

ART. XX.—*The Land Mollusca of the Thames Goldfields.*

By JAMES ADAMS, B.A.

[Read before the Auckland Institute, 14th November, 1886.]

It will surprise many of those who spend a large part of their lives in the forests of New Zealand to learn that there are a great number of land-shells in the bush. These shells, however, are in general so small and so inconspicuous that they are only found after a careful search, although every forest has, perhaps, thousands of at least forty different species. They are not only overlooked on account of their small size, but they hide also under leaves, or under the bark or in the crevices of the trees.

A few of the larger ones are, of course, well known in the localities where they are numerous—such as *Paryphanta busbyi*, and *Rhytida greenwoodii*—but the greater number range in size from that of a pea to a pin's head. Indeed, one of them, and not the smallest, has a Latin cognomen that means "pin's head." There are at present known to science about one hundred and twenty of the Land Mollusca of New Zealand, and these have been classified and described by Captain Hutton in a paper in the sixteenth volume of the "Transactions."*

It occurred to me, when collecting land-shells for him and for my friend Mr. Cheeseman, that it might be useful to make a list of the species found in the Thames District, and to mention at the same time the most favourable localities for searching for them. In one respect the land-shells are deserving of more than a passing attention, and that is the surprise that every one must experience in finding them at all in New Zealand.

They are easily drowned in fresh water, and salt water is sudden death to them. They cannot bear exposure, as they quickly disappear from even rude clearings; and yet our land-shells have their nearest relations in Tahiti, Samoa, and the Solomon Islands. Countless ages must have elapsed while such slowly-moving animals gradually spread over the intervening space between such distant countries. Indeed, their great antiquity is confirmed by the fact of finding fossil land-shells on a fossil tree in the Palæozoic rocks. It may be supposed that, when forests flourished on the oldest sedimentary rocks of New Zealand, the ancestors of the present land-shells swarmed under the dead leaves and on the tree trunks.

* "Trans. N.Z. Inst.," vol. xvi., art. viii.

One vast forest extended, perhaps, from New Zealand to Queensland on the west, and to Tahiti on the east. It may be significant that this very ancient form of fauna is abundant on the nikau (*Areca sapida*), and on the kiekie (*Freycinetia banksii*), both of which belong to the most ancient forms of flora. The nikau is a favourite for land-shells in any situation, but they are found more numerous on it in deep shady valleys near the banks of streams. The shells usually found are *Carthæa kivi*, *Patula buccinella*, *P. corniculum*, *Phriagnathus maria*, *Amphidoxa chiron*, and *Thalassia neozelanica*. A couple of years ago, after an unsuccessful search for land-shells on the main range of this peninsula, I cut down a nikau (*Areca sapida*), and by examining each leaf right into the heart I found twelve different species, chiefly of the genera *Patula*, *Phriagnathus*, and *Psyra*.

The kiekie (*Freycinetia banksii*) usually contains the same kinds of land-shells as those found on the nikau; but, as a rule, the less number of nikaus in the locality, the greater number and greater variety of shells the kiekie affords. There is a species of *Phriagnathus*, mentioned in the list appended, that appears peculiar to this tree.

The tree-fern is another very ancient type of flora, and here also a successful search for land-shells can be made; but they are easily overlooked in the brown scales and decaying fronds, except such conspicuous shells as *Patula corniculum*.

I have made a special trial of how many kinds of land-shells can be gathered in and about the black tree-fern (*Cyathea medullaris*), and the silver tree-fern (*Cyathea dealbata*) that formed a grove, and there were found 19 different species. Of these, 6 were species of *Patula*, 3 of *Phriagnathus*, 2 of *Endodonta*, 2 of *Therasia*, 1 *Elæa*, 1 *Amphidoxa*, 1 *Fruticicola* and *Thalassia neozelanica*.

The land-shell last mentioned is the commonest found in the bush. It is generally the first to meet the eye when the day's search begins. This search is of course delayed until the real bush track is entered on, that leads through the groves of pukapuka (*Brachyglottis repanda*) that usually form the outskirts of the forest.

The large leaves accumulate in hollows, or near the roots of the mahoe (*Melicytus ramiflorus*), or the pukatea (*Atherosperma nova-zealandia*), or the taua (*Beelshmeidia taua*), and these piles of damp decaying leaves become a favourite haunt for *Rhytida greenwoodi*, *Thalassia neozelanica*, and *Phriagnathus maria*. Many other shells are also frequently found, but they are usually dead ones.

On advancing further, or rather climbing higher into the bush, a place must be sought on the slope of a ridge, where small stones are covered with black mould and decaying leaves; and, by patient search, small live land-shells will be found,

such as *Psyra planulata*, *Phrixgnathus erigone*, *Patula buccinella*, *Therasia celinde*, and *Amphidoxa chiron*.

The handsome hairy shell, *Thalassia portia*, is very local, and though four or five may be found in one place, the vicinity may be searched in vain for any more.

Many land-shells are found under the bark of dead trees, especially in damp places. The rimu (*Dacrydium cupressinum*) is best for several kinds of *Patula*, and under the loose bark of the taua (*Beelschmeidia taua*), *Phrixgnathus conella*, *Elæa jeffreysiana* and *Endodonta pæciloticta* are not uncommon.

On cushions of moss growing on dead trees, or on patches of *Hymenophyllum*, *Endodonta leimonias* can be found, but this minute shell is very inconspicuous.

The fleshy tubers of *Earina autumnatis* may harbour *Otconcha dimidiata*; but this shell is more likely to be found under the outer decaying fronds of the nikau (*Areca sapida*) in damp situations.

The eggs of land-shells are found chiefly under the fronds of the nikau, or within the leaves of kiekie or of *Astelia solandri*. That the land mollusca and their eggs have many enemies, appears evident to me, but to write on this subject would require much closer observation than I have been able to devote to it.

FRESHWATER MOLLUSCA.

The freshwater mollusca are represented in every stream and in every swamp, and though very plentiful, there are very few species. In the Kaueranga River, about half a mile from its mouth, there is an abundance of a *Mytilus* which resembles *M. ater*, but it may be a new species. In the upper course, *Melanopsis bifasciata* is not uncommon on pieces of dead wood, and some tributary rivulets abound in *Potamopyrgus corolla*.

Planorbis corinna, and *Pisidium neozelanica*, appear to occur in only one place, but they are both inconspicuous and easily overlooked. The one is found on *Azolla rubra*, and the other on the muddy bottom at the roots of *Cyperus ustulatus*. I append a list of the Mollusca found in the district, which may probably be increased by the addition of a few more species.

CATALOGUE OF THE LAND AND FRESHWATER MOLLUSCA OBSERVED IN THE THAMES DISTRICT.

I.—LAND MOLLUSCA.

1. *Carthæa kivi*, Gray. On leaves of nikau, kiekie, and kawa-kawa.
2. *Tornatellina neozelanica*, Pfeiffer. On fronds of ferns.

3. *Patula coma*, Gray. Under the bark of dead trees; chiefly rimu and taua.
4. *P. buccinella*, Reeve.
5. *P. corniculum*, Reeve. On fern trees and leaves of nikau.
6. *P. brauca*, Hutton.
7. *P. anguicula*, Reeve.
8. *P. timandra*, Hutton. Under bark of dead rimu.
9. *P. tapirina*, Hutton.
10. *P. biconcava*, Pfeiffer.
11. *Thera stipulata*, Reeve. Under leaves in stony places.
12. *Fruticicola pilula*, Reeve. On nikau.
13. *Microphysa caput-spinulæ*, Reeve. On kiekie.
14. *Strobila*, sp.
15. *Endodonta leimonias*, Gray. On Hymenophylla, in dense bush.
16. *E. pæcilosticta*, Pfeiffer. Under dead leaves.
17. *E. marina*, Hutton.
18. *E. nerissa*, Hutton.
19. *Phriagnathus maria*, Gray. Very common in all places where shells are found.
20. *P. conella*, Pfeiffer. On nikau and kiekie.
21. *P. regularis*, Pfeiffer.
22. *P. erigone*, Gray.
23. *P. celia*, Hutton. Under the leaves of kiekie.
24. *Amphidoxa cornea*, Hutton. On nikau leaves.
25. *A. chiron*, Gray.
26. *A. costulata*, Hutton.
27. *A. perdita*, Hutton.
28. *Otoconcha dimidiata*, Pfeiffer. Under nikau leaves or moss, in very damp places.
29. *Charopa ida*, Gray. On nikau.
30. *Psyra dimorpha*, Pfeiffer. Under dead leaves of pukapuka.
31. *P. planulata*, Hutton. Very common, but chiefly under decaying nikau leaves.
32. *Psyra*, sp.
33. *Therasia celinde*, Gray. On fern-trees.
34. *T. tamora*, Hutton. Under dead leaves.
35. *T. decidua*, Pfeiffer.
36. *Thalassia portia*, Gray. Under dead branches of wood in stony places.
37. *T. neozelanica*, Gray. Very common.

38. *Janella bitentaculata*, Quoy and Gaimard.
 39. *Elæa coresia*, Gray. In dead trees.
 40. *E. jeffreysiana*, Pfeiffer.
 41. *Rhytida greenwoodi*, Gray. Under damp leaves, near the roots of pukapuka or pukatea.
 42. *Leptopoma*, sp. Under dead leaves in forest ranges.

II. FRESHWATER MOLLUSCA.

43. *Limnæa arguta*, Hutton. On leaves in swamps.
 44. *Bulinus variabilis*, Gray. In running streams.
 45. *Planorbis corinna*, Gray. On leaves of swamp plants.
 46. *Melanopsis trifasciata*, Reeve. In the Kaueranga River.
 47. *Potamopyrgus cumingiana*, Fischer. On cress in rivulets.
 48. *P. corolla*, Gould.
 49. *P. antipodum*.
 50. *P. pupoides*.
 51. *Pisidium neozelanica*. At the roots of swamp plants.
 52. *Mytilus ater*? In the Kaueranga River.

ART. XXI.—*Description of the Little Barrier or Hauturu Island, the Birds which inhabit it, and the Locality as a Protection to them.*

BY A. REISCHEK, F.L.S.

[Read before the Auckland Institute, 14th November, 1886.]

HAVING heard the practical and beneficial proposals to science and agriculture made by Judge Fenton at the last meeting of this Institute, I thought it might be useful to give a brief and general description of Hauturu Island, which I have visited five times, spending in all about ten months, searching and cutting tracks in various directions. Hauturu Island is situated 12 miles in a north-easterly direction from Rodney Point. The island is, in a straight line from north to south, $4\frac{1}{4}$ miles, from east to west $3\frac{1}{2}$ miles, in extent, and rises about 2,383 feet above sea-level. It is very broken, except on the south-eastern portion, where there is a small flat, and a few slopes grown over with grass, ferns, and small ti-tree; these places were cleared by cutting firewood. A main range runs across the island from west to east, which in places is very narrow and steep. The Island is well timbered, and there are some very fine kauris in the interior.