any great extent; while we are not likely to have any suitable recent fauna parasites until after the advent of the scales, since if by chance a Chalcid come to us over sea, it would find nothing in which to propagate its species.

Some of our imported scales, as will be explained in detail when the species are discussed, are infested by parasites. For example *Mytilaspis citricola*, an injurious orange scale, is infested both in Jamaica and Antigua. But so far as I have been able to observe, the Jamaica Coccidæ have few enemies, and to this, in large part, is probably to be attributed their great abundance. It is hoped, at some future time, to introduce some of the Coccid-enemies that are likely to be useful, but of this more hereafter. Prof. C. V. Riley, who is more competent than anyone else to judge of such a matter writes (March 25, 1892): "I think it would an easy matter for you to import the parasites of any particular scale which may be common to Jamaica and this country and I will gladly help you when opportunity offers."

How to send Scale-insects by Post.

Later on, it is proposed to treat with the various species separately and in detail. In the meanwhile, the writer will be very glad to receive Scale-insects from any part of Trinidad or the West Indies. They are as a rule extremely easy to collect: all that is necessary is to cut off some of the infested leaves or twigs, and put them in an envelope, writing on the outside the name of the plant, the estimated severity of the attack, the locality, and the name of the collector. Such envelopes may be enclosed in a larger one, and sent by post in the ordinary way. Species that are soft, or liable to be damaged, can be sent inside a small joint of bamboo, or any convenient receptacle. It is better not to put the specimens in any air-tight box, especially if the leaves are fresh, as they are liable to rot.

[Any specimens sent will be duly acknowledged and identified, and proper credit given in publication. They should be addressed to Mr. T. D. A. Cockerell, Las Cruces, New Mexico, U.S.A., or to Mr. F. W. Urich, Trinidad, British West Indies.]

DETERMINATION OF A TRINIDAD TICK.

Some specimens of ticks collected at Mayaro, East Coast, as well as some others taken from snakes from different districts of the Island were submitted to Dr George Marx of Washington who kindly determined them as *Ambylomma mixtum*, C. Koch.

According to Dr. Marx this species is found in Yucatan, Mexico, Pernambuco and Honduras. Mr. Tyler Townsend records this species from St. Davids, Jamaica where it was found on a horse. The Mayaro specimens were taken from horses, cows and dogs and are great pests in that district. The young of this tick infests guinea grass and low shrubs in large numbers, and I have often been covered with them in going through infested patches. If they are not noticed at once and the clothes not changed they attach themselves to the skin and are very irritating. The best way to get rid of them is to rub the body with coconut oil. They are commonly called "carapattes" in the country.

Dr. Marx is desirous of more material, and I shall be very glad to receive specimens from all localities in Trinidad, with full information as to the animals on which they are found. All specimens will be duly acknowledged.

F. W. Urich.

27th Nov., 1893.

CLUB PAPERS.

A QUANK "HUNT."

[For interesting notes by Mr. T. W. Carr, (father of the writer) explanatory of some of the terms used in this paper the reader is requested to refer at each interpolated letter to the end of the paper.]

Having been called upon in April 1891, by a few pleasure-seeking friends, who had come from Town with a burning desire for a hunt (*a*) in the virgin forest of Caparo (*b*), I willingly promised to initiate them into the mysteries of the woods—with what amount of success will presently appear.

The next day was fixed upon; when preparatory to starting we set about to see that our hunting implements, to wit: guns, hunting knives (*c*), cutlasses (*d*), lances (*e*), a coffee-digger (*f*), and an axe, were ready. We then saw to that other important factor,—our provisions for the day, which consisted of roasted game and bread, and the amateur chasseur's indispensable recuperative, a flask of whisky, an item which our old professional "hunters" have learnt to do without. These people, one of whom made the fifth of our party, are in some cases, small peasant proprietors, generally descendants of that valuable pioneer class of the early part of the century, the Venezuelan peons (*g*). Their habit of life is to work one half of the week, and hunt and rest the remainder. Our hunting pack comprised nine native curs, all trained in Quank (*h*) and Lappe (*i*) hunting. Starting at 7

a.m., under a clear and cloudless sky, we wended our way through a few beautiful young Cacao cultivations, over which stood the bright scarlet tops of the Immortel tree *(j)*, then in full bloom, and in a few minutes were in the forest. Here and there huge Silk-cottons *(k)*, Cedars *(l)*, Figuiers *(m)* and Balatas *(n)* were seen, and palms from four feet to 150 feet high, while ferns of many kinds made themselves conspicuous by the incessant vibration of their tender and graceful leaves. The heads of the taller palms could only be seen, however, from the tops of hills, rising over the wavy, oft liane-crested forest. The ferns, among which we noticed the beautiful silver-fern *(o)*, are invariably found by water and abound in the ravines. The vanilla *(p)*, whose thick and fleshy vines peculiarly affect the ridges of poor hills, climbing to the tops of their hardwood trees, where they expand in liane-like festoons, from which in the season, as now, pend scores of pods, richly fragrant when ripe. The thousand lilies *(q)*, whose dark green leaves line the banks of the slow-running streams, the various rich-coloured orchids *(r)* hanging from the branches of their majestic supporters; the graceful form of a harmless cribo *(s)* snake, *Spilotes corais*, wending its way in search of its prey; the sudden bound of a startled deer *(t)*; the "roar" (not howl) tailing off with a grunt (equally loud in its earlier and lower notes) of the red monkey, a *Mycetes*–Araguato of our spanish *peonaje*–to be heard for miles around; the pranks of the timid agouti—*Dasyprocta isthmica*, *D. aguti* Linn, over his meal of balata fruit—by the way, the choicest delicacy of the woods for man and beast; the soft musical sounds made by the rippling water of an occasional creek; the incessant prattle of tiny stream frogs; the raucous note of a tree-frog thrown in; and last, but not least, the chirping and warbling of the numerous gorgeous members of the feathered tribe *(u)*, the beauty and dazzle of whose plumage are somewhat lost in the gloom so characteristic of the tropical forest, amply repay the sportsman (*qua* naturalist) for the toil, exposure, and deprivations of the day.

After an uneventful hour's ramble over a succession of hills and valleys, my attention was attracted by something on the ground near me, and on looking closer I found we had happily come upon a freshly-beaten Quank track. All other thoughts, save of meeting face to face this little terror, vanished, and we made ready for what we expected would be an exciting and possibly a satisfactory chase. The dogs by this time, had found the track, caught the scent, and were making their way towards us with upraised hair, noses to the ground, and tails beating with great excitement. After a few moments, as if an exchange of signs had been made between them, they, one and all, dashed off, and in a short while their yelping, though harsh and discordant,

made lively music. We were no less excited ourselves, each hurrying off, cutting his own way through vines *(v)*, prickly palms (*w*), undergrowth, and other obstacles, hoping to be first on the scene of the terrible fight which is sure to take place when the prey is brought to bay. The pursuit was vigorously kept up for fully an hour, when the hoped for goal was reached, and it was found that the object of our chase had taken refuge within the hollow trunk of a gigantic balata tree, lying prostrate a stately wreck, probably for over two generations. Within about fifteen minutes after the arrival of the first, the remainder of the party came up. Stopping both ends of the trunk with fallen branches, we sat down and rested for ten minutes to recover breath and relieve our jaded muscles, considering the safest and easiest way to capture our prisoner. After this short rest, we began operations with the sharp-edged axe on this dead but hardshelled giant of the forest, and worked incessantly for about an hour before we reached the now maddened creature, the chattering of whose tusks bespoke danger and warned us to be careful. A wide enough entrance having been hewn, I asked to be allowed to shoot, as the uninitiated would surely make mischief. This request was quickly granted, when at the report of my shot and to our pleasant surprise, two more frightened members of the same band, who thought discretion the better part of valour, jumped right amongst us from the opening we had effected and made clear their way before the remainder of the party had time to snatch up their guns. After a short run, however, they were brought to bay by four of the dogs while the remaining five stood guarding the dead quank. This, I may say *en passant*, is a habit of our hunting-dogs; they are so trained, with the object of keeping off a certain class of hunters or 'sneak thieves' (Amer.) I should rather call them, who follow noiselessly upon the heels of the unsuspecting hunter with the view of "annexing" his game if left unguarded. These faithful animals can be relied upon, as they bark furiously at the approach of a stranger, and the hunter whose practised ear seldom fails to recognise the thousand and one sounds peculiar to the forest, including the bark peculiar to each of his dogs, hurries towards his faithful guards to find that the intruder has either used his better judgment and moved off as fast as his locomotive powers would allow, or is standing surrounded by his anything but pleasant companions, whose furious barking and threatening attitude make matters very uncomfortable for him. Should one of these rascals be caught, he is dealt with summarily, and taught a lesson that he does not readily forget. To continue, we quickly followed, and witnessed one of the most determined fights between beast and beast. Here were two full-grown quanks, foaming with rage, their backs against the trunk

of a large tree, faced by the four dogs, who kept up a continuous barking and snapping at them. This was kept up for a minute or two, when the angered rovers of the woods put a stop to this truculent intrusion by frightfully mutilating with their tusks two of their annoyers. The wailing and groaning of these poor animals was pitiful to hear; but nothing could be done to them before the quanks were killed. After seeing that the remaining dogs were not in our way, two shots were simultaneously fired, both taking effect and bringing to the ground these daring little animals. Upon a close examination of their skins it was found that they too, had had their share of bites, though with the difference, that their's were mere skin-bruises, while the dogs' were deep flesh-wounds. Of all the wild animals of the Trinidad forest, the quank is the most savage and pugnacious. They are known, after having killed their common enemy, to sit on their haunches tearing him into strands. In defending themselves, they sometimes rush at and chase the dogs for fifty yards or more.

Exciting and not free from danger, as the foregoing might seem to the reader, there was, however, another incident which assumed a far more fearful aspect. It was an encounter with the dreaded mapepire (*Lachesis mutus*) which had inhabited or was asleep in the hollow of the balata tree in which the quanks had taken refuge, and as an instance of the sluggishness of this snake, if not—as O'Reilly says—of the insensibility of ophidians to sound, I can aver that notwithstanding the noise occasioned by the barking of the dogs, chopping of the log, and report of the gun, his snakeship had not been in the least disturbed until one of the most daring of the dogs that had, on our return to this, the scene of our first "kill," gone into the hollowed trunk rummaging in quest of further possible game, indecorously seized and dragged into the open this terrible animal. On realizing however, what was the nature of this fresh find, the dog immediately relaxed its grip, thereby allowing its enemy a clear fighting field. The snake now attacked by the half-dozen unwounded dogs, darted its ugly, triangular head as quick as lightning, first at one dog and then at another, sometimes missing but sometimes striking the infuriated animals, and before we could get near enough to kill this death-dealing brute, it had bitten four dogs, one dying almost immediately and another within fifteen minutes. These two unfortunate creatures would not permit us to attend to their wounds; they ran off, howling piteously, succumbing to the effects of the venom in the short time mentioned; but the other two, one bitten on the neck and the other on the paw, were promptly attended to, and got well after a few days, The remedy used was a tincture I carried, prepared from roots, barks and seeds, and is a pleasant, though strong balsamic bitter. The two sick patients, though

conscious, were unable to walk and had to be carried home in *guayares*, an extemporised basket-like Indian palm-leaf and liane knapsack, (*x*) which is suspended from the shoulders, by means of two straps, lies flat to the back, can be made to receive seventy to eighty pounds weight, and is by far the most convenient contrivance for the carrying of a load through the woods, or up an ascent, as it allows the free use of hands and arms, and is entirely without pressure on the breast. The snake was killed by the blows of a long green stick, cut for the purpose, as shooting among the dogs was hazardous. This crotalid, a fairly large one, measured 7 feet 10 inches long by 3 inches through the thickest part of the belly. After skinning it and removing the fangs (*y*) from their death-chamber in the upper gum (these to be kept as trophies), we sat down and partook of our well-earned refreshments. The first to rise was the old hunter, who, by the way, declared that never during his long experience, had he, in a single hunt, witnessed such a large proportion of disaster among his dogs. Of our pack of nine, two of the best were killed, four wounded, and only the remaining three free from hurt. When ready to start, we, one and all, shouldered our guayares (or wayas), one carrying a dog, another a quank, and so on, and made tracks for home. The amateurs found chasing much pleasanter than carrying, and our journey back, which should have been accomplished in three hours, lasted fully four. We reached home thoroughly exhausted, and rested the rest of the weary, after a most exciting if not unqualifiedly enjoyable day.

1st. Sept. 1893. ALBERT B. CARR.

(*a.*) *Hunt.* Sporting—by gun or otherwise—in the woods, hills, plains or marshes of Trinidad, necessarily undertaken afoot in the Island always—among high and low alike - goes by this term; in Creole *la chasse*, and the hunter *chasseur*.

(*b.*) *Caparo.* Middle Caparo (in which the hunt here written of took place) is a sub district called after the valley and river of this name. The Caparo is the only considerable stream draining the Northern face of the Montserrat range. A large area about its upper reaches is yet unalienated, in wild forest, practically unexplored, and the N.E. saddles, giving access to Tamana and the shortest practicable route through the hollows of that range to the Upper Nariva and Ortoire country *en route* to Mayaro, is unmapped and unknown.

(*c.*) *The Trinidad hunting knife* is ordinarily an old cutlass, worn or broken down to a total length of a couple of feet, seven inches being taken up by the corded handle. The blade has been narrowed and ground down to a long point, both edges sharpened; in fact it has been converted into a great dagger or poniard.

(*d.*) *Cutlass.* The common field implement of the Trinidad and Spanish Main labourer, whether for chopping Canes, trimming Cacao trees, cutting grass for stock, slicing one's way in the forest through bush-ropes or the small vines, cutting rastro (*ratrajo* or ruinate), brushing beneath grown

Cacao, chopping branchwood for faggots or fuel, &c., without which light and handy implement no one here would think of entering the forest or any bush land. It is in the form of a broad bladed sword without guard, plain wooden handle rivetted with a slightly recurved acuminate point, scabbardless and is sold by the importing ironmongers at from 18c. to 40c. each.

(*e.*) *Lance.* The usual lance of the Trinidad bush-hunter, the most effective known to him, than which he wishes no better, is the bayonet of an old Brown Bess mounted on a straight five feet pole of tough hard wood, cut in the forest, and shaped and fitted at leisure in his Ajoupa or cabin home.

(*f.*) *Coffee-Digger.*. This straight, narrow, strong, flat-bladed implement (*luchette* in patois, *chucuara* of the 'panyoles) made originally perhaps in England for drain-cutting, is employed here for digging coffee-holes and for transplanting young coffee, loosening and lifting the plant with a ball of earth attached as much as possible with unexposed or unbroken roots. This grubbing spade is always taken by the hunter who hopes to meet a lapp or tatou (armadillo or hog-in-armour of the 17-18 century planters). With it he digs down to the game in the tunnel he has burrowed and retreated into. When the back of the animal is exposed to view, the digger is thrown aside to give the *coup de grace* to the poor beast by the lance (the old bayonet); then the hole is widened to draw it to grass.

(*g.*) *Peon.* A very useful class of men, who entered the colony from the western side of the Gulf in considerable numbers during the desperate struggle for independence from the hated rule of Spain by the Creoles of Venezuela in the early part of the century. They appear to have settled largely in the Quarter of Couva, spreading gradually North, South, and East into Montserrat. Being good woodmen, they were much employed by the proprietors of that day in throwing down forest and opening land for new estates. Squatting in the wild and neglected backlands, they carved out conucoes in the woods, growing roots, corn and plantains for daily provision, and cacao for a permanent crop. They, I should now rather say the descendents of the original peons, are unequalled in the speed and neatness with which they underbrush and establish a cacao-piece. The peonaje of the main are descended from Indian (aboriginal) mothers by fathers of the early Spaniards.

(*h.*) *Quank. Dicotyles Tajacu*, or Collared Peccary of naturalists, called here (to distinguish it from *D. labiatus* Cuv. or White lipped Peccary of literature, the 'Small Red Quank' of our swamps); the 'Big Gray Quank' (Cuenco) being gray all over, collar included.

(*i.*) *Lapp.* (Labba of Demerara) *Cælogenys Paca L.* In general estimation, the best mammal flesh in the Island. Still abundant in many parts of the Island, disappearing by degrees in the settled Wards.

(*j.*) *The Immortel* (more commonly shortened to 'Mortel) Tree. Two species are used by the Trinidad planter, to shade the delicate cacao-tree: the Anauco (*Erythrina velutina* Willd.) the tall clean stemmed tree with a small head of branches high above the tops of the cacao and the low branching Bucaré (*Erythrina umbrosa L.*) which shades the tender cacao much better in its early years, but gives much trouble in trimming to reduce the shade when too umbrageous, done also to avoid the need there would otherwise be to remove the lower branches when they had grown so large and heavy that their fall at that stage could not be effected without breaking the cacao branches beneath them. Yet despite the increased labour and and cost, many planters in low grounds prefer the bucaré to the anauco. In character and appearance of wood and seed, these two species differ but little from each other to the common eye.

(*k.*) *Silk Cotton tree. Eriodendron anfractuosum* D.C. An immense tree

es intended for the Club
the Honorary Secretary,
B.W.I.

Annual Subscription, 3/.
1894. **No. 12.**

eurs écrits toute personnalité,
es de la discussion la plus
OULBÈNE

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rt-of-Spain

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Communications and Exchanges intended for the Club should be addressed to the Honorary Secretary, Port-of-Spain, Trinidad, B.W.I.

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J'engage donc tous à éviter dans leurs écrits toute personnalité, toute allusion dépassant les limites de la discussion la plus sincère et la plus courtoise.—LABOULBÈNE

Trinidad Field Naturalists' Club.

NATURA MAXIME MIRANDA IN MINIMIS.

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"MIRROR" Office, Port-of-Spain.

☞ All Communications and Exchanges intended for the Club should be addressed to the Honorary Secretary, Port-of-Spain, Trinidad, B.W.I.

JOURNAL

OF THE

Field Naturalists' Club.

Vol. I. FEBRUARY, 1894. No. 12.

REPORT OF CLUB MEETINGS.

6th December, 1893.

This meeting was the first of the Ladies' Evenings the Club proposes to hold every six months. It was somewhat of the nature of a Conversazione. His Excellency the Governor, Sir F. Napier Broome, K.C.M.G. and Lady Broome, Colonel Man and a large number of Ladies honoured the Club with their presence. The President briefly welcomed the guests and in the name of the Club thanked them for their kindness in gracing the proceedings. Mr. F. W. Urich, Hon. Secretary, read a paper on "Our persecuted Friends and cherished Enemies." The paper was apparently much appreciated and His Excellency proposed a vote of thanks to Mr. Urich, which was unanimously carried. The evening's pleasure was greatly enhanced by the singing of Mrs. Miller, Messrs F. J. Maingot and Woolward and some choruses by the Officers of the German warship *Stosch*. Amongst the many exhibits contributed by the members the subjoined deserve special mention: Mr. Caracciolo, a fine collection of bats and drawings of Insects; Mr. Potter a large nest of bees; Mr. Broadway, two cases of Trinidad insects and microscopical slides of insects; Mr. R. J. L. Guppy a fine collection of Trinidad foraminifera which he exhibited under the microscope.

5th January, 1894.

Present: Mr. H. Caracciolo, President, Sir John Goldney, Dr. Rake, Professor Carmody, Messrs. Syl. Devenish, M.A., Edgar

Agostini, T. I. Potter, John Hoadley, R. R. Mole, W. E. Broadway, C. W. Scott and F. W. Urich, Hon. Secretary and Treasurer. Mr. Lyon (London) was present as a visitor. The following gentlemen were elected: Mr. John Terry, F.R.G.S., &c. (London), corresponding member; Messrs G. Creagh-Creagh, Aucher Warner, B.A., M. Harding-Finlayson, R. H. S. Smith, W. S. Tucker, H. J. Baldamus, and Dr. C. F. Knox, Town Members. Dr. J. W. Eakin and Mr. Alex. S. Laing, both of San Fernando, Country Members. Mr. Mole read an account of an excursion in the St. Ann's Valley and illustrated it by a number of the specimens taken on the occasion. Letters were read from Professor Dr. O. Boettger, Hon. Member, (Frankfürt-on-the-Main), thanking the Club for his election and congratulating it on its success, and enclosing his portrait for the Club Album; and from Mr. H. F. Wilson, Hon. Member, accompanied by a list of butterflies and moths collected during his stay in Trinidad, many of which had not previously been recorded from the Island. In this letter Mr. Wilson mentioned that a fine centipede, *Scolopendra prasina* from Trinidad was taken to England alive and lived several days at the British Museum during July, 1892. The following extract from a letter of Mr. W. F. Kirby, British Museum, to Mr. Wilson with reference to the *Siderone marthesia*, Cramer, was read, and the attention of members is called to it: "I may also tell you that there are specimens of *Siderone* "*marthesia*, Cramer, from Trinidad in the Dublin Museum, a "handsome black and red butterfly, which I have not seen from "Trinidad in any other collection, and of which specimens are "particularly required for the Museum here. Cramer figures "the female, which is tawny where the male is scarlet, and I "enclose you a tracing* of his figure. I expect it is a forest "insect, with probably a strong and perhaps rather lofty flight."

The President placed on the table an interesting head ornament made by the Indians of the Upper Amazon from the elytra of *buprestide* beetles which had been presented to the Club by Mr. St. Vraz, Hon. Member. Notes from the Jamaica Institute Museum were read by the Hon. Secretary, Mr. Urich, as well as Circular Note No. 4, issued by Mr. J. H. Hart, F.L.S., of the Botanical Department of Trinidad. With reference to the latter Mr. Urich said it contained some inaccuracies. The creatures known in Trinidad as two-headed snakes living in Parasol ants nests were in reality lizards and belonged to the genus *Amphisbæna* and were represented by two species, *A. alba* (L) & *A. fuliginosa* L. The *Typhlops* mentioned by Mr. Hart was T.

* This tracing as well as a colored drawing of the butterfly can be seen on application to the Hon. Secretary.

reticulatus, L which might sometimes be found in ants' nests, but it was not, owing to its small size, such an important enemy to the ants as the *Amphisbænæ*. The larvæ of the *Tipula*, Daddy Longlegs or Cranefflies, were not known in England as "Wire-worms" but as "Leather Jackets." The Wire-worms were the larvæ of the beetles known as "Skip-Jacks" or "Click beetles," from their power of regaining their legs, when laid on their backs, by a spring or skip, accompanied by a sharp click. They belonged to the *Elateridæ*, and in Trinidad many species of this genus occurred and were known as candleflies from the light they emit at night.

Sir John Goldney presented the Club with a second instalment of books, viz., six volumes of Cassell's Natural History (New Edition) and Beale "On the Microscope."

Dr. Rake presented the Library with three numbers of the Transactions of the Bombay Natural History Society. The Meeting adjourned at 9.30. The additions to the collection during the month of December were a fine specimen of Hercules beetle presented by Rev. E. F. Tree, Couva, and two large centipedes, *Scolopendra* sp. from Monos presented by Mr. J. de La Sauvagère.

CLUB PAPERS.

NOTES ON A SOUTH AMERICAN DIAMOND RATTLE SNAKE—(*CROTALUS HORRIDUS*, Linn).

[The subject of these notes was exhibited during their reading but refused to either rattle or feed while under the observation of the Club.]

The Rattler before you was brought from Venezuela by Mr. C. W. Scott about the middle of last February. He was confined in a small bottle with several cockroaches and covered with a piece of cloth. Mr. Scott kindly gave him to Mr. Mole, who, after keeping him a few days, gave him to me in board and lodging. At that time he was of a little lighter colour than he is now and the different markings were not as clear as they are at present. His length was about 10 inches and thickness of body about half an inch. As you see he is now more than twice that size. His rattle is perfect, *i.e.*, he has the first ring, or original button, as it is called by Mr. Quelch of the Demerara Museum, and two other segments.

This snake belongs to the family of *Crotalidæ*, or Pit-vipers, *i.e.* those vipers, which, like the Rattler before you, have a pit

between the eye and nostril—to which our "Mapepire Z'anana" (*Lachesis muta*) and "Mapepire Balsain" (*Bothrops atrox*) also belong. The most curious thing about a rattle snake is the appendage to its tail. "This appendage," as Mr. Quelch says, "consists not of a series of rings, as is popularly supposed, but of several hollow, three lobed pieces, packed into one another in such a manner that the anterior large lobe of each piece covers the two smaller lobes of the piece in front it." All the members of this family are very venomous.

After having thus told you to what family our Rattler belongs I shall now give you some of his personal history. He is generally coiled up in one corner of his box, but not always as you see him now, for he is now on the *qui vive* and is nervous at seeing so much movement about him. When he is alone and quiet he assumes his "comfortable" position, as I call it; *i.e.* he coils in larger circles and relaxes all the muscles of his body in such a way that he becomes quite flat; but, unless he is about to change his skin, and in consequence does not see very well, or is not approached with precaution, it is rare I catch him in this position as he is very sharp and at once lets me know I am seen by the sharp whirring noise he makes with his rattle, which he keeps up as long as I move about the room. His appetite I am glad to say is good, for he eats well. His diet consist of mice and half grown rats which he kills by means of his venom. When I first had him he would not feed before me, but now he is getting more civilized and does not mind if there are spectators. At the same time he never loses sight of them. All the mice and rats that I have seen him kill survived his bite from a few seconds to 3 minutes. Mice he usually holds in his mouth until they are dead and then swallows them. On one occasion he tried to do this with a rat, but the animal being too strong for him got away from his hold, but the deadly venom soon laid him a corpse. Since I have had him he has eaten 47 mice and three half grown rats. He has changed his skin four times viz; on the 11th March, 13th April, 21st May, and 13th July, as you see every month. At each changing of his skin he adds a segment to his rattle, so that he now has seven segments coming under my observation with three. It is therefore quite a mistake to say as many works on Natural History do say, that the number of rings in the rattle correspond with the age of the snake, generally understood in years, though it might be taken as a criterion of its age in months, but a most uncertain one, as the rattle constantly meets with accidents. Up to now the segments have gradually increased in size, a sign that the snake has been well fed, for, if it were the reverse the rattles would decrease in size, an indication that the growth of the rattle depends on the amount of food

taken. This observation confirms Mr. Quelch's opinion *vide Timehri* (Vol. V., Part I., June 1891). During movement the snake always carefully holds his rattle up away from the floor of his box.

2nd September, 1892. F. W. Urich.

Some time having elapsed since the above notes were read at the Club our Secretary has asked me to supplement it with a few of my observations on this interesting reptile. Prior to his being confided to Mr. Urich's care, and about two days after I received him from Mr. Scott, I gave him a mouse which he killed instanter. I was absent for three or four hours and when I returned I found he had not swallowed the mouse and that a large number of ants (*Camponotus atriceps*, Smith) the species referred to by Mr. Hart as having killed a tree boa at the Gardens some time ago, had got into the cage, and in addition to attacking the dead mouse, had commenced operations on the living rattle snake. It was a remarkable sight to see this deadly reptile which could kill a well-nourished healthy man in about four or five hours, being worried to death by a few scores of tiny ants. The operation of taking him out of his perilous position was a delicate one, as it had to be performed on a dark, windy night, in an open yard, with a flickering light, which might at any instant be blown out, but the snake was considerate enough to know I meant him no harm, and like the sensible beast he always is, crawled out of one box into another in the quietest manner possible. My experience of rattlesnakes is confined to this specimen, but if they are all of as sweet a temper as he, I consider them most affable creatures and not at all vicious. Subsequent to the reading of Mr. Urich's paper I saw this snake kill and devour a three-quarter grown rat which had half murdered two strong and healthy young *Epicrates cenchris* which habitually live on these rodents, but for some reason or other were just then off their "feed." On the 13th April, 1893, Mr. Urich sent "Rattles" to me, and the following are some of the notes I have made upon him up to the present time. He has continued to grow and has cast his coat on several occasions, but at intervals of six weeks which is now increasing to two months and the changes will be even more rare with age. With regard to his poison the following instances will show the celerity with which it works :—

April 14.—A small rat was killed in 29 minutes.
April 15.—A quarter-grown rat in 5 minutes.
July 25.—A young rat in 4½ minutes.
Aug. 4.—An average sized rat bitten twice, but though "rather

sick," not dead 33½ minutes afterwards. Bitten again, Rat dead 30 minutes afterwards. That is 63½ minutes after first bite was inflicted.

Since then several average sized rats have been killed in about 15 minutes. Mice vary from half a minute to five minutes, but on June 9 a mouse was 12 minutes dying. The snake was about to change his skin, his eyes had recovered from the blueness which indicates the approaching of the sloughing process, but the skin had not begun to peel. The skin was shed on the 11th. Up to April 21. this snake had 8 rattles ; on the night of that date he had shed his skin and we then noticed he had only five rattles. The button at the extremity appeared to be all right, but much larger, and the rattle looked more uniform—it previously terminated with such a slender point. The box had been cleaned directly it was found the skin had been cast, and it was then that the alteration was first noticed. A portion of the droppings were recovered and searched, but without success. Since then he has developed 3 rattles and now has 8. On one occasion in seizing a mouse "Rattles" hitched the teeth of his lower jaw in the scales of his own neck and could not release himself. In the meantime the mouse died, and, as I wished to free the snake, I placed a stick on his head and held it firmly down and then placed my hand on his head. This so frightened him that he raised his neck and thus disengaged himself, and I removed my hand. Although the treatment was rough he made no attempt at biting. When it is necessary to clean the box I open it and shake him out. While the box is being washed I allow him to crawl round the room—his movements are exceedingly slow and cautious. When the box is ready it is placed on the floor and I simply sweep him back into it with a broom. Every non-venomous snake I know would resist such treatment by biting vigorously, but this formidable reptile never even strikes at the broom and simply sounds an alarm with his nervous tail. I have never even known him strike at anyone through the glass no matter how much he is purposely irritated. He has his bad moods, however, and they are usually when he is about to slough and cannot see well, but his only sign, of anger is to assume a striking attitude and to vibrate his tail. Having noted in Miss Hopley's book that rattle snakes will eat dead animals I tried him with a small owl on June 19th but he refused it altogether, also a dead mouse. Yet a fortnight ago he swallowed a rat which had been killed by the Porter. As a rule he let rats go after having bitten them and waits for their death. When very hungry he constantly examines them with his tongue to find out whether they are still alive and sometimes begins before they are dead, in which case the rat usually jumps and the snake retires to his corner in great

alarm. Recently, however, he caught a rat and held it down until it was dead. He only on one occasion bit more than once, and probably the mortal blow was the last, or third stroke, when the rat died 30 minutes later. He once killed and ate a small snipe-like bird but there was nothing remarkable about the operation. This snake has been called *Serpent à sonnettes*; in Venezuela it is known as the "Cascabel," and in Brazil as "Cascarella" or "Maraca." In Trinidad there is a snake commonly known as the "Cascabel dormillon," but it is nothing but the common Tree Boa and of course is not at all venomous, though a very fierce reptile.

One word before I close these brief notes. A great deal has been said about a certain power of fascination exercised by the rattlesnake in particular and snakes in general. Animals introduced into "Rattles'" cage do not seem to be aware of his presence and run over him without the slightest fear. It is only when the snake strikes that they appear to realize their position.

February, 15th 1894. R. R. Mole.

THE GOLDNEY PRIZE COMPETITION.

Prize Paper:

AN EXCURSION TO ST. ANN'S.

My object in writing being simply to record the things observed on my excursion to St. Ann's, I will therefore, be as brief as possible in describing sceneries and other incidents that may have occurred on the way.

It was on the 28th day of May, the clock had just struck six, when, opening my window, I was greeted by the pale translucent cheeks of dawn that gradually assumed brighter and brighter hues, as the sun, slowly rising over the eastern hills, distilled its soft and golden rays over the surrounding scenery.

"This augurs well for us," said I to Leo, and, as we collected our nets, bottles and other gear, being well equipped, we started from the Convent of the Holy Name of Jesus.

Here I must draw your attention to the magnificent *Eriodendron anfractuosum* (silk cotton tree) a fortnight ago denuded of leaves, but rich in cotton, which, blown away by the East wind, dropped on the green grass of the neighbouring savannah, forming a natural carpet.

On the west of this pasture is another in which is situated the Victoria Institute and the Princes Building, the former established in honour of the Jubilee of Her Most Gracious Majesty the Queen, as a museum for the collection of the natural

wealth of the island, the other for the use of public entertainments.

Proceeding onward, on the right the *Ravenala madagascariensis* or traveller's tree, intermingling with the tall palms *Orcodoxa regia*, and the smaller but elegant *Thrinax radiata*, amidst which blossomed the variegated "Frangipanni" *Plumeria sp.* Hibiscus, Magnolia, Jassamine, and other sweet scented flowers is typical of tropical scenery.

The *Poinciana regia*, Flamboyant, which last month was the mere skeleton of a tree, is to day resplendent with rich pink coloured flowers, that fall on the ground forming a beautiful red parterre.

As you get to the angle formed by the Queen's Park, a very curious spectacle presents itself to the observer: A logwood tree *Hœmatoxylon campechianum* has been invaded by one of the parasitical *Ficus*, which sooner or later is destined to replace its host, and it is probably a bird which, dropping the seed on the logwood is the author of the mischief. Going along one must pause before Mr. Stollmeyer's residence, and contemplate the variety of roses blooming in that charming garden, while on either side of the newly constructed porch two elegant Betel nut trees (*Areca Catechu*) in the centre of which a pretty little fountain throwing innumerable jets of water in every direction, spraying the green foliage below, tower high over the surrounding scenery. Further on the gri-gri *Martinczia caryotæfolia* the *Thrinax radiata*, and two graceful date palms, form the delight of the stranger.

In the centre of the Queen's Park the pretty Cricket Pavilion, with its red and white cupola seems to impart life and gaiety to the surrounding plain, and at a distance beyond, rising upward to the azure sky, extended the long and picturesque chain of mountains, forming a semi-circle the western side of which sank fainter and fainter as it lost itself in the pale line of the horizon.

On one of the surrounding hills on the grounds of the garden is seen the cosy little look-out with its conspicuous red roof and tall flag staff, from where a magnificent bird's eye view of the Queen's Park and Port-of-Spain can be had.

As I proceeded, my attention was drawn to a number of parasol ants, *Æcodoma cephalotes*, busily engaged collecting the flowers of the "Saman" trees that strewed the ground below.

It was wonderful to observe the difficulties experienced by these industrious little creatures which nothing daunted, surmounted them heedless of the world around.

Further on and on the right again (for the left which forms the boundary line of the Queen's Park consists of a succession of

Saman and log wood trees) we came to the Laventil school-house in front of which stands the Savonetta *Sapindus* sp. a large native tree the fruits of which produce a froth when rubbed between the hands ; this reminded me of my school days when we used them instead of soap to wash our mouths and hands after eating mangoes.

Leading on we reached the tram terminus, and, entering by the wicket gate, got into the Savannah, where the cows were jumping about in the most excitable manner, pursued no doubt by the bot fly, whilst the tick bird *Crotophaga ani* stood gazing in wonderment at the infuriated herd—over the green sward flew the blue-black wasp *Pepsis elevata* in search of prey for its larvæ, whilst the ubiquitous "Quest ce-qu-il dit" *Saurophagus sulphuratus* was greedily feasting on aerial creatures.

On reaching the northern wicket gate, there is a small guard house surrounded with crotons ; there I had the good footune to capture a beautiful butterfly, the *Nymphalis orion*, commonly known as the "shoemaker." As we left the Savannah and on the Circular Road there were numbers of *Dysderus ruficollis*, a beautifully marked hemiptera, always seen in pairs, large black ants *Cryptocerus atratus* and a species of *Attidæ*, imitating very closely the movements of the ant.

On the right is another pasture at the corner angle of which stands an immense locust tree *Hymenœa Courbaril* which in former days formed the delight of boys, who amused themselves swinging on the massive lianes that hung gracefully from its branches.—As we proceed the *Cassia marginata*, with its richly coloured purple flowers was in full bloom, but the *Kigelia pinnata* with long pendant flowers had, unfortunately, already dropped them.

Nearing the entrance of the "Botanic Gardens" a species of *Pandanus*, a solitary palm, and a field of Guinea grass from which the whistling of the frogs gave animation to the surrounding scenery, concludes that part of the scenery along the Circular road.

Entering the main gate of the Garden, by the road leading to the office of the Superintendent stands the remarkable *Ficus Benjamina* the leaves of which closely resemble those of the nutmeg ; on a little elevation beyond it three immense Saman trees spread their mighty limbs in every direction, shading the ground beneath where Tennis is played ; next to these the whistling willow, the ever crooked Norfolk Island pine and the *Melicocca rijuga*, the last forming the delight of bees, are the most interesting trees to be seen on that side of the road, On the right a succession of palms amongst which the *Hyophorbe Verschaffeltii*, *Arenga* or wine palm, *Attalea Cohune*, *Pritchardia pacifica*, *Caryota urens*

Livistona Hoogendorpi, *Livistona chinensis*, with here and there large Samans on whose far spreading limbs grow the tall cactus, ferns, and other parasitical plants, presented the most curious aspect of an aerial garden.

As I stood in admiration before this charming panorama my ears were treated to the sweet song of birds interrupted now and then by the inquisitive *Quest ce-qu'il dit* which seemed to question what we were saying.

At the base of the wine palm the *Bulimus oblongus* a garden pest was feeding greedily, but of butterflies there were only two observed viz. the *Terias lisa* and the *Opsiphanes tamarindi*.

On arriving at the office of the Superintendent I was agreeably surprised with the success attending Mr. Broadway's efforts in breeding the silk moths *Attacus Cynthia* lately imported in the chrysalis stage from England, for numbers of full grown caterpillars were feeding on the *Zizyphus Jujuba* whilst some had already spun their cocoons.

A walk into the orchid section revealed a fine selection of those interesting plants some of them in full bloom ; amongst the most remarkable were the *Dendrobium moschatum* with its yellowish pink flowers, the *Dendrobium nobile* growing clusters, *Dendrobium suavissimum* particularly cherished by the bees which delighted in nibling at its delicate pink lips, exhaling a delicious odour and tasting very much like honey, whilst the *Phalœnopsis amabilis* rightly named from its delicate white flowers seemed to welcome the visitor and the *Cattleya Gaskelliana* the Queen of them all was grandest among the grand.

From the orchids I directed my steps towards the nursery and in passing by the bath room, the *Amherstia nobilis* one of the handsomest trees in the garden, was in full bloom, its numerous red flowers forming magnificent bouquets.

Stepping into the nursery my attention was drawn to the wild cocoa (*Herrania albiflora*?) which was covered with pods, but on my way, having happened to disturb a nest of the small bee *Trigona ruficornis*, I was assailed most unmercifully and in the affray abandoned both hat and coat, whilst with violent commotions of the arms and legs, in self-defence, succeeded in beating a retreat, not without having applied some severe blows on my already properly bitten head and neck.

Reader you would have been amused to witness the scene and after the battle was over, see me stand and gaze upon the maddening crowd of little creatures, blessing them, as you may well understand, to the best of my abilities.

This is enough for me said I to Leo,—now let us proceed on our journey. Before leaving the nursery a word of praise to Mr. Broadway now Acting Superintendent of the Gardens is the least

I can offer, for the neatness in which every thing seemed to be kept, every tree being well attended to and every flower bed clean and richly supplied.

On we went and crossing Mrs. Feez's pasture got to the road, on the right side of which is situated the pretty little Roman Catholic Church so much improved since the advent of Reverend Father Victor, the zealous Curate of the Parish. On the way to Fonds Almandes Valley the scenery is rather monotonous, being occupied by dwelling places, the principal of which being that of Mr. Goodwille and Dr. Seccombe.

On the left one cannot help admiring the perseverance of Mr. Potter who has succeeded in forming a splendid little coffee plantation shaded by the tall Saman, notwithstanding the difficulties he was told he would have to encounter in getting the land to produce this staple and further on clusters of bamboo and mangoes alternately following each other afford a delightful shade to the traveller.

"Come," said I to Leo, "let us hurry up as we must get to Fonds Almandes Valley at eight o'clock!"

In a few minutes we reached that part of the road which divides in two, one leading to the Ariapita Valley, the other to Fonds Almandes, but though our destination was the latter, we entered the former for the purpose of observing part of that valley, and crossing over hill through Mr. Mahoney's residence we would get there in a very short time. On arriving, we were warmly greeted by our hospitable host, who welcomed us heartily and bid us do as we pleased on his grounds.

I may tell you that Mr. Mahoney's charming little country seat called "Tara's Hall" is situated in a delightful spot on an elevation, and commands a beautiful view.—Mr. Mahoney, who is a lover of flowers, has formed a charming garden in which a large variety of ornamental plants, jassemines, lillies and sweet-scented roses, distil a delicious perfume around, whilst the honey suckle in full bloom attracted swarms of bees, and in the centre of this enchanting spot a decorative little fountain sent its sprays in all directions, producing the most marvellous effects.

On the sandy road leading to the cottage I could observe the yellow striped wasp *Monedula continua*, busily engaged carrying food to its larvæ.

This insect bores holes about $\frac{1}{4}$ inch diameter in sandy places and deposits its eggs at the bottom; these hatch, and the loving parent wanders from place to place in search of food which she introduces in the hole entering head foremost.

Just near by was a lemon tree, the fruits of which were rotting on the ground. I examined some of them, and found the *Typhœa fumata* and *Europs impressicollis* the same as

observed in decayed sugar cane. Whilst collecting these, I received a sharp sting on the back of my neck, and bringing my hand quickly to the part affected, seized a vicious looking little dark wasp, *Polybia* sp.

Next to the lemon tree was the memorable *Warscewiczi coccinea* also called "Chaconia" in honour of the Spanish governor who had the good sense to surrender to Sir Ralph Abercrombie, but who, when he received the communication was engaged dancing at St. Joseph, then the capital of the island, and coolly replied: *Hasta mañaña, hoy estoy, bailando*"—"To-morrow will do, I am dancing now!"

Next to it the *Cassia bacillaris* which flowered profusely was invaded by a number of large black bees *Xylocapa frinbriata* and the smaller *Eulaena Cayenensis*, the latter having a yellow band across the abdomen; on the ground below, I caught a beautiful beetle *Gymnetis Marmorea* two or three species of which occur in this valley. These insects are remarkable for the curious designs on their thorax and elytra which sometimes look like hieroglyphics.

Over head the *Cicada plebeia* was shrieking fearfully, for the purpose of attracting the female which possesses no musical organs.

Along the margin of the river, there is a small cocoa plantation, in which I noticed that some of the pods were attacked by *Coccidæ*, which were being milked by the stinging ants.

It is both curious and interesting to see how these ants would caress the little creatures with their antennæ and shortly after the good milch cow would emit a liquid which was immediately gulped. I also noted that some of the other ants would stop as they passed by and the liquid was shared.

A large blue fly *Tabanus* sp. was plentiful about the cocoa and coffee trees and the destructive parasol ants in procession line carried chips of leaves to their habitations.

Before leaving the river side to ascend the hill which leads to Fonds Almandes, I set two traps and caught a field rat which has been forwarded to the British Museum for determination. Along the road on the hill side were a number of cashew trees the fruits of which were attacked by a small black bee and on the ground below on a few rotten mangoes the *Trachyderes succinctus* a pretty longicorne beetle with a yellow stripe across the elytra, was feeding in company with the *Trachyderes Elegans* and a few butterflies, amongst which I observed the *Terias Marginella*, flirting fairy-like about the flowering grass *Cyperus elegans*, the *Nymphalis clymeneus* commonly known as "Eighty nine" and the romantic little *Ithosnia. Phemonœ* otherwise called glass that seemed always to select the most delightful spots for

its haunt. As we walked along we disturbed a large number of micro-lepidoptera which flew in all directions, concealing themselves under the leaves.

On the fruit of a wild "Mammy apple tree" three beautiful bronze coloured beetles *Anticheria Chalcea* were feeding greedily. Going down towards the river the road on either side was covered with a variety of shrubs some of which were very interesting; amongst these were the *Cephœlis tomentosa* a prettily varied leaf bearing a red flower, a curious fern *Lygodium scandens* whose leaves resemble those of the bamboo and a species of Miconia with light pink coloured leaves.

About this spot I captured several butterflies viz: the *Euryphanis Amphismedon* or Chinese eyes, *Morpho peleides* of celestial blue colours *Heliconia Sara,* which seemed to have just left its *Chrysalis* form, *Papilio Zenzis* and *Junona Genoveva.*

Crossing the river towards what is still known as Lack's residence the pretty fern *Adiantium obliquum* formed a regular festoon along the road side.

On the walls of the old ruin, facing the river was seen occasionally the miniature fern *Hemionitis palmata,* whose leaves are shaped very much like the *Geranium* and on the ground around us the *Adiantum obtusum* the young shoots of which are of a most delicate light pink colour formed a thick fringe along the river bank.

Here I caught the *Mantis oratorio* a curious *orthopterous* insect, which is bred in China, as Cocks are, for the purpose of fighting and a species of *phasma* known here as God-horse and in Venezuela as *Caballito del Diablo.*

Under the roofing of the old ruin we saw clusters of bats, *Molossus obscurus* seven of which we captured viz: four males and three females, two of the latter had one well developed embryo each.—Mr. Urich a week after, captured one on the Caroni which also had an embryo which shows that this is about their breeding time.

The ordinary house Cockroach *Blatta occidentalis* were flying in every direction and the drummer, *Blaberus Giyanteus* sought shelter and protection in every crevice.

About the old ruins are fields of *Vervene* (*Stachytarpha cayennensis*) and *pomme d'or*; here I captured a magnificent *Calligo Ilionis, Victorina Steneles* or *Vhuile, Euptychia occirrhoe* and the ever present doctor *Thymele Simplicius.*—Ascending the hill at the back of the house, I saw nothing worth noting and retraced my steps passing along a ravine that led to the river. At the base of the hill stands one of the tallest nutmeg trees I have seen and in a little pool near by I found a water-beetle *Hydrophilus* sp. in a rotten stump near by I dug out a number of

flat beetles *Passalus interruptus* and a pretty green bug with red spots *Vulnea formosa* was found on one of the shrubs. On a rotten stump near by two scorpion-spiders, *Phyrnis reniformis* were buried in the decayed matter. At a little distance from us stood a Sapodilla *Achras Sapota* laden with fruits, which were unfortunately not ripe.

Whilst admiring the number of sapodillas on this tree, I listened with delight to the sweet song of the "Carouge" *Cacicus cristatus*, one of our loveliest birds; near by the "Casse noisette" *Pipra guttularis* was feeding voluptuously on some berries, and the *Myobius Nigriceps* or "Oiseau fou" was jumping about in every direction, turning round and round upon itself in the most ludicrous manner; the blue bird *Tanagra glauca* and the "Sucrier" *Mniotilla venusta* were flying from tree to tree.

Walking along we came to an old shanty in which sat a middle-aged man; next to him stood a pint bottle which was suggestive of a quiet drunk, when, to our surprise, we learnt that it was a bottle of medicine; *passe pour cela*, after exchanging a few words we went on until we got once more to the river bank. As we were coming out of the thicket, we saw a magnificent *Morpho Peleides* which was sailing gaily over the running stream, and on the tall fern *Nephrodium macrophyllum*, whose beautifully shaped leaves fanned the surface of the water, two superbly elegant and graceful *Libellulae* also called "Demoiselles" *Hetaerina occisa* and *Mecistogaster antipennis* were tossed about by the gentle breeze, while on the fragrant *Oroidæ* the large *Archilestis grandis* seemed to act as sentinel.

Reader! I wish I could describe in suitable language the glorious scenery that unveiled itself before me.

At my feet a crystal stream, fanned by the soft breeze, rippled through an agglomeration of white quartz, and eventually lost itself in the basins formed by the accumulation of large blocks of limestone formation.

Eastward, the immense trees bending gracefully over the river-side, afforded a delightful shade, while through the interlaced branches the golden streaks of light distilling through the green foliage, lent animation to the enchanting scene.

Here, was a miniature cave, covered with clusters of green ferns from the roots of which trickled limpid drops of water that looked like pearls as they fell in slow cadence on the white pebbles below; there a ravine the bed of which consists of enormous blocks of shale, emptied itself in the main stream and through an aperture in the rock came oozing out a slow stream of yellow ochre.

Nature was alive, and seemed to welcome me, as I stood spell bound, contemplating her beauties, but, alas! I had to

depart and with a farewell that I heard her whisper as I left this enchanting spot, I retraced my steps and reached the main road that leads out of this valley.

Here we found the same ferns as described before as well as the *Adiantum macrophyllum* the *Adiantum lucidum* and a species of lily *Iris*-like plant which though exceedingly common happens, it is said, not to be definitely described.

Of Insect life I met but a few parasol ants, another species of ant *Eclatonima tuberculata* and the peculiar *Odontomachus hæmatodes* which has a pair of forceps almost as long as its head.

Descending an incline which leads to the river we disturbed a few species of *Ameiva* which took refuge in the grass around us whilst the tree lizard *Uraniscodon plica* was climbing on the branches above.—In the river bed I captured a few small frogs *Hyolodes trinitatis* which has the peculiar custom of carrying its young on its back together with another species not yet determined.

Overhead on a branch overhanging we saw a fine specimen of *Tarantula, Mygale* but did not capture it as I had nothing to secure it in. From here we started for home and passing once more through Mr. Mahoney's grounds came down the St. Ann's road.

Just where the road divides, one leading to the Cascade, the other to the reservoir from where we came, there is an immense sand-box tree whose limbs stretch far over the neighbouring pasture.—Lower down, after passing a few pretty residences we came to another sand-box tree under which grew a guava whose main branch hugging it closely has grown as tall.

Further on the *Cassia marginata* which bears bunches of pink flowers like apple blossoms, the *Adenanthera pavonina* the whistling willow, the cannon ball tree, the *Peltophorum ferroginum* with its large cluster of yellow flowers and the *Fustic* (*Maclura tinctoria*) are the most remarkable. On the right a succession of mangoes and bamboo clumps completes my excursion.

In conclusion, I would venture to relate a couple of anecdotes that occurred on the way.

The first is that of a boy who was walking along the road; he had a piece of bread in one hand, and a mango in the other. As he passed us, "Leo," who had already taken two sips of the bottle, became rather talkative, and stopping the youth said: "Hey, boy! You like it then?" "Yes, sar," replied the youth, "*must* like it sar, hab not'ing better and God bless the mango season!"

Further on a Barbadian was going along unconcerned with his hands crossed behind his back, whistling away joyfully—"You, sar," said Leo, "Why you â whistle so?"—"Well, friend,"

says he, "I hungry and have nothing to eat, and I whistle to kill time, what for to do; if I grieve, I feel worse, I always tink of the proverb, 'Belly full, tell hungry belly keep heart.'"

I leave you now, reader, with these two philosophers in order that you may draw your conclusions. I must now offer my thanks to Messrs. Broadway and G. W. Smith, the Curator of the Botanic Gardens in Grenada for the kindness they have showed me in determining the plants collected.

Apologizing at the same time for the length of my paper, which must have appeared tedious at times, and craving your indulgent criticism I take leave of you.

MICROBIA. (H. Caracciolo).

NOTES ON SOME TRINIDAD COCCIDÆ.

By T. D. A. Cockerell, F.Z.S., F.E.S.

The following notes are based on an examination of some interesting scale-insects sent to me by Mr. F. W. Urich. I have not thought it necessary to indicate the characters of the several species; partly because to do so would be to duplicate much that has already been published elsewhere, and partly because I doubt not that Mr. Urich will show specimens of the insects to any member of the Club who is interested in the subject, and desires to identify his captures. It will be seen from the statements given below that the collection illustrates several facts in distribution &c., which were hitherto unknown. The numbers given to the species are those of the specimens, as numbered by Mr. Urich.

14. *Chionaspis braziliensis*, Signoret.
On a fern, St. Anns (Urich). New to Trinidad. It agrees with Signoret's species as identified by Mr. Maskell, from whom I have examples. Hitherto found at Bahia, Brazil (on plant not identified), in Australia (on an orchid) and in Ceylon (on a fern).

11. *Ischnaspis filiformis*, Douglas.
On *Pandanus*, St. Anns (Urich).

18. *Mytilaspis citricola*, Packard.
On orange, Port-of-Spain (Urich). Found previously in Trinidad by Mr. W. P. Pierce, U. S. Consul.

19. *Pinnaspis pandani*, Comstock.
On palms, St. Anns (Urich).

2. *Aspidiotus palmæ*, Cockerell.
On banana, Port-of-Spain (Urich). New to Trinidad; known previously from Jamaica.

rted by great buttresses; the wood
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vn out at 80-90 feet above the
lodgers: epiphytes, parasites,
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zards, opossums.
in Trinidad, Eastern Venezuela,
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OIDEÆ. It is the *Cedrela ordorata L.*
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or Turpentine order. The name
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Our common or red Cedar *Ced.*
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least, the *U. nymphcæfolia L.*, is a
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aluable order, the *Sapoteæ*, is much
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be a gum nearly allied to gutta
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ɔd and purified. The timber is a
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ı it, or the gust of a cyclone; this
ı the jagged wound, causes decay
ıe it has a hollow extending far
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spread at base, of fully ten feet,
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ıen was no doubt several centuries

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at a ripe old age, 120-150 feet high, supported by great buttresses; the wood white, soft, valueless; the great horizontal, dangerously brittle, branches, each in bulk and weight a tree, thrown out at 80-90 feet above the ground, loaded—from the fork—with lodgers: epiphytes, parasites, bromeliads, orchids, sedges, cacti, and other plants, among which nestle quite a colony of insects, birds, snakes, lizards, opossums.

(*l.*) *Cedar.* By this word is meant in Trinidad, Eastern Venezuela, Central America, Cuba and Jamaica, a tall light-wooded tree of the Mahogany order—CEDRELACEÆ, in MELIOIDEÆ. It is the *Cedrela odorata L.* or Red Cedar of the West Indies. The "Cedar" of the Caribbean chain belongs to *Bignoniaceæ* and is a harder though pale colored wood, a favourite of ship-wrights and lighter-builders. The cedars of North America, like the type, or original cedar, the cedar of Lebanon and the Deodar of the Himalayas, are Conifers. While our Swamp cedar belong to the nutmeg order, our soft cedar to the *Leguminosæ*, and the red and white cedars of the Guianas are *Icicas* of the *Terebinthaceæ* or Turpentine order. The name cedar seems to have been applied by the older planters and seamen to any strange forest tree whose wood by its odor, colour or grain, reminded them of the ancient cedar of the Levant. Our common or red Cedar *Ced. odor.*, grows in rich deep soil to great bulk and height; the wood, as is well known, is easy to work and employed in numerous ways. The close-grained harder wood of a well-matured tree grown on the hills in a poorer soil and and wind buffetted, yields in the horquet or fork, furniture slabs of great beauty, quite equal to mahogany.

(*m.*) *Figuiers* or Wild Ficus trees, in creole generically termed also *bois lait* from the milky sap, are *Ficus* or *Urostigma* sp. of the sub-order *Moreæ* of the extensive and oddly multiform nettle order *Urticaceæ*. Some grow to a large size, and one species at least, the *U. nymphæfolia L.*, is a matapal (mata palo or tree killer from it winding and climbing round the trunk of another tree to its top, as a liane, crushing it, and overshading it with its large leathery leaves till it supplant the erst supporter as a large tree self-dependent. The wood of all the species I have seen cut is white, light and of no special value; nor is the puny insipid fruit sought but by bats, and perhaps some birds.

(*n*) *Balata.* This, a stately tree of a valuable order, the *Sapoteæ*, is much more worthy of notice than most of those we find in the woods. It grows to probably 120 feet in total height and is often 40-60 ft before it forks or branches. The stem is quite terete or circular, 4 to 6 feet through at base, slowly narrowing, and has very little sapwood, throws out no buttresses till it attains a great age, grows perfectly erect to the first fork, has a rather thick bark containing among other liquids one that stains red, and a copious creamy sap which on drying proves to be a gum nearly allied to gutta percha and applicable to like uses. Properly prepared this gum is valued in England, and might be locally gathered and purified. The timber is a deep red, hard and straight grained, splitting freely, and lasting many years in the weather, thus making it peculiarly suitable for shingles (very durable as such) and railway sleepers. A great branch is sometimes broken off by the weight of a mass of lianes upon it, or the gust of a cyclone; this leading to the settlement of rain water in the jagged wound, causes decay down the heart of an old tree, till in time it has a hollow extending far along the centre, and below it decaying wood. I have seen in the back lands of the late General Peschier's estate in Carapichaima, now engulfed in *Waterloo*, a venerable balata, with a spread at base, of fully ten feet, possibly twelve or more, with such a cavernous hollow that it appeared to stand on arches, yet the sap flowing up the uninjured portions of the bark fed with life some staring branches at the head of the tree rather scantily furnished with leaf. This specimen was no doubt several centuries

old. The common balata of the Island, believed to be identical in species with that which is so abundant in the Guarapiché country, as the wood, gum and leaf of that tree are not to be distinguished from ours, was for forty or fifty years described by the local botanists and Grisebach as the *Mimusops globosa* Gaertn., till in 1889 it was stated by the Superintendent of the Botanic Garden (on the authority of a determination at Kew) to be believed to be the M. dissecta. R.Br. There is a kind on the Ortoire plain having a pinkish white milk Ewen) probably a different species from the better-known one. Grisebach found we had both *M. glo.* and *M. diss.* in the Colony, while Prestoe, without mentioning *dissecta*, says after *M. glo*, that there is another indigenous *Mimusops*. The commercially-worked balata tree of Berbice and Paramaribo, differing not widely from our common kind, is the *Mim. Mulleri;* the wood is considerably heavier and of a deeper red than ours. It grows there in country much subject to flooding. The balata is found in every ward, on hill and plain, in small groups in company with other trees; but in at least two quarters is gregarious and in great number.

(*o.*) *Silver fern. Gymnogramme calomelanos*, Kaulf. The Gold fern is also a Gymnogramme.

(*p. Vanilla.* There are at least four native species, the *V. planifolia* var. and *V. aromatica*, Griseb, both odorous, and the *V. anaromatica*, Griseb., inodorous and worthless, the fourth is perhaps the *V. lutescens* noted without authority stated by Prestoe. Cruger also says there are four indigenous species and and that he exhibited all. Horne told me in 1862 there were four native species then cultivated and under his charge on trees in the Botanical Garden. Mr. Prestoe was confident that vanilla could be profitably cultivated in the Colony, and commended it especially to the attention of ladies.

(q.) Lilies are not rare in damp and shady localities, but the list of native species that have been observed is a very short one, an Agave, an *Amaryllis*, an *Hypoxis*, 2 *Pancratiums* and an *Alstrœmia* comprise all my list at present shews.

(r.) Orchids. Trinidad is for its area (little larger than Hants or Somerset), remarkably rich in this varied, curious, and often richly decked order. How many species and varieties are now known to be indigenous to the Island I cannot state, for probably many novel forms have come to light since the compilation of my M.S. list in 1866 which I revised and brought on to date in 1884. It shewed 161 named species, plus 16 indicated and possible and 8 varieties (7 of them named) equal to a total of 185. Of the predominant local form *Epidendrum* it had 35 species and 3 varieties.

The latest published list is that issued from the Botanic Gardens and which appeared in the Agricultural Record two years ago (1891), in the *Hortus Trinitensis*, J. H. Hart. The number of native genera therein stated was 50 and of native species 73 named, plus 9 more indicated equal 81 (or more) sp. The native *Epidendrums* of that list number only 12 (no varieties). It is true the *Hor. Trin.* professes to be no more than a list of the plants cultivated in the Botanic Garden at St Ann's, but it was understood, some years ago, that it was the ambition of the curator to have the native orchids worthily and fully represented.

Going again through my MS. list, with care, I find it shows the following number of native genera, species and varieties, in so far as I have learnt, say to the end of 1893—but which must omit a good many brought in or seen since 1884: named genera 68, plus indicated and possible 17—a possible total of 85. 168 named species, 3 unnamed, 17 indicated and possible, and at least 8 varieties—a total list determined and possible, of 196 species and varieties. There can be no doubt the Colony has more than 200 species of indigenous orchids.

(*s.*) *Cribo.* One of the commonest in Trinidad of the numerous and harmless family of the *Colubridæ.* Cribocs are useful about the house in being 'dead on rats' and good mousers, but the housewife must keep an eye on her chicks, for these noiseless ophidians are ready to snap up any tiny, toothsome creature that cros-es their path,

(*t.*) *Deer.* The deer meant here was either the common Red deer of the Island, one of the greatest pests in a young cacao piece, Biche of the French Creoles, Guazupita of the Spaniards, provisionally classed as *Cariacus nemorivagus,* F.. Cuvier;—or that in which the male has covered horns—'biche à cornes couverts'—an equally mischievous animal, very similar in habit, general build and proportion to the first-named, but a distinct kind, as the females of both have been met by my sons and in both cases are entirely without horns. The horn of the 'corne couvert' is clothed with skin on which the short hair grows, very little at the point and little differing in color from the deep red of this deer on other parts of its body, a darker red than that of the Red Deer of the Northern Range where the Corne Couvert is little seen if at all. Both kinds are met with on the Caparo plain, but the 'Corne Couvert' less frequently than the common 'Biche.'

(*u,*) *Birds.* In consequence of its extent and the variety of its surface and bird-food, but especially from its near proximity at two points to the great Southern continent, Trinidad is the home of or is visited by a much greater number and variety of birds than any other island of the West Indies. Leotaud counted 287 distinct species, but my present list contains names (or notes) of 324, to which Mr. F. M. Chapman (after January next) will be able to add a few more, and taking into consideration the rather large number of marine birds that have been observed in other islands of the group and are not yet included in the Trinidad list though pretty sure to visit us likewise, it is not in the least improbable that a more complete search will reveal near upon 350 species as found here, including migrants and visiting sea-birds.

THE MICROZOA OF THE TERTIARY AND OTHER ROCKS OF TRINIDAD AND THE WEST INDIES.

By R. J. Lechmere Guppy.

On any question relating to the geology of Trinidad the first reference naturally is to the Geological Report of G. P. Wall and J. G. Sawkins. Previous to the publication of that report in 1860 the knowledge we possessed relative to the structure of the island was of the most meagre and erroneous kind. But the conditions of the Colony restricted so much the time and means at the disposal of the Surveyors that a general outline only was possible to them, leaving the details to be filled in by the irregular and erratic hand of the amateur. Hence the descriptions of the sedimentary strata of the district of Naparima contained in the report were more imperfect even than the natural conditions and difficulties of observation, themselves pretty considerable, need have made them. The relations of the various

strata, their position and order of succession as well as their origin and organic contents were imperfectly elucidated ; and for part of this there is the excuse that it is exceedingly difficult if not impossible to obtain anything like clear evidence of superposition among the different beds or formations. It is usually by inference alone that we have to deduce the respective positions and age of the beds. And in this of course there is liability to error.

The tertiary rocks of Naparima in Trinidad are described in the Report as a series of marls, conglomerates and calcareous sands. The Report mentions the cliffs of marl, the most important exposure of the series, on the shore of the Gulf of Paria. These cliffs extend some distance north and south of the Town of San Fernando. After alluding to the extensive presence of asphalt in the beds, the Report states the existence of calcareous nodules, thin beds of limestone, and some sandstones, and refers particularly to a stratum to the south of the Town standing out into the Gulf and appearing at first sight like a vertical dyke of asphalt. This stratum is figured in the Report and the authors state that on examination they found it to be merely a highly inclined layer of marl with fragments of shells and a large proportion of bitumen. This is the bed referred to in my communication of July 1863* to the Scientific Association of Trinidad as being entirely or almost entirely composed of the remains of Orbitoides and Nummulina. I referred to this bed again in 1866 when I read to the Geological Society a paper on the relations of the Tertiary formations of the West Indies. Among the illustrations to that paper was a diagram sketch of part of the coast section near San Fernando,† and Professor T. Rupert Jones was good enough to append a note on the Orbitoides and Nummulinæ.‡ I had indicated as unfossiliferous certain other beds exposed in the coast section. The oolitic texture of these and others of the Naparima rocks had been noted in the Geological Report, but apparently the exact nature of that texture had not occurred to the authors any more than it had to me when writing my paper of 1866. A subsequent and more careful examination showed me that the supposed oolitic grains were no other than minute fossils belonging chiefly to the order Foraminifera.

I announced this discovery in a paper read before the Trinidad Society in 1872 and published in the "Geological Magazine" for 1873. In it I gave the names of fifteen species of forminifera besides those already recognized from the Orbitoides bed. Subsequently I published in the "Geological Magazine" (Sept. and

*Reprinted in "Geologist," 1864, page 159.
†Quart. Journ. Geol. Soc. vol. xxii (1866) p. 571.
‡See also Geol. Mag, vol. i, p. 102.

Oct., 1874,) a further account of the West Indian tertiary fossils with a list of all the species of invertebrates (except corals) known up to that time from the tertiary rocks of the West Indies, leaving out the most recent formations whose fossils are all or nearly all of living species. Since then some other fossils have been described by the late Professor W. M. Gabb* and by myself; † but until the late discussion arose on the microzoic rocks of Trinidad and Barbados the only name to be added to the list of forty-four foraminifera recorded from six West Indian localities was *Tinoporus pilaris* Brady, a fossil from Jamaica, Cumana and other places.

The gradual accumulation of evidence on the subject of the relative age of the West Indian geological formations led to the conclusion that the fossiliferous beds of Naparima and Manzanilla in Trinidad ought to be separated from the miocene deposits of Haiti, Jamaica and Cumana as of distinctly older date and containing a decidedly different fauna. Consequently in my paper of 1874 just quoted the name Eocene is used for these older beds.‡ There still remains in Trinidad a considerable series of formations (the Caroni series) having fossils similar to those of the miocene beds of Haiti, Jamaica and Cumana.

In my paper published in the "proceedings of the Scientific Association of Trinidad" for December, 1877, I gave a diagram to show the general succession of the rocks of Trinidad. According to that diagram and the explanation thereof the rock-formations of Trinidad are in ascending order as follows :—

(*a b c d*) Caribean group (paleozoic)
(*e*) Compact Limestone (Devonian?)
(*f*) Secondary Rocks (Cretaceous)
(*g*) Eocene of Naparima (including the Foraminifera-beds)
(*g'*) Eocene of Manzanilla
(*h*) Miocene of Guaracara (Nariva Series)
(*h'*) Miocene of South Naparima (including the Radiolarian Marls)
(*h''*) Miocene of Savaneta, Point Noir &c. (Caroni series)
(*h'''*) Miocene and Pliocene (probably the latter in most part) of Moruga, Mayaro, &c.
(*i*) Postpliocene (including the "Detrital Series")

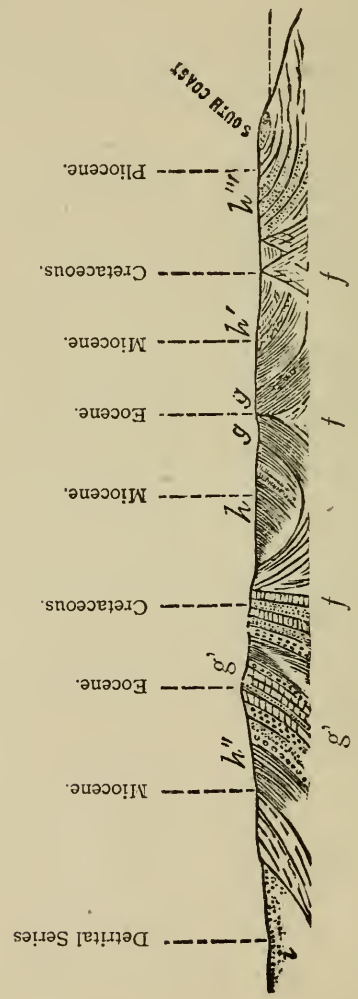
Though the diagram was very rough and susceptible of much

*Trans. Amer. Phil. Soc. vol. xv p. 49, and Proc. Acad. Nat. Sci. Phil. 1872 p. 270.

†Quart. Journ. Geol. Soc. vol. xxxii 1876 p. 516.

‡On this point see Cleve, Kongl. Svenska Vetenskaps-Akad. Handl. Band ix No. 12 (1871), and Annals New York Academy of Science vol. ii (1881) p. 190; also Cotteau on West Indian Fossil Echinoderms, Kongl. Svenska Vetenskaps-Akad. Handl. Band. xiii, No. 6, (1875).

amendment yet as it represented fairly correctly the main features of the succession of the rocks in Trinidad I reproduce here that portion of it which relates to the cretaceo-tertiary formations with the letters corresponding to the synopsis just given.



The principal deductions from the observations I have made on the Microzoic deposits of Naparima are stated in my paper read to the Geological Society* and I do not propose now to go over the same ground again. I may, however, briefly state some of those conclusions namely that deep water (say somewhere about 1000 fathoms more or less †) existed where Naparima now is; that the nearest land was some twenty to twenty-five miles distant from thence and that that land was the Parian range that is to say the northern mountain range of Venezuela then forming a continuous and unbroken chain with our northern hills. We infer also that the Parian range was the southern boundary of a mass of land occupying some portion of the present Caribean Sea but of what extent we have not the means of judging at present. Any one wishing for fuller information on the subject can refer to my paper just quoted. I may mention as matters of economic importance that the use of some of the Naparima marls for the manufacture of cement, and of the Argiline of the Naparima Hill for polishing purposes as well as railway ballast are alluded to in the paper. Some account has been given first in the Geological Report and next in my paper just referred to of the so called Argiline of Naparima Hill. Identifiable fossils have not hitherto been found in this rock. However, we are only on the threshold of knowledge as regards this as well as the other formations of Trinidad. Beds of different texture occur in the argiline, some being more sandy in composition. In these I have found very evident organic remains though I cannot yet say exactly what they are. In another stratum of the same rock I found two or three identifiable foraminifera, namely *Pullenia* and *Sphaeroidina*, both deep water forms. But many of the other Naparima and Pointapier rocks contain a great variety of remarkable and interesting Microzoa and other fossils. Besides the Foraminifera and Radiolaria we have some small corals and polyzoa and many spines and plates of echinoderms (including Holothurians, brittle-stars, common sea-stars and sea-eggs,) spicules of seafans and seapens and of sponges (both siliceous and calcareous). The Pointapier Ditrupa-bed contains abundance of such organisms as well as coccoliths, peculiar little organisms characteristically abundant in deep sea deposits; and also pretty little star-like objects figured by Jukes-Brown and Harrison in their paper. These I have considered to belong to

*Quart Journ. Geol. Soc. vol. xlviii (1892) p. 519.

†Brady (cited by Jukes-Brown and Harrison, Quart. Journ. Geol. Soc. vol. xlviii (1882) page 197) estimates the depth of water in which the foraminiferal beds of Barbados were deposited at from 500 to 1000 fathoms. The fauna of our Naparima beds is almost identical. When my paper was written I had not seen Jukes-Brown and Harrison's paper and had no knowledge of its contents.

organisms like that called *Calcaroma* by W. Thomson (see The Atlantic, vol. 1 page 233). Of larger animals the chief remains are those of fishes. Otolites are the most abundant of these and very curious they are. Teeth are not uncommon, but not so abundant as otolites.*

Little attention seems to have been paid to the Ostracoda either recent or fossil of the West Indies. They are doubtless of high interest and I have made a beginning in the identification of the forms found in the Naparima rocks. I might have included them in the table, but as none are recorded from any West Indian deposit I content myself with giving a simple list. But the determinations are only approximate and possibly some even may be generically wrong as my slender acquaintance with these minute crustacea does not admit of greater exactness and there is no literature to refer to on the subject of West Indian Ostracoda.

Pontocypris faba Reuss N.
trigonella Sars N.
simplex Brady N.
Cythere dictyon Brady N.
circumdentata Brady N.
viminea Brady N.
rastromarginata Brady P.
Cytherella polita Brady N.P.
dromedaria Brady N.
Bairdia amygdaloides Br. N.P.
Krithe bartonensis Jones N.P.
producta Brady P.

(N. Naparima beds. P. Pointapier Ditrupa bed.)

On account of the minuteness of the Radiolaria and Diatoms and the quantity of extraneous matter associated with them they are difficult to isolate and mount and I have not done much in this way. So far as the Radiolaria are concerned I believe our deposits contain the identical forms found in Barbados. One afternoon I sat down and made out from a slide of South Naparima marl of my own mounting the following forms named by Ehrenberg from Barbados specimens:—

Eucyrtidium ampulla
excellens
montgolfieri
acephalum
gematum
Podocyrtis argulus
puellasinensis
dominasinensis
mitrella
Haliomatina humboldti
entactinia
oculatum
Carpocanium coronatum
Rhabdolithis ingens
Lithopera lagena
Halicalyptra setosa
Flustrella concentrica
Perichlamydium spirale
accrescens
Stylosphæra
Anthocyrtis
Lithocyclia
Cornutella
Stylodictya

* On Otoliths of Fish see Stoddart, Intell. Observer vol iii (1853) p 98.

Besides the above I have identified a good many others with more or less certainty. In the foraminifera-rocks I have come across the following among others

Periphæna decora	Halioma oculatum
Spongosphæra rhabdostyla	Lithocyclia ocellus.

I have not done more work in the identification of the radiolaria and diatoms partly on account of the difficulty already mentioned of isolating and mounting them and partly on account of the unscientific way in which they have been named. What are evidently merely individual forms have been described as genera and species. There is little satisfaction therefore in working at the nomenclature of these organisms until some one undertakes the task of its revision and simplification, in fact to do for this subject what Parker, Jones and Brady and Carpenter have done for the Foraminifera.

As regards the Foraminifera which constitute the most important element of this Microzoic fauna and the one I am best acquainted with, I have introduced some slight changes from my former paper. A few names I was not quite sure of have been omitted including some forms of doubtful validity and a few I have since discovered have been added. There are still some whose affinities are undetermined. Of the forms whose names are given there are some which are marked varieties or show constant differences from the types and these may probably hereafter receive distinctive names. The foraminifera of the radiolarian marls are generally poor and small examples.

Several of the Microzoca are of limited occurrence and very few indeed pass throughout the series. Globigerina occurs most abundantly in all the beds except the shallow water ones, namely the Orbitoides and Amphistegina beds and the Ally creek shell-bed. The Nummuline forms (Orbitoides, Nummulina, Heterostegina, Amphistegina and Tinoporus) are confined to these beds. The following occurred each in a single sample of rock from the Globigerina beds ; Anomalina polymorpha, A. anomala.

The following are also of very restricted occurrence though the first three are tolerably abundant in the beds in which they occur.

Miliolina (several forms)
Amodiscus incertus, A charoides
Discorbina bertheloti
Pulvinulina menardi
Nonionina (one or two species)
} Very rare.

Another very rare form is one I have not yet determined—this is like a Glandulina in shape but appears to unite some of the characters of Lagena and Miliolina (Biloculina). I do not say, however, that it really combines the characters of those groups.

The most abundant Nodosarias are those identified as N. abysorum and N. rugosa, both to a certain degree anomalous, the first an account of the polymucronate apex, the latter on account of the peculiar structure of its test. In the columns of the appended table relating to the Trinidad rocks an attempt has been made to give an idea of the relative frequency of occurrence of each of the forms named. This has been done according to the following scale :—

M.	represents	1000 examples or more.
.	„	500 to 1000 examples.
.	„	100 to 500
L.	„	50 to 100
.	„	10 to 50
V.	„	5 to 10
I.	„	1 to 5

For the other localities I could not add such indications, being without any information as to relative frequency of occurrence. I feel sure that many if not all the gaps in the table will hereafter be filled up when sufficient search has been made for rocks of corresponding age and conditions of deposit. We have information of the occurrence in Cuba and Haiti of oceanic beds. The table clearly shows the strong resemblance between the fossil foraminiferal faunas of Trinidad and Barbados.

The table is not intended to give an exhaustive list.* There are many other forms in my collection. Even of the forms ranked under the names here given some have marked and constant differences which might intitle them to varietal distinction.

*I might also add that if my object had been to give a long list of names I might have almost doubled the number given in the table, so numerous are the varieties occurring in the Trinidadian rocks.

Tables showing the Distribution of the Foraminifera of the Cretaceo-Tertiary Microzoic Rocks of Trinidad.

	Trinidad.				Barbados Oceanic-beds.	Miocene of Haiti, Jamaica, Cumana, &c.
	Ditrupa-bed Pointapier.	Orbitoides-bed, Amphistegina- & Shell-beds	Globigerina-beds of Naparima.	Radiolarian-beds of S. Naparima.		
Miliolina venusta ...	L	...	...	...	*	...
oblonga ...	V	...	...	...	...	...
agglutinans ...	X	...	V	*	...	...
seminulum ...	M	L	...	...	...	*
subrotunda ...	X	...	...	...	...	...
cuvieriana ...	C	...	...	...	...	...
auberiana ...	V	...	...	...	...	...
trigonula ...	...	X	X	*	...	...
Spiroloculina tenuis ...	V	...	V	...	*	...
tenuiseptata ...	X	...	...	...	...	...
limbata ...	...	...	X	*	...	*
fragilissima ...	I	...	...	...	...	...
excavata ...	...	...	V	...	...	...
alata ...	...	I	...	...	...	...
Biloculina ringens ...	V	...	I	...	...	...
depressa ...	...	...	I	*	...	...
laevis ...	...	...	V	...	...	...
Cornuspira involvens ...	I	...	...	...	...	...
Planispirina celata ...	...	...	L	*	...	...
contraria ...	X	...	...	...	...	...
sigmoidea ...	...	...	I	...	...	...
Trochamina coronata ...	...	...	X	...	...	...
conglobata ...	...	...	X		...	...
Webbina clavata ...	I	...	X		...	...
Hormosina globulifera ...	...	...	X		...	...
Amodiscus incertus ...	I	V	D	*	...	...
charoides ...	...	...	...		...	
gordialis ...	V	...	V	...	...	
Vertebralina striata ...	...	...	...	...	...	*
Orbitolites complanatum ...	...	...	...	...	...	*
Cyclamina cancellata orbicularis }	...	...	L	...	...	...
Haplophragmium agglutinans glomeratum emaciatum }	...	...	X	*	...	
Haplostiche soldanii ...	...	...	...	...	...	*
Reophax nodulosa pilulifera }	...	...	X	...	...	...
Clavulina communis ...	L	...	X	...	...	...

	Trinidad.				Barbados Oceanic-beds.	Miocene of Haiti, Jamaica, Cumana, &c.
	Ditrupa-bed Pointapier.	Orbitoides-bed, Amphistegina- & Shell-beds.	Globigerina-beds of Naparima.	Radiolarian-beds of S. Naparima.		
parisiensis ...	X	...	X	...	...	...
Verneuilina pygmæa ...	...	...	X	...	...	...
polystropha ...	X	...	...	...	...	...
propinqua ...	...	...	X	...	...	...
spinulosa ...	I	...	...	...	...	...
triquetra ...	V	...	V	...	*	...
Bigenerina capreolus ?	...	...	C	*	*	...
pennatula ?						
Pavonina flabelliformis ...	...	...	V	...	...	...
Spiroplecta americana ...	...	...	V	...	...	...
annectens ...	...	...	I	*	*	...
Textularia agglutinans ...	...	...	X	...	*	*
turris ...	...	...	V	...	...	...
Karreti ...	...	I	I	...	...	*
sagittula ...	X	...	V	...	...	...
Gaudryina pupoides ..	...	...	X	*	...	...
baccata ...	...	...	X	...	...	...
pariana ...	X	...	...	...	...	...
Cuneolina pavoria ...	...	...	...	...	...	*
Bulimina contraria ...	V.	...	I	...	...	...
pyrula ...	X	...	...	...	...	...
striata ...	...	...	...	...	*	...
inflata ...	I	...	V	...	...	...
buchiana ...	...	...	I	...	...	...
elegans						
affinis	...	...	X	*	*	*
ovata						
pupoides						
Pleurostomella brevis ...	...	...	X	...	*	...
rapa ...	...	...	V	...	...	...
alternans ...	...	...	X	...	*	...
subnodosa ...	...	...	L	*	*	...
Chrostomella ovoidea ...	...	...	I	...	...	...
Bolivina pusilla ...	...	...	V	*	...	...
robusta ...	...	..	...	*	*	...
nobilis ...	C	..	...	...	...	...
ænariensis ...	...	..	...	*	...	...
Beyrichi	C	..	...	...	...	...
alata						
Cassidulina crassa ...	...	..	...	...	*	...
lævigata ...	?	.	V	...	...	...
subglobosa ...		...	C	...	*	...
Ehrenbergina serrata ...		...	...	...	*	...

	Trinidad.				Barbados Oceanic-beds.	Miocene of Haiti, Jamaica, Cumana, &c.
	Ditrupa-bed Pointapier.	Orbitoides-bed, Amphistegina- & Shell-beds.	Globigerina-beds of Naparima.	Radiolarian-beds of S. Naparima.		
Ellipsoidina ellipsoides ...	?	...	X	...	*	...
exponens ...	...	...	I	...	*	...
Glandulina rotundata lævigata obtussisima ...	...	...	X	...	...	...
ægualis ...	...	...	V	...	...	...
Nodosaria radicula ...	...	...	X	*	...	...
communis ...	...	...	X	*	*	...
pauperata ...	...	...	X	...	*	...
mucronata ...	...	...	X	...	*	...
longiscata ...	...	...	X	...	*	...
arundinea ...	...	...	X	...	...	...
farcimen ...	...	...	X	...	*	...
ovicula ...	...	...	X	...	*	...
pyrula ...	V	...	L	*	*	...
hispida ...	...	...	X		*	...
veruculosa ...	...	...	X	...	...	...
plebeia ...	...	...	X	...	*	...
raphanus ...	V	...	X	*	*	...
obliqua ...	V	...	X	*	*	...
rœmeri ...	...	...	X	...	...	...
filiformis ...	...	...	X	...	...	...
consobrina ...	...	...	X	...	...	...
simplex ...	...	...	X	...	...	...
rugosa ...	...	...	C	*	...	...
abysorum ...	...	...	C	...	...	...
raphanistrum ...	...	V	X	*	...	*
acicula ...	...	...	V	...	...	*
scalaris ...	...	...	I	...	...	...
comata ...	...	...	I	...	...	...
Vaginulina legumen ...	...	...	V	...	*	*
Rhabdogonium tricarinatum ...	...	...	...	...	*	...
Marginulina glabra ...	...	...	I	*	*	...
costata ...	...	...	I	...	...	...
Allomorphina trigona ...	...	...	...	...	*	...
Frondicularia milleti ...	...	...	I	...	*	...
pupa ...	...	...	V	*	...	...
interrupta ...	...	...	V	...	...	...
inæqualis ...	...	...	X	...	...	...
complanata alata ...	V	...	V	...	...	*
Cristellaria tenuis ...	...	...	...	...	*	...
crepidula ...	I	...	V	...	*	...

	Trinidad.					
	Ditrupa-bed Pointapier.	Orbitoides-bed, Amphistegina- & Shell-beds.	Globigerina-beds of Naparima.	Radiolarian-beds of S. Naparima.	Barbados Oceanic-beds.	Miocene of Haiti, Jamaica, Cumana, &c.
Cristellaria wetherelli }	L	...	...	...	*	...
aculeata }						
cultrata ...	X	X	L	*	*	*
rotulata ...	X	V	X	...	*	*
orbicularis ...	...	...	V	...	...	...
cassis ...	...	...	I	...	...	...
italica ...	...	...	V	...	...	*
compressa ...	...	...	X	...	...	...
obtusata ...	...	...	X	*	...	...
nitida ...	...	...	X	...	...	...
gibba ...	...	...	X	...	...	...
echinata ...	...	...	V	...	...	...
papillosa ...	...	X	...	...	...	...
calcar ...	X	...	I	...	...	*
Lagena striata ...	...	...	I	...	*	...
sulcata ...	...	...	V	...	*	...
striato punctata ...	...	...	I	...	*	...
fimbriata ...	...	...	I	...	*	...
alveolata ...	...	...	V	...	*	...
lævigata ...	...	...	...	...	*	...
marginata ...	I	...	V	*	*	...
lagenoides ...	...	...	...	...	*	...
pulchella ...	...	...	I	...	*	...
trigonomarginata ...	...	...	...	...	*	...
apiculata ...	...	...	X	...	...	...
distoma ..	I	...	I	...	...	...
lævis ...	...	...	V	...	...	...
squamosomarginata ...	...	...	V	...	...	...
castrensis ...	I	...	I	...	...	...
orbigniana ...	...	...	V	*	...	...
tetragona ...	...	...	I	...	...	...
hispida ...	...	...	X	*	*	...
aspera ...	...	...	X	...	...	...
crenata ...	...	...	I	...	...	...
formosa ...	...	...	I	...	...	...
longispina ...	...	...	I	...	...	...
Polymorphina lactea ...	...	...	L	*	...	...
angusta ...	...	...	I	...	*	...
problema ...	...	...	X	*	...	...
elegantissima ...	...	...	X	...	...	...
anceps ...	...	I	X	...	...	...
gibba ...	...	...	X	*	...	...
burdigalensis ...	...	...	X	...	...	...

	Trinidad.				Barbados Oceanic-beds.	Miocene of Haiti, Jamaica, Cumana, &c.
	Ditrupa-bed Pointapier.	Orbitoides-bed, Amphistegina- & Shell-beds.	Globigerina-beds of Naparima.	Radiolarian-beds of S. Naparima.		
Polymorphina fusiformis ...	...	...	X	...	...	...
lanceolata ...	...	...	X	...	...	...
cylindroides ...	...	...	X	...	...	...
sororia ...	...	...	X	...	...	...
Uvigerina pygmæa ...	X	...	L	*	*	...
angulosa ...	I	...	...	...	*	...
schwageri ...	V	...	V	...	...	...
porrecta ...	X	...	...	...	...	...
tenuistriata ...	...	...	X	*	...	...
canariensis ...	...	...	V	...	...	...
aculeata ...	I	...	...	...	...	...
asperula ...	...	...	L	*	*	...
Sagrina virgula ...	...	...	I	...	...	...
nodosa ...	...	...	...	...	*	...
raphanus ...	...	...	I	...	...	...
Globigerina bulloides ...	M	...	MM	*	*	...
inflata ...	...	...	M	*	*	...
dutertrei ...	...	...	M	*	*	...
conglobata ...	...	...	M	*	*	...
pachyderma ...	...	...	M	*	...	...
æquilateralis ...	...	...	C	...	*	...
triloba ...	X	...	C	...	...	...
quadrilobata ...	X	...	C	...	...	...
cretacea ...	...	...	C	...	...	...
digitata ...	...	...	X	...	...	...
Orbulina universa ...	C	...	D	*	*	...
Sphæroidina bulloides ...	...	...	L	*	*	...
variabilis ...	C	...	...	...	...	...
Pullenia sphæroides ...	I	...	L	*	*	...
quinqueloba ...	...	...	I	...	*	...
Planorbulina larvata ...	...	I	...	...	...	...
Discorbina bertheloti ...	...	I	X	...	...	...
Truncatulina lobatula ...	...	...	...	...	*	...
akneriana ...	...	...	X	...	*	...
haidingeri ...	...	I	D	...	...	...
tenera ...	...	...	L	...	...	...
mundula ...	...	...	X	...	...	...
culter ...	...	...	D	...	...	...
reticulata ...	C	...	...	...	...	...
Anomalina ariminensis ...	...	...	...	...	*	...
amonoides ...	V	...	...	...	*	...
wullerstorfi ...	...	L	M	*	...	...
grosserugosa ...	...	...	D	...	*	...

	Trinidad.				Barbados Oceanic-beds.	Miocene of Haiti, Jamaica, Cumana, &c.
	Ditrupa-bed Pointapier.	Orbitoides-bed, Amphistegina- & Shell-beds.	Globigerina-beds of Naparima.	Radiolarian-beds of S. Naparima.		
Annualina polymorpha ...	...	...	X	...	*	...
Pulvinulina canariensis ...	C	...	...	*	...	...
menardi ...	...	I	I	...	...	...
pauperata ...	...	...	D	*	*	...
elegans ...	...	...	X	...	...	...
crassa ...	...	...	...	...	*	...
auricula ...	I	...	...	...	...	...
Rotalia soldanii ...	...	...	D	*	*	...
orbicularis ...	...	...	C	...	...	...
broeckiana ...	...	...	C	...	...	...
beccarii ...	...	...	...	...	...	*
Nonionina exponens ...	...	...	I	*	...	...
depressula ...	...	I	...	...	...	...
pompilioides ...	...	...	I	...	...	...
umbilicatula ...	...	...	...	...	*	...
Tinoporus pilaris ...	...	I	...	...	...	*
asteriscus ...	...	M	...	...	...	...
vesicularis ...	...	...	...	...	...	*
Amphistegina lessoni ...	...	M	...	...	...	*
Heterostegina depressa ...	...	X	...	...	...	*
Operculina complanata ...	...	X	...	...	...	*
Nummulina radiata ...	...	L	...	...	...	*
ramondi ...	...	M	...	...	...	*
rouaulti ...	...	...	...	...	...	*
Orbitoides mantelli ...	...	M	...	...	...	*
Carpenteria monticularis ...	...	...	...	...	*	...

1. *Aspidiotus destructor*, Signoret.
   On banana, Port-of-Spain, (Urich). New to Trinidad; known previously from Bourbon, Laccadive Is., and Demerara.
9. *Aspidiotus articulatus*, Morgan.
   On *Pandanus*, St. Anns (Urich).
5. *Aspidiotus biformis*, Cockerell.
   On orchids, San Fernando (P. L. Guppy).
12. *Lecanium hemisphœricum*, Targioni-Tozzetti.
   On a garden plant, San Fernando (P. L. Guppy).
   Also No. 21 (in part), on *Eranthemum variegatum*, Port-of-Spain (Urich).
7. *Lecanium oleæ*, Bernard.
   On Guava, St. Anns (Urich). New to Trinidad, but a well known pest in the U. S. and elsewhere.
21. (in part). *Orthezia insignis*, Douglas.
   On *Eranthemum variegatum*, Port-of-Spain (Urich).
   Now first definitely recorded from Trinidad, but is probably the same as *Orthezia* sp. incert. previously recorded. It is also found in Demerara, Jamaica and Mexico.
8. *Vinsonia stellifera*, Westwood. On species of fern St. Anns (Urich). New to Trinidad; previously known in Demerara, Jamaica, Barbados, and St. Kitts.
25. *Aspidiotus destructor*, Sign. On cocoanut palm, St. Quintin Estate, Cedros, also found at Mayaro (Urich).
17. (pars) *Chionaspis minor*, Mask. On *Hibiscus* Port-of-Spain (Urich).
24. *Pinnaspis pandani*, Comst. On Balizier, St. Anns (Urich).
23. *Pinnaspis pandani*, Comst. On *Pandanus*, *Heliconia Biahai L.*, St Anns (Urich).
20. *Pinnaspis pandani*, Comst. On palms, St. Anns (Urich). Most of these were typical, but I found several examples of a new form *albus*, which has the scale white. This form has considerable general resemblance to *Chionaspis minor*, for which it might be mistaken if occurring alone. Intermediate examples were not observed.
17. (pars) *Lecanium depressum*, Targ. On *Hibiscus*, Port-of-Spain (Urich).
28. *Asterolecanium miliaris*, Boisd. On bamboo, St. Anns (Urich). Not before found in the Neotropical Region.
29. *Asterolecanium bambusæ*, Boisd. On bamboo, St. Anns (Urich). New to Trinidad.
30. *Diaspis lanatus*, Ckll. On *Carica papaya*, Port-of-Spain, (Urich). A very serious pest in Jamaica. If only just introduced into Trinidad an effort should be made to stamp it out.

4. *Asterolecanium urichi*, n.sp. On palms, Port-of-Spain, (Urich). Scale slightly over 1 mm. long, elongate-oval, shiny, brownish, more or less translucent, with an obscure median longitudinal ridge; fringe short, reddish; surface of scale pitted.
Fringe consisting of numerous parallel straight rods which curl at their ends.
Seen by transmitted light, the scale appears transparent, and the pits or depressions (which are large and numerous) pale lilac. This is of course not due to pigment; the same effect is observed in *A. miliaris*. The animal itself is pale yellow, turning orange in caustic soda. This colour-change to a sort of apricot colour is very well marked, and is observed also in *A. miliaris*. The structural characters are ordinary, but the mouth parts seem rather more elongate than usual in the genus. Easily distinguished from *A. palmæ*, which is much narrower in proportion to its length, and bright lemon yellow in colour. From *A. miliaris* it is distinguished by the shape, and the rounded (not narrowed as in *miliaris*) end of the scale.

16. *Inglisia vitrea*, n.sp. On *Acacia* sp., Port-of-Spain (Urich). 3 mm. long, 1½ wide, oval, moderately convex. Glassy scale white, with a conspicuous median longitudinal ridge; posterior cleft large, about one-third total length of scale. Surface of scale strongly but finely striate radiately on sides; the apparent striations, highly magnified; resolve themselves into rows of small dots (air cells?). The dorsal portion of this scale is divided into testudinoid plates; there are apparently six series of such plates, three along each side, but the two middle series are the sides of a single median row, divided only by the keel or ridge. Beyond these the broad margin is not divided into plates.
The plates are concentrically striate, with a granular patch in the middle of each. The median row of plates consists of two large dorsal ones, and two smaller posterior ones. The second row consists of three plates on each side, and the third row of seven on each side. Margin with a fringe of rods at rather distant intervals. The subtransparent scale removed leaves the insect shiny red-brown, looking like a *Lecanium*. Derm with large gland-pits near the margin; margin with simple spines, varying in size. Anal plates with their outer sides subequal. In two specimens carefully examined (adults) I failed to find any trace of legs or

antennæ ; but an individual of the second stage showed the legs normal, digitules of claw and tarsal knobbed hairs present ; antennæ also present, but short, considerably shorter than tibia + tarsus, with some hairs near its tip. Two short caudal setæ.

One specimen was infested by an hymenopterous parasite.

This is the first genuine *Inglisia* found in the neotropical region, and it may have been introduced from Australia or new Zealand. Mr. Maskell has kindly sent me his *I. fagi, ornata, leptospermi, patella,* and *foraminifer* and on comparison I find it is none of these. The remaining species, *I. inconspicua*, resembles it quite closely ; but judging from Maskell's figures and description, it cannot be this,—more especially by the character of the glassy plates.

6. *Pulvinaria (Protopulvinaria) pyriformis*, n. sp. On guava, at St. Anns (Urich).

Female scale flat, pyriform, about $2\frac{1}{3}$ mm. long and 2 broad ; reddish-brown rather shiny radiately finely ridged : anal plates almost exactly in the middle of the scale, but rather anterior than posterior. Cottony matter (ovisac) projecting slightly round hind margin of scale ; the cottony matter consists of curled waxy filaments.

Margin of scale with hairs with enlarged ends, mostly branching at tips. Anal plates extremely long and narrow, the posterior outer side much shortened, and the anterior outer side greatly produced. Anal ring with apparently about eight hairs. Femur about a quarter longer than tibia, tibia about a quarter longer than tarsus. Tarsal knobbed hairs ordinary, but digitules of claw large, stout, with large knobs and somewhat bulbous bases ; they extend considerably beyond the claw.

Antennæ 7 jointed, 7, 2 and 3 about equal, or 7 a little longer. 5 and 6 equal and shortest. 4 distinctly longest. Last joint emitting some long hairs ; a very long hair from 4th joint.

Young oval, pale yellow, with a wide caudal incision and moderately long setæ, spring from distinct tubercles digitules of claw and tarsal knobbed hairs present. Last joint of antenna emitting two exceptionally long hairs

Eggs oval, lemon yellow.

Found on the under side of the leaf, close to the midrib, female scales only seen. Male unknown.

This interesting species is placed in *Pulvinaria* because it has a cottony ovisac, though little developed. It is, however, very close to *Lecanium mangiferæ* and its allies, if we except the generic characters. It may be considered typical of a new subgenus *Protopulvinaria*, distinguished by the flat pyriform female scale, with very long anal plates, and a slightly developed cottony ovisac.

26. *Pulvinaria simulans*, n. sp. On tree not identified, Port-of-Spain (Urich).

Length, with sac, about 5 mm., length of sac about 3 mm breadth of sac about 2 mm.

Shrivelled female brown; ovisac snow-white, depressed, with parallel sides, not ribbed, closely felted, not at all overlapping scale.

Antennæ of 7 joints; 4, 5, 6, 7 sub-equal, 4 shortest. 3 longest. 6 has a false joint near its end, but I feel sure is only one joint. Tibia about one-third longer than tarsus. Tarsal knobbed hairs ordinary; digitules of claw very large and thick, with large knobs. Margin of scale with simple spines; spines of lateral incisions distinct, one of each pair longer than the other, in one case the longer spine was bifid. Anal plates short and broad. Anogenital ring with very many hairs.

It is attacked by a Chalcidid parasite.

Compared with *P. camellicola* from Macon, Georgia (sent by Dr. C. V. Riley, the locality is a new one) it is practically the same, so far as external appearance goes. The microscopical characters, however, are not quite those of *camellicola*; and *P. simulans* occurs on the under-side of a leaf which is certainly not camellia. *P. psidii* is also somewhat similar (I have specimens from Mr. Maskell), but it occurs massed together, not singly like *simulans*. Many of the species of *Pulvinaria* are very closely allied, and while I consider it best to treat *simulans* as distinct, I realise the possibility that future investigations may show it to be a variety of *camellicola*.

Agricultural Experiment Station, Las Cruces,
New Mexico, U.S.A. Oct. 7th 1893.

A CHECK LIST OF THE COCCIDÆ OF THE NEOTROPICAL REGION.

By T. D. A. Cockerell, F. Z. S., F. E. S.

Note.—All Mexican species are included though some are hardly neotropical. Species also found outside the Neotropical Region are marked with an asterisk.

Ortonia, Sign.
1 O. bouvari, Sign Guatemala
2 O. uhleri, Sign Ecuador
Leachia, Sign.
3 L. braziliensis, Walk B. Ayres
Icerya, Sign.
4 I. montserratensis, R & H W.I.
5 I. palmeri, R & H Mex.
*6 I. purchasi, Mask Mex.
*7 I. rosæ R & H W.I.
Llaveia, Sign.
8 L. axinus, Llave Mex.
b. var. dorsalis, Dugès Mex.
Capulinia, Sign.
9 C. sallei, Sign Mex.
Acanthococcus, Sign.
10 A. tomentosus, Lam Mex.
Dactylopius, Costa.
*11 D. citri, Bdv W.I., Mex.
*12 D. longifilis, Comst W.I.
13 D. mexicanus, Ckll. Mex.
14 D. virgatus, Ckll. W.I.
b. var. farinosus, Ckll. W.I.
c. var. humilis, Ckll. W.I.
15 D. segregatus, Ckll. W.I.
16 D. brevipes, Ckll. W.I.
17 D. simplex, Ckll. W.I.
18 D. filamentosus, Ckll W.I.
19 D. nipæ, Mask. Demerara
Coccus, L.
*20 C. cacti, L. Mex. W.I.
b. var. bassi, Targ Mex.
c. var. sylvestris, Th-Mer Mex.
Margarodes, Guild.
21 M. formicarium, Guild W.I.
Conchaspis, Ckll.
22 C. angrœci, Ckll. W.I.
Lichtensia, Sign.
23 L. lutea, Ckll Mex.
Pulvinaria, Targ.
24 P. cupaniœ, Ckll. W.I.
25 P. dendrophthorœ, Ckll W.I.
26 P. urbicola, Ckll. W.I.
27 P. simulans, n. sp. Trinidad
subg. Protopulvinaria, n. subg.
28 P. pyriformis, n. sp Trinidad
Lecanium, Ill.
*29 L. hesperidum, L. Mex., W.I.
30 L. terminaliœ, Ckll. Mex., W.I.
31 L. schini, Licht MS., Ckll. Mex.
*32 L. mangiferæ, Green W.I.
33 L. rubellum n. sp Jamaica
34 L. assimile var amaryllidis, Ckll. W.I.
*35 L. longulum, Dougl. W.I.
*36 L. tessellatum, Sign. W.I.
37 L. begoniœ, Dougl. Dem. W.I.
*38 L. depressum, Targ. W.I.
*39 L. oleœ, Bern W.I. Mex.
*b. var testudo, Curt. Dem., W.I.
*40 L. hemisphœricum, Targ. W.I.
*41 L. filicum, Boisd W.I.
*42 L. coffeœ, Walk Brazil
*43 ? L. hibernaculorum, Boisd Dem. W.I.
44 L. sallei, Sign Mex.
45 L. verrucosum, Sign. Montevideo
Ceroplastes, Gray.
*46 C cirripediformis, Comst. W.I.
47 C. plumbaginis, Ckll. W.I.
48 C. depressus, Ckll. W.I.
49 C. denudatus, Ckll. W.I.
50 C. psidii, Chav. Brazil
b. subsp. cistudiformis, Twns. MS. Ckll. Mex.
51 C. janeirensis, Gray Brazil
52 C. jamaicensis, A. White W.I.
53 C. chilensis, Gray Chile
*54 C. floridensis, Comst. W.I.
55 C. fairmairii, Targ. Montevideo
56 C. cassiæ, Chav. Brazil
*57 C. ceriferus, Anders, W.I. Mex. = dugesii, Licht. MS. Twns.
*58 ? C. myricæ, L. Jamaica
59 C. utilis, Ckll. W.I.
*60 C. irregularis, Ckll. Mex.
Vinsonia, Sign.
*61 V. stellifera, Westw. W.I. Dem.
Inglisia, Maskell.
62 I. vitrea n sp Trinidad
Fairmairia subg. Ceroplastodes subg nov.
63 F. nivea Ckll. Mex.
Tachardia, Sign.
*64 T. lacca, Kerr Demerara
65 T. mexicana, Comst Mex.

66 T. gemmifera, Ckll. W.I.
LECANOPSIS, Targ
67 L. dugesii, Licht. & Sign. Mex.
PROSOPOPHORA, Dougl.
68 P. dendrobii, Dougl Demerara
ASTEROLECANIUM, Targ.
*69 A. bambusæ, Boisd W.I.
*70 A. miliaris, Boisd Trinidad
71 A. urichi, n. sp. Trinidad
72 A. palmæ, Ckll. W.I.
*73 A. pustulans, Ckll. W.I., Mex., Dem.
*74 A. aureum, Boisd W.I.
= oncidii, Ckll.
ORTHEZIA, Box
*75 O. insignis, Dougl. W.I. Dem.
76. O. prælonga, Dougl. W.I. Dem.
ASPIDIOTUS, Bouché
*77 A. ficus, Riley MS. Ashm W.I. Mex.
78 A. scutiformis, Ckll Mex.
79 A. articulatus, Morg W.I. Mex.
*80 A. aurantii, Mask W.I.
81 A. personatus, Comst W.I.
82 A. biformis, Ckll W.I.
b. var cattleyœ, Ckll. W.I.
c. var odontoglossi, Ckll. W.I.
83 A. dictyospermi, Morg W.I. Dem.
b var. arecæ. Newst, Demerara
84 A. mangiferœ, Ckll. W.I.
85 A. punicæ, Ckll. W.I.
86 A. diffinis, Newst, M.S. Dem
= affinis, Newst (not Targ.)
87 A. palmœ, Ckll. W.I.
*88 A. uvæ, Comst. W.I.
*89 A. rapax, Comst. W.I.
*90 A. destructor, Sign, Dem. Trin.
b. var fallax Ckll. W.I.
c. var cocotis, Newst. W.I. Dem
*91 A. nerii, Bouché Mex. Chili
92 A. mimosæ, Comst Mex.
93 A. sacchari, Ckll. W.I.
94 A. longispina, Morgan Dem.
PARLATORIA, Sign.
*95 P. pergandii, Comst. W.I.
*96 P. proteus, Cust W.I.
PSEUDOPARLATORIA, Ckll.
97 P. ostreata, Ckll.
MYTILASPIS, Sign.
*98 M. citricola, Pack, W.I.
*99 M. albus, Ckll. W.I.
100 M. crotonis, Ckll. W.I.
PINNASPIS, Ckll.
*101 P. pandani, Comst.
b. var albus, Ckll. Trin. W.I.
102 P. bambusæ, Ckll. W.I.
FIORINIA, Targ.
*103 F. fioriniæ, Targ. W.I.
ISCHNASPIS, Dougl.
*104 I. filiformis, Dougl. W.I. Dem.
AONIDIA, Sign.
*105 A. lauri, Bouché Chili
CHIONASPIS, Sign.
*106 C. minor, Mask W.I.
*107 C. citri, Comst. W.I. Dem
*108 C. brasiliensis, Sign, Bra. Trin.
AULACASPIS, Ckll.
*109 A. rosæ, Bouché W.I. Dem.
*110 A. boisduvalii, Sign, W.I. Dm.
111 A. tentaculatus, Morg, W.I.
*112 A. cymbidii, Bouché, Dem.
DIASPIS, Costa.
113 D. lanatus, Ckll. W.I.
114 D. cacti, var. opuntiæ, Ckll. W.I.
115 D. opunticola, Newst, MS. Dem.
= opuntiæ, Newst
*116 D. pinnulifera, Mask Dem.
117 D. aurantii, Sign. MS. Dem

DESCRIPTION OF A NEW FUNGUS.

By J. B. ELLIS & B. M. EVERHART.

Asteridium moniliferum, n. sp. On living leaf of some tree.* Island of Trinidad, Com. Prof. T. D. A. Cockerell, Aug., 1893.

Perithecia superficial, scattered, hypophyllous, black, scretate, strongly convex, $\frac{1}{3}$—$\frac{1}{2}$ mm. diam., pierced above, of fine cellular texture, with only a very slight rudimentary marginal fringe of

* *Saraca indica, L. (Jonesia Asoka, Roxb.)* Native of India.

mycelium. Asci broad fusoid—oblong, sessile, narrowed at both ends, paraphysate, 8—spored, 70—80 x 15—20 *u*. Sporidia cylindric—fusoid, multiseptate, constricted at the septa so as to present a moniliform appearance, yellowish—hyaline, 30—50 *u*. long, the joints 5—7 x 4—6 *u*.

The specimens were not fully mature, and the sporidia refused to leave the asci, so that their exact length may not be accurately stated.

A QUANK HUNT.

The following is a note omitted in our last *Journal* (through pressure on our space) from the valuable commentary by Mr. T. W. Carr upon his son's paper "A Quank Hunt." There are some more notes, but these arrived too late for this *Journal*, and, it is hoped, they will be embodied in some other form in another article.

v. Vines and lianes (*liane* is the Creole-French term for a ligneous wyth or bushrope ; *bejuco* or *vejuco*, in Spanish). These plants are ubiquitous in tropic American forests, they are rope-like, from one to some inches in diameter according to age and kind. They climb to the tops of the highest trees and only then burst into flower ; and tangle there in a luxuriant mass. It is curious to find this form in so many of the Natural Orders : the native lianes number at least 18 (N.O.) *Dilleniaceæ* includes the water-wythe (*liane de l'eau*) ; *Polygalea*, the boa-like *liane paque*, *Securidaca*. The Gamboge order yields the Arali. *Ternstræmiaceæ* contains the richly-flowered 'Prince of Wales Plume,' native of this and of Guiana. *Malpighiacea* owns the orchid-like, petalled, yellow-flowered *Stigmaphylla*. In *Rhamnea* is the Chawstick (*liane savon*). The Grape-order, *Ampelida*, contains the Blister-leaf, *Cissus sicyoides*, also the *Vitis caribbæa*. The *Sapindaceæ* contains several bushropes, notably the supplejacks (several species.) The *Legume* order has the biggest, toughest, most singular of all, the broad, flattened, pale-skinned, many-stemmed, wavy monster, the chain-wythe or *liane tassajo*—so-called from a resemblance to beef cut on the Pampas or Llanos, salted, dried in the sun for export to Trinidad or Cuba. The showy-flowering *Mucuna* belong also to *Leguminosæ*—with several other lianes, trailers, climbers and vines. The Brush-liane whose long, even-topped mass of scarlet flowers takes the form of a butler's crumb-brush, belongs to the *Myrobalans* order (*Combretaceæ*). The usually herbaceous Passion flowers, of which Trinidad owns several wild species, has at least one ligneous-stemmed example,

the most refreshing fruited Bell-apple (*pomme liane*), that makes a liane of some substance when old. The amount of fruit obtained from it is altogether disproportionate to it's ugly wooded tangle. A woody-vined gourd, *Feuillea cordifolia* of *Cucurbitaceæ*, whose fruit, globose, 5 or 6 inches through, soft-shelled, contains a number of large, compressed, S-shaped, bitter nuts, 1½ to 2 inches long, having an oil which preserves the edges of fine tools and instruments from oxidation. The nut is valued locally as an alexiteric, against snake-poison, and, it is said, other parts of the plant are alexiphasmic in a case of vegetable poisoning. *Ebenaceæ* grows the toothbrush stick (*bois canique*, or *bois brosse à dents*). The milky, poisonous-juiced *Apocyneæ*, in whose beautiful flowers an orangy yellow or creamy white generally prevails or monopolises, is the parent of the golden *Allamandas* and the lovely *Odontadenias*. *Bignoniaceæ* embracing our lovely Pouis, the soundest wood in the Island, has at least two lianes or bushropes, the *liane crabbe*, dedicated as *Macfadyena*, to the author of the Flora of Jamaica, a work unfortunately left unfinished by Dr. McFadyen's untimely death. There are three species natives in Trinidad, the *M. corymbosa*, Gr., gathered by Schach and Crüger, the yellow-flowered *M. uncinata*, A. de Cand., found by Crüger, and a rosy and white-flowered kind (the *liane crabbe*) growing on a hedge in the Belmont Road. The second native liane is the *Bignonia unguis*, appropriately called Claw vine, as its fine, recurved hooks enable it freely to hold to and climb any trunk. It sends out a wealth of clustered golden poui-flowers, hard to tell from the rich flowers of the Black Poui. The once tiny stems gain a thickness of 2 or 2½ inches. The pod is thin, narrow, ribandy, running to 3 and even 3½ feet long. Among the Palms a native genus is found which condescends to play the climber, armed with fierce, metal-like hooks. It is called 'wait-a-minute' by the English, and *croc-chien* or dog tusk by the creole woodmen. The East Indian Rattans (*Calamus*, perfectly at home in the Botanic Gardens) may be considered the counterpart of our *Desmoncus*, of which Trinidad has two species, *D. major* of Cr. and *D. minor* of H. Prestoe. One of these is probably the *D. polyacanthus*, Mart. (native of Trinidad, St. Vincent, Tobago, British Guiana and Brazil); a thin-stemmed D. which bears knotting like a supplejack, is common. This may be Prestoe's undescribed *D. minor*. Can it be the Brazilian *D. prunifer* of Pœppig?

The following *Errata* occurred in Mr. Carr's Notes in No. 11: At foot of page 273, instead of *ratrajo*, read *rastrajo*. In note (*u*), instead of 287, read 297.

END OF VOL. I.

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