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LORD HOWE ISLAND.

ITS

Zoology, Geology, and Physical Characters.

PRINTED BY ORDER OF THE TRUSTEES,
E. P. RAMSAY, CURATOR.

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No. 1.

THE GENERAL ZOOLOGY OF LORD HOWE ISLAND.

BY

R. ETHERIDGE, JUNR.

(Palæontologist to the Australian Museum, and Geological Survey of New South Wales).

CONTAINING ALSO

AN ACCOUNT OF THE COLLECTIONS MADE BY THE AUSTRALIAN MUSEUM COLLECTING PARTY, AUG.-SEPT., 1887.

PREFACE.

THE present work has a twofold object. It is intended, in the first place, to record the proceedings of a Collecting Party despatched by order of the Trustees to Lord Howe Island in August-September, 1887, and to give descriptions of the specimens so obtained; and secondly, to give an epitome of the general Zoology of the Island, so far as is at present known. From its geographical position, and from the fact that it forms the farthest outlying portion of the territory of New South Wales, a more detailed examination of its fauna than had hitherto been made was deemed desirable.

The determination and description of the collections has been effected by the Museum Staff, with the exception of the rock specimens, which have been obligingly described for the Trustees by Mr. T. W. Edgeworth David, of the Geological Survey of New South Wales.

In 1882 Mr. Alexander Morton, then of this Museum, visited Lord Howe Island for a brief period, and made sundry collections. A description of these is included in the present work, with previous gatherings, chiefly entomological, made by Mr. George Masters, late of the Australian Museum, in 1869; and also that of purchases made from Mr. E. H. Saunders, a collector who spent some time on the Island since the return of the Museum Party.

From unavoidable causes the descriptive account of the Mollusca is not yet ready for publication, although the plates are issued in advance. The former will appear subsequently as a second part of this Memoir.

A description of the remains of the extinct *Meiolania* is also for the present postponed. The Museum is gradually acquiring an extensive series of its bones, and it is intended, at a future date, to issue a separate Memoir dealing with this interesting Reptile.

The work of general Editor has been performed by Mr. Etheridge, under my supervision.

ED. P. RAMSAY,
Curator.

THE GENERAL ZOOLOGY OF LORD HOWE ISLAND;

CONTAINING ALSO

AN ACCOUNT OF THE COLLECTIONS MADE BY THE AUSTRALIAN MUSEUM COLLECTING PARTY, AUG.-SEPT., 1887.

In August last (1887) I was instructed by Dr. E. P. Ramsay, Curator of the Australian Museum, to proceed in company with Messrs. J. A. Thorpe, and T. Whitelegge, to Lord Howe Island. Our instructions were to investigate the general zoology, geology, and palæontology of that little known and interesting island, aptly termed the "Madeira of the Pacific."

In the present Report I have endeavoured to point out what has been accomplished by observers in the past, and to place on record our mutually accumulated notes during a three weeks' residence on the island.

A Preliminary Report of our proceedings has already been published;* it will, therefore, be unnecessary to recapitulate our daily movements and method of procedure. Mention may, however, be made of the assistance we received from Mr. H. A. Unwin, of the Chief Secretary's office, who, although on his way to Norfolk Island, remained the whole time at Lord Howe, and made one of our party, working and collecting with us. The collections have been determined by the Australian Museum staff as below mentioned, viz.:—

The Aves and Echinodermata, by Dr. E. P. Ramsay.
Reptilia and Pisces, by Mr. J. Douglas Ogilby.
Mollusca, by Mr. J. Brazier.
Insecta, &c., by Mr. A. S. Olliff.
Polyzoa, Crustacea, Actinozoa, Protozoa, } by Mr. T. Whitelegge.

New species, or any known forms meriting special notice, will be described.

Lord Howe Island is situated in S. Lat. 31° 33′, and E. Long. 159° 5′†, but its relative distances from Sydney, and the nearest point of New South Wales contiguous to it, are variously given. In an Official Report,‡ however, made by the late Water Police Magistrate, Mr. P. L. Cloete, it is said to be 450 miles north-east of Sydney, and 300 miles from Port Macquarie.

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* Australian Museum (Report of the Trustees for 1887–1888), p. 30.

† Lord Howe Island (Report on Present State and Future Prospects of) by the Hon. J. Bowie Wilson, *N. S. Wales Legislative Assembly Papers*, 1882, 36-A., p, 8. [W. J. Conder, Report of Superintendent of Trigonometrical Survey.]

‡ Lord Howe Island—Official visit of the Water Police Magistrate, and the Director of the Botanic Gardens, Sydney; together with a description of the Island. By Edward S. Hill, 1870 (8vo. Sydney), p. 14.

It is some 500 miles this side of Norfolk Island, and is the most southern of the outlying islands on the east coast of Australia (Frontispiece). It is between six and seven miles in length as the crow flies, but much more taking into consideration the great inequalities of the ground; whilst the average width is only one mile, but more in certain parts. According to Mr. Charles Moore, the Government Botanist, the island contains 3,220 acres, of which 2,000 are capable of cultivation.*

The small group of islets generally comprised under the name of Lord Howe Island consists, in addition to the island proper, of a small islet immediately detached from its southern extremity called Gower Island; a similar one to the north, known as the Sugar-loaf; to the east, separated by somewhat more than half-a-mile of water, another which has received the name of Mutton-bird Island; whilst on the west side, within the Lagoon is Goat or Rabbit Island. To the north, separated from the main island, about a quarter of a mile, is a cluster of six rocks known as the Admirality Islets; and still further north two other rocks, one of them called North Island.

Mr. A. T. Corrie, R.N., in a short paper entitled. "A visit to Lord Howe Island,"† has well remarked that the early history is wrapt in a good deal of mystery. "It was," says Mr. E. S. Hill, "during the passage from Port Jackson to Norfolk Island, that Lord Howe Island was discovered by Lieutenant Henry Lidgbird Ball, Commander of His Majesty's tender 'Supply,' on the 17th February, 1788" ‡ (Pl. VIII). A survey of the Island was made in 1835 by Mr. Surveyor H. F. White, but his report does not seem to have been published. A reduction of his map is given by Hill, from which it appears that many of the original names, presumably bestowed by him on the more prominent features have been since altered (Pl. IX). Another report I have not succeeded in gaining access to—by Dr. Foulis, who resided on Lord Howe for three years, about forty years ago—would probably yield much valuable information of the then condition of the island.

We are in possession of but very few details of the zoology of Lord Howe Island, notwithstanding that several collectors of marked ability, for instance, Macgillivray, Brazier, and Masters have visited it and made collections. Although numerous species have been identified, and some described, the descriptions are so scattered and little known, as to be of small practical value to the working naturalist. The birds have been catalogued, so far as known to him, by Dr. E. P. Ramsay § whilst an epitome of a few days collecting has been furnished by Mr. Alexander Morton,‖ who accompanied the late Dr. Wilson's expedition in 1882.

The scrubby and thickly timbered condition of Lord Howe rendered collecting both tedious and difficult. Its limited size, and the fact that all branches can be more or less pursued at one and the same time to some extent compensated for this. For all practical purposes however, our investigation resolved itself under three heads—that of the high scrubby hills and intervening gullies; the lower lying, and sometimes more open and less hilly ground; and the marine fauna, more especially the relation of the Lagoon and Coral-reef life as compared with that found on other portions of the shores.

* Sketch of the vegetation of Lord Howe Island—Hill's *Lord Howe Island, loc. cit.*, p. 17.
† Proc., R. Geogr. Soc. 1878, XXII, p. 136.
‡ Hill's *Lord Howe Island, loc. cit.*, p. 8.
§ Notes on the Zoology of Lord Howe Island. *Proc. Linn. Soc. N.S. Wales*, VII, pt. 1. p. 86.
‖ Report to the Trustees of the Australian Museum. *Lord Howe Island, Report on Present State, &c.*, 1882, *loc. cit.*, p. 12.

The dense and beautiful vegetation has been ably described by Mr. Charles Moore,* and Mr. John Duff,† of the late Forest Branch, Department of Mines.

The latter says:—"There are probably few islands of similar size possessing so rich and varied a flora as Howe Island, handsome banyan and other trees, shrubs, palms, pandanus, and dwarf ferns growing everywhere in great abundance and luxuriance."

Touching the magnificent Banyan trees to be seen on Lord Howe, Mr. Charles Moore remarks:—"The most remarkable plant, however, upon the Island is a species of *Ficus*, and the only one of the genus found there. Along the whole extent of the flat and richest ground, on the south-west side, this noble tree grows in large numbers—very rarely in exposed situations—but marks distinctly an inner zone of vegetation, being protected on every side by belts of trees of various descriptions. It possesses to an extraordinary degree the branch-rooting characteristics of the famous Banyan of India, *Ficus indica*. From its high wide-spreading branches adventitious roots are produced, which descend to the ground, then rapidly enlarge and become in the course of time huge stems drawing nourishment from the earth for the support and increase of the parent branch, which, as it extends, produces similar root-stems, the tree by this means covering a very large space of ground. In some instances the original stem had perished altogether, the branches becoming separate trees, each with numerous root-stems, and forming by the whole a beautiful amphitheatre of considerable dimensions."

Again, Mr. Duff's observations are interesting:—"These old trees are certainly the most remarkable and interesting features in the vegetation of Howe Island, their large columnar roots descending from the horizontal branches, often from a height of 50 to 60 feet, and at distances of 4 to 6 feet apart, forming a series of supports to them, each root having the appearance of being a separate tree. Some of the largest of these old trees are reputed to cover an area of 2 to 3 acres."

Mr. Moore further states that "every part of the island is covered with a dense vegetation, the undergrowth being kept comparatively clear by pigs and goats, which are allowed to roam at large." At the present time the aspect of the island is very different; the domesticated goats have been abolished by mutual consent on the part of the Islanders, and the pigs penned up, whilst the wild goats and pigs are confined to the two extremities of the Island. Now the scrub and brush is of the most copious description, and renders travelling, except along the beaten tracks, both tedious and difficult.

It may, perhaps, not be out of place to refer here to the palms growing on the island. Both Mr. Moore and Mr. Duff have recorded four species.‡ Up to an altitude of 400 feet the Thatch Palm (*Kentia Forsteriana*,) grows, but it flourishes luxuriantly along the shore flats, in the form of groves. The Curly Palm (*K. Belmoreana*), on the other hand, extends as high as 1,200 feet on the sides of Mounts Ledgbird and Gower. The third species, the Umbrella Palm (*K. Canterburiana*), is first met with at about 1,000 feet § and continues to the summit of the highest of the two mountains, Mount Gower, at an elevation of 2,840 feet. The last and smallest of these handsome

* Sketch of the vegetation of Lord Howe Island. Hill's *Lord Howe Island, loc. cit.*, p. 17.

† Report to the Hon. J. Bowie Wilson, *Lord Howe Island, Report on Present State, &c.* 1882, *loc. cit.*, p. 8.

‡ Sketch of the Vegetation of Lord Howe Island, *loc. cit.*, p. 19.

§ These are the heights given by Mr. Duff.

trees, the Dwarf Mountain Palm (*K. Moorei*,) is confined to the summits of Mounts Gower and Ledgbird. A very remarkable fact in connection with the two lowland species, *K. Forsteriana*, and *K. Belmoreana*, and one I have not hitherto seen mentioned, is worthy of record, and has a bearing on the geology of the island. Wherever the soil is derived from the decomposition of the Coral-sand rock, the Thatch Palm (*K. Forsteriana*) exclusively prevails, whilst the appearance of the Curly Palm at once indicates a volcanic soil. So marked and constant is the position of the two palms, that it may be taken in a general way as an index to the running of geological boundaries between the two formations.

Mr. Moore says that the Thatch and Curly Palms "both grow to about the same height, the highest observed being about 35 feet." In favourable situations, however, these trees attain to a much greater stature than thirty-five feet. I was conducted by Capt. T. Nichols, a resident, to the "Valley of the shadow of Death," a gully on the eastern side of the Island, running down to Middle Beach, where the finest palms are to be seen. Here the Thatch Palm grows with clean, straight stems to heights of 60, 70, and in a few instances to as much as 100 feet, the over-lapping leaves forming a complete canopy above, producing a general gloom, well expressed by the name conferred on the ravine.

The Physical Features of Lord Howe will be described in a subsequent report, when dealing with the Geology.

The remarks which follow are intended to give a general outline of the collections made by us, and an epitome of the zoology of Lord Howe Island, so far as known.

Mammalia.—The first settlers date no farther back than about 1834, when three New Zealand colonists are said to have taken up their residence there with Maori women. Since then there has been a very sparse and fluctuating population, but traces of aboriginal inhabitants have nowhere been discovered. I made every effort to ascertain whether any remains had been met with in caves; or traces of early man in the form of implements, or rock paintings, but without the slightest success.

The only indigenous lower mammals existing on Lord Howe are bats, but even these are not plentiful. A single specimen of *Scotophilus morio*, Gray,* similar to those obtained by Morton was shot by Mr. Unwin, and a larger species was occasionally seen. The "gardens" and other clearings are their favourite haunts, but they are sometimes seen flying around the cottages. Mr. A. Morton, when on the island in 1882, reported the existence of a flying fox,† but careful inquiry failed to elicit confirmatory evidence of this, and none were observed by us. We anticipated meeting with bats in the Coral-rock caves at North Bay, one of the most favourable habitats for them on the whole island, but not the slightest trace was found.

According to Mr. Morton the shores are visited, especially during gales, by seals, probably identical with one or other of the Australian species of *Arctocephalus*.

A mouse, said to have been introduced from Norfolk Island, is now moderately common. It appears to Dr. Ramsay and myself to be a variety of *Mus musculus*, with a larger proportion of yellow-tawny hair, mixed with the fur of the back, than is usually seen in that species. It now frequents the houses, but formerly infested the clearings in such numbers as to become

* Dobson (Cat. Chiroptera, Brit. Mus. 1888, p. 248) calls this *Chalinolobus tuberculatus* Forster, sp.

† Report to the Trustees, &c., *loc. cit.*, p. 12.

a pest. Writing in 1870, Mr. E. S. Hill says,* "Mice within the past two years have accidentally been introduced. They now swarm the island, and threaten to become a great nuisance; they have taken to the fields and burrow in every knoll." To show the remarkable manner in which this little rodent has diffused itself over Lord Howe, we were informed by Mr. W. Nichols that it had been found under the precipitous wall towards the summit of Mount Ledgbird. Rabbits formerly existed on Rabbit or Goat Island, the small islet in the Lagoon, but they appear to have died out. From a remark made by the writer just quoted—"there are a few rabbits, which fortunately are confined to a small island on the west side, between the shore and the reef"—they do not appear to have gained a footing on the main island.

It is a remarkable fact, when we take into consideration the extent of cover and the general physical features, that the indigenous mammalian fauna is practically none. It is one of the strongest arguments in support of the relation of the fauna at large to that of New Zealand, as against its Australian affinities, where the only undoubted indigenous mammals are bats! This comparative absence of the highest forms of animal life is again instanced in the case of the Sandwich Islands. Since the advent of the first settlers, pigs, goats, and the domestic cat have been introduced and lapsed into a natural state. Mr. Campbell Stevens, the Postmaster at Lord Howe, and a very intelligent natural history observer, says that the original cat, which took to the bush, was black, but cats of that colour have entirely disappeared, whilst those met with wild in the hills at present are the descendants of the variety now domesticated there, and in which the black colour does not predominate. Mr. Hill says: "In the olden time, twenty-four years back, a number of cats were sent ashore from a whale ship and turned adrift. These soon became populous, and found an easy prey in the pigeons, parrots, birds like a guinea-fowl, and brown hens, decimating the former and driving the latter to the mountains. These cats are still numerous, and all black."† Goats and swine formerly roamed over the whole island, but both are now largely decreased in number, not so much from hunting, we were told, as from a cause, the explanation of which is not at first apparent. It seems, however, that the breed of neither has been to any extent altered by the introduction of fresh blood, and it is more than probable that deterioration has arisen from the consequent inter-breeding of individuals confined within a limited area. The goats are restricted to the mountainous ground of Mounts Gower and Ledgbird in the south, and the North Ridge at the opposite end of the island, the respective herds remaining separate from one another. Their activity is very remarkable, as shown by the manner in which they ascend and descend the almost perpendicular faces of the cliffs. We observed the ease with which this is accomplished on the sea-face of the North Ridge, when on our cruise to the Admiralty Inlets, where a small party, feeding on some grassy ledges close to the water's edge, on the approach of the boat, zig-zaged their upward course from ledge to ledge, and point to point, until the brow of the cliff was reached, and they disappeared over to the less precipitous land side. The swine are now confined to the southern end of the island, especially on the slopes of Mount Ledgbird. Now and then fine animals are produced, boars, we were told by Mr. G. Nichols, at times reaching 200 lb., but the average all round weight is 100lb. During an excursion to the high ground about Erskine Valley, and on another occasion, when on our way to

* Hill's *Lord Howe Island, loc. cit.*, p. 46.
† Hill's *Lord Howe Island, loc. cit.*, p. 46.

Mutton-bird Point, we observed traces of pigs, both tracks and wallowing places ("mud holes"). An excellent description of the method employed by the Islanders in hunting goats is given by the late Deputy Surveyor-General, Mr. R. D. Fitzgerald,* and is well worth perusal.

Aves.—The birds of Lord Island have received greater attention than any portion of its fauna, but the general information relating to them, and the specific descriptions are very much scattered. In an interesting paper "Notes on the Zoology of Lord Howe Island,"† Dr. E. P. Ramsay gives a list of thirty-four birds known to him as occurring there, but omitting one, an undoubted introduction, there remained at the time his table was published thirty-three indigenous birds. Since then the "Tabular List of all the Australian Birds"‡ has appeared by the same author, in which a comparative table of the Lord Howe and Norfolk Island birds is given. Certain changes in nomenclature are made, which will be referred to hereafter (see p. 16). The collection acquired during our stay at Lord Howe Island, through our own efforts and those of Mr. G. Nichols, comprising about two hundred skins, has been examined and named by Dr. Ramsay, and although we were not fortunate enough to obtain an equal number, several birds were met with, or seen, not mentioned in the list referred to. I have adopted Dr. Ramsay's list and table, distinguishing the species shot by ourselves with an asterisk (*), whilst those which are additions to the record are indicated by a dagger (†), (see p. 17).

Of the rapacious birds, the diurnal division is represented in Dr. Ramsay's list by two Fish Eagles, *Haliaster sphenurus*, Vieill, and *Haliætus lucogaster*, Lath. We did not meet with either of these birds, but the existence of a Hawk, *Circus Wolfii*, was determined. It frequents the North Ridge, usually in the vicinity of Mount Eliza, soaring high, and carefully keeping out of reach. The bird, however, has at times, after the manner of its kind, been known to visit the settlers' poultry-yards, and is said to play great havoc with the wild kids.

The nocturnal section of this group has for its representative *Ninox boobook*, Lath., but is known to the Islanders as the "More-pork." *N. boobook* frequents thickets of scrub on the hill sides, during the day, and may be found around the settlements at night, probably on the look out for mice, otherwise its food is a mystery, unless it be nocturnal insects.

The Kingfishers are very abundantly represented by one species, *Halcyon vagans*, Less., a New Zealand bird,§ and we were told a comparatively recent addition to the avifauna of the island. It may be constantly seen, flying about the small open places and clearings along the shore, or perched on dead timber, or even seated on small rocks at and below tide-marks.

It pairs in October, or perhaps towards the end of September. Sir W. L. Buller's remarks on the habits of this bird can be very appropriately applied to the variety found at Lord Howe:—"It is, moreover, one of those birds that seem instinctively to resort to the habitations of man; and instead of, like many other indigenous species, decreasing, it thrives and multiplies under the altered physical conditions resulting from the colonization of the country. . . . . During the winter months, especially, it resorts to cultivated grounds in quest of grubs and worms, which at this season constitute its

* Hill's *Lord Howe Island, loc. cit.*, p. 44.

† Proc. Linn. Soc., N. S. Wales, 1883. VII, pt. 1, p. 86.

‡ Tabular List of all the Australian Birds at present known to the Author, &c., 4to. Sydney, 1888.

§ See Buller, Manual of the Birds of New Zealand, 1882, p. 8, t. 3.

principal food. . . . In the pairing-season this species becomes very noisy and lively, the mated birds chasing each other in amorous play from tree to tree, or from post to post, with loud unmusical cries, something like the syllables *cree—cree—cree* uttered in quick succession."

The Bush Creepers have two representatives at Lord Howe, *Zosterops strenuus*, Gould, and *Z. tephropleurus*, known as the "Silver-eyes." Both species are indigenous to the island, and are met with in small flocks, equally plentiful both in the open spaces and thick scrub. The chief difference between the species is that of size, and slight shades of colour only, but individuals were carefully sexed by Mr. Thorpe.

The most interesting point connected with our researches amongst the birds was the discovery of a new *Gerygone*. Dr. Ramsay had already described one species from Lord Howe, *Gerygone insularis*,* but the new one is much smaller than the latter, with a feebly-yellow tinted breast. Two examples were shot by Mr. Thorpe and myself on August 24th, and were carefully sexed by the former when skinning them. It has been named by Dr. Ramsay *Gerygone Thorpei*,† a very deserving tribute to Mr. Thorpe for his exertions towards the success of our expedition. It associates itself with the larger species, *G. insularis*, and appears to be particularly fond of frequenting lemon-trees. The latter species is locally known as "Pop-goes-the-Weasel," and possesses a very pleasing song-like note.

Merula vinitincta, Gould, a very active and pleasing bird, represents the Thrushes. It is locally known as the "Doctor Bird," and is peculiar to the island. Other and allied species are found throughout the Pacific Islands, such as New Caledonia, Fiji, the Sandwich and Solomon Islands, and the New Hebrides; but the genus is unknown on the Australian continent. In the paper previously quoted, Dr. E. P. Ramsay says:—"It is somewhat remarkable that while the genus *Merula* is found so close to Australia as on Lord Howe Island, no species of the genus has been recorded from the mainland."‡ *M. vinitincta* frequents the more secluded hillsides, especially at the north end of the island, although it was found in the low ground bordering the shore, on the east side, but not to the same extent. We also observed it high upon the flanks of Mount Ledgbird. Mr. R. D. Fitzgerald§ states also that the bird possesses the same leaf-tossing habits as the Blackbird. The nest is composed of palm-tree fibre, and is long and cylindrical, the base solid and filled up.

A more numerous group are the Flycatchers. We obtained the really elegant *Rhipidura cervina*, Ramsay, another species peculiar to Lord Howe. It is a delicate bird, frequenting any open glades where insects can be taken on the wing. Dr. Ramsay also records the occurrence of *Myiagra plumbea*, V. & H., and *Eurystomus pacificus*, the "Dollar-bird" of New South Wales. Passing to the Pachycephalinæ or "Thick-heads," the type genus *Pachycephala* is represented by two species, *P. gutturalis*, Latham, and *P. rufiventris*, of the same author. The former we found to be common, and in no way to differ from individuals found in New South Wales. It is the most brilliantly coloured bird met with on Lord Howe Island, and the vivid yellow breast plumage of the male is readily distinguished in the low-lying scrubs and thickets. *P. gutturalis* was not seen on any of the higher points of the island. *P. rufiventris* recorded by Dr. Ramsay, did not come under our notice.

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* Proc. Linn. Soc. N.S. Wales, 1878, III, pt. 2, p. 117.
† *Ibid*, 1887, II, pt. 4, p. 677.
‡ Proc. Linn. Soc. N.S. Wales, 1878, III, pt. 1, p. 89.
§ Hill's *Lord Howe Island, loc cit.*, p. 38.

Aplonis fuscus, representing the Starlings, is both one of the most plentiful, and at the same time destructive birds, playing great havoc in the settlers' gardens during the fruit season. The genus *Aplonis* is a peculiarly Oceanic one, being met with in the southern part of New Guinea, Fiji, the New Hebrides, and Solomon Islands, but is represented in Australia by the allied genus *Calornis*.* Although frequenting the smaller and lower trees, it undoubtedly loves high branches and elevated positions. *A. fuscus* is easily tamed, and forms a lively pleasurable companion.

The musical honours amongst the birds of Lord Howe are carried off by the so-called Magpie, *Strepera crissalis*, Sharpe, whose note, although not by any means as melodious as some of the magpies of the mainland, is not unpleasant. The bird is another of those peculiar to Lord Howe, and is very plentiful, especially at this season of the year, in the higher regions and retired deeper gullies of the south end. Young birds make fair eating.

Philipp Island, an outlier of Norfolk Island, was inhabited by a parrot, *Nestor productus*, Gould, so Lord Howe Island was similarly infested in former years by a parrakeet, of which there is not the slightest trace remaining. The existence of the bird in question is mentioned by Mr. A. T. Corrie, in the paper previously quoted, but we are indebted for a general description of it to Mrs. Thomas Nichols and Mr. Mosely. They described the parrakeet as generally of a green colour with a red patch on the head, at the base of the bill; red under, and a little blue along the edge of the wing. These characters accord fairly well with those of some Platycerci, especially species inhabiting New Zealand; in fact, there is good reason to conjecture that it may have been either *Platycereus novæ-zelandiæ*, or *P. auriceps*, but as no mention was made of any yellow feathers the bird was most probably the former species, more especially as this is recorded as occurring at Norfolk Island.† The parrakeet is said to have existed in very large numbers, doing considerable damage to the crops, and to have gradually disappeared about ten years ago. This would correspond with the date of Mr. Corrie's observations. Even before this, in 1870, it must have been very scarce, for we find Mr. E. S. Hill observing, "The paraquet also was a nuisance to the cultivators, once appearing in flocks; now I saw but a solitary pair in their rapid flight through the foliage, and recognized them only by their peculiar noise."‡

Of the Cuckoos, two species have been met with, but they are rare. We obtained *Cuculus inornatus;* and *Chalcites lucidus*, Gml., the Bronze Cuckoo, is quoted by Dr. Ramsay. The latter bird has been caught at sea, between Lord Howe Island and New Zealand, doubtless whilst migrating from the latter to the former island.

The Columbidæ are now represented on Lord Howe Island by one species only—the *Chalcophaps chrysoclora*, Wagl., a representative of the *Gouridæ*, or ground pigeons. This is an elegant and gentle bird, is found in all thick low timber on the flats and bases of the hill flanks, and is easily traced by its low plaintive note. It is so tame that the settlers are in the habit of catching it with the hand snare. In former years other varieties of pigeons must have existed in numbers for Mr. Fitzgerald remarks that, "a large pigeon is remembered, but has become extinct."§ The common "Rock" has been introduced and established itself; it is, however, as wild in its habits and difficult of approach as the *Chalcophaps* is gentle and tame.

* Ramsay, Proc. Linn. Soc., N. S. Wales, 1883, VII, pt. 1., p. 89.
† Buller, Manual of the Birds of New Zealand, 1882, p. 34.
‡ Hill's *Lord Howe Island, loc. cit.*, p. 46.
§ Hill's *Lord Howe Island, loc. cit.*, p. 38.

Writing on this subject, Mr. E. S. Hill remarks, "There appears to be a predisposition in animals to go wild on this island;—domestic pigeons have forsaken the dove-cot, and have taken up positions in the mountain cliffs, and have proved the correctness of Darwin's theory, for what were originally pied and mottled are now blue, with bar shoulder, with rare exceptions. The island at one time abounded with large wild pigeons—so much so, that within the past twenty-five years it was no unusual thing for a man to snare, by aid of a stick and string, fifteen or twenty birds of a flock without the others taking the least alarm."*

It appears strange, considering the excellent cover some of the flats afford, that no rasorial birds, such as the quail, exist. It is, however, due, perhaps, to the distance of Lord Howe from the mainland being too great for the performance of their periodical migrations. The fowl is another instance of a domestic creature which has become wild. Some years ago a number took to the bush and have bred and thriven there. The present breed of domestic fowl kept on the island is the Bramah and its crosses. The birds in question, however, are quite distinct from this, and there does not appear to be any attempt at inter-breeding. They have not spread, as they seem to frequent the hill-sides near the holding from which they originally escaped.

The Plovers are represented by the Golden Plover, *Charadrius xanthocheilus*, Gould, a handsome bird, associated in small flocks, and also accompanying one of the curlews, *Numenius uropygialis*. We met with these birds along the shores of the Lagoon and other reaches on the east side, especially where the beach assumed a less sandy character than usual.

Several birds recorded by Dr. Ramsay, but not met with by us, take their place here, such as the Bittern, *Ardetta minuta*, Linn., and the Nankeen Crane, *Nycticorax caledonicus*, Lath. The White-fronted Heron, *Ardea novæ-hollandiæ*, was seen by Mr. Thorpe on the rocks to the north of Middle Beach. Two genera of Curlew are plentiful—*Limosa uropygialis*, Gould, and *Numenius uropygialis*—and are to be seen in any of the little bays where a sandy shore predominates. The Hooded Dottrell, *Hiaticula monacha*, was also seen by Mr. Thorpe.

Sand-pipers did not come under our observation, but Ramsay records *Cinclus interpres*, Linn., and a species of *Œgialitis*.

Rails are not indigenous to the island, but *Rallus pectoralis*, Gould (called *Hypotænidia australis*, Pelzeln, in Dr. Ramsay's last list), is said to have been introduced, but we were not fortunate enough even to see it. The Red Bill, *Porphyrio melanotus*, as far as we could ascertain, is an indigenous bird, at least it is believed to be so by those Islanders to whom we mentioned the matter. To our great annoyance we did not see a trace of it, its occurrence being a fact we much wished to put beyond doubt, in connection with its relation to the extinct *Notornis alba*, White, sp. The very remarkable bird, known under this name, and probably quite extinct, is without exception, the most noteworthy of the forms comprising the fauna of Lord Howe Island. Although specimens are not preserved, so far as I know, in any of the Australian Museums, there is now no doubt that the *Fulica alba*, White, as it was formerly called, existed in large numbers both on Lord Howe and Norfolk Islands. As *Fulica alba* it was described by White† without locality, and ostensibly from New South Wales, but it is more than probable that his specimen found its way from Norfolk Island in the earliest days of convict settlement there. Mr. E. S. Hill, in the pamphlet previously

* Hill's *Lord Howe Island, loc. cit.*, p. 46.

† Journal of a Voyage to New South Wales, 1790, p. 238.

quoted, remarks that in one of Lieut. P. G. King's (the first Governor of Norfolk Island) reports from thence, mention is made of a bird "not unlike the Guinea-fowl, except in colour (being chiefly white)."* Governor Phillip, likewise, in his "Voyage to Botany Bay,"† gives as the localities of this bird, Norfolk and Lord Howe Islands. Either under the above name, or as *Galinula alba*, Latham, or *Porphyrio alba*, Gray, the White Gallinule was known, until Dr. von Pelzeln, in a paper on the "Birds of Norfolk Island,"‡ and again in another on the "Birds in the Imperial Collection at Vienna,"§ pointed out its affinity with the quasi-extinct New Zealand genus *Notornis*, Owen, and of which it forms only the second species known. Pelzeln believes the skin in the Imperial Collection at Vienna to be White's original specimen, as it was purchased at the sale of the Laverian Museum. Mr. G. R. Gray, in a "List of the Birds of New Zealand and adjacent Islands,"‖ mentions *Porphyrio alba* as coming from Norfolk Island and described it as "entirely white, but some differ in having bright blue between the shoulders, and spotted on the back with the same." He further adds:—"It is stated that a similar bird was found on Lord Howe Island, which was incapable of flight. The wings of the male were beautifully mottled with blue." And again he further states:—"The young are said to be black, then they become bluish-grey, and afterwards pure white." In 1869 the venerable Dr. G. Bennett¶ spoke of the White Gallinule as formerly found on both islands, although at that time extinct.

An excellent opportunity was afforded Mr. E. S. Hill, in 1870, of ascertaining the state of matters at Lord Howe respecting this bird, when he accompanied Mr. Cloete's Expedition. In his pamphlet the following remarks are made:—"There were also white birds like a Guinea-fowl. All that we could now learn of any bird of this kind was that once or twice large birds at certain seasons, and within the past two years, have been seen, the colour of which was bluish wings, with slate-coloured body, but having a remarkable double red comb. This, with the exception of a double red comb, answered pretty well to the description of *porphyria* or red-bill of Australia; and probably the male birds only exist now, as evidently all the larger birds seen both here and at Norfolk Island in 1788 were white birds, probably females."** Messrs. Salvin and Sclater††, when noticing this statement, say, "This bird is very probably the same as the species from Norfolk Island, described by Latham as *Gallinula alba*." With the exception of the skin in the Imperial collection at Vienna, there appears to be only one other in existence, which is said by Professor A. Newton‡‡ to be in the Derby Museum at Liverpool. An excellent figure of this bird has been given by Mr. O. Salvin,‖‖ taken from a sketch by Von Pelzeln of the type skin. The feathers of the neck and breast possessed a yellowish tinge, those of the remainder of the body with a delicate indication of blue, the legs yellow, the bill, forehead, and iris of the eye red. I have referred at this length to *Notornis alba* with the view of attracting notice to a probably extinct and little known bird, a

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* Hill's *Lord Howe Island, loc. cit.*, p. 8.
† London, 2nd edit., 1790, p. 160.
‡ Reviewed in the *Ibis*, 1860, p. 421.
§ *Ibis*, 1873, p. 14.
‖ *Ibis*, 1862, p. 214.
¶ Proc. Zool. Soc., 1869, p. 471.
** Hill's *Lord Howe Island, loc. cit.*, p. 46.
†† Index of the Ornithological Literature of 1870, *Ibis*, 1871, pp. 417 and 443.
‡‡ *Ibis*, 1866, p. 159, note.
‖‖ *Ibis*, 1873, p. 295, t. 10.

recently surviving species of a genus akin to the *Dinornis*, and one of which there does not appear to exist a skin in any of the Australian Museums. The occurrence of the White Gallinule on both islands within the historical period is a very interesting point, and one of the most prominent features in the evident relation which exist between their fauna and that of New Zealand. It is possible of course, although not probable, that a few individuals may still remain in the hilly and less frequented portions of Norfolk Island, but with regard to Lord Howe I fear no trace is likely to be found. Writing of the New Zealand bird, *Notornis Mantelli*, Owen, the type of this genus, Buller says, "Thus, the three known examples have been taken from localities ninety miles apart, and over an interval of thirty-five years, proving pretty conclusively that the species still survives in the remote parts of the country."* This may also apply to Norfolk Island. It is very interesting to find that one of the most philosophic minds who have ever written on the subject of life distribution, Alfred Russell Wallace, should have conceived the probable existence of a cursorial bird on Norfolk Island, apparently without any knowledge of *Notornis alba*. Speaking of the Chatham Islands, he says, "It is to be hoped that some search will be made here, and also in Norfolk Island, in both of which it is not improbable remains, either of *Apteryx*, or *Dinornis* might be discovered."†

Soon to become extinct on Lord Howe, unless protected, is the Wood-Hen, *Ocydromus sylvestris*, Sclater, a curious and stupid bird. At the present time its range is confined to the extreme southern end of the island, in Erskine Valley, and the ground around the sea-girt base of Mount Gower. It is even now rare and difficult to obtain, and would be impossible of capture were it not for the fact that its curiosity overcomes its shyness. Its gradual extinction is probably due to the ravages committed by the wild domestic cats. During a journey to Mount Gower, primarily to procure specimens, only one individual was seen, and during the whole of our residence there those well acquainted with their haunts could obtain but four others. *Ocydromus sylvestris* can be attracted within gun shot by any continuous and varied noise, such as knocking two stones together, striking against a tree, occasional whistling, and other peculiar but discordant noises. Mr. R. D. Fitzgerald, Deputy Surveyor-General, during a trip to Mount Gower at the time of Cloete's Expedition had an excellent opportunity of witnessing the method adopted by the Islanders for catching this bird. His account is as follows‡:—"Ned suddenly stopped with the exclamation, 'That's a wood-hen!' as a note like two rasps at a saw is heard at some distance among the lower stones and fern. Then he imitates the bird, and the wood-hen answers. He tries the imitation again, but the bird is silent. Tom strikes the back of the tomahawk against a tree, again the bird answers. Then the strokes of the tomahawk are of no use, and the barking of a dog is tried with effect, at each time the answer being a little nearer, and so on. Anything that strikes him as strange, say a scrap of the National Anthem by all hands, or the crowing of a cock, or anything else with which the bird is not likely to be acquainted. Nearer and nearer comes the answer, till suddenly out runs a bird, like a large corn-crake, in a daft sort of way, up to their very feet."

Ducks are occasionally known to visit the island, but we were unable to ascertain the species. Dr. Ramsay quotes *Anas superciliosa*, Gould.

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* Manual of the Birds of New Zealand, 1882, p. 65.
† Island Life, 1880, p. 450.
‡ Hill's *Lord Howe Island*, 1870, p. 42.

Lord Howe and its associated islets are a great resort of sea-birds, and have been so more in the past than now. This is particularly the case with the Admiralty and Mutton-bird Islets, and a few spots on the main island, which are at certain seasons of the year veritable rookeries.

The larger of the Admiralty Islets is an irregularly shaped island, pierced at its northern end by a sea-water passage. The north-east side presents a perpendicular face to the ocean, but its western face is a gradual although steep slope, and is occupied by thousands of birds, Gannets, Petrels, and Terns. There is but one point at which a landing can be effected, and this only in fine settled weather. The whole hillside is indiscriminately occupied by the sea-fowl, every tussock hides a so-called nest, and every projecting piece of rock has its sitter. Notwithstanding their number, there is no regular deposit of guano, but what there is becomes mixed with the red loamy basaltic soil, and is more or less washed over the faces of the cliffs on the eastern side and northern end, and from the succeeding chemical decomposition produces a white streaky appearance on the cliff faces, over which the semi-fluid material has poured, and giving rise, when viewed at some distance from a boat, to the appearance of a series of white-washed spaces on the perpendicular cliffs. The late Dr. Charles Darwin, F.R.S.,* describes a similar substance on the cliffs of St. Paul's rocks—"Extensive portions of these rocks are coated by a layer of a glossy polished substance with a pearly lustre and of a greyish-white colour; it follows all the inequalities of the surface, to which it is firmly attached.....It is considerably harder than calcareous spar, but can be scratched with a knife; under the blow-pipe it scales off, decrepitates, slightly blackens, emits a fœtid odour, and becomes strongly alkaline; it does not effervesce in acids. I presume this substance has been deposited by water draining from the bird's dung, with which the rocks are covered."

Amongst the Petrels, *Prion turtur* was obtained, but at the time we visited the island, it was anything but common. It is perhaps worthy of record that we saw the Pintado or Cape Pigeon, *Daption capensis*, both going and returning from the island about S. Lat. 32°. This group is, however, abundantly represented by the "Mutton-birds," so called. Two species, *Puffinus brevicaudus*, Brandt, and *P. sphenurus*, Gould, are exceedingly common; the smaller *P. sphenurus*, on Mutton-bird and Goat Islands, and on the Admiralty Islets, but the other species frequents certain spots on the east coast of the island itself. The Mutton-birds begin to arrive at the latter end of August, as we made our first capture on September 1st, on Goat Island. The same species was afterwards obtained by Mr. Thorpe and the writer at Mutton-bird Point, where we experienced both the biting propensities, and the peculiar and offensive smell emitted by these birds. Their holes are usually hid under a tussock of grass, sometimes running into the face of the slope for a considerable distance, at other times a mere excavated depression of the surface. The propensities just mentioned have been commented on by the late Mr. Macgillivray, who, speaking of Goose Island, in Bass Straits remarks†—"As usual with the Petrel family, they bite severely if incautiously handled, and disgorge a quantity of offensive oily matter, the smell of which pervades the whole island." The large species, *P. brevicaudus*, frequents the east coast of the main island, and forms for itself extensive rookeries extending inland from the edge of the cliff, or the beach at high-water mark, as the case may be, for a considerable

* Geol. Obs. Volc. Islands, visited during the voyage of H.M.S. "Beagle," 1844, p. 32.
† Voyage of H.M.S. "Rattlesnake," 1852, I, p. 73.

distance. Good examples of these "rookeries" may be seen at Clear Place Point, the head of the Valley of the Shadow of Death, and at Ned's Beach. Regular runs, or pathways, are formed through the long grass or scrub, by the constant locomotion of the birds to and from the sea. At these places the burrows consist of vertical or somewhat oblique funnel-shaped holes or depressions scooped out in the loose sandy or rich loamy soil, as the case may be. At the Clear Place Point and the Valley of the Shadow these excavations occupy acres in extent, some of the burrows, instead of mere depressions, consisting of underground tunnels, extending inwards horizontally for as much as three feet. The birds begin to arrive in September, and become plentiful in October, when they proceed to clear out the old holes; and we were informed by Captain T. Nichols that the din at night, when this is going on, and fighting that takes place for the possession of favoured spots by rival claimants, is something deafening. According to the same informant, laying is commenced about 28th November regularly, and completed on 1st December, the young after hatching being fed and tended until April, when they are allowed to cater for themselves. Some idea of the immense numbers of these birds may be gained from a statement made by an anonymous writer "Linnæus."* He says:—"Some idea may be formed of the flocks of the dusky mutton-bird, when it is mentioned that a party of five visited one island three days during this last season (1882) and obtained in a few hours 600 dozen of the eggs." He further adds:—"The eggs are perfectly sweet, and not the slightest unpleasant flavour or odour can be detected. They answer just as well as duck's or hen's for all purposes to which those are employed, the only difference being that the albuminous portion is slightly in excess in the eggs of the mutton-bird." A third species of mutton-bird, with which we are at present unacquainted, is found on the summit of Mount Ledgbird, at a height of 2,504 feet. We heard this bird passing overhead, when camped in Erskine Valley, and the fledglings were obtained for us by Messrs. C. & G. Nichols. The bird is said to have a quantity of white feathers in its plumage; this, and also its time of breeding clearly indicate as specifically distinct from the other two referred to above. It is believed by Dr. Ramsay to be a *Procellaria*.

The Terns are exceedingly well represented. On the precipitous cliffs of the east coast, and on the Admiralty Islets we met with *Anous cinereus*, Gould, the Grey Tern, and obtained its egg. It is a very elegant little bird making its apology for a nest, consisting of a few straws, on ledges, usually overhung by a projecting point of rock. Dr. Ramsay has lately described† the egg from specimens we obtained.

In strong contrast to the above is another species, *Anous stolidus*, Latham, the Noddy Tern, locally known as the "Noddy." With its sooty-brown plumage, black breast, and french-grey poll, this bird forms a strong contrast to *A. cinereus*. We observed it only on the Admiralty Islets, where they form a flat nest on the few low bushes to be found there. The nest seems to be made of any flotsam and jetsam the bird can pick up, cemented together with a dirty-looking paste, probably earth. The birds had evidently paired at the time of our visit, but had not laid. A third and very graceful species is the Sooty Tern, *Onychoprion fuliginosus*, Gould, known to the Islanders as the "Wideawake." Its white breast, white forehead and cheeks, and otherwise black plumage, with the two long delicate

* The Island of Lord Howe. The Madeira of the Pacific.—By "Linnæus." (12mo. Sydney, 1882), pp. 8 and 9.

† Proc. Linn. Soc., N.S. Wales, 1887, II, pt. 4, p. 678.

tail feathers, render it quite as conspicuous as the last species. In Gould's figure of *O. fuliginosus* the two characteristic tail feathers are represented black with a white edging, whereas, in reality, they are quite white, with the slightest possible cloud on the inner margin. The egg is laid on any exposed surface, ledge or rock, or on bare spots amongst grass, without protection of any kind, from immediately above high-water mark upwards to the full height of the island. The eggs, which vary much in the mottling of the surface, are plentiful at the beginning of September. They have been since described by Dr. E. P. Ramsay.*

The Tropic Birds are represented at Lord Howe by *Phæton phœnicurus*, Gould, known as the Red-tailed Tropic or Boatswain Bird. We observed them on the west side of Mount Ledgbird and on the seaward precipitous face of the North Ridge. It is a remarkably shy and difficult bird to obtain. A frigate-bird, probably *Attagen ariel*, Gould, the small frigate-bird of Torres Straits, is also said to be a visitant.

The Gannets are confined to the Admiralty Islets, although one or two stray individuals of *Sula australis*, Gould, were seen sailing about the Lagoon. The bird inhabiting the Admiralty's is *Sula cyanops*, of which we obtained a fine series. On approaching from seaward, the white plumage of this bird renders it a most conspicuous object, presenting to the eye large white dots scattered in all conceivable positions over the side of the hill. *S. cyanops* is very stupid, sluggish, and easily captured, for when climbing the steep sides of the Islet, they may be literally walked over, before any attempt on their part is made to waddle off. The egg, of which we obtained a few, is white, nothwithstanding Gould's statement to the contrary, that it is stained red. Dr. Ramsay has lately described† examples brought by us.

The eggs are simply laid between tussocks of grass. In Gould's figure, the legs and feet are represented as of a peculiar green, and the iris of the eye yellow. Every example collected by us, on the other hand, had these portions of the body black. Gould's representation is far from a good one. Lastly a Pelican is said to sometimes visit Lord Howe, but there is not enough brackish water for these birds.

The tameness of the land-birds on this ocean-girt island is very remarkable, so much so that at times it is difficult to get sufficiently far enough away from certain species to avoid blowing the specimen to pieces. This trait is taken advantage of by the residents who frequently obtain birds alive by hand snaring. It is particularly noticeable in the case of *Merula vinitincta*, both species of *Gerygone*, *Pachycephala*, and to some extent also *Aplonis fuscus*. A similar friendliness of disposition is described by Darwin in the case of the birds of the Galapagos Islands.‡ "I must describe," he remarks, "more in detail the tameness of the birds . . . . There is not one which will not approach sufficiently near to be killed with a switch, and sometimes as I have myself tried with a cap or hat."

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* *Loc. cit.*, p. 678.

† *Loc cit.*, p. 679.

‡ Journ. Researches Geol. and Nat. Hist., H.M.S. "Beagle," 1839, p. 477.

The explanation of the following table[1] has already been given :—

Name.	Species—peculiar.	New Zealand. Genus.	New Zealand. Species.	New South Wales. Genus.	New South Wales. Species.
Haliastur sphenurus, *Vieillot*	...	...	...	*	*
Haliætus leucogaster, *Latham*	...	...	...	*	*
*Ninox boobook, *Latham*	...	*	...	*	*
*Halcyon vagans, *Lesson*	...	*	*	*	...
*Zosterops strenuus, *Gould*	*	*	...	*	...
*Zosterops tephropleurus, *Gould*	*	...	...	...	...
*†Gerygone Thorpei, *Ramsay*	*	*	...	*	...
*Gerygone insularis, *Ramsay*	*	...	...	...	...
*Merula vinitincta, *Gould*	*	*	...	...	...
*Rhipidura cervina, *Ramsay*	...	*	...	*	*
Myiagra plumbea, *V. & F.*	...	...	...	*	*
Eurystomus pacificus, *Latham*	...	...	...	*	*
*Pachycephala gutturalis, *Latham*	...	...	...	*	*
Pachycephala rufiventris, *Latham*	*	...	...	...	...
*Aplonis fuscus, *Gould*	*	...	...	*	...
*Strepera crissalis, *Sharpe*	...	...	...	*	...
*†Cuculus inornatus *Gould*	...	*	...	*	*
Cuculus flabelliformis, *Latham*	...	*	*	*	*
Chalcites lucidus, *Gml.*	...	...	...	*	*
*Chalcophaps chrysoclora, *Wagler*	...	*	*	*	*
*Charadrius xanthocheilus, *Gould*	...	...	*	*	*
*†Numenius uropygialis, *Gould*	...	*	*	*	*
*Limosa uropygialis, *Gould*	...	*	*	*	*
Ægialitis bicinctus, *J. & S.*	...	*	*	*	*
Cinclus interpres, *Linn*	...	...	*	*	*
Ardetta minuta, *Linn*	...	*	*	*	*
*‡Ardea novæ-hollandiæ, *Latham* (2)	...	*	*	*	*
Nycticorax caledonicus, *Latham*	...	*	*	*	*
Porphyrio melanotus, *Tem.*	...	*	...	...	...
Notornis alba, *White*	*	*	...	...	...
*Ocydromus sylvestris, *Sclater*	...	*	*	*	*
Anas superciliosa, *Gmel.*	...	*	*	*	*
*Prion turtur, *Smith*	...	...	*	*	*
†*Puffinus sphenurus, *Gould*	...	...	*	*	*
‡*Puffinus brevicaudus, *Brandt*	...	...	...	*	*
*Anous cinereus, *Gould*	...	...	...	*	*
*Anous stolidus, *Latham*	...	...	...	*	*
*Onychoprion fuliginosus, *Gmel.*	...	...	...	*	*
*Phæton phœnicurus, *Gould* (2)	...	*	...	*	*
*†Sula cyanops, *Sand.* (3)	...	*	...	*	*
†*Procellaria, sp. (4)	...	...	...	*	...
Birds introduced, now wild—					
Rallus pectoralis, *Gould*	...	*	...	*	*
Birds reported to visit or to have existed—					
Pelecanus, sp.	...	...	...	*	...
Platycercus, sp.	...	*	...	*	...

(1) To this table may now be added *Graculus hypoleucos* and *Himantopus leucocephalus.* (2) Seen, but not captured. (3) *Sula fiber.* (4) The young only obtained.

In the more recently published "Tabular List of Australian Birds," by Dr. E. P. Ramsay, some changes have been made in the nomenclature. Thus: The bird hitherto known as *Ninox boobook* is regarded as distinct from that species, and is described as *N. albaria*, Ramsay; *Myiagra plumbea* becomes *M. rubecula*, Latham; *Cuculus inornatus* becomes *Cacomantis pallidus*, Latham; *C. flabelliformis* is now known as *Cacomantis flabelliformis*, Latham; *Chalcites lucidus*, Gml., is a synonym of *C. plagosus*, Latham; *Puffinus brevicaudus*, Brandt, is now referred to the genus *Nectris; Phœton phœnicurus*, Gould, is now *P. rubricauda*, Bodd.; and lastly, *Rallus pectoralis*, is now entered as *Hypotœnidia philippensis*, Linn. The following additional birds are mentioned :—*Circus Gouldii*, Bp.; *Majaqueus Gouldii*, Hutton; *Graculus melanoleucus*, Vieillot; and *Himantopus leucocephalus.*

With regard to the affinities of the bird fauna of Lord Howe, Dr. E. P. Ramsay, in 1883, wrote as follows*:—"It will be seen how closely its avifauna approaches that of New South Wales on the one hand, and in two important particulars that of the New Zealand region on the other. The genera found in the New Zealand region, and not in the Australian, are *Notornis*, *Ocydromus*, *Aplonis*. All the other genera are represented in New South Wales by the same or allied species, there being of the whole avifauna only nine species, as far as it is at present known, peculiar to the island."

Reptilia.—Mr. Corrie, who wrote in 1878,† states that neither snakes nor lizards are known on Lord Howe Island, but in this statement he is to some extent wrong. Snakes are certainly unknown, but this important sub-kingdom is certainly represented by the Lacertilia. We succeeded in obtaining two of the three forms recorded, but no additional ones were captured.

The Geckonidæ are represented by *Phyllodactylus Guentheri*, Boulenger,‡ and *Gehyra oceanica*, Gray.‖ The first was originally brought from Lord Howe Island by the H.M.S. "Herald," and is also known to exist both on Norfolk Island and in North-west Australia. *Gehyra oceanica* was one of the discoveries of that accomplished naturalist and collector J. Macgillivray, during the voyage of H.M.S. "Herald." It is both a Fijian and Samoan species, and in fact appears to be generally distributed throughout the South Pacific Islands.

The Scincidæ have only one representative at Lord Howe, *Lygosoma lichenigerum*, O'Shaun.,§ which is restricted to the island, where it was first discovered by Macgillivray. So far as our researches enabled us to judge, *Phyllodactylus Guentheri* is the commonest, the distribution of this and the other species being very general, not only on the main island, but also on Goat Island and the Admiralty Islets.

They may be sought for on dry stony ground, under stones, amongst dry leaves, and at the feet of low scrubby trees.

As before stated there are no snakes, nor did we see any trace of fresh-water chelonians. The creeks are much too shaded and protected; indeed there is only one, the Deep Creek, passing Wright's (now Johnston's) Farm, in the slightest degree fitted for their existence. Turtles are, however, known to occasionally frequent the shores of the island. Formerly, according to the statements of Mr. E. S. Hill, during the earlier days of the island's history, they were plentiful. He says:—"Innumerable quantities of of exceedingly fine turtle frequent this place in the summer time, but at the approach of winter they all go to the northward."¶

In the paucity of its reptilian fauna Lord Howe resembles the Sandwich Islands.

Pisces.—The Fish-fauna of Lord Howe is of a remarkably interesting nature, and on the whole, of a decidedly Australian facies. It is an entirely new and unworked field for the Ichthyologist, as we are destitute of a systematic description, or even catalogue, of the fish of this isolated spot in the South Pacific. Mr. J. Douglas Ogilby informs me that Dr. Albert Günther, F.R.S., only mentions three species as found there, *Serranus*

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* Proc. Lin. Soc., N. S. Wales, 1883, VII, part 1, p. 87.
† Proc. R. Geogr. Soc., XXII, p. 138.
‡ Cat. Lizards, Brit. Mus., 2nd Edit., 1888, I, p. 90, t. 7, f. 3.
‖ *Ibid.*, p. 152.
§ *Ibid*, 1887, III, p. 269, t. 20., f. 1.
¶ Hill's *Lord Howe Island, loc. cit.*, p. 9.

Dæmelii, Günther, obtained during the voyage of the "Herald"; *Plectropoma cinctum*, Günther; and *Trachypoma macracanthus*, Günther.

The specimens obtained during our late visit were one hundred and fifty-five in number, distributed over about thirty-two genera, and between thirty-five and forty species. Except a few, too young to be identified, all are of interest, and some, such as *Tetragonurus*, of especial interest and value. The identification of the genera and species has been carried out by our colleague, Mr. J. Douglas Ogilby, whose appendix to the present sketch will be read with much interest. On glancing through the list given below, the reader will be at once struck by the number of important food fish inhabiting the waters around Lord Howe, a fact to be dwelt on later.

Serranus Dæmeli, Günther, the Black Rock Cod or "Sea Perch," and one of the best marketable fish in Sydney, is common, and of large size. The largest seen by us, was one hooked by Mr. Thorpe, which could not have been less than between 80 and 90 lb. An excellent spot for Rock-cod fishing will be found at the western base of Mount Gower, off the Erskine Valley, and the rocky ledges to the east of Ned's Beach, where our monster was hooked. Other members of the *Percidæ* obtained were *Plectropoma cinctum*, Günther, a Norfolk Island species, and *Trachypoma macracanthus*, Günther, said to be restricted to Norfolk and Lord Howe Islands.

The so-called Salmon, *Arripis salar*, Rich., is very common, especially within the Lagoon, where we caught numerous examples, ranging from a few ounces to 3 or 4 lb. in weight. Notwithstanding the reputed poisonous qualities of *A. salar*, we partook freely of it, and did not experience any unpleasant symptons, nor did we hear of any evil effects arising from its consumption by the Islanders. It is poisonous probably only when stale.

Of the tropical family Squamipinnes, two genera were caught, the Sweep, *Scorpis æquipinnis*, being the most important. The Sparidæ, or Sea Breams are represented by *Girella cyanea*, Macleay, with which the seas around the islands are teeming. It is one of the most important food fish obtained there, and would yield large results to well conducted fishing operations. No species commends itself more highly for carriage to the Sydney market than *G. cyanea*, both from its size, plentitude, the firmness of its flesh, and ease with which it is caught. It reaches a size of fifteen pounds, and is one of the most exquisitely, although uniformly coloured fish, caught off Lord Howe Island.

Two members of the curious family *Scorpænidæ*, were secured—one, a handsome *Scorpæna*, and a dried example of *Pterois volitans*, Linn., presented by Mr. W. E. Langley. "These fish possess in various degrees of development those skinny appendages resembling the fronds of sea-weeds, by which they either attract other fishes, or by which they are enabled more effectually to hide themselves."* Two other edible forms, members of the Carangidæ, are a species of *Caranx*, a very large fish, allied to the Horse Mackerels; and the *Seriola Lalandi*, C. & V., the King-fish, called "Yellow-tail" by the Islanders, but not the yellow-tail of Port Jackson. It would be of great assistance in unravelling the confusion existing among the local names of fish if a catalogue of the same could be compiled, showing their application to the different species throughout the Australian seas. As a case in point the Rev. J. E. T. Woods remarks† that *Seriola Lalandi*, although called "King-fish" in New South Wales, is not the fish of that name caught in Victorian waters, nor that known under a similar designation in Tasmania.

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* Günther, *loc. cit.*, p. 413.

† Fish and Fisheries of New South Wales, 1883, p. 59.

We were not successful in obtaining any of the Fishing Frogs, but Mr. Campbell Stevens, the postmaster presented an example of the pelagic *Antennarius coccineus*, Les. & Garn. This and its congeners are tropical forms attaching themselves to masses of seaweed. Their habits when inshore, appear to be those of concealment under and amongst stones, from whence they descend on their prey. To Mr. Stevens we are again indebted for the second example known of *Tetragonurus Wilkinsoni*, Macleay, originally brought from Lord Howe by the Visiting Magistrate, Mr. H. T. Wilkinson,* and described by the Hon. W. Macleay,† under the name of *Ctenodax*. It was subsequently shown by Mr. Macleay,‡ on the authority of Dr. E. P. Ramsay, to be referable to the genus *Tetragonurus*, Risso., a scarce deep sea fish found in the Mediterranean, and off Madeira. The general name of "Coral-fish" has been applied to numerous fish frequenting tropical coral-reefs, although appertaining to various families. Under this appellation in our collection may be mentioned a species of *Apogon*, with coloured spots on the tail, also met with at Norfolk Island; *Plesiops nigricans*, Rüpp., one of the Nandidæ, this being, in the opinion of Mr. Ogilby, a far south station for its occurrence; and a blue-spotted *Pomacentrus*, to which the same remark may be applied. One mullet only can be so far recorded from Lord Howe, *Myxus elongatus*; it is, however, tolerably common.

The Lagoon is frequented in quantity by a Gar-fish or Half-beak, *Hemirhamphus intermedius*, easily taken from a boat with fine tackle. Amongst other forms obtained were,—a Herring, *Spratelloides gracilis*, Sehl.; the semi-pelagic *Gonorhynchus Greyi*, Rich., the "sand-eel" of the New Zealand Colonists; one of the "Skippers," *Scombresox Forsteri*, C. & V.; and two Wrasses, *Labrichthys luculentus*, Rich., and *L. inscriptus*, Rich.

Three fish to which more than passing attention should be called are a new species *Hoplodactylus Etheridgei*, Ogl., caught in a small pool on the largest of the Admiralty Islets; and a red Sucking-fish, *Diplocrepis costatus*, Ogl., found for the first time at Lord Howe.

Passing to the Muræniдæ, it is interesting to note the occurrence of the common eel, *Anguilla australis*, Rich. It is tolerably common in many of the dark deep pools in the gullies both of the North Ridge and the southern hills, more especially the Deep Creek. Here our specimen was obtained by the guide, W. Nicholls, following a most exciting chase by the whole party after more than one fish. Individuals are obtained up to 5 and 6 lb. weight. Under blocks on the Coral-reef are found the beautiful striped eel, *Muræna nebulosa*, Ahl., which afforded equally good sport, whilst endeavouring to secure it in a "billy." The common green eel, *M. afra*, was also caught on the reef, although it usually frequents holes and crevices in the rocks.

The Sclerodermi are very plentifully represented by *Ostracion diaphanus* Bl., the Box or Coffer-fish, their bony envelopes strewing the sandy beach of the Lagoon in quantities. We were not successful in obtaining any Gymnodont fish, but Mr. Robin presented a new Globe-fish or Sea Hedgehog, *Tetrodon callisternus*, Ogl.

I have omitted to mention that sharks of a large size sometimes visit the lagoons. During the visit of Mr. A. H. Taylor, of the Department of Mines, to Lord Howe in March, 1886, a Tiger Shark, said to be *Galeocerdo Rayneri*, M'D. & B., was seen in the Lagoon, and would have attacked some bathers had not timely warning been given.

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* Since these pages have been in type we have had to deplore the death of this highly accomplished gentleman.

† A remarkable fish from Lord Howe Island. Proc. Linn. Soc., New South Wales, 1886, x, pt. 4, p. 718.

‡ Note on *Ctenodax Wilkinsoni*, *loc. cit.*, xi, pt. 2, p. 511.

The following is a list of the principal genera and species, as determined by Mr. Ogilby:—

Serranus Dæmeli, *Günther.*
Plectropoma cinctum, *Günther.*
Trachypoma macracanthus, *Günther.*
Arripis salar, *Rich.*
Apogon norfolcensis, *Ogl.*
Atypichthys strigatus, *C. & V.*
Scorpis æquipinnis, *Rich.*
Girella cyanea, *Macleay.*
Haplodactylus Etheridgei, *Ogl.*, (sp. nov.)
Scorpæna Cookii, *Günther.*
Pterois volitans, *Linn.*
Plesiops nigricans, *Rüpp.*
Pempheris Unwinii, *Ogl.* (sp. nov.)
Tetragonurus Wilkinsonii, *Macleay.*
Caranx georgianus, *C. & V.*
Seriola Lalandii, *C. & V.*
Antennarius coccineus, *Less & Garn.*
Gobius æolosoma, *Ogl.* (sp. nov.)
Salarias quadricornis, *C. & V.*
Myxus elongatus, *Günther.*
Diplocrepis costatus, *Ogl.*
Heliastes hypsilepis, *Günther.*
Labrichthys luculenta, *Rich.*
Labrichthys inscripta, *Rich.*
Pseudoscarus, sp.
Stethojulis axillaris, *Q. & G.*
Hemirhamphus intermedius, *Cant.*
Scombresox Forsteri, *C. & V.*
Gonorhynchus Greyi, *Rich.*
Sprattelloides gracilis, *Sehl.*
Solenognathus spinosissimus, *Günther.*
Anguilla australis, *Rich.*
Muræna nebulosa, *Ahl.*
Muræna afra, *Bl.*
Monacanthus howensis, *Ogl.* (sp. nov.)
Ostracion fornasini, *Bianc.*
Ostracion concatenatus, *Bl.*
Tetrodon callisternus, *Ogl.* (sp. nov.)

In concluding this brief and fragmentary review of the fish of Lord Howe, it may not be out of place to consider the position and prosperity of the island in relation to the future fish supply of the large coast towns of New South Wales. As at present existing, the supply of fresh fish to Sydney and its suburbs, especially the latter, is lamentably deficient. For many years doubtless the fishing-grounds of the main-land coast will be quite capable of supplying any increased demand which may spring up. On the other hand, a time will come when even this supply will be insufficient, both from an increasing population, decrease quantities of the fish caught, and other causes. Public attention will then be directed to Lord Howe Island, as the one place capable of at once affording a good, wholesome, and copious supply of food-fish, within easy distance of the coast, and affording facilities for the prosecution of the industry. The greater part of the island itself, from its peculiar physical conditions, is practically useless for either agricultural or

pastoral purposes, and has, in the meantime, been wisely declared by Government a botanical reserve. It is, however, most favourably situated for a fishing station, within easy reach of Port Jackson by fast steam packets. Even a ketch covers the distance, with a favourable wind, in three days—the surrounding seas teeming with fish—the Lagoon forming a safe anchorage for small craft in almost any wind—and the entrances capable of great improvement, so that small draft supply steamers could also be admitted, except in the foulest weather—and finally, excellent sites for the accommodation of a fishing population. Everything tends to indicate that the future of Lord Howe Island is interwoven with the question of the fish supply of New South Wales.

Polyzoa.—Beyond the fact that few species were obtained, little can be said of the Polyzoa. In all probability had our arrangements for dredging been better our success would have been greater. The following are the species obtained, as determined by Mr. Whitelegge:—

Schizoporella hyalina, *Linn.*
„ tuberosa, *Reuss.*
Aetea recta, *Hincks.*
Scruparia chelata, *Linn.*
Menipea cervicornis, *M'Gillivray.*
Bugula neritina, *Linn.* (with avicularia).
Catenicella elegans, *Busk.*
„ venusta, *M'Gillivray.*
Discoporella novæ-zelandiæ.
Idmonea, sp.
„ radians, *Milne Edw.*
Steganoporella, sp.
Lepralia, sp.
Membranipora, sp.

Mollusca.—The distribution of molluscan life at Lord Howe Island may be considered under four aspects, that of the Coral-reef, that of the Lagoon within it, that of the shore generally, irrespective of the former, between high and low-water marks, and the deep water shells. In fact, it may be said that these remarks apply generally to the whole marine fauna. As previously stated, we were able to study the Coral-reef and its objects only at its extreme northern and southern ends, where, however, it was found to be very rich in life. The Lagoon, on the other hand, proved very barren, much to our surprise, but it is possible that our dredging operations might have yielded better results could we have had the assistance of steam-power. The general sameness of marine life cast upon its sandy beach would support the opinion that it is not prolific in objects of interest. The shore fauna differs essentially from that of the Coral-reef, chiefly in its simplicity, and the superabundance of a few special forms. Of the deep water fauna we are practically ignorant, the state of the weather during the greater portion of our residence there and the want of adequate apparatus quite putting a stop to any possible investigations. Mr. John Brazier has named the whole of the Mollusca.

It may be naturally inferred that our gatherings in the Cephalopoda, the highest group of the Mollusca, were of a very limited nature. In fact, we obtained three representatives of the Decapoda, *Spirula Peroni*, Lamk., *Onychoteuthis Banksi*, Leach, and *Sepia latimanus*, Q. & G. The posthorn-like shells of the former cover some parts of the Lagoon beach in hundreds, and at those spots it is impossible to walk without crushing numbers of this

beautiful species. Greatly to our delight, we were fortunate enough to find one example of *S. Peroni* with nearly the whole of the body preserved, but the head and tentacles had been removed.

Amongst the Prosobranchiate Gasteropoda we found that *Fusus Hanleyi*, Angas, a shell common in Port Jackson, was exceedingly rare at the island, but of the genus *Nassa* three species were obtained, *Nassa mucronata*, A. Adams, *N. elegans*, Kiener, a West Australian shell, and *N. paupera*, Gould. These shells were found on the Coral-reef, and on the rocky ledges at Ned's Beach, but they are all rare. *Purpura succincta*, and its vars. *textilosa* and *striatus* are all characteristic shells on the reef at the foot of Mount Ledgbird, especially *P. succincta*, with its coarse concentric costæ. Next to *Turbo imperialis* it is the largest univalve we have met with. *Purpura amygdala*, Kiener, is also obtainable, and is a very interesting shell from its wide distribution from our own coasts to those of Western Australia. Wherever the nature of the shore permitted an inspection to be made we found *Sistrum chaidea*, Duclos, very common between tide marks on rocks and stones. So also was *Cominela* (*Adamsia*) *tritoniformis*, Blainv. Could an examination of the middle portions and outer face of the reef have been made *Voluta* would doubtless have proved of more common occurrence. As it was, only three specimens of *Voluta nucleus* were met with. On the other hand, both on the Coral-reef, and on the basaltic reefs and edges on the east coast, Cowries were tolerably abundant. *Cypræa annulus* is common, *C. caputserpentis*, Linn., is moderately so, but *C. staphylæa*, Linn., is not by any means plentiful. *C. erones*, Linn., occurs in numbers, but *C. felina*, Gray, is very rare. Mr. Brazier has recognized what he believes to be one example of *Cypræa moneta*, Linn.

Potamides either exists, or has existed at Lord Howe. A single dead specimen of *Potamides ebininus*, Brug., so common on our estuarine shores was picked up. It is remarkable that a mollusc occurring in such numbers when it is met with, should be so rare in the present instance. It may perhaps indicate one of those mysterious disappearances of a species of which several partial instances have occurred in Port Jackson.

The Mitridæ are well represented by the genera *Mitra*, *Engina*, and *Columbella*, especially the latter. Of the first genus there is *Mitra scutularia*, Chem.?, a rare shell, and another peculiar small species mottled black and white. Both species of *Engina* are rare, which is to be regretted, as the var *maculata* of *E. lineata*, Reeve, is a small but very pretty shell, marked with dark spiral lines and dots. *Columbella versicolor*, Sby., occurs, but unlike those of this coast and Northern Australia, the individuals are all small. *C. Tyleri*, Gray, is tolerably common, but the other species are not so. Species of the sub-genus *Æsopus* was obtained, which may perhaps be new. The reason advanced in the case of the Volutes will also probably account for the paucity of the Cones, as three species only were obtained. *Conus anemone* Lamk., found under stones and blocks, is the most abundant. *C. ebreus*, Brug., the next so, whilst *C. coronatus*, Dilw., is limited in numbers. Amongst truly tropical shells we obtained at Ned's Beach a few examples of *Scalaria perplexa*, Pease. The Cerithiidæ are represented in the collection by dead shells of *Lampania australis*, Quoy, all of them distorted. Either it must have entirely got out of its latitude or the immediate physical conditions surrounding the settlement must have been uncongenial.

One of the commonest shells at Lord Howe, but very local in its distribution, is *Planaxis mollis*, Sby., always found in some hollow space under a large stone, associated in large numbers. We obtained a quantity in this way on the north-west extension of the Coral-reef in North Bay.

The Littorinidæ are another strongly developed family. The widely distributed *Littorina diemenensis*, var. *mauritiana*, is found wherever there are rocks along or above high-water mark. Both the black basaltic rocks and the coral-sand rock, where forming reefs and ledges, are frequented by this shell, which appears to be equally indifferent whether it is lapped gently by the incoming tide, or remains high and dry some feet above flood water-mark, and dependant only on spray. It is a remarkable fact that it may be found covering the rocks at some points, in large numbers, whilst, without the slightest indication why, many square feet of similar rock in a like position, are almost deserted by it, and its place taken either by a *Patella* or *Nerita*. In a similar dry position the writer obtained several examples of *Littorina nodulosa* on the basaltic spurs running out from the north extremity of Ned's Beach, but the shell does not appear to be by any means common. Still rarer than this species is *L. plicata*, Linn., obtained on the blocks of basaltic rock strewn on the ledges to the south of Ned's Beach, but in this case always between tide marks, and fully covered at high water. Of the rarer forms of *Littorina*, *L. undulata*, Gray, was also collected.

The Neritidæ are an equally interesting group of shells, both from their prevalence and general distribution. *Nerita melanotragus*, E. A. Smith, occurs in thousands everywhere, but more particularly at those points where the beach, between tides is composed of the coral-sand rock forming the low-lying portions of the Island. On the off-lying islets, especially Rabbit Island, and along the east coast generally this species is decidedly smaller, than when found on the rocky ledges between the landing place and the Old Settlement, where some fine specimens can be obtained. *L. melanotragus* is found plentifully on the coast of New South Wales, and also at Norfolk Island. Another common form is *Nerita antiquata*, Recluz, a shell found on the Victorian coast, but rare here. On the south shore end of the Coral-reef the most typical shell is *Turbo imperialis*, Linn., with its wonderfully massive operculum. Notwithstanding its frequency, however, it is difficult to obtain cabinet specimens, the shell appearing to have a natural affinity for the growth of an incrusting nullipore, and other epiphytic organisms. Associated with *T. imperialis*, although in less numbers, we found *Purpura succincta* already mentioned, and numerous examples of *Dolium variegatum*, Lamk. An immense specimen of this shell was brought from Lord Howe, by the Visiting Magistrate, Mr. H. T. Wilkinson, and exhibited at the Linnean Society, Sydney,* measuring about nine inches in its longest diameter, by a transverse measurement of eight inches. At the meeting in question, Mr. Brazier stated that the species had not previously been found so far east of the mainland of Australia.

Only two species of *Trochus* were found, one, *T. Torresi*, and another known to Mr. Brazier only, from Western Australia. The place of *Trochus* is taken by the little trochoid *Ricella plicatula*, Phil., another Norfolk Island shell. It seems to love crawling over small stones, on a more or less flat beach, especially if of a muddy nature. Such patches are to be found on a part of the foreshore of the Old Settlement, and around Rabbit Island, where it is very plentiful. A small form of *Haliotis* is plentiful on the Coral-reef, the largest examples averaging about one inch in diameter. We did not observe any of the larger species of this genus. Although found on the Coral-reef it cannot be said that *Patella* is common there, but here and there along the coast line *P. tramoserica*, Martin, becomes more so; whilst

* Proc. Linn. Soc. N. S. Wales, 1885, x, p. 696.

at the Admiralty Islets it acquires a much larger size, and is decidedly more plentiful. One specimen of *Siphonaria denticulata*, Q. & G., common to Port Jackson and New Caledonia, was taken on Rabbit Island; and several examples of *Scutus unguis*, Linn., var. *corrugatus*, Reeve, were found on the Coral-reef. The Chitonidæ are sparsely represented by a small *Chiton*, and two species of *Anthochites*, and were attached to stones on the Coral-reef.

Dead specimens of *Triton cynocephalus*, Lamk., and *Pterocera chiragra*, var. *rugosa*, Sby., were found, but Mr. Brazier, without additional evidence, is disinclined to regard these as other than conveyed to the island through human agency. They are New Caledonia species, and have not been traced so far to the south-east before.

The relative prevalence of *Patella* and *Siphonaria* seems to be exactly the opposite of the Rev. J. E. T.-Wood's experience on the north-east coast of the Continent. In the neighbourhood of Trinity Bay he found *Siphonaria* to be the characteristic genus, whilst in our own case it is *Patella*.*

The remaining groups of the Gasteropoda are but feebly represented in our collection. Of the Tectibranchiata we have only three, *Bulla*, *Pleurobranchus*, and *Aplysia*. The former is represented by a few examples of *B. ampulla*, but all dead specimens; the latter by *Aplysia tigrina*, Rang.

The Nudibranchs would probably reward a more vigorous search than we were able to give, two genera only coming under our notice, a species of *Onchydium*, and *Dolabrifera Brazeri*, Sby. The Heteropora are of more importance from the plentiful occurrence of *Ianthina*. This beautiful genus is represented by two species—*I. casta*, Reeve, and *I. exigua*, Lamk. The former is scattered in thousands on the sandy beach of the Lagoon, invariably coming on shore with the mollusc *in situ*. The latter is the beautiful high-spired species, with the well marked sinus in the outer lip of the mouth. From amongst the immense number of the commoner form examined by us, only two specimens of this species were found.

The group to which the greatest interest attaches itself is certainly the Pulmonifera. Thanks to the untiring exertions of Mr. Whitelegge, we are able to extend this division of the Mollusca by no less than seven undescribed species. A curious resemblance exists to some extent between Lord Howe Island and the Sandwich Islands. Not only are both widely isolated, but in the former the land shells are said by Wallace† to be peculiar to the group, and they are certainly so in the case of Lord Howe. A further resemblance takes place in the very small number of Operculate Pulmonifera existing on both groups of islands—in the case of our island, only three genera. More attention has been paid to the land shells of Lord Howe than to any other group of Mollusca found there through the researches of Pfeiffer, Cox, Brazier, and Gaskoin, and collections made by the late Mr. Macgillivray, Mr. G. Masters, and Mr. A. Morton. From a short note by Mr. Brazier in 1869,‡ it appears that Macgillivray alone collected four species of *Helix*, a *Bulimus*, four *Diplommatina*, and an *Omphalotropis*.

The genus *Helix* is represented by no less than ten species. The typical form, characteristic of Lord Howe, *Helix Sophiæ*, Gaskoin,§ is scattered freely over the whole island, and extends to a comparatively high altitude on Mount Ledgbird. In the lower lying portions of the island, in

* Proc. Linn. Soc. N. S. Wales, v, pt. 2, p. 112.
† Island Life, 1880, p. 303.
‡ "Lord Howe Island," *Sydney Morning Herald*, 1869, LIX, No. 9,694 (June 16th), p. 8.
§ Proc. Zool. Soc., 1854, p. 152.

well-wooded localities, but not in the open flats, it is very plentiful under dead timber, bark, and fallen palm leaves. We particularly noticed its prevalence on soil formed of the decomposed Coral-sand rock, the dead shells in places strewing the ground in thousands. On Rabbit Island, *H. Sophiæ*, assumes a more elongated character, and Mr. Brazier proposes to distinguish this as the variety *conica*. On the summit of Mount Ledgbird, the place of *H. Sophiæ* is taken by an equally large, if not somewhat larger species, *Helix howinsulæ*, Cox.* In describing the original specimens collected by Mr. E. S. Hill, Dr. Cox says simply "on a mountain," but examples brought us by Mr. G. Nichols, prove this to be Mount Ledgbird (2,504 ft.), where it occurs from the summit downwards. The little Rabbit or Goat Island does not appear to have a species peculiar to itself, for *H. Catletti*, Brazier,† the common species there, occurs on the main island. On the eastern flanks and spurs of Mount Ledgbird we collected a small *Helix*, at a height of 800–900 ft., which Mr. Brazier proposes to call *Helix Ledgbirdi*. It is a pretty little turreted and variegated shell, and may be found after rain crawling on the basaltic boulders and blocks strewn over the flanks of this inaccessible hill, but in dry weather it takes refuge in the large vesicular cavities of the basalt. On the low grounds at the northern end of the island, amongst cultivated ground a small species was found in numbers to which the name of *H. Unwini*, Brazier, is attached, in compliment to Mr. H. A. Unwin, who joined our party as a volunteer worker. The humid gullies and moist hill flanks, running from the North Ridge to the Old Settlement, afforded a prolific hunting ground. There, amid loam, decaying wood, and under stones, were obtained numbers of small Helices, which Mr. Brazier proposes to designate *H. Whiteleggi;* a very finely but regularly transversely striated species, *H. Balli*, a rare form, named in honour of Lieut. Ledgbird Ball, the discoverer of Lord Howe Island in 1788; and lastly, *H. Wilkinsoni*, a pretty, flatly coiled, and equally rare shell, after the late Mr. H. T. Wilkinson, Visiting Magistrate. In addition to the species already mentioned, two others have been described, but we failed to rediscover the last named, viz., *H. textrix*, Pfr.,‡ and *H. cimex*, Pfr.;§ the latter a dark brown shell, with a perspective umbilicus. The former is said, by Mr. A. Morton,‖ to occur "on Mount Gower, 2,840 feet above the level of the sea," *i.e.*, on the summit. A fine new species of *Vitrina* was found on the stems and leaf sheaths of the palms growing on the lower grounds, (*Kentia Belmoreana*, the "Curly Palm," and *Kentia Forsteriana*, the "Thatch Palm"), and is called by Mr. Brazier, *Vitrina Etheridgei*. In a similar position we also found *Helicarion Hilli*, Cox,¶ but did not trace it above a height of 400 to 500 feet. On the other hand Mr. Morton quotes** *Helix Hilli*, from the summit of Mount Gower, but as there is no species of that name on the Island, he probably refers to the *Helicarion*.

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* Description of new Land Shells from Australia and the Solomon Islands. *Proc. Zool. Soc.*, 1873, p. 148.

† Description of Six new species of Land Shells from Australia and Lord Howe's Island, *loc. cit.*, 1872, p. 617.

‡ Proc. Zool. Soc., 1885, p. 92.

§ *Ibid*, 1854, p. 288.

‖ Report to the Trustees of the Australian Museum, (*Lord Howe Island, Present State, &c.*), 1882, p. 12.

¶ Description of New Land Shells from Australia and the Solomon Islands. *Proc. Zool. Soc.*, 1773, p. 151, t. 16, f. 7, a-b.

** *Loc. cit.*

Some years ago Mr. Brazier described * a species of *Tornatellina* from Lord Howe, but from the fact that only one fragment was found amongst our large gatherings from the North Ridge gullies, it must be very rare. In the paper referred to he also described *Simpulopsis Mastersi*,† one specimen of which occurs in the present collection.

Equal only in abundance, even if not commoner than the characteristic *Helix Sophiæ*, is *Bulimus bivaricosus*, Gaskoin,‡ found everywhere under cover, and in immense numbers. Like the *Helix*, this shell appears to avoid open spaces as a rule, and prefers shady damp situations and the scrubby hill sides where composed of the Coral-sand rock. It is sparingly represented even at the higher altitudes, being reported as seen under the "wall" of Mount Ledgbird. The egg-cases are usually met with at the base of the palm leaf sheaths, between the latter and the stems. There is great variation exists in the thickness of the shell of this species, and I believe it was on a thin shelled variety that Dr. Cox established his *Bulimus cuniculinsulæ*.§ It occurs on Rabbit or Goat Island, and is, as Dr. Cox says, both smaller and lighter than the typical form of the main island. Numbers of gradations can, however, be traced amongst a series of the latter, and it seems more in keeping with facts to regard the Rabbit Island shell simply as a variety. This variation in the thickness is carried to the extreme condition in the sub-fossil examples of *B. bivaricosus*, in which the shell becomes thickened to an enormous extent, but in this case even gradations can be traced to the existing condition of the species. This variety I purpose calling *B. bicaricosus*, var. *solida*. We may now pass to the operculate section of the Pulmonifera consisting of three genera and seven species. Two forms are common, *Omphalotropis exquisita*, Pfr.,‖ and *Diplommatina Macgillivrayi*, Pfr.,¶ both originally collected at Lord Howe by the late J. Macgillivray. Two other species of the last genus were collected both by Macgillivray and ourselves, *D. capillacea*, Pfr.,** and *D. Cantori*, Pfr.,†† but are not as plentiful as the former shells. A fourth species of *Diplommatina* is said by Dr. Pfeiffer to exist on Lord Howe, called by him *D. chordata*,‡‡ but we did not obtain it. The list may be concluded by one specimen of *Realia*.

Under very trying circumstances we were fortunate enough to discover fresh water non-pulmoniferous forms at a considerable height on the eastern flanks of Mount Ledgbird in steep gullies running down to the shore. These consisted of two species of *Bythinella*, crawling over stones. One, a spirally striated shell, with a deep suture, will be described as *B. Whiteleggei*, by Mr. Brazier, and the other as *B. Ramsaii*, as an appreciation of the interest taken in our proceeding by the Curator of the Australian Museum.

The bivalve mollusca (Pelecypoda) are not largely represented at Lord Howe Island. Within the Lagoon at, and a little below low water-mark,

* Description of six new species of Land Shells from Australia and Lord Howe's Island *Proc. Zool. Soc.*, 1872, p. 619.

† *Loc, cit.*, p. 619.

‡ Proc. Zool. Soc., 1854. p. 152.

§ Description of new land shells from Australia and the South Sea Islands. *Proc. Zool. Soc.*, 1872, p. 19, t. 4, f. 3.

‖ A Monograph of the Genera *Reilia* and *Hydrocena*. *Proc. Zool. Soc.*, 1854, p. 307 (=*O. Pfeiferi*, Crosse).

¶ Descriptions of eighteen new species of Cyclostomacea from Mr. Cuming's Collection. *Proc. Zool. Soc.*, 1854, p. 303.

** *Ibid*, p. 303.

†† Descriptions of sixteen new species of Pneumonopoma from the Collection of H. Cuming, *Proc. Zool. Soc.*, 1856, p. 336.

‡‡ Proc. Zool. Soc., 1855, p. 105.

occur *Pinna* (sp. nov. ?), *Lucina interrupta*, Lamk., *Cardium unedo*, Linn., and *Mesodesma glabrata*, Lamk., all, with the exception of the last, very common. Large numbers are cast upon the beach, but they may be obtained wherever the sand has a slight admixture of argillaceous matter, as at the north end of the Lagoon, off the Old Settlement. *Cardium unedo*, the "Strawberry cockle," exhibits endless varieties in its colouring. Some are almost colourless, others with a few of the strawberry seeds on the anterior sides; others yellow tinted towards the ventral margins, or even a delicate red tint; some have the red specs carried on to the posterior slopes, whilst again many are beautifully besprinkled across the whole breadth of the valves. The colourless condition appears to represent old shells.

The genus *Pecten* is peculiar by its absence. We did not meet with many bivalves of importance on the reef, but the commoner forms are *Mytilicardia variegata*, Brug.; two species of *Avicula*, *A. fimbriata* Reeve, *and A. malleoides*, Reeve; a few *Lima multistriata*, Sby.; two species of stunted oyster, a *Modiola* met with in all the pools and crevices, but specifically unknown to Mr. Brazier; and two species of *Arca*, *A.* (*Litharca*) *decussata*, Sby., and *A. divaricata*, Sby. The first is moderately common, and distorted into all sorts of shapes; whilst the latter, unlike individuals from the more tropical islands of the Pacific, are small and uncommon. Perhaps the most characteristic bivalve found on the reef is a small clam, *Tridacna elongata*, Lamk., lying half buried in cracks and depressions of the surface. It is also found on the rocky ledges of the east coast. An example of *Crassatella pulchra*, var. *Cumingi*, A. Ad., and a dead valve of *Pectunculus costatus*, Reeve, were also picked up. Neither Brachiopoda, nor Pteropoda were met with.

The following is the complete list of Mollusca collected, as determined by Mr. Brazier:—

Spirula Peroni, *Lamk.*
Onychoteuthis Banksi, *Leach.*
Sepia latimanus, *Q. & G.*
Fusus Hanleyi, *Angas.*
Ranella leucostoma, *Lamk.*
Nassa mucronata, *A. Ad.*
„ elegans, *Kiener.*
„ paupera, *Gould.*
Purpura succincta, *Martin.*
„ „ *var.* striata.
„ „ *var.* textilosa.
„ amygdala, *Kiener.*
„ Smithi, *Brazier* (sp. nov.)
Cominella tritoniformis, *Blainv.*
Ricinula morus, *Lamk.*
Sistrum chaidea, *Duclos.*
„ marginalba, *Bean.*
Voluta nucleus, *Lamk.*
Columbella versicolor, *Sby.*
„ Tyleri, *Gray.*
„ varians, *Sby.*
„ Cumingi, *Reeve.*
„ sp.
Engina armillata, *Reeve.*
„ lineata, *Reeve.*
Mitra scutulata, *Chem.?*
„ sp.

Vermetus, sp.
Cypræa erones, *Linn.*
„ moneta, *Linn. ?*
„ annulus, *Linn.*
„ caputserpentis, *Linn.*
„ staphylæa, *Linn.*
„ felina, *Gray.*
„ vitelus, *Linn.*
Natica picta, *Recluz*, var.
Dolium variegatum, *Lamk.*
Scalaria perplexa, *Pease.*
Conus anemone, *Lamk.*
„ ebreus, *Hwass.*
„ coronatus, *Dilo.*
„ capitaneus, *Linn.*
„ vermiculatus, *Hwass.*
Strombus floridus, *Lamk.*
„ luhuanus, *Linn.*
Vertagus obeliscus, *Brug.*
Cerithium, sp.
Lampania australis, *Quoy.*
Potamides ebeninus, *Brug.*
Littorina diemenensis, var. mauritiana, *Lamk.*
„ nodulosa, *Gmelin.*
„ undulata, *Gray.*
Planaxis mollis, *Sby.*
Hipponyx antiquatus, *Linn.*
Nerita melanotragus, *E. A. Smith.*
„ antiquata, *Recluz.*
„ albicella, *Linn.*
„ plicata, *Linn.*
Turbo imperialis, *Linn.*
Trochus Torresi, *E. A. Smith.*
Clanculus, sp.
Ricella plicatula, *Phil.*
Thalotia, sp.
Haliotis, sp.
Patella tramoserica, *Martin.*
Scutus unguis, var. corrugatus, *Reeve.*
Siphonaria denticulata, *Q. & G.*
Chiton, sp.
Anthochites, sp.
Bulla ampulla, *Linn.*
Aplysia tigrina, *Rang.*
Pleurobranchus, sp.
Onchydium, sp.
Dolabrifera Brazieri, *Sby.*
Ianthina exigua, *Lamb.*
„ casta, *Reeve.*
Helix Sophiæ, *Gask.*
„ „ *var.* conica, *Brazier* (var. nov.)
„ howinsulæ, *Cox.*
„ Catletti, *Brazier.*
„ Whiteleggei, *Brazier* (sp. nov.)

Helix textrix, *Pfr.*
„ Ledgbirdi, *Brazier* (sp. nov.).
„ Balli, *Brazier* (sp. nov.)
„ cimex, *Pfr.*
„ Unwini, *Brazier* (sp. nov.).
„ Wilkinsoni, *Brazier* (sp. nov.).
Bulimus bivaricosus, *Gask.*
„ „ *var.* cuniculoides, *Cox.*
Helicarion Hilli, *Cox.*
Vitrina Etheridgei, *Brazier* (sp. nov.).
Tornatellina inconspicua, *Brazier.*
Simpulopsis Mastersi, *Brazier.*
Omphalotropis exquisita, *Pfr.*
„ Pfeifferi, *Crosse.*
Realia, sp.
Diplommatina Macgillivrayi, *Pfr.*
„ capillacea, *Pfr.*
„ Cantori, *Pfr.*
„ chordata, *Pfr.*
Bythinella Whitleggei, *Brazier* (sp. nov.).
„ Ramsayi, *Brazier* (sp. nov.)
Ostrea, sp. *a.*
„ sp. *b.*
Avicula fimbriata, *Reeve*
„ malleoides, *Reeve.*
Pinna, sp.
Lima multicostata, *Sby.*
Modiola, sp.
Litharca decussata, *Sby.*
Arca divaricata, *Sby.*
Pectunculus tenuicostatus, *Reeve.*
Chama, sp.
Tridacna elongata, *Lamk.*
Carduim unedo, *Linn.*
Lucina interrupta, *Lamk.*
Crassatella pulchra, *Reeve*, var. Cumingi, *A. Ad.*
Tapes literata, *Linn.*
Mesodesma glabrata, *Lamk.*
Mytilicardia variegata, *Brug.*

Tunicata—Ascidians are excessively common on the stones and blocks, and in the depressions and hollows of the Coral-reef, and many of a very marked appearance. Our knowledge of the Australian species is too limited to permit of any remarks being made.

Insecta—The Insecta, and allied classes were not made a special object of search, but were simply captured when presented to our notice. Indeed, the season was not sufficiently advanced for collecting one order at all—the Lepidoptera, a solitary individual being the only one seen and that shortly after our arrival.

So far as our collection can be taken as a test, the Coleoptera are the most abundant, and as it happens this order has been, through the researches of the Hon. W. Macleay, Mr. F. P. Pascoe, and Mr. A. S. Olliff, and others, more systematically worked out than the others. Amongst the Longicorn Beetles we obtained what is believed to be *Cnemoplites Howei*, Thomson, and *Ceresium simplex*, Gyll. Two examples of *Blax Wollastoni*, White, were discovered, and

also two of the beautiful green beetles peculiar to Lord Howe, *Lamprima insularis*, Macleay,* found by Mr. Thorpe, one on Rabbit Island, the other on the main island. Although not obtained during our visit it may be mentioned that Mr. Olliff has in course of description two species of Staphylinidæ — not hitherto recorded; one he calls *Hesperus pacificus*, differing from the mainland species, *H. hæmorrhoidalis*, Macleay, in several important particulars; the other is *Creophilus erythrocephalus*, Fab., an abundant and widely distributed species. The same author has already recorded† two species of Cucujidæ, viz, *Dendrophagus australis*, Erich., a widely distributed Australian form; and *Cryptamorpha Desjardinsii*, Guer., found on the banana trees of the Island, but probably introduced. The most numerously represented divisions of the Coleoptera are the Carabidæ, and Rhynchophora. Amongst the former we have the very uncommon *Scaraphites Macleayi*, Westw., a new discovery at Lord Howe, but found in New South Wales; *Chlænius peregrinus* Cast., a widely distributed Australian species, and one found in Norfolk Island. The *Rhynchophora* are all recorded species, but we were not fortunate enough to find any of them, although they are peculiar to Lord Howe Island, viz., *Orthorhinus lateralis*, Pasc.,‡ *Tranes insularis*, Pasc.,§ *Embaphoides pyxidatus*, Pasc.,‖ *Æthreus cicatricosus*, Pasc.,¶ *Sphaeropterus barbipes*, S. & J., and *Hybomorphus melanosomus*, S. & J., the most peculiar form of insect found there; and lastly a strange, and perhaps new species of *Telephorus*, locally known as the "bug." By far the two commonest and most widely distributed beetles on Lord Howe are the little *Saragus exulans*, Pasc., and *S. Gulielmi*, Oll., to be found under every stone and in every rotten stump. They are peculiar to the island, and when disturbed immediately feign death, tucking their legs underneath the body and remaining still for an incredibly long time. Since our return from Lord Howe, Mr. W. E. Langley has brought from thence a true water-beetle of the family Dytiscidæ, referable to the genus *Cybister*. The Hymenoptera are conspicuous by their absence in our collection. Bees are plentiful and cultivated; but whether or no there is a native bee, we are unable to say. Nests are occasionally taken from the banyan trees, probably those of bees escaped from confinement, and I regret to say that I saw more than one instance of these noble trees felled for the purpose of obtaining the comb. As before stated, our visit was paid at too early a season for *Lepidoptera*, with the exception of a few *Heterocera*, chiefly small forms. There is, however, one exception in *Dasypodia cymatodes*, Guénée, which occurs under very interesting circumstances in some caves at the North Bay. These occur in the Coral-sand rock, and extend for a limited distance underground, the roofs of both being completely clothed by thousands upon thousands of this moth.

The most important members of the *Orthoptera* we obtained were a large *Blatta*, probably a new species, which is invariably found in and under decayed logs: a mole-cricket, *Gryllotalpa australis*, Eric., not hitherto recorded from the island; and an immature grasshopper of the genus *Phaneroptera*, and of which there appeared to be large numbers about. The so-called "Tree Lobster," *Eurycantha australis*, Montr., peculiar to Lord Howe, was found to occupy the hollow trunks of the smaller trees along

* Revision of the Genus *Lamprima* of Latreille, &c. *Proc. Linn. Soc., N. S. Wales*, x, pt. 2, p. 137.

† Proc. Linn. Soc., N. S. Wales, x, pt. 2, p. 218 and 220.

‡ Ann. Mag. Nat. Hist., 1882, ix, p. 381.

§ *Ibid.* 1874, xiii, p. 387.

‖ *Ibid, loc. cit.* p. 419.

¶ *Ibid*, 1875, xvi, p. 65, t. 1, f. 8.

parts of the flats in some quantity. Their presence is at once discerned by the small heaps of droppings collected either at the open base of the hollow, or on the ground, at the foot of the tree inhabited by them. To obtain specimens, the hollow in the trunk must be followed out, and a hole cut at the particular spot occupied by the insect, their habit and power of closely clinging to an object preventing the adoption of any other method except, perhaps, that of smoking out. We found the females greatly predominating over the males. Since our return from Lord Howe Island, Mr. W. H. Langley has brought from thence a specimen of the Water Scorpion, *Belostoma indicum*, L. & S. It is, however, possible that it may have been introduced.

The only Hemipterous insect met with by ourselves was an immature bug, belonging to the family Scutellaridæ, and perhaps even of the genus *Scutellera* itself. This bug was obtained in large numbers by the writer, on the flat at the back of Blenkinthorpe Beach, where it occurred in hundreds on the tree-trunks and branches, and covering many yards square on the ground. A few years ago a *Coccus* seems to have played sad mischief with the banyans. Mr. Duff remarks on this subject,—"I noticed with regret that many of the large banyan-trees (*Ficus columnaris*) on the low land were in an unhealthy and decaying state, mostly their leaves having fallen off, whilst those remaining were infected with an insect (*Coccus*) underneath the leaves, causing them to have a sickly yellow appearance. The *Coccus* insect is the same as that which attacked and damaged the Moreton Bay fig-trees in Sydney parks and gardens a few years ago."*

Passing to the Myriopoda, several forms of *Julus* are met with, particularly a slender black species. This occurs wherever there is a superabundance of rotton woody matter, and frequently at the bases of the palm sheaths, between the leaf stalks and the stem.

The first order of this class, the Chilopoda, is represented by a Centipede, *Heterostoma*, met with under much the same circumstances.

Lastly we obtained a number of Spiders, but these appear to be immature individuals, and of doubtful identity, and this group would undoubtedly repay further research. The following Arachnid genera are recorded by Mr. E. S. Hill—*Epeira*, *Lycosa*, *Olios*, *Thomisus*, *Clubiona*, *Delena*, and *Amourobius* (*?*)

The following is as complete a list of the "Insecta" of Lord Howe, using the term in its broadest sense, which it has been possible to get together.†

Cnemoplites Howei, *Thom.*
Leptops Etheridgei, *Oll.* (sp. nov.)
Blax Wollastoni, *White.*
Lamprima insularis, *Macleay.*
*Hesperus pacificus, *Oll.*
*Creophilus erythrocephalus, *Fabr.*
Scaraphites Macleayi, *Westw.*
Chlænius peregrinus, *Cast.*
Lestignathus fugax, *Oll.* (sp. nov.)
Dyscolus hilaris, *Oll.* (sp. nov.)
Diaphoromerus iridipennis, *Ch.*
*Orthorrhinus lateralis, *Pasc.*
*Tranes insularis, *Pasc.*

* Report to the Hon. J. B. Wilson (*Lord Howe Island, Report on Present Prospects, &c.*), *loc. cit.*, p. 10. [This seems to be a mistake. The insect was the larva of a species of *Galeruca* (*Coleoptera.*)—E.P.R.]

† Those species marked with an asterisk are quoted from authorities.

*Embaphiodes pyxidatus, *Pasc.*
*Æthreus cicatricosus, *Pasc.*
*Hybomorphus melanosomus, *S. & J.*
*Sphaeropterus barbipes, *S. & J.*
*Dendrophagus australis, *Eric.*
*Cryptamorpha Desjardinsii, *Guer.*
Cybister tripunctatus, *Oliv.*
Nyctobates sterrha, *Oll.* (sp. nov.)
Telephorus apterus, *Oll.* (sp. nov.)
Saragus exulans, *Pasc.*
Saragus Gulielmi, *Oll.* (sp. nov.)
Dasypodia cymatodes, *Guénée.*
Blatta, sp. nov. ?
Gryllotalpa australis, *Eric.*
Phaneroptera, sp.
Eurycantha australis, *Montr.*
Belostoma indicum, *L. & S.*
Scutellera, sp. ?
Julus, sp.
Heterostoma, sp.

Crustacea.—This group does not call for a prolonged notice, although Crustacea may be found in great abundance, throughout the surrounding seas, and to a great extent on the rock-bound shores of the island. So far as Mr. Whitelegge has been able to determine them, from 27 to 30 genera, comprising 35 species, were collected, chiefly Decapods, with an Isopod, a Stomapod, and a few Cirripedia. In Dr. Haswell's Catalogue none are recorded from Lord Howe Island. The task of determining the collection has proved of no small difficulty to Mr. Whitelegge, from the almost entire absence of the more important illustrated works bearing on the subject.

The Carcinology of Lord Howe Island is practically an unworked branch, and its study would well repay the student of this interesting group, the large variety of forms to be obtained there having already been commented on by Mr. A. Morton.* No better hunting ground could exist than the deep pools, and rocky eastern coast of Lord Howe, and the numerous shelter places on the western Coral-reef. Although one or two rare forms were taken by us, we did not collect any of large size. The preponderance of Decapoda can hardly be taken as implying a superabundance of this division of the Crustacea, but only so far as came under our notice.

The Inachidæ are represented by a funny little species, *Menethius monoceras*, Lath., found on the Coral-reef amongst stones and weeds, and on the approach of the collector, sits up in a grotesque and semidefiant manner. It is widely distributed throughout the neighbouring tropical seas. The Canceridæ are, as regards genera, the most numerous, and a fair series were obtained, including three species of *Actæa*, especially *A. tomentosa*, M. Edw., another reef crab but remarkable only for its abundance. A second species is believed by Mr. Whitelegge to be *A. rugata*, A. & W., a form not recorded by Dr. Haswell as Australian. Passing to the genus *Xanthodes*, we found *X. atromanus*, Hasw., to be fairly abundant, and are thus able to localize a very interesting crab, of hitherto unknown habitat, and a species which may be a *Medæus*, but, perhaps distinct from that hitherto recorded as Australian. We found *Etisus longimanus*, a Queensland, Fiji, and Sandwich

* Report to the Trustees (*Lord Howe Island, Report on Present Prospects, &c.*), *loc. cit.*, p. 12.

Island species, common on the reef. Other representative tropical forms are *Phymodius ungulatus*, M. Edw., and *Chlorodius niger*, Forsk., the latter being very abundant. By far the commonest Decapod at Lord Howe is *Ozius truncatus*, M. Edw., found everywhere on the rocks between tide marks. It is of a remarkably active disposition, and possesses the faculty of making its way into all sorts of crevices and corners. The largest we obtained measured two and a half inches across the carapace, by one and three-quarters. Another small species of *Ozius*, as yet unnamed, with the fingers of the hand tipped with dark red, occasionally came under notice, and is a very distinctly marked form. The Eriphidæ, besides the genus *Ozius*, are represented by a species of *Pilumnus*, apparently not recorded as Australian by Haswell, *Actumnus tomentosus*, Dana, a Queensland species, and *Trapezia cymodoce*, Herbst, a rare form.

Small individuals of *Neptunus pelagicus*, Linn., were caught, and, with *Thalamita prymna*, Herbst, represent the Portunidæ. The former is one of the edible crabs sold in the Sydney market, and a very widely-distributed species, but does not appear, so far as our observations went, to attain any size at Lord Howe Island. A second small species of *Thalamita* was collected, covered with many spines, but is at present undetermined. When visiting Blenkinthorpe Bay, Mr. Thorpe and the writer obtained numerous examples of a sand-crab, to all appearance *Ocypoda ceratophthalma*. Dr. W. A. Haswell states* that the hands are not spinous, but in our specimens they are decidedly so, and correspond more closely with the description given by Stark† than they do with that of the other writer. This crab burrows in the sand between tide-marks, to a depth of two feet or more, the burrows running obliquely in a direction from the approaching water. The apertures of these retreats are circular, and at a first glance resemble those of some mollusca.

The largest crab we met with at Lord Howe was *Grapsus variegatus*, Fabr., and it is without doubt also the commonest. It is a species found everywhere throughout the Pacific, reaching even to the coasts of Chili.‡ Another cosmopolitan member of the Grapsidæ is *Planes minutus*, Linn., and besides this we found *Paragrapsus quadridentatus*, M. Edw., and *Plagusia chabrus*, Linn. The identification of the former is open to some doubt, although the females were obtained having the characteristic line down the hand to the forefinger. The latter is another species having a very wide distribution.

The little *Leiolophus planissimus* is common under stones, exceedingly quick, and, like some spiders, has the habit, when disturbed, of crouching down with its legs tucked under it, when its almost flat carapace is difficult to detect.

By far the most important member of the Decapoda was Mr. Whitelegge's discovery of a fresh-water crab, plentifully distributed in the water-carrying gullies of the North Ridge, behind the Old Settlement, at a height of from 200 to 300 feet above high-water mark. It is a species of *Hymenicus*. After leaving Newcastle in the s.s. "Taupo," on our way to Lord Howe Island, a derelict waterman's wherry was picked up, and in the joints of the timbers and along the keel we found a small crab, probably the larval condition of *Mycteris longicarpus*, Latr., a species found in Port Jackson, and, according to Dr. Haswell, in New Caledonia also. It is frequently met with marching in large companies over sandy flats. The elegant *Ranina dentata* occurs at Lord Howe, but although at times plentiful enough, we did not succeed in taking it. A specimen was, however, obligingly presented by Mr. W. Nichols.

* Cat. Austr. Stalk and Sessile-eyed Crustacea, 1882, p. 94.
† Elements Nat. Hist., 1828, II, p. 148.
‡ Fish and Fisheries of New South Wales, 1883, p. 125.

The Hermit Crabs, so far as our observations went, are not plentiful. *Pagurus punctulatus*, M. Edw., was secured in a dead specimen of *Turbo imperialis;* it is a widely distributed species. A second and very pretty crab was found in a young shell of the same mollusc, the ambulatory legs cross-banded in variegated colours. Fragments of a *Palinurus* were shown to us, perhaps those of *P. ornatus*, Fabr., and we were informed that the Sydney Crawfish, *P. Huegellii*, Heller, was also indigenous to the island. Should this be so, it is possible that the well-stocked waters of Lord Howe Island would form an excellent preserving ground for this most delicious of all the Australian Crustacea.

The Crangonidæ are represented by *Alpheus Edwardsi*, Aud., one of the "Nippers." This Crustacean afforded Mr. Whitelegge much amusement when collecting, by the peculiar clicking noise made when an individual was thrust into the collecting jar, just like the sudden cracking of a bottle. So deceptive was the noise, that on several occasions the jar was examined to ascertain if it had burst, and it was some time before the obvious explanation was grasped. Dr. Coppinger, in his account of the "Alert's"* cruise, describes a similar phenomenon. Speaking of a dredge-haul in Port Curtis, he says:—"Conspicuous by their abundance amongst the contents of the dredges, and by their curious habit of making a low, snapping noise, with the large pincer-claws, were the shrimps of the genus *Alpheus*. When placed in water in a glass jar, the sound produced exactly resembles the snap which is heard when a tumbler is cracked from unequal expansion of hot water."

The only Stomapod noticed was the well-known Australian tropical reef Squilla, *Goniodactylus chiragra*, Fabr.

Not the least interesting crustacean we obtained was an Isopod, a species of the genus *Ourozeuktes*, which lives parasitically within the oral cavities of fish. We found it frequenting the Sweep, *Scorpis æquipinnis*, Rich. A small Cirripede is attached freely to a multitude of marine terrestrial objects scattered about the beach. It is probably *Lepas pectinata*, Spengler. This habit of fixing itself in small clusters to almost anything is referred to by Darwin,† who mentions, amongst other things, *Spirula*, on which we also saw it. Its geographical range is wide, extending from "the North of Ireland to off Cape Horn," and it is also common under the tropics. The equally widely distributed *Lepas anserifera*, Linn., also occurs at Lord Howe. The volcanic rocks at Ned's Beach, along the high-water mark, and possibly also those at other parts of the Island are thickly dotted over with *Tetraclita rosea*, Kraus, [=*Balanus Cumingii*, Chenu.], a barnacle common to the east coast of Australia from Moreton Bay to Twofold Bay, attached, Darwin says, to "littoral rocks and shells."

The following is a complete list of the Crustacea, so far as at present determined by Mr. Whitelegge:—

Menæthius monoceros, *Lath.*
Lophactæa granulosa, *Rüp.*
Actæa tomentosa, *M. Edw.*
Actæa rugata, A & W.
Actæa, sp.
Xanthodes atromanus, *Hasw.*
Xantho? integer, *De Haan.*
Medæus, sp.

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* Cruise of the "Alert," 1883, p. 182.
† Mon. Sub-class Cirripedia. Lepadidæ, 1851, p. 85.

Etisus lævimanus, *Randall.*
Phymodius ungulatus, *M. Edw.*
Leptodius, sp.
Chlorodius niger, *Forsk.*
Ozius truncatus, *M. Edw.*
Ozius, sp.
Pilumnus, sp.
Actumnus tomentosus, *Dana.*
Trapezia cymodoce, *Herbst.*
Neptunus pelagicus, *Linn.*
Thalamita prymna, *Herbst.*
Thalamita, sp.
Ocypoda ceratophthalma, *Pallas.*
Grapsus variegatus, *Fabr.*
Planes minutus, *Linn.*
Paragrapsus quadridentatus, *M. Edw. ?*
Plagusia chebrus, *Linn.*
Leolophus planissimus, *Herbst.*
Hymenicus, sp.
Ranina dentata, *Latr.*
Petrolisthes, sp.
Pagurus punctulatus, *M. Edw.*
Pagurus, sp.
Calcinus elegans, *M. Edw.*
Alpheus Edwardsi, *Aud.*
Goniodactylus chiragra, *Fabr.*
Palinurus ornatus, *Fabr. ?*
Palinurus Huegellii, *Heller ?*
Ourozeuktes, sp.
Lepas anserifera, *Linn.*
Lepas pectinata, *Spengler.*
Tetraclita rosea, *Kraus.*

A glance of this list will at once indicate the tropical facies of the crustacean fauna of Lord Howe Island.

Annelida.—The state of our knowledge at the present time, even of Australian worms, quite forbids our instituting any comparison with those of extra Australian localities. The earth worms of Lord Howe, of which we obtained numerous examples, resemble in general appearance those of this continent. Several ciliated marine worms were also found under loose stones on the Coral-reef. The Hirudinea are possibly well represented, the shady dark pools of the Deep Creek being admirably suited for their propagation. Land leeches occur, one form being found at the top of Mount Gower, and another in the gardens in the lower parts of the island. Two species of *Sipunculus* were found attached to stones on the Coral-reef; but the most interesting of all are the Planarian worms, of which there are large numbers. At least five or six species were obtained, both from rotten logs, from under bark lying on the ground, and from those parts of the palm stem where protected by the leaf-sheaths. In all probability the species are quite undescribed, and as they are all two-eyed, may for the present be placed in the genus *Rhynchodemus.*

Echinodermata.—Professor Jeffery Bell,* in describing the Echinodermata collected by Dr. Coppinger during the voyage of the "Alert," in 1881–82,

* Report, &c., Voyage of H.M.S. "Alert," 1881–82, p. 171.

records four Echini, as in the collection of the Australian Museum, from Lord Howe Island, viz.:—

Echinometra lucunter, *Leske*.
Strongylocentrotus tuberculatus, *Lamk*.
Echinostrephus molare, *A. Agas*.
Breynia australasiæ, *Leach*.

In the subsequently published "Catalogue of the Echinodermata in the Australian Museum,"* Dr. E. P. Ramsay mentioned the same species, and also *Tripneustes angulosus*, Leske, as occurring there.

During our late visit we obtained the whole of these except *Echinostrephus molare*, but in addition two other forms not previously recorded.

The beautiful family of the Diadematidæ is represented by *Centrostephanus Rodgersii*, A. Agass, distinguished at once by the dark purple-claret colour of the test and spines. We met with this magnificent species in the pools and hollows of the dead coral on the large reef, and, if I mistake not, rather more plentifully in similar cavities on the basaltic ledges of the west coast, but no where is it plentiful. Speaking of those found in Port Jackson, Dr. Ramsay makes the following remarks, which are equally applicable to the specimens observed at Lord Howe Island. "These Urchins frequent the reefs and rocky shores just below low tide mark, where they obtain their food; they progress with considerable rapidity for an Urchin, when once disturbed, until they find a secure retreat in some crevice of the rocks, from whence it is difficult to remove them without destroying either the spines or test. . . . . The peculiar pigment or dye contained in the spines and within the test itself is worthy of investigation. I know of no other species on our coast which has this peculiarity. In cleaning the tests, the fingers and nails become stained with the pigment, which is very difficult to remove." Their habitat at Lord Howe, at any rate, is between tide marks as well as below. In a paper "On the habits of some Australian Echini,"† the Rev. J. E. T. Woods refers to the restricted habitat of this species, so that its discovery at Lord Howe Island is of some importance. He remarks on the species that "it clings to the rock with its powerful suckers with the surface free. It is very careful to select as a place of repose a very narrow cell with just room enough for its body." Our observations quite bear out the fact that it does occupy most peculiar holes and crevices, but we saw it quite as frequently in open pools with plenty of room around.

The Cidaridæ are represented by a *Phyllacanthus*, perhaps *P. baculosa*, Lamk. We did not obtain this, but a much damaged example has been presented to the Museum by Mr. Campbell Stevens.

Echinometra lucunter, Leske, is by far the commonest Urchin, as it appears to be also on some parts of the Australian coast. It was invariably met with in holes just large enough for its reception on the flat table surface of the Coral-reef, when it became an exceedingly difficult matter to effect the extraction of individuals. Of one thing I am quite satisfied, some do not leave their cells but continue to enlarge them as their growth progresses. This is obvious from the overhanging upper edges of their domiciles, rendering the opening in some degree smaller than the Urchin's test, and to effect the extraction of such, a hammer was requisitioned. This habit of frequenting restricted spaces may, perhaps, to some extent, explain

* Catalogue Echmodermata, Australian Museum. Part 1. Echini. 1885, p. 45.
† Proc. Linn. Soc., N. S. Wales, v, pt. 2, p. 196.

the absence of suckers around the actinosome, which, according to the Rev. J. E. T. Woods, are wanting in this species.* As it is the commonest, so it is the most variable Urchin in the colour of its spines. We observed examples with light drab spines; others with those organs of a greenish-yellow, tipped with a lighter shade; and lastly, a less common variety, in which the whole of the spine is dark-brown, and the lips a yellowish-grey, forming a very strong contrast, but there are even gradations to be traced in these varieties. Another remarkable feature, and one not referred to by Alexander Agassiz in his "Revision" and the generality of writers, is the want of symmetry in the test of a larger number of examples. Some certainly appear to be more or less circular, but in by far the larger number, the test is laterally compressed, assuming a more or less oblong outline. This is even very apparent in non-denuded examples.

Another member of the Echinometridæ found at Lord Howe Island, where it is common, is *Strongylocentrotus tuberculatus*, Lamk. It is a large olive-spined form, not then known from the mainland according to Dr. Ramsay,† but almost peculiar to the island.‡ We obtained a few moderately large examples, and many young individuals. With the exception of the succeeding species it is the largest Urchin found at Lord Howe. The Rev. J. E. T. Woods quotes§ this species as found generally in "N. E. tropical Australia," and he mentions also one example from Port Stephens and another from New Zealand.

The edible Urchin *Tripneustes angulosus*, Leske, grows to large proportions in the genial waters of the Lagoon at the island, the sandy beach within the harbour being an excellent locality for obtaining examples cast up alive from deeper water. We obtained several large specimens.

Breynia australasiæ, Leach, occurs in great abundance in the sandy bottom of the Lagoon, at some little distance below low-water mark, and of large size, some of our own examples measuring four and a half inches by four, and some nearly five from before backwards. It varies from a deep cholocate to a dark fuscous-brown and burrows in the sand, sometimes to a depth of six inches. Although authorities differ as to its geographical distribution little doubt can exist that Lord Howe Island is its principal habitat. Dr. Ramsay says "it has been seldom found in Port Jackson or on the adjacent coast," whilst Mr. Tenison Woods remarks "found from Cape York to Port Jackson." Very fresh specimens must be obtained if it is desired to examine the soft parts, for they decompose with great rapidity, leaving the shells more or less filled with foraminifera on which they appear in a great measure to live.

Lastly Messrs. Whitelegge and Thorpe obtained five examples of a very pretty little *Echinoneus* on the flat reef running out from the south side of Ned's Beach. The specimens are of a dark chocolate-brown colour, completely covered with a fur of delicate, short spines, and were found under stones. The smallest was somewhat over half an inch in its longest diameter, whilst the largest was quite one and a half inches. The species has been determined by Dr. Ramsay to be *E. cyclostomus*, Leske.

The Asteroidea collected are not numerous, four genera and species comprising the series. *Asterias calamaria*, Gray, is exceedingly common on the

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* Proc. Linn. Soc., N. S. Wales, v, pt. 2, p. 197.

† Cat. Echinodermata, Australian Museum. Part I. Echini. 1885, p. 46.

‡ It has lately been found at Shark Point, Port Jackson, by a Mr. Hunt.

§ The Echini of Australia, Proc. Linn. Soc., N. S. Wales, II, pt. 2, p. 158.

Coral-reef; scarcely a stone of any size can be overturned but what examples of this species are to be seen clinging to it. *Asterina exigua*, Lamk., a disc-like form, is almost as frequent as the last species, and so much resembles the colour of the rocks to which it adheres, that it is at times distinguished with difficulty. *Ophidiaster Germani*, Per., is sparingly met with, of a dull red colour, and with long finger-like arms. It is very similar, except in colour, to a blue species met with in Torres Straits. We also found a fourth small species, *Patiria crassa*, Gray, somewhat solariform, with six or seven rays, and grey in colour. Both in the Australian Asteroidea, and the succeeding group of the Ophiuroidea, much yet remains to be done; in fact, they may be practically said to be unworked groups. We obtained *Ophiocoma breviceps*, Peters, and *O. crenacea*, M. and T. We have reason to believe that many fine *Holothurians* will be met with in the future over this prolific hunting ground, although we only succeeded in capturing four species, chiefly under stones and in the pools of the Coral-reef. The smallest and commonest of the four, a *Holothuria*, of a brownish colour, emits, when touched, a white, sticky, fibrous discharge, which congeals like india-rubber. This is probably allied to the "milk-fish" described by the Rev. J. E. T. Woods*, from the reefs of the south-east coast of Australia. He says, "Another species is the "milk-fish," or "cotton-fish," so called from its power of emitting a white viscid fluid from its skin, which clings to an object like shreds of cotton." Another species is a large form, a foot in length, perhaps *Holothuria vagabunda*, Seleneka, of a black-brown colour; a third and rather common Holothurid, brown, mottled with white, we believe to be *Stichopus chloronotus*, Brandt, and obtained by the "Challenger" expedition in the Fiji Islands. The last is a *Cucumaria* of a pale straw yellow.

Actinozoa.—We experienced great disappointment in our efforts to obtain a representative series of the corals forming the fringing reef at Lord Howe. The long continued foul weather quite prevented our visiting those portions of the reef best adapted for the study of its actinology. Quantities of dead fragments are scattered about the sandy beach of the Lagoon, but usually in such a comminuted, or rolled condition, as to be quite useless for identification. In this manner we obtained convoluted masses of a *Turbinaria*; finger-like colonies of a *Stylophora*, very like *S. cellulosa*; globose masses of *Cyphastrea Bruggemanii*, Quelch; and flabellate expansions of a *Madrepora*. In the pools of the shore ends of the reef *Cœloria dadœlia*, E. & S., or at any rate a coral we believe to be this species occurs plentifully, forming irregular rounded masses from a few inches upwards to specimens of large size. Accompanying these are short small colonies of a *Tubipora* of very curious structure, and so far undetermined by us. The upper portions of each corallite, above the terminal platform or external tabulum, is uncalcified, and remains membranaceous, and soft. Alcyonarians are plentiful. We recognized small creeping clusters of a *Zoanthus*, of a greyish purple; flattened disk like expansions referable to *Polythoa*; *Ammothea thrysoides*, H. & Ehr., in arborescent finger—like tufts, and a number more at present undetermined. An *Alcyonium* must however be mentioned, forming flat irregular table-like masses with small convolutions, and an *Anicella* not unlike *A. australis*, Gray, previously found at Port Essington, by the late Professor J. B. Jukes, when acting as naturalist to H.M.S. "Fly." Sea-anemones are very plentiful on all rocky ground between tide marks. We observed three varieties—the dark carmine-red, green, and a small brown

* Proc. Linn Soc., N. S. Wales, v, pt. 2, p. 128.

form. It would have taken up far too much of our time to have attempted to kill these when expanded, without which spirit specimens are of very little value.

The Fringing reef itself forms "a simple broad platform, as an extension apparently of the dry land," at both its northern and southern ends where it impinges on the shore at North Bay, and under Mount Ledgbird respectively. There are no less than five channels communicating between the Lagoon and the open sea. Two of these channels are navigable, the northernmost giving five fathoms, and that at the south end seven fathoms. Inside the Lagoon the depth varies from a sixth up to two and a quarter fathoms; but there are here and there holes, yielding much deeper water. Immediately outside the sea face, the depth varies from one and three quarters fathoms to five fathoms, rapidly descending to fifteen, twenty, and twenty-five fathoms within a comparatively short distance of the reef. The latter at its greatest distance from the shore is about two-thirds of a mile. The seaward edge is but little broken up; but the Lagoon margin is much more sinuous. The reef varies in width from less than a cable up to four and six cables. The longest section between any two channels penetrating it is over a mile in length. The beach immediately contiguous to the shore ends of the reef is composed of large coral blocks intermingled with others of basalt, and piled up into a regular terrace, extending to a height of from fifteen to twenty feet above high-water mark. This terrace graduates outwards from the shore forming the central ridge of the reef built up of dead coral blocks, and is always bare at from half to three-quarter ebb. Around this central portion is a lower shelf or platform, composed chiefly of dead coral *in situ*, and always more or less a-wash at low tide. Its surface is furrowed with narrow water channels and excavated into deep pools containing great abundance of life, and many fine living examples of *Cœlaria dadœlia*, E. & S. ?, and *Tubipora*. The blocks generally are profusely covered with Nullipores. The appearance of the inner portions of the Lord Howe Island reef corresponds well with Dana's description of the shore platforms of some of the Paumotus Islands. He says, "Much of it is commonly bare at low tide; there are places where it is always covered with a few inches or a foot of water; and the elevated edge, the only part exposed, often seems like an embankment preventing the water from running off."*

The seas which break over the Lord Howe reef during gales from the westward are very heavy, and simply as a display of nature, remarkably grand. The destruction, however, caused by them does not seem to be particularly heavy, which is perhaps accounted for by the very gradual increase in the soundings outside. The two southernmost channels through the reef are opposite the mouths of partially dry freshwater creeks. Doubtless at times a good deal of floodwater traverses these, but it can hardly be of sufficient continuance or volume to gradually influence these openings. In some well-known fringing reefs the channels are opposite main valleys, and it is supposed that the growth of the coral polyp is influenced by the sediment discharged from them. This can scarcely be so at Lord Howe for the reason given above, the discharge from these creeks being more of the nature of torrent freshets than continuous streams constantly conveying the products of slow denudation to interfere with the healthy existence of the coral polypes.

* Corals and Coral Islands, 1872 (Engl. Edit.) p. 176.

The width of the Lord Howe fringing reef is very variable, and in consequence its distance from the shore equally so. It is however, from one to three-quarters of a mile, but as the bottom of the Lagoon shoals very gradually this is perhaps to be accounted for. The depth of the channels passing through the reef differs much. The main north-west entrance varies from a little less than four to six fathoms. The south entrance immediately in the gut-way has six and seven fathoms of water, outside increasing to nine, whilst just inside the Lagoon it shoals to two and a quarter fathoms.

The Lagoon wherever examined by us showed a sandy bottom, except off the "Old Settlement," where it becomes rather more argillaceous. We anticipated finding it teeming with life, but it proved very barren, and comparatively destitute of isolated coral growth. The coral life of Lord Howe Island was one of the points to which we were least able to pay satisfactory attention, and will afford a wide field of inquiry for future researches.

Hydrozoa.—Like the Actinozoa this group required a much larger amount of time than we were able to afford for its study. The specimens obtained were chiefly collected from weed thrown up on the sandy beach of the Lagoon. One very important discovery, however, was made by Mr. Whitelegge, namely, *Ceretella fusca*, Gray, with the polypes protruded, and which by very careful manipulation he was able to kill in that condition. I believe I am correct in stating that the zoöids of this hydrozoon have not before been observed.

The *Siphonophora* are very plentifully represented by *Physalia* and *Velella*. At certain times the Lagoon beach is simply covered by myriads of the *Physalia megalista*, Brandt; but what is very singular, on those days on which the *Velella* is washed ashore in equal quantities, *Physalia* is entirely absent. The stinging properties of *P. megalista* are very powerful. Not only is intense inconvenience caused to the part brought in contact wth the animal—say, for instance, the hand—but the irritation so caused can be conveyed from that member to any other part of the person touched, such as the face. Although losing the beautiful dark purple-ultramarine blue when placed in spirit, the bladder retains this tint for a considerable time, in more or less perfection, when left lying on the sandy beach.

The remaining Hydroids collected, as determined by Mr. Whitelegge, are:—

Ceratella fusca, *Gray?*
Sertularella solidula, *Bale.*
Eucopella campanula, *Lendfel.*
Sertularia minima, *D'A. W. Thompson.*
Halicornaria, sp. nov. ?
Halicornaria, sp. nov. ?
Plumularia, sp. nov. ?
Plumularia spinosa, *Bale.*
Campanularia tincta, *Hincks.*

Porifera.—Of large sponges but few were obtained, and these wholly as dead specimens. The blocks and stones about the reef foster several forms of small incrusting sponge which would probably repay study.

The determinations so far, made by Mr. T. Whitelegge, are as follows:—

Ianthella flabelliformis, *Gray.*
Cacospongia, sp.
Euspongia officinalis, *Linn.*, vars.

The purple-blue fan-shaped growths of *Ianthella* probably grow to a considerable size at Lord Howe. Several varieties of the sponge of commerce occur, and are used by the Islanders. They are, however, small. The tufts of *Cacospongia* are the most numerously represented.

Protozoa.—We found that the beach sand, besides comminuted coral, and some shell detritus, is to some extent composed of *Orbitolites complanatus*, Lamk., and either *Tinoporus* or *Calcarina*. The latter is that peculiar radiated, tuber-like Foraminifer discovered by the late Prof. J. B. Jukes, in Torres' Straits.

R. ETHERIDGE, JUNR.

EXPLANATION OF PLATE IV.

Figs. 1, 2, 3, 4, 7, 8, 9, 10, 11, 12, 21, 22.—Purpura (Polyptropa) Smithi, Brazier.

Figs. 5, 6.—Helix (Patula) Unwini, Brazier, × 4.

Figs. 13, 14, and 26.—Helix (Rhytida) Balli, Brazier, × 2.

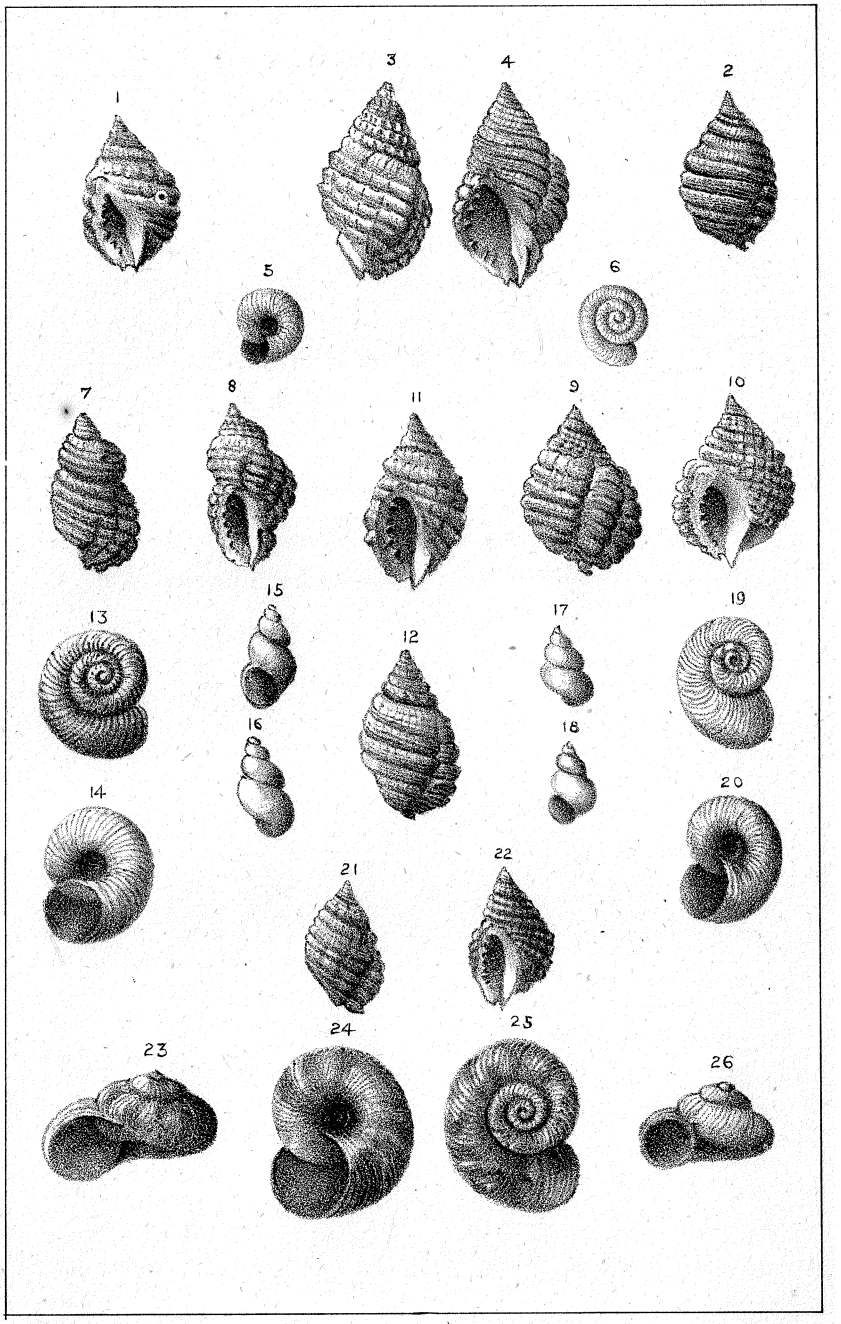
Figs. 15, 16.—Bythynella Ramsaii, Brazier, × 3.

Figs. 17, 18.—Bythynella Whiteleggei, Brazier, × 4.

Figs. 19, 20.—Helix (Rhytida) Ledgbirdi, Brazier.

Figs. 23, 24, 25.—Helix (Rhytida) Whiteleggei, Brazier, × 2.

Unless otherwise stated the figures are of the natural size.



G.H. Barrow, Del et Lith. (5a 26-88.)

EXPLANATION OF PLATE V.

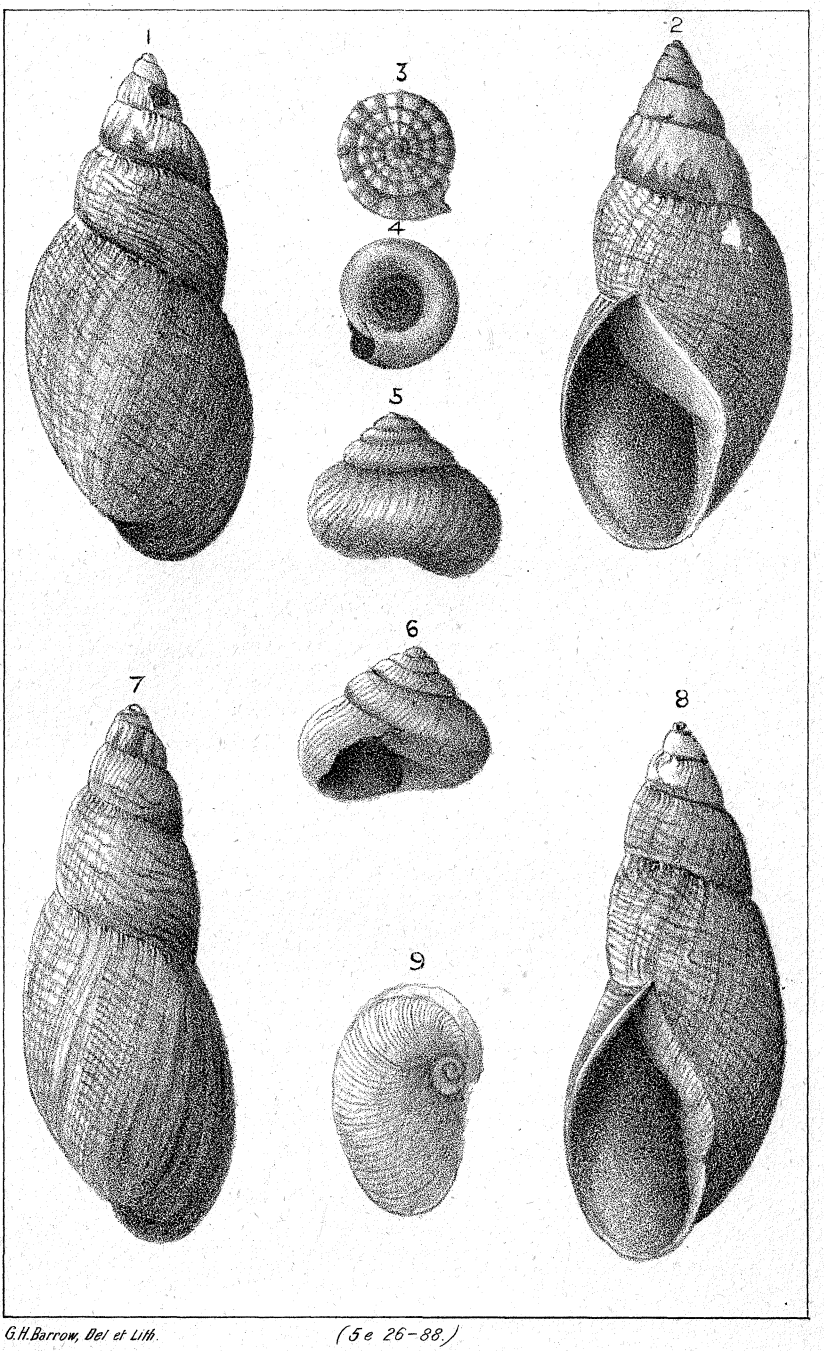
Figs. 1, 2, 7, 8.—Bulimus (Eurytus) Etheridgei, Brazier.

Figs. 3, 4.—Helix (Charopa) Wilkinsoni, Brazier, × 6.

Figs. 5, 6.—Nanina (Hemiplecta) Sophiæ, var. conica, Brazier, var.

Fig. 9.—Vitrina (Parmella) Etheridgei, Brazier, × 2.

Unless otherwise stated the figures are of the natural size.



G.H.Barrow, Del et Lith. (5e 26-88.)

ERRATA.

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7	...	46	...	„	Zig-Zaged	„	Zig-Zagged.
8	...	6	...	after	Lord	„	Howe.
8	...	25	...	for	Haliaster	„	Haliastur.
			and	„	lucogaster	„	leucogaster.
10	...	16	...	„	Philipp	„	Phillip.
12	...	7	...	„	Galinula	„	Gallinula.
20	...	29	...	„	Hoplodactylus	„	Haplodactylus.
21	...	50	...	„	decrease	„	decreasing.
23	...	42	...	„	was	„	were.
25	...	24	...	„	Brazeri	„	Brazieri.
26	...	31	...	„	arter	„	after.
33	...	44	...	„	Actœa	„	Actæa.
35	...	8	...	„	Huegellii	„	Huegelii.
36	...	18	...	„	chebrus	„	chabrus.
36	...	19	...	„	leolophus	„	leiolophus
36	...	29	...	„	Huegellii	„	Huegelii.
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77	...	21	...	„	Lidgbird	„	Ledgbird.
88	...	36	...	„	tibia	„	tibiae.
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101	...	34	...	„	spec	„	speck.
105	...	8	...	„	shorther	„	shorter.
113	...	40	...	„	Promotory	„	Promontory.
117	...	38	...	„	debris	„	débris.
117	...	38	...	„	dessicated	„	desiccated.
124	...	26	...	„	mergeance	„	mergence.
130	...	78	...	„	grand-mass	„	ground-mass.
	Plate i.		...	„	Phæton	„	Phaëton.

N.B.—Plates iv. and v.:—The figures on these plates have been reversed.