NOTES ON POLYPLACOPHORA, CHIEFLY AUSTRALASIAN. (Part II.)

By Tom Iredale.

Read 13*th May*, 1910.

The genus *Eudoxochiton*.

On Sunday Island, Kermadec Group, I collected two small shells which superficially seemed referable to *Callochiton*. The girdle appeared to be composed of minute diamond-shaped scales, whilst internally the sutural laminæ were connected. They were, however, traced to *Eudoxochiton*. Upon microscopical examination the girdle was found to be leathery and crinkled, but quite devoid of hairs. Reference showed that a section of *Callochiton* had, instead of a scaly girdle, one with hairs; that was, differing in no way from *Eudoxochiton* save in the nature of the teeth. A member of that section is *inornatus*, Ten.-Woods, an inhabitant of Tasmania; this is a shell much less than *Eudoxochiton*, but still larger than *Callochiton platessa*, Gould. Superficially it would pass for a small *Eudoxochiton*. The coincidence of size, habitat, and facies interested me, and suggested relationship between the two genera. I had not completed my studies when I received Dr. Thiele's work, wherein he transfers *Eudoxochiton* to his sub-family Callochitoninæ. His reasons for so doing appear sound, and in this disposition I would concur. In the present state of our knowledge this seems more suitable than the position selected for *Eudoxochiton* in Pilsbry's classification.

New Zealand Onithochitons.

Quoy & Gaimard (Voy. Astrolabe, Zool., vol. iii, p. 393, pl. lxxv, figs. 19–24, 1835) described *Chiton undulatus* as a smooth shell. Reeve wrote (Conch. Icon., pl. xvi, figs. 87–90, sp. 87, 1847), "lateral areas sometimes obscurely ridged." Hutton's description (Man. N.Z. Moll., p. 114, 1880) reads, "with indistinct radiating moniliform ridges.

In the Bull. Soc. Philom., Paris, 1880–1, p. 120, Rochebrune introduced three new species, and the following year in the same Journal, p. 190, duplicated one of these by giving a new name to the same shell as he had previously described. These four names obviously refer to one species, which is as certainly Reeve's *undulatus*.

In the Man. Conch., vol. xiv, p. 247, pl. lv, figs. 10, 11, Pilsbry introduced a new species *semisculptus*, of unknown habitat, and in the next volume, p. 106, referred to Rochebrune's four species as unrecognizable. In 1904 Wissel recorded *semisculptus*, Pils., from the Chatham Islands, and added a new species, *marmoratus*, to the New Zealand list. Suter, the following year (Journ. Malac., vol. xii, p. 71, 1905) reported *semisculptus* also from the Chathams, Wissel's work being unknown to him. Later, Suter (Proc. Malac. Soc., vol. vii, p. 297, 1907) introduced a new species *nodosus*, and then, receiving Wissel's paper, alleged (Nachr. deutsch. malak. Ges., vol. xli, p. 75) that *marmoratus* was simply a colour variant of

undulatus. This view appeared reasonable from Wissel's figures and description (Zool. Jahrb. Syst., vol. xx, p. 660, figs. 67–9, 1904), but Thiele (Revision . . . Chitonen, 1909, p. 99), from an examination of Wissel's type, has shown *marmoratus* to be the shell later named *nodosus* by Suter, Wissel having omitted to point out the salient characters of his species both in the figure and description. Thiele has, moreover, stated that all Rochebrune's species have priority over *semisculptus*, with which they are identical; further, that these are all synonyms of *undulatus*, and I can see no reason for disagreement. The majority of the specimens in the British Museum are "*semisculptus*", and vary so that they become inseparable from a perfectly smooth *undulatus*. If, however, a name is required for this form, *Filholi*, Rochebrune, must be used.

Recently Suter has given the *Onithochiton* from the sub-Antarctic Neozelanic islands varietal rank under the name *subantarcticus*. I have seen many specimens from the Auckland Islands, and upon dissection find that the teeth are much shorter than in *undulatus*. As the internal characters vary very little in *Onithochiton*, the fact that there is a noticeable variation in conjunction with geographical distribution and colour constancy would induce me to give this shell specific rank. Consequently I would recognize three species of *Onithochiton* from Neozelanic waters: *undulatus*, Q. & G., of which *Filholi*, *decipiens*, *Astrolabei*, and *neglectus*, all of Rochebrune, and *semisculptus*, Pilsbry, are synonyms; *marmoratus*, Wissel, of which *nodosus*, Suter, is a synonym; and *subantarcticus*, Suter. Filhol has described *Lepidopleurus Campbelli* from Campbell Island (*Comptes Rendus*, vol. xci, p. 1095, 1880). Thiele wrote (Revision, p. 78), "so ist *Lepidopleurus Campbelli* ein dunkelbrauner *Onithochiton undulatus*." If this were so the name would be applicable to Suter's var. *subantarcticus*. But Filhol's description, given below, indicates a yellow specimen of *Ischno. Gryei*, Filhol: "Couleur jaune clair, dernière valve plus grand que la première, couverte de lignes concentriques, granulées; aires latérales marquées de lignes concentriques, à cavité supérieure."

Chiton Georgianus, Q. & G.

Chiton Georgianus, Q. & G., Voy. Astrolabe, Zool., 1835, vol. iii, p. 379, pl. lxxv, figs. 25–30.

The type of this species appears to have been lost. It was transferred by Pilsbry (Man. Conch., ser. 1, vol. xiv, p. 241) to *Liolophura*. Collected by Quoy & Gaimard at King George Sound, South-West Australia, it has not since been met with by collectors. Search should be made at that locality, and the species either rehabilitated or eliminated. From Quoy's good description and figures it would seem to be a valid species. Another doubtful inhabitant of the same locality is *Chætopleura biarmata*, Roch. (Bull. Soc. Philom., 1881–2, p. 195), which Thiele (Revision, ii, p. 73, pl. vii, figs. 19–26) has shown to be a good species and a *Chætopleura*. This genus has not been recorded from Australia. *Chiton Dieffenbachii*, Reeve, Newcastle, Australia, was included by Pilsbry (Man. Conch., vol. xiv, p. 35) as a *Chætopleura*, and was

suggested to be a synonym or variety of *C. lurida*, Sowb., from Peru. The type tablet was marked Peru, and the shell is *lurida*, Sowb., so that it is certain that Reeve's locality is erroneous.

Chiton (Callistochiton) Coppingeri, Smith.

C. (*C.*) *Coppingeri*, Smith, Zool. Alert, 1884, p. 80, pl. vi, fig. *e*.

Though included in the Man. Conch., vol. xiv, p. 275, as a *Callistochiton*, Pilsbry later (Proc. Ac. Nat. Sci. Phil., 1894, p. 72) stated his belief that this was the young of *Ischnochiton fruticosus*, Gould. Examination of the type enables me to confirm this conjecture.

Australian Acanthochites.

The numerous species recently described makes it difficult to assign any specimens without careful comparison of typical shells. Therefore Dr. Thiele (Revision . . . Chitonen, i, p. 48) has left the identification of Rochebrune's and Blainville's species to Australian Chiton students. He has pointed out, however, that *Sueurii*, Blainv., must replace the familiar *asbestoides*, Smith. From the good figures of *scaber*, Blainv., given by Thiele, it should be easily identified if Australian.

Acanthochites turgidus, Roch., alleged to have been collected by Péron et Lesueur, may be *Bednalli*, Pilsbry.

Acanthochites jucundus, Roch., supposed to have been collected in New Holland by Belligny, and Cooks Straits by Filhol, I should cross off the Australian list until rediscovered. The Cooks Straits shells Thiele admits to be *Zelandicus*, Q. & G., and the New Holland shells I should certainly so name. The bottle contained about a dozen specimens, and it is almost impossible to suggest the occurrence of so plentiful a shell in Australian waters without any collector retaking it. Rochebrune has named a shell *Ac. Bellignyi*, apparently collected in New Caledonia by Belligny. Thiele's examination of the type proves it to be identical with *jucundus*, and I conclude this habitat must also be doubted. From my studies of these specimens and localities, I must advocate the non-acceptance of any of these species without confirmation.

Acanthochites tristis, Roch., I would consider the same as the species described by Thiele as *Thilenuisi* from New Zealand. No certainty can be arrived at without examination of suites of specimens in this genus, the variation in *Acanthochites* being unknown. The sculpture and form become modified by the action of environment, and this has not yet been taken into consideration when describing new species. I am led to make this statement by the examination of a series of *Acanthochites rubiginosus*, Hutton. Suter figures a short broad low shell, and this form I have seen from Stewart Island. A series dredged by Macgillivray in the Hauraki Gulf consists almost entirely of elongate, narrow, very highly keeled shells, only one, a young specimen, being short, broad, and low. Another lot collected by the early explorers is mixed, but again high-keeled forms predominate. The sculpture is quite variable, the pustules varying tremendously in size, and also in shape, whilst the ribbing on the anterior valve is quite an uncertain feature, in two instances

being absolutely missing. All the specimens of *laqueatus*, Sowb., I have yet seen have been low shells with the tail-valve many-slit, whilst the *rubiginosus*, Hutt., have all had few slits in that valve. But the number of slits is quite variable also, and these facts must be borne in mind when the differentiation of species of *Acanthochites* is undertaken.

Abnormal Chitons.

In the Trans. N.Z. Inst., vol. xi, p. 375, 1907 (1908), I recorded the occurrence of a five-valved specimen of *Chiton pellis-serpentis*, Q. & G., and a six-valved *Plaxiphora ovata*, Hutton, commenting upon the scarcity of such finds. I had never seen a seven-valved specimen at that time, nor have they been frequently met with by any collector. Yet they would appear to be more common than records show, or else I have been peculiarly fortunate. At Port Curtis, Queensland, I collected all the specimens of *Sclerochiton Curtisianus*, Smith, only sixteen in all, I could find, yet among these was a beautiful seven-valved shell. As this had not been detected whilst collecting, it caused me to look through my Kermadec shells, with the result that I unearthed two seven-valved Ischnochitons, one of which I have unfortunately mislaid. At Seascale, Cumberland, England, the only Chiton I could find was *Cras. cinereus*, Linn., but I was exceedingly gratified to note a seven-valved specimen. This is the first one I have seen living.

How easily abnormalities can be passed over is evidenced in the British Museum by a series of six *Plaxiphora Matthewsi*, Iredale, collected by Mr. Matthews and presented by Mr. Bednall. Though such keen collectors, it would appear they have overlooked that one of these has only six valves.

Queensland Polyplacophora.

When Chiton-collecting in New Zealand I became interested in Australian forms, and through the co-operation of my esteemed correspondents, Messrs. E. H. Matthews and A. F. Basset Hull, I acquired a fairly representative collection of the Chitons of Southern Australia. I drew up some tables showing the distribution of the recorded species, and much of interest revealed itself. Two noticeable features were the poverty of the known Tasmanian fauna and the entire lack of Queensland records. The former, I believe, is due to the greater attention given to these molluscs in other states, not to the inferiority of the fauna. In respect to the latter no collections appear to have been recorded, and very little attention has been paid to the collection of Chitons. In February, 1909, the opportunity presented itself to me of investigating the Chiton fauna of sub-tropical Queensland. I have just received from Mr. Hedley his Catalogue of the Marine Mollusca of Queensland (Proc. Aust. Ass. Adv. Sci., 1909), and on p. 352 he only totals twenty species in the class Amphineura, of which two are Aplacophora. In view of this list and the collections I made, it seems opportune to record the latter with some comments

on their nature. Since I drew up these notes I have read Hedley's paper in the P.L.S. N.S.W., vol. xxviii, 1903, on the effect of the Bassian Isthmus on the Marine Fauna of Australia. As my studies in Chitons completely confirm his conclusions, I am herewith amplifying my previous report by incorporating a short account of the Australian Chiton fauna in the terms introduced by Hedley in that paper. Consequently this note has developed into a review of that class of the marine Mollusca of Southern and Eastern Australia, practically forming an Appendix to Hedley's essay. In the place quoted Hedley introduced some new names for the divisions he proposed as follows: the extent of Southern Australia from Melbourne to Westralia he calls the *Adelaidean Region*; the east coast of Tasmania, Gippsland, and New South Wales constitute the *Peronian Region*; the Queensland coast from Moreton Bay to Torres Straits he terms the *Solanderian Region*; whilst from Torres Straits to Houtman's Abrolhos is named the *Damperian Region*. It must be remembered that these terms apply to the marine fauna only, and that the Solanderian and Damperian are only subdivisions of the Indo-Pacific fauna, and that the Peronian and Adelaidean Regions are only subdivisions of the Euronotian or Bassian fauna. Hedley notes that considerable interchange has taken and is yet taking place between the Peronian and Adelaidean Regions.

To return to the Queensland Polyplacophora: the list made up by Hedley consists almost entirely of Torres Straits, Port Molle, and Port Curtis records. It is at once recognized as typically Solanderian, no fewer than twelve of the eighteen species being confined, as far as the east coast of Australia is concerned, to Queensland, north of Moreton Bay. I collected at Caloundra, just north of Brisbane, and there procured some fifteen species and one variety, all of which, with one exception, have been obtained at Port Jackson, New South Wales, and no fewer than ten species are additions to Hedley's list. At Port Curtis, about 300 miles to the north, this fauna is non-existent. As I will shortly show, Australian Chitons have very limited range, and the fact that the Peronian Chitons die out between Caloundra and Port Curtis shows Hedley's limits for his regions to be maintained by the study of this class. The species I collected at Caloundra were—

**Plaxiphora costata*, Blainv.
**Acanthochites costatus*, Ad. & Ang.
**A. variabilis*, Ad. & Ang.
**A. retrojectus*, Pils.
Callistochiton antiquus, Reeve.
**Chiton limans*, Sykes.
**C.* n.sp., near *Coxi*, Pils.
C. translucens, Hedley & Hull.
**Callochiton platessa*, Gould.
Onithochiton quercinus, Gould.
Liolophura Gaimardi, Blainv.
Ischnochiton australis, Sowb.
**I. crispus*, Reeve.
**I. divergens*, Reeve.
**I. smaragdinus*, Angas.
**I. smaragdinus picturatus*, Pils.

Those not included in Hedley's list are marked with an *.

I have collated a total of ninety-five Chitons for Australia, of which, politically, twenty-eight belong to Queensland, thirty-one to New South Wales, thirty-seven to Victoria, fifty-two to South Australia, and twenty-five to Tasmania. I have only one record from West Australia, though I have seen three species purporting to come from

the Swan River. All the three appear distinct from Adelaidean forms. Biologically the species may be proportioned thus:—

SOLANDERIAN.

Ischnochiton Adelaidensis, Reeve.
Sclerochiton miles, Pils.
S. Curtisianus, Smith.
Chiton pulcherrimus, Sowb.
Schizochiton incisus, Sowb.
Cryptoplax Burrowi, Smith.
C. oculatus, Q. & G.
Onithochiton quercinus, Gould.
Tonicia fortilirata, Reeve.
T. picta, Reeve.
T. confossa, Gould.
Acanthopleura spinosa, Brug.
A. spiniger, Sowb.

PERONIAN.

Lepidopleurus badius, H. & H.
Ischnochiton divergens, Reeve.
I. fruticosus, Gould.
I. lentiginosus, Sowb.
I. smaragdinus, Angas.
I. australis, Sowb.
Chiton pellis-serpentis, Q. & G.
C. limans, Sykes.
C. jugosus, Gould.
C. Coxi, Pils.
C. translucens, H. & H.
C. Vauclusensis, H. & H.
Plaxiphora Pæteliana, Thiele.
Choriplax Grayi, Ad. & Ang.
Callochiton platessa, Gould.
Cryptoplax striatus, Lam.
Tonicia Carpenteri, Angas.
Acanthochites costatus, Ad. & Ang.
A. Coxi, Pils.
A. retrojectus, Pils.

DAMPERIAN.

Onithochiton Scholvieni, Thiele.

DEEPWATER SPECIES.

Lepidopleurus columnarius, H. & M.

DOUBTFUL POSITION.

Ischnochiton crispus, Reeve.
Chiton, n.sp., near *Coxi*, Pils.
Liolophura Gaimardi, Blainv.
Callistochiton antiquus, Reeve.
Lorica volvox, Reeve.
Loricella Angasi, Ad.
Callochiton inornatus, Ten.-Wds.
Acanthochites Sueurii, Blainv.

ADELAIDEAN.

Lepidopleurus inquinatus, Reeve.
L. Matthewsianus, Bedn.
L. cancellatus, Sowb. (?).
Ischnochiton juloides, Ad. & Ang.
I. Pilsbryanus, Bedn.
I. pallens, Ashby.
I. cariosus, Pils.
I. virgatus, Reeve.
I. contractus, Reeve.
I. sulcatus, Q. & G.
I. carinulatus, Reeve.
I. arbutum, Reeve.
I. Novæhollandiæ, Reeve.
I. Mayi, Pils.
I. pura, Sykes.
I. Wilsoni, Sykes.
I. Pilsbryi, Bedn.
I. variegatus, Ad. & Ang.
I. ptychius, Pils.
I. Tateanus, Bedn.
I. Tateanus, var. (= n.sp.).
I. Thomasi, Bedn.
I. resplendens, B. & M.
I. sculptus, Sowb.
I. ustulatus, Reeve.
Chiton tricostalis, Pils.
C. calliozona, Pils.
C. exoptandus, Bedn.
C. Torrianus, H. & H.
C. aureomaculatus, B. & M.
C. Bednalli, Pils.
C. Verconis, Torr & Ashby.
C. oruktus, Maughan.
Plaxiphora albida, Blainv.
P. costata, Blainv.
P. Matthewsi, Iredale.
Callochiton rufus, Ashby.
Cryptoplax Gunnii, Reeve.
Onithochiton Ashbyi, B. & M.
Acanthochites speciosus, H. Ad.
A. Bednalli, Pils.
A. Pilsbryi, Sykes.
A. Matthewsi, Bedn. & Pils.
A. glyptus, Sykes.
A. Wilsoni, Sykes.
A. granostriatus, Pils.
A. variabilis, Ad. & Ang.
A. cornutus, T. & A.
A. crocodrilus, T. & A.
A. exilis, T. & A.
A. Tatei, T. & A.
A. Maughani, T. & A.

We have thus thirteen species allotted to the Solanderian Region, only one of which ranges into the Peronian; twenty Peronian species, of which seven have reached into the Adelaidean Region; of the

fifty-two species I consider Adelaidean only five have as yet been recognized in the Peronian fauna. I know only one Damperian species which does not elsewhere occur. The solitary Chiton at present known from deep water does not concern us. It is of peculiar interest that out of the total of ninety-five species only eight do not easily become placed.

Ischnochiton crispus, Reeve, *Lorica volvox*, Reeve, *Loricella Angasi*, Ad., and *Acanthochites Sueurii*, Blainv., appear to be as plentiful in the Peronian as in the Adelaidean, whilst the last-named ranges into the Solanderian. *Liolophura Gaimardi*, Blainv., is placed by Hedley as a characteristic Peronian mollusc, but I should consider it Solanderian. *Callistochiton antiquus*, Reeve, though found of large size in South Australia, seems Solanderian, but I have not sufficient data to decide.

Callochiton inornatus, Ten.-Wds., I suggest should be attached to the Peronian fauna. The *Chiton* near *Coxi*, Pilsbry, may be Solanderian, but I doubt it. All the preceding figures will need revision when Gippsland and Eastern Tasmania receive as careful attention as South Australia, Port Phillip, or Port Jackson have done. Nevertheless, it will be seen that study of the Chiton faunas shows the extreme localization of species, and consequently points to some apparent misidentifications in the preceding lists.

Chiton pulcherrimus, Sowb., included in Hedley's Catalogue, would appear to need another name, Sowerby's species being recorded from Bohol Island, Philippines. *Tonicia confossa*, Gould, also in Hedley's list, needs reconsideration, though this latter is more probable than the former, the species of *Tonicia* having a wider range than those of *Chiton*, but neither extend far.

The record of *Lepidopleurus cancellatus*, Sowb., from Victoria is obviously incorrect; another dubious record from that locality is *Ischnochiton arbutum*, Reeve; when described, no locality was known; Pilsbry has added Port Essington. From the preceding lists it is argued that both records cannot be accepted. I do not know where the type was collected, so have included Gatliff and Gabriel's shell, though the identification is questionable.

The Euronotian Chiton fauna is characterized by an extraordinary development of the genera *Ischnochiton* and *Acanthochites*; of both these, species are much more numerous in the Adelaidean Region.

Hedley has stated that a collection of Marine Molluscs received from Geraldton, West Australia, was essentially Adelaidean, though masked by an overlap of Indo-Pacific forms. I conclude that the Chiton fauna of West Australia will be of a most interesting nature. It will contain representatives of the Adelaidean Region, Damperian species will also occur, and I anticipate the existence of a few peculiar forms representing the Autochthonian element.

I have omitted from consideration the species described by Blainville, Rochebrune, etc., from "New Holland", which have not yet been recognized, as they probably appear in the lists under different names.

I have just been looking up records of marine molluscs from West

Australia, and, though scanty, there appears distinct evidence of an Antarctic element which has not arrived there via Tasmania. I suggest an Autochthonian element showing forms more closely allied to Neozelanic species than to Euronotian, and that this will be clearly shown by the study of the Chiton fauna.

Kermadec Islands Chiton Fauna.

In the preceding note I have discussed the complex nature of the Australian Polyplacophora and how the forms resolve themselves into four groups, agreeing with the divisions of the Australian marine fauna proposed by Hedley.

"It is to be noted that the Antarctic fauna which passed over New Zealand is quite distinct from, and probably far older than, that other Antarctic element, the Euronotian, which reached Australia through Tasmania" (Hedley, P.L.S. N.S.W., 1899, p. 399).

In support of this may be cited the Neozelanic Chiton fauna, which differs essentially from the Euronotian Chiton fauna. The noticeable features are the poverty of species of *Ischnochiton*, the large size of the *Acanthochites*, the distinct nature of the *Plaxiphora* and *Onithochiton*, and the presence of the genus *Eudoxochiton*.

The Chitons collected at Sunday Island agree in the majority of these items, yet possess so many peculiarities that they deserve some little notice. *Eudoxochiton* is endemic in Neozelanic waters with two distinct species. *E. nobilis*, Gray, lives on the surf-swept boulders, and its form and internal characters are well suited to withstand the force of the waves. *E. Huttoni*, Pilsbry, is easily separated by its much more depressed form and longer teeth, it is only found on the most exposed situations, and would appear to be much rarer. Which is the parent or to which would the parent form be more like would be difficult to suggest. The question is more complicated by the finding on Sunday Island of two forms of *Eudoxochiton*. The occurrence of this genus so far north was entirely unexpected, *Acanthopleura* being anticipated instead. The existence of that genus in New Zealand now depends on the record of two specimens of a West Indian species supposed to have been collected there. As no locality or collector is known, surely no acceptance can be given to such records in the face of the examination of the Australian Polyplacophora. *Acanthopleura* has a wide range, but in Australia it does not extend much outside the tropics. The occurrence of an Australian species of that genus in New Zealand would be doubted; how much more doubt must be received by the report of a West Indian species? The Eudoxochitons of Sunday Island are very puzzling, as the existence of two forms on such a small island I could scarcely credit myself. Yet the shells seem easily separable into two lots, which might be classed as varieties of *nobilis*, Gray: they differ in general form as much from each other as from that species, and are both less elevated. One form is even lower than *Huttoni*, Pils., though in the characters and number of the teeth it absolutely agrees with the other. I have so far been unable to provide a satisfactory explanation for the differentiation of these from

each other, and from the Eudoxochitons of New Zealand. A species of *Plaxiphora* was obtained which agrees with the New Zealand *cælata*, Reeve, in everything save girdle-characters. It has the girdle densely crowded with hairs instead of with few hairs, as in that species. All the specimens collected agreed in this respect. A beautiful smooth *Onithochiton* in the characters of the valves, externally and internally, cannot be separated from smooth *undulatus*, Q. & G. But its girdle is clothed with slender glassy spikes like that of *Onithochiton amicorum*, Baird, from Niue. I have examined the type of this species, and though it is in bad condition it is certainly an *Onithochiton*. A *Chiton* was procured which had developed most peculiar habits: it lived in crevices of rock between tide-marks, huddling together, half a dozen being found one upon another, so that some did not touch the rock at all. This species was entirely black, and allied to *pellis-serpentis*, Q. & G. A small *Lepidopleurus* was living under dirty stones below low-water. It was only on the underside of stones deeply embedded. On smooth stones just below low-water lived species of *Chiton*, of the *æreus*, Reeve, group, and *Ischnochiton*, of the *crispus*, Reeve, group. I have written species, as I have so far failed to realize how many or how few I have collected. The shells can be separated into three forms of *Chiton* and two of *Ischnochiton*, but I am almost in the position of the ornithologist who could see the differences but could not write them down. If these forms could be classed as variations of one species of each genus, that would seem best, but then we are confronted with the facts that *C. æreus*, Reeve, and its relations are very constant, as also is *I. crispus*, Reeve. Then how should a species of such groups commence varying under such restricted conditions as is offered them on such a small area? These forms were all living under absolutely the same conditions, so that I have been forced to suggest that they present convergence of species through the action of identical external conditions. From 15 to 25 fathoms was dredged a fine *Lepidopleurus*, which has no near relation yet on record. It faintly resembles some Japanese species. From a piece of coral pulled out of 6 feet of water at low tide a small *Tonicia* was detached, whose affinities are Polynesian. As valves of similar size were common in dredgings, it would appear to be adult. Associated with these were valves of two small species of *Acanthochites*, a genus not otherwise met with. That the Chitons were not completely collected was evidenced by finding a valve of a large Chiton, apparently a *Cryptoconchus*, in shell-sand on an exposed piece of the coast. When the Chitons of New Caledonia are more fully known than at present, I believe they will show near relationship to those of New Zealand. When Suter described *Chiton Huttoni* (T.N.Z.I., vol. xxxviii, p. 329, 1905 (06)), he remarked, "the affinities of the marine molluscs of New Caledonia and New Zealand are slender." But that species and *C. æreus*, Reeve, have a very close ally in the New Caledonian *C. discolor*, Souverbie (=*minaceus*, Cpr. MSS., and *perpunctatus*, Cpr. MSS.); and the more recently described *Chiton clavatus*, Suter (Proc. Malac. Soc., vol. vii, p. 296, fig. 3, 1907), from New Zealand, seems very near *Chiton*

tuberculosus, Souverbie (Journ. de Conch., p. 251, pl. ix, fig. 3, 1866), from New Caledonia, but this species was compared by the author with the New Zealand *Chiton pellis-serpentis*, Q. & G.

In a preceding note I have observed that to me *Acanthochites jucundus*, Roch., appears conspecific with the New Zealand *Acanthochites Zelandicus*, Q. & G. Dr. Thiele states that *Acanthochites Bellignyi*, Roch., described as from New Caledonia, is identical with *Acanthochites jucundus*, Roch. Confirmation of the locality will add interest to the question, as then, though specific differences may be observed, the shells will be another connecting link.

Through the energy and enterprise of Mr. A. F. Basset Hull, the most enthusiastic Chiton student in Australasia, the Chiton faunas of Lord Howe and Norfolk Islands will shortly be made known. I have had the pleasure of examining his collections, and find they are more probably closely allied to New Caledonian forms than to Peronian species. A *Chiton* and *Ischnochiton* were obtained from Norfolk Island which may agree with one of the puzzling forms mentioned above from the Kermadecs. The *Chiton* of *pellis-serpentis* alliance from the Kermadecs was represented on both Lord Howe and Norfolk Islands by shells which seem distinct from each other. From Lord Howe Island comes a *Lepidopleurus*, which appears to rank between *L. badius*, H. & H., from Port Jackson, New South Wales, and the species from the Kermadecs. An *Acanthochites* and *Onithochiton* were also procured, whose relationships must be sought for among New Caledonian forms. I have concluded that by means of a close study of the Chitons of the Southern Hemisphere we shall be able to trace the source of almost all the species, and the value of such knowledge cannot be over-estimated.