THE Tasmanian Naturalist

THE JOURNAL OF THE

Tasmanian Field Naturalists' Club

Vol. 2. OCTOBER, 1909. No. 2.

CONTENTS :

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THE

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Annual Report.

IT is with much pleasure that your Committee present the following Annual Report upon the proceedings of the Club during its fifth year. The growth of the Club during the past year has been phenomenal, no less than fifty-eight new members having joined; and the revised roll shows the total membership to be 153. The number of young members who have joined points to this position being of a permanent nature.

Meetings.

It was decided to continue the monthly meetings throughout the winter, and accordingly twelve meetings were held during the past year. They have been most successful; the subjects for discussion being of usefulness and interest, and covering the most important branches of nature study, and were at all times dealt with most ably by the lecturers. The attendance at the meetings shows an increase over previous years, on two occasions there were nearly 100 present. A concise resumé of the meetings is given as follows:—

September 10th, 1908. Annual Meeting. Total membership, 110 Balance sheet showed deficit of £3 0s. 3d. Mr. L. Rodway gave a Presidential Address on 'Tasmanian Heaths,' which has been published in the *Naturalist*, pages 2-5 of the present volume.

October 15th. Mr. A. L. Butler described a trip to Moulting Lagoon, East Coast, dealing with the water birds met with.

November 12th. Mr. Robert Hall spoke on 'Birds and Fishes in Comparison,' and drew attention to the many features in common between birds and fish, and their habits, &c.

December 10th. Mr. Robert Hall gave an interesting discourse on Bird-life in Australia, speaking largely upon its distribution.

February 4th. Dr. F. Noetling gave an able lecture on the subject of Earthquakes. He described the different kinds of earthquakes, their movements and centres of most frequent occurrence, mention was particularly made of the disastrous one at Messina in Sicily.

February 18th. Messrs. C. E. Lord and E. A. Elliott spoke on some Tasmanian Birds, illustrating their remarks with a number of lantern slides from photos of their own taking.

March 18th. Mr. J. H. Gould gave an exhaustive description of the Flower, clearly setting forth its evolution and mentioning the detail of several typical flowers.

April 15th. Mr. L. Rodway reported on the plants met with during the Easter Camp-out at Freycinet Peninsula, and Mr. Robert Hall upon the birds noted then. Specimens collected at the camp were exhibited.

May 6th. An enthusiastic meeting was held re Camp. Lantern slides of camp-scenes were shown by the Secretary, and others of East Coast scenery, taken by Mr. J. W. Beattie, were explained by the Chairman.

June 3rd. Mr. T. Thompson Flynn gave an interesting lecture on the invertebrate life of Freycinet Peninsula, illustrated with numerous sketches on the black-board.

July 7th. Conversazione, Dr. Noetling, Messrs. R. Hall, A. D. Mackay and L. Rodway spoke on specimens exhibited.

August 12th. Mr. A. L. Butler described a number of excellent lantern slides from photos taken by Mr. A. H. E. Mattingley, of Melbourne.

The exhibitions of specimens have been good, but these might be better and thereby add to the interest of the meetings. It is also desired that more members assist in this part of the Club's work. The list given below of members who have exhibited, and specimens shown, is as complete as possible, but members are again requested to supply the Secretary with notes of their exhibits for record.

Anthony, E. S.—Photo of Mrs. Fanny Smith (last of Tasmanian aborigines) and basket and bag made by her in native fashion. Atkins, W. N.—Collection of eggs of English birds. Brent, A. E.—Black Duck, Brown Hawks, m. and f. Butler, A. L.—Photos of Dusky Robin's nest and of Native hen's nest. D'Emden, T.—African water snakes. Elliott, E. A.—Eggs of black swan, shining fly-catcher with nest and eggs, pen-rack made from feet of wedge-tailed eagle, sparrow-hawk, green parrakeet and kestrel. Flynn, T. Thompson—Young megapode. Giblin, H.—Spirifer fossil. Gould, H. J.—Tulip leaf growing through cork. Hall, Robert—Trumpet fish, polyzoa, tunicates, and numerous birds and birds' nests. Kermode, Miss D.—Collection of New Zealand ferns. Lea, A. M.—Collections of stigmodera beetles, elateridæ or 'click' beetles, Tasmanian butterflies, also tiger beetles, carbolic acid beetle, whip snake, &c. Lord, C. E.—Nest of strong-billed

ground thrush, young goshawk. Mackay, A. D.—Varieties of granite from Wineglass Bay, general geological specimens. Noetling, Dr. F.—Specimen of lava. Oldmeadow, J.—Butterfly mimicking dead leaf. Roberts, Mrs. H. L.—Photos of Tasmanian tigers and devils. Robey, Miss E. J.—Collection of shells from Wineglass Bay. Rodway, L.—Photos of 'native bread' fungus in flower and fruit, caterpillar fungus, flower spike of olearia stellulata, fern hymenophyllum marginatum, King William pines, sponges, &c. Swindells, A. W.—Crocodile eggs. Walch, Miss J. C.—Eggs of nurse shark. Walch, Jas.—Elephant fish.

Excursions.

As a Society for furthering the study of field observations, the Committee regret that the excursions have not been as frequent nor as largely attended as desired, but hope to do more in this respect during the coming year, when arrangements will be made to include at least two dredging trips in the syllabus. Illness of the leaders or their unavoidable absence from town prevented two excursions from being held but the following is a record of those which took place :—

September 12th. Botanical to Cascades with Mr. L. Rodway as leader; fair collecting done but heavy rain came on during afternoon.

October 24th. Botanical and Ornithological to Mount Nelson. Leaders, Messrs. L. Rodway and C. E. Lord. A well attended and successful outing.

November 14th. Botanical Gardens. Leaders, Messrs. Robt. Hall and L. Rodway. A profitable afternoon was spent by many who attended.

February 20th. Shore-life to Bellerive. Leader, Mr. Robt. Hall. Much interesting material was obtained.

March 6th. General collecting to Risdon. Afternoon spoiled by heavy rain.

April 24th. Held in Museum. Leader, Mr. Robt. Hall. Much valuable information was given by the leader on general matters.

Camp-out.

A noteworthy part of the Club's work during the past year was the Easter Camp-out. No less than 85 persons (including 25 ladies) were present at this camp, which was held on Freycinet Peninsula and was a complete success, but as a separate illustrated report has been issued on this camp no further mention need be made here. We, however, wish to record our appreciation of the treatment given us by Messrs. Holyman & Sons, from whom the steamer 'Koonookarra' was chartered for the trip.

Journal.

In February of this year your Committee recommenced issuing the *Tasmanian Naturalist*, when an excellent number was brought out, and with which members were well pleased. The present number contains more valuable articles, and there appears to be every probability of the nature of the journal being maintained. This is also in part due to a change of printers and our present arrangements are most satisfactory.

Finance.

The present year began with a debit balance of £3 0s. 3d., but not only has this been cleared off but there is at present a credit balance of £1 17s. 11d., with no outstanding liabilities. Therefore, in every respect, the past year has been highly successful.

STATEMENT of Receipts and Expenditure

For the Year ending 30th September, 1909.

RECEIPTS.				EXPENDITURE.			
Balance brought forward ...	£1	19	9	Stationery, Postage, and Stamps	£3	17	10
Subscriptions paid in advance for ensuing year 1909-10 ...	0	7	6	Rent of Room	4	17	6
Subscriptions year 1908-9 ...	26	5	0	Printing	15	3	3
Ditto Arrears ...	2	17	6	Advertising	7	16	6
Donations Printing Fund ...	0	17	6	Hire of Motor Launch ...	1	5	0
Sale of Publications	2	19	0	Refund of Loan	5	0	0
Advertising in Journal ...	0	2	6	Cartage	0	6	6
Contribution towards cost of Hiring Motor Launch ...	0	11	6		£38	6	7
Surplus *re* Easter Camp-out	4	4	3	Credit Balance	1	17	11
	£40	4	6		£40	4	6

Audited and found correct,

R. A. BLACK,
Hon. Treasurer.

T. C. SIMPSON,
F. L. BROWNELL, } Auditors.

TREASURER'S REPORT to STATEMENT.

I have the honour to furnish my Report for the year 1908-9 :—The transactions as compared with those of the previous year have been greater by £15 4s. 6d. During that year, owing to the falling off of the revenue, appeals had to be made to members for donations to the Printing Fund, but even then the responses which amounted to £4 15s. 6d., were insufficient to meet all liabilities. This year I am pleased to say we have not only overtaken the liabilities of the Club, including the return of a loan of £5 which was very generously advanced by our Chairman—Mr. Rodway—during the early part of the year 1907-8, to meet pressing demands, but we have a small credit balance of £1 17s. 11d. Although we may congratulate ourselves upon this state of affairs we must nevertheless bear in mind that our expenses are increasing with the years, and, therefore, members are asked to assist the Treasurer in every way, especially by forwarding their subscriptions in early because on which much of the Club's prosperity depends. It is trusted that members will not think that we are now independent of receiving donations, far from it, in fact it appears that to enable the Club to incur similar expenditure and bring out a Journal, donations will be absolutely necessary. Every effort has been made to collect all subscriptions, but there are still some arrears which amount for the year just closed to £2 16s. 3d., and for back years to £3 7s. 6d., making a total of £6 3s. 9d. outstanding. It will be noticed in the Statement on opposite page that the cost of printing the Club's Journal is not included for the reason that it was not ready at the time of balancing. Several items of expenditure have of necessity been increased as compared with those of the previous year. For instance, item 'Stationery and Stamps' was increased by £1 12s. 4d.; item 'Advertising' by £4 6s. 3d; item 'Rent of Room' by £2 12s 6d.; but as against these increases of expenditure I am pleased to state that current receipts have increased from £19 1s. in 1907-8 to £26 5s.

R. A. BLACK,
Hon. Treasurer,
23/9/09.

Guide to the Mollusca.

Adapted for Young Students.

By W. L. MAY.

INTRODUCTORY.

THE following treatise is very much in the form of a compilation, being adapted from Woodward with a view to its applicability to the Tasmanian fauna. Many genera represented in our waters are not mentioned, there being no intention to write a manual, but enough have been dealt with to enable the collector to place most of his specimens in or near the right place; the accompanying plates will also be of good service. To those who are within reach of it, the named collection in the Hobart Museum will be found of the greatest assistance. All the species likely to be collected by a beginner will be found there represented. In addition the author will be pleased to assist in identification, when the above means have failed. The figures illustrating this paper are all drawn from Tasmanian shells.

The animal kingdom is divided first of all into *sub-kingdoms*, then each *sub-kingdom* into so many *classes* containing those which have further characteristics in common. The *classes* into *orders*, the *orders* into *families*, the *families* into *genera*, and these again into species or kinds.

The Mollusca or soft-bodied animals form a *sub-kingdom*, and are divided into four classes.

1. Cephalopoda.
2. Gastropoda.
3. Pteropoda.
4. Lamellibranchiata.

CLASS I. — The Cephalopoda (Head-footed) contains those Mollusca that, like the common octopus, have a number of feet (or arms) set round the mouth; and is divided into those having two gills (Order I. Dibranchiata) and those with four (Order II. Tetrabranchiata).

Order I. is again divided into (a) Those with eight feet like the Argonaut (or Paper nautilus), of which we have one fine species (*A tuberculata*), sometimes drifted on to our coasts; and the common octopus (b) those with ten feet, such as the Loligo or squid, whose delicate, internal shell so much resembles a pen in shape; the cuttle fish, sepia, whose so-called 'bone' is frequently found on our beaches, and the pretty little spirula (Fig. 6).

The only representative of the four-gilled order now living is the well known Pearly nautilus, but in former times this order was extremely numerous, especially the Ammonites.

CLASS II.—Gastropoda (Belly-footed) comprises those Mollusca which, like the common snail, creep on the under surface of the body, and, with one exception (Chiton, Fig. 16), their shells are univalve (*i.e.*, composed of one piece). The aperture, whence the animal issues, is called the *mouth ;* and its outer edge the *lip ;* each turn of the shell is a *whorl :* the last and largest the *body whorl*, the whorl from the top at the *apex* down to the mouth form the *spire ;* and the line where the whorls join each other is called the suture. The axis of the shell around which the whorls are coiled is sometimes open or hollow, and the shell is then said to be *umbilicated* (as in Fig. 8); when closely coiled a pillar of shell or *columella* is left (as in Fig. 2). Sometimes the corner of the mouth farthest from the spire and next the columella is produced into a channel, the *anterior canal* (see Fig. 2). Most Gastropods are *dextral*—that is to say, the mouth is to the right of the axis as you look at it ; a few, however, are sinistral (like Physa, Fig. 20), whilst reversed varieties of both kinds are met with occasionally.

Gastropods of the first order have comb-like gills placed in advance of the heart, and hence are termed Prosobranchiata. They are divided into two groups. (a) *Siphonostomata* (Tube-mouthed), in which the animal has a long proboscis and a tube or siphon from the breathing chamber that passes along the anterior canal of the shell, which in this group is well developed (as in Fig. 2). They have a horny operculum or lid with which to close the aperture. (b) *Holostomata* (or whole-mouthed). In these the siphon is not produced, and does not want to be protected, accordingly the mouth of the shell is *entire*, *i.e.*, has no canal (see Fig. 9). The operculum is horny or shelly.

The former (Group a) includes several families :—

1. The *Strombidæ*, comprising many large showy species, some of which are used for cameo cutting. None are found in Tasmania.

2. The *Muricidæ*, containing *Murex*, of which we have several species more or less spiny, and *Fusus*, or long-tailed whelks, with several fine Tasmanian species (Fig. 2).

3. The *Buccinidæ*, including *Nassa*, *Cominella*, Purpura (Fig. 3), and Oliva, all with representatives here.

4. The *Cassididæ*, or 'Helmet shells,' with *Cassis* (Fig. 7) and *Lotorium*, with several fine species ; the large *L. spengleri* is a common form (Fig. 4).

5. The *Conidæ*, whose type, the 'Cone shell' (Fig. 1), is so abundant in tropical seas, but only represented here by one fair sized and one minute species. And also the *Pleurotomidæ*, an immense genus of small but beautiful shells, well represented here, but usually found in deep water.

6. The *Volutidæ*, embracing the *Voluta*, *Mitra*, and *Marginella*. They have solid shells, usually polished or enamelled, and with several strong *plaits* or folds on the columella (see Fig. 5). We have several very fine volutes, including one of the largest (*i.e.*, *V. mamilla*).

Mitras are fairly well represented, and Marginellas are very numerous, Tasmania being rich in this genus. They are small, highly polished shells, inhabiting sand or mud from low water to 100 fathoms.

7. The *Cypræidæ* or Cowries, which owe their high polish to the size of the shell-secreting organ (mantle), whose edges meet over the back of the shell, concealing it within its folds. One large and several smaller species occur here.

The second group, or *Holostomata*, is divided into nineteen families, beginning with—

1. The *Naticidæ*, whose type, *Natica*, is well represented by the common *N. conica* of our coasts (Fig. 9)

2. The *Cancellaridæ*, in which the shells are cancellated or cross-barred by a double series of lines.

3. The *Pyramidellidæ*, which are high spired, elongated and slender shells, usually small or minute forms.

4. The *Solaridæ* or 'Staircase shells,' whose umbilicus is so wide that as you look down it the projecting edges of the whorls appear like a winding staircase (Fig. 8).

5. The *Scalaridæ*, which may be readily recognised from their white and lustrous appearance and from the strong ribs that encircle the whorls (Fig. 18).

6. The *Cerithiadæ* (or 'Horn shells'), very high spired (Fig. 13). These shells are usually dull coloured, and occur here in shallow, muddy bays and estuaries.

7. The *Turritellidæ* or 'Tower shells,' the type *Turritella* (Fig. 10) is spiral, but in the allied *vermetus*, though the spire begins in the natural manner, it goes off into a twisted tube, resembling somewhat an ill-made corkscrew. The mouth of this family is often nearly round. All these forms are well represented here.

8. The *Melaniadae*, and 9, the *Paludinidae*, are mostly fresh-water shells ; the former is not found here, but the latter is represented by a species that is very abundant on mud flats in shallow inlets, where it is more or less amphibious.

10. The *Litorinidae* or 'Periwinkles' are small, round shells found living on stones at or near high water mark.

11. The *Calyptraedae* comprise the 'Bonnet limpets.' They may be described as limpets with traces of a spire left, several of our species live perched on other shells, either living or dead.

12. The *Turbinidae* or 'Top shells,' the common *Turbo undulatus* or 'Warriner,' and the *Phasianella*, 'Pheasant shell' (Fig. 11) are examples with shelly operculums ; and *Trochus* with horny operculums are well represented by some handsome species (Fig. 14), among them being the well known 'Kelp shell.'

13. The *Haliotidae*, 'Ear shell' or 'Mutton fish'; we have several fine species, one, *Haliotis naevasa*, being plentiful on rocks at about low water mark on many parts of our coast.

14. The *Ianthinidae* or 'Violet snails' that float about in the open ocean. Two species are occasionally drifted to our shores. At certain seasons they secrete a curious float or raft, to which their eggs are attached.

15. *Fissurellidae* or keyhole and notched limpets (Fig. 17), whose name sufficiently describes them, and of which we have several interesting species.

16. The *Neretidae*. A group of globular, solid shells (Fig. 12), which we have one species common on rocks on parts of the East Coast, black on the outer surface and white within.

17. The *Patellidae* or True limpets, well known to all seaside visitors. Tasmania has some good representatives of the family.

18. The *Dentaliadae*, represented by the genus *Dentalium* or 'Tooth shells,' are simply slightly curved tubes, open at both ends and tapering from the mouth downwards, and cannot be mistaken.

19. Lastly, we have the *Chitonidae*, whose simple genus *Chiton* (Fig. 16) possess shells differing from all other Mollusca in being composed of eight plates overlapping each other and set in a horny girdle. This animal is not only like the limpet in form, but also in habits, being found adhering to rocks and stones at low water.

Order II.—Pulmonifera contains the air-breathing Gastropods, and to it consequently belong all the terrestrial Mollusca, though some few aquatic genera are also included. Foremost in this order stands the great family :—

1. *Helicidae*, named after its chief representative, the genus *Helix* which is only too well known by the introduced garden snail, *Helix aspersa*. There are a number of interesting, but mostly small, species of this family in our wooded country, nearly all of which are peculiar to the island.

2. The *Limacidae* or slugs, also too well known ; some have a more or less imperfect internal shell, others none at all.

3. The *Limnaeidae* embrace the 'Pond snails' *Limnaea*, *Physa* (Fig. 20) (with reversed whorls), *Ancylus* or freshwater limpet, and *Planorbis* or 'Coil shell,' which is wound like a watch spring. All of these have representatives in our rivers and ponds, and we may boast of having the finest known *Ancylus* in the Great Lake.

4. The *Auriculidae* includes both spiral shells such as *Auricula*, and a limpet like one, *Siphonaria*, common on rocky coasts.

Order III.—Opisthobranchiata. These animals carry their gills exposed on their backs and sides, towards the rear of the body ; only a few have any shell.

PLATE I.

Fig. 1. Conus anemone. *Lamarck.*

„ 2. Fusus novæ-hollandiæ. *Reeve.*

„ 3. Purpura succincta. *Martyn.*

„ 4. Lotorium spengleri. *Chemnitz.*

„ 5. Voluta undulata. *Lamarck.*

„ 6. Spirula spirula. *Linn.*

„ 7. Cassis semigranosa. *Lamarck.*

„ 8. Solarium reevei. *Hanley.*

„ 9. Natica conica. *Lamarck.*

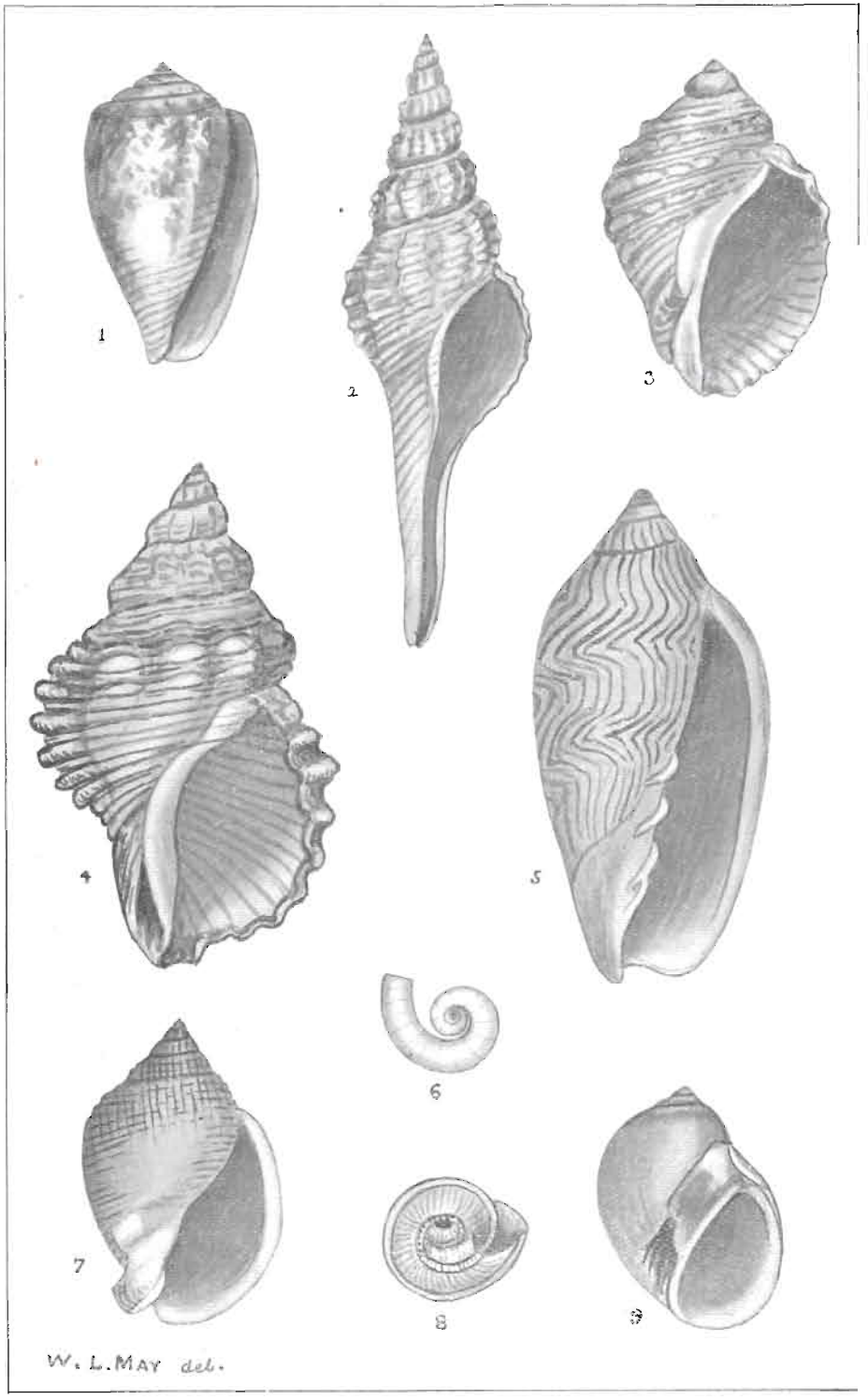


PLATE II

Fig. 10. Turritella gunni. *Reeve.*

„ 11. Phasianella ventricosa. *Quoy.*

„ 12. Nerita melanotragus. *Smith.*

„ 13. Cerithium australis. *Quoy.*

„ 14. Calliostoma meyeri. *Philippi.*

„ 15. Bulla australis. *Gray.*

„ 16. Chiton novæ hollandiæ. *Reeve.*

„ 17. Fissurella scutella. *Sowerby.*

„ 18. Scala aculeata. *Lamarck.*

„ 19. Cavolina trispinosa. *Lesueur* (enlarged).

„ 20. Physa mamillata. *Sowerby.*

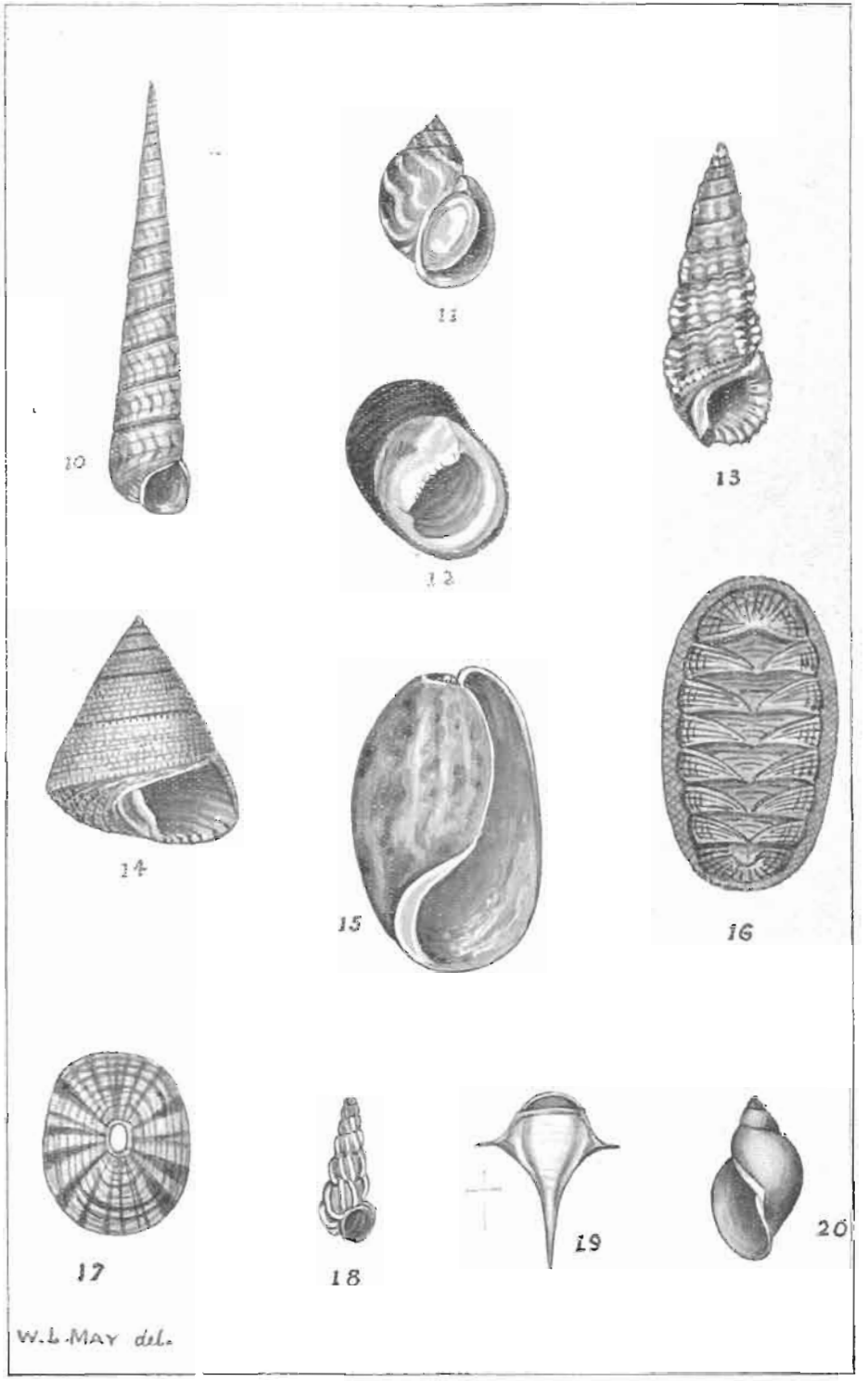


PLATE III.

Fig. 21. Gari zonalis. *Lamarck.*

„ 22. Arca pistachia. *Lamarck.*

„ 23. Solen vaginoides. *Lamarck.*

„ 24. Venus disjecta. *Perry.*

„ 25. Glycimeris striatularis. *Lamarck.*

„ 26. Cochlodesma angasi. *Crosse.*

„ 27 Lucina buttoniana. *Vanatta.*

„ 28. Maetra pura. *Deshayes.*

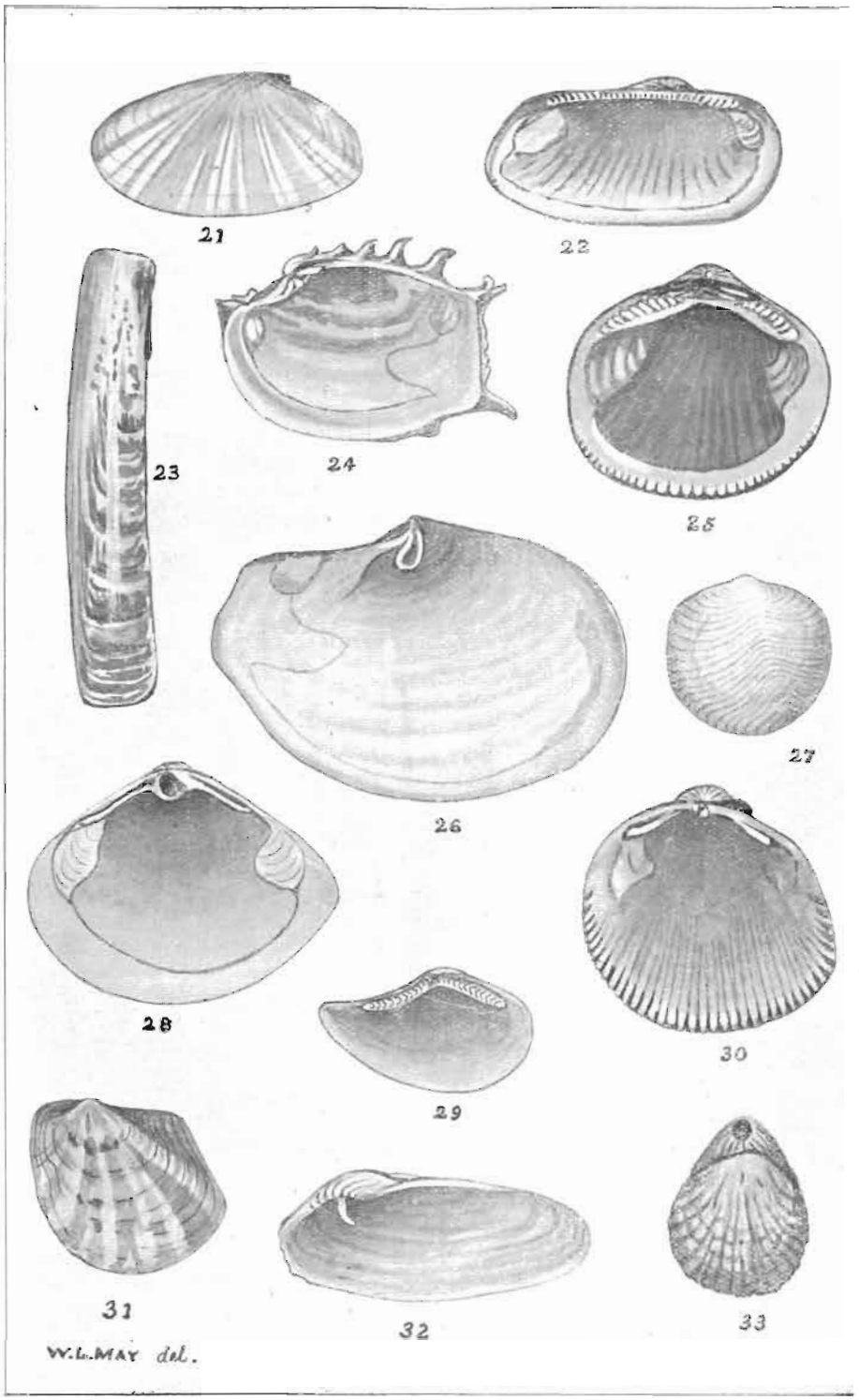
„ 29. Leda crassa. *Hinds.*

„ 30. Cardium tenuicostatum *Lamarck*

„ 31 Avicula papilionacea. *Lamarck.*

„ 32. Pholas australasiæ *Gray*

„ 33. Magellania flavescens. *Lamarck.*



1. The *Tornatellidæ*, which have a stout, little spiral shell.

2. The *Bullidæ* (Fig. 15), in which the spire is concealed.

3. The *Aplysiadæ* or 'Sea hares,' where the shell is flat and oblong or triangular in shape.

The remaining families are slug-like and shell-less.

CLASS III.—Pteropoda. These pretty little Molluscs are ocean swimmers. The members of one division to which *Cavolina* (Fig. 19) belongs are furnished with glassy, transparent shells. They may be taken alive from the surface by a towing-net; the dead shells very frequently appear in dredgings in deep water. Several species have lately been taken at the 100 fathom line off Cape Pillar.

CLASS IV.—Lamellibranchiata (Plate gilled) or Conchifera (shell-bearing) includes the Mollusca, commonly known as 'bivalves,' the animal being snugly hidden between two more or less closely fitting shelly valves.

The oysters, cockles, etc., are examples of this class. The two valves are fastened together near their points or beaks (technically called *umbones*) by a tough, elastic ligament, sometimes supplemented by an internal cartilage. If this be severed and the valves parted, it will be found that in most cases they are further articulated by projecting ridges or points called the *teeth*, which, when the valves are together, interlock and form a hinge. The margin of the shell on which the teeth and ligament are situated is termed the hinge line. A bivalve is said to be *equivalve* when the two shells composing it are of the same size; *inequivalve* when they are not.

If the umbones are in the middle the shell is *equilateral* (Fig. 27), but *inequilateral* when they are nearer one side than the other (Fig. 24). If the shell be an oyster or a scallop, you will find on the inside a single circular, scar-like mark near the centre; this is the point to which the muscles that close the valves, and hold them so tightly together, are attached. In the majority of bivalves, however, there are two such muscular impressions or scars, one on either side of each valve of the shell. The former group on this account are often called *Monomyaria* (having one shell muscle), and the latter *Dimyaria* (having two shell muscles). In the last-named the two muscular impressions are united by a fine groove (or *pallial line*), which in some runs parallel to the margin of the shell (Fig. 25), whilst in others it makes a bend in (*pallial sinus*) on one side of the valve towards the centre (Fig. 24). In *Monomyaria* it will be found running parallel to the margin of the shell. It marks the line of attachment of the mantle or shell-secreting organ of the animal to the shell, which grows by the addition of fresh matter along its edges; so that the concentric curved markings so often seen on the exterior correspond in their origin with the periodic mouths of the Gastropods.

The bivalves are all aquatic, and many bury themselves in the sand or mud by means of a fleshy, muscular foot. These are furnished with two siphons or fleshy tubes, sometimes united, sometimes separate, through

which they respire, drawing the water in through one and expelling it by the other. Those kinds whose habit it is to bury themselves below the surface of the mud or sand are furnished with long, retractile siphons, and to admit of their being withdrawn into the shell the mantle is at this point attached further back, giving rise to the *pallial sinus* above described; this sinus is deeper as the siphons are proportionately longer, and in many cases, too, the valves do not meet at this point when the shell is closed. Attention to these particulars is necessary when arranging your bivalves, as on them the classification depends, the class being divided into—

a. Asiphonida (Siphonless).

b. Siphonida, *Integro-palliata* (with Siphons) — Pallial line entire.

c. Siphonida, *Sinu-palliata* (with Siphons) — Sinus in pallial line.

Division A.—Asiphonida is next sub-divided into—

1. The *Ostreidae* or Oysters, which are deservedly a distinct family in themselves. We have one fine large species.

2. *Anomiadae*, comprising the multiform and curiously constructed *Anomia*.

3. The *Pectenidae*, taking its name from the genus *Pecten* or 'Scallop-shells,' of which one kind (P. medius) is frequently seen in the fishmongers' shops: altogether, we have five species, most of which are fine, handsome shells when good specimens are obtained. The 'Thorny oysters,' Spondylus, take rank here, and are highly esteemed by collectors; the genus is represented in our fauna by one small species only.

4. The *Aviculidae* or 'Wing shells' (Fig. 31), among which are numbered the 'Pearl oyster' of commerce: and also *Pinna*, of which we possess one fine species. The Pinnas, like the mussels and some other bivalves, moor themselves to rocks by means of a number of threads spun by the foot of the mollusc and termed the *byssus*.

5. The *Mytilidae* or Mussels.

6. The *Arcadae* or 'Ark shells,' characterised by their long, straight hinge line, set with numerous fine teeth (Fig. 22); the genera *Glycimeris* (Fig. 25) *Nucula* and *Leda* (Fig. 29) also belong to this family.

7. The *Trigoniadae*, whose single living genus, *Trigonia*, is confined to the Australian and Tasmanian coast line, whereas in times now long past they had a world-wide distribution.

8. The *Unionidae*, comprising the fresh-water mussels, of which one species inhabits our rivers, but is said to be found only in those which flow into Bass Strait.

Division B.—Siphonida, *Integro palliata*.

1. The *Chamidae*, represented by the reef-dwelling *Chama*.

2. The *Tridacnidae*, whose sole genus, *Tridacna*, contains the largest species of the whole class of bivalves, the shells sometimes measuring two feet across.

3. The *Cardiadae* or Cockles, usually found embedded in mud (Fig. 30).

4. The *Lucinidae*, in which the valves are nearly circular, and frequently prettily sculptured on the outside (Fig. 27).

5. The *Cycladidae*. Some genera belonging to this family, small thin shells, are to be found in many of our ponds and streams.

6 and 7. The *Astartidae* and *Cyprinidae* belong to the northern hemisphere.

Division C.—Siphonida, *Sinu-palliata*.

1. The *Veneridae*. The hard, solid shells of this family are, for elegance of form and beauty of colour, amongst the most attractive a collector can possess. Amongst others we have one beautiful species, whose ridges in fine specimens develop into elevated pink frills. (Fig. 24).

2. The *Mactridae* are somewhat triangular in shape, with hard, solid shells, and may at once be recognised by the pit for the hinge ligament (Fig. 28).

3. The *Tellenidae* comprise some of the most delicately tinted, both externally and internally, of all shells. In some, coloured bands radiate from umbones, and well bear out the fanciful name of 'Sunset shells' bestowed upon them. Their valves are generally much compressed.

4. The *Solenidae* or 'Razor shells' are readily recognised by the extreme length of the valves in proportion to the width, and also by their gaping at both ends (Fig. 23).

5. The *Myacidae*. Not represented here.

6. The *Anatinidae* have thin, often inequivalve pearly shells; one member of the family (Cochlodesma Angasi, Fig. 26) is a conspicuous object on some of our beaches.

7. The *Gastrochænidae* embraces two genera (*Gastrochæna* and *Saxicava*) of boring Mollusca, and also the remarkable tube-like 'Watering-pot shell,' *Aspergillum*, which is hardly recognizable as a bivalve at all.

8. The *Pholadidae* concludes the list of bivalves, and comprise the rock-boring *Pholas* (Fig. 32) and the wood-boring *Teredo* or 'Ship-worm,' which is so destructive to the piles of wharves and jetties.

Although the *Brachiopoda* or 'Lamp shells' are not true Mollusca, they are not very far removed from them, and are so often to be found

in cabinets that it will not do to pass them over, especially since in past times they were so abundant, an enormous number occurring in the fossil state. Only eight genera are now living. Shells belonging to this class are readily recognised by the fact of one valve being larger than the other and possessing a distinct beak, the apex of which is perforated.

The *Terebratulidae* are the most extensive family of this class. (Fig. 33).

July, 1909.

Billardiera Berry.

By L. RODWAY.

IT is well to call our climbing berry by the above name for two good reasons: it is the correct scientific name, and it avoids confusion. If we call it Blue Berry it clashes with the Dianella Lily, which is also so called; if Blue, or Purple, Climbing Berry there is also confusion, as it is sometimes white or red, or some mixture of these. If we call it Billardiera we are fairly safe; for the only other such plant found in Tasmania is a closely related form with long, greenish berries that grows in the north.

Billardiera is so named in honour of M. Labillardiere, an eminent French botanist, who did much good work amongst our plants in the early part of last century. In general appearance it appears very unlike any other of our wild shrubs, yet the structure of the flowers shows that it is closely related to Pittosporum. Young botanists must learn that general appearance does not necessarily indicate relationship. This fact is not so only amongst plants, as a dolphin or porpoise is very like a fish, a bat is somewhat like a bird.

Another source of confusion is in the fruit. We all respect the source from which we take the quotation: 'By their fruit shalt thou know them'; but by this was not meant that similar fruits mean relationship. Similar fruits sometimes do indicate such a fact, but not always. The fruit called a legume, familiar to us in pea and bean, is confined to one family; the same with grain as found in grasses, but with such a form as berry it is found upon all sorts of plants.

If you find Billardiera in flower you will see the corolla is yellowish or somewhat green, and is long (from this it has received the scientific name of Billardiera longiflora) and tubular. This tubular form is caused by the petals adhering to one another along their edges, and not by being united in a tube; a most important character to note, as it indicates wide difference of relationship. If you dissect the flower you will find outside five small sepals that usually fall early; alternating with these, and inserted close above them, are five well-developed petals that tend to cohere along their margins; within these are five stamens

that alternate with the petals; and in the centre is the pistil. This is formed of two carpels so blended that they enclose a single chamber on each side, of which along the lines of junction is a row of minute ovules.

If, instead of a Billardiera flower, you take that of a Pittosporum it will be found to conform also to the above description. When fruit forms a difference becomes apparent. Billardiera develops a berry, Pittosporum a leathery capsule, with numerous red or yellow sticky seeds.

Our common form bears beautiful, nearly square, dark, purple berries; but sometimes they are white. They may be white or tinged with blue on the same plant. In close proximity to the sea the berries are often pink or dark red, sometimes with a mixture of purple. If a young red-berried plant, or a slip of one, be cultivated away from the sea the berries appear to maintain their colour; but if a plant is raised from the seed of a red berry the colour seldom comes true, the fruits being generally a dirty purple. Why the proximity of salt water induces red fruit in this plant is not known. Our common Love creeper has usually blue flowers, rarely white, but when close to the sea it often bears pinky flowers. It will be interesting to test with these whether the white forms will be influenced by the addition of salt to their food.

Preliminary Note on the Pterylosis and Myology of the Hind Limb in Certain Megapodes.

By T. THOMSON FLYNN, B.Sc.

(John Coutts Research Scholar, Sydney. Lecturer in Biology, University of Tasmania).

PTERYLOSIS. Nitzsch pointed out that in a museum specimen, badly preserved, of Megapodius rubripes, the oil gland was tufted (Proc. Ray Soc., 1867). Garrod, later (Proc. Zool. Soc., 1878, pp. 629-631, Coll. Sc. Papers, pp. 452-3), states that in his examination of Megacephalon maleo, the oil gland was *nude*. These are the only two references available to me. In the 'mallee fowl' (Lipoa ocellata) and the 'scrub' or 'brush turkey' which two genera I have lately examined the oil gland was absolutely nude. Thus I had come to think that the naked oil gland was a general Megapode character, when I had the opportunity, through the courtesy of F. Young, Esq., engineer on Ss. 'Upolu,' of examining a twelve days old chick of Megapodius eremita

from the Solomon Islands, and was surprised to find that in this case the oil gland was tufted. It may be that Nitzsch was right, therefore, in describing a tufted gland for M. rubripes, and that this characteristic is common to the genus Megapodius but not to the Megapodes.

MYOLOGY. The muscles of the thigh are similar to those pointed out by Garrod as common to Gallinaceous birds (P.Z.S., 1873, pp. 626-644) There is also present a vinculum joining the deep flexor of the foot to the flexor longus hallucis. In addition there is another vinculum which may be of equal classificational value joining M. flexor perforatus digiti III. to M. perforatus et perforans digiti III.

Since these are scratching birds the muscles of the foot are well developed. Of these, the most interesting is probably M. adductor digiti IV., of which Gadow (Bronn's Thier-reichs, Aves p. 204) says: 'Diesen Muskel in der Literatur erwähnt ist habe ich nur bei sehr wenigen Vögeln gefunden. . . .' He mentions its presence in Rhea, Bucorvus, and Rhamphastus. Its occurrence in the Megapodes is, therefore, especially interesting. It arises from the upper part of the anterior aspect of the tarso-metatarse and from part of that bone as well as from the side of the extensor brevis digitorum. It is a thin spindle-shaped muscle with a tendon passing through a canal between the metatarsals of digit III. and IV. to be fixed on the inner side of the base of the proximal phalanx of digit IV.

Arrival of Swallows in Tasmania.

By E. A. ELLIOTT.

IN order to ascertain the time taken by the Welcom Swallow (Hirundo neoxena) to spread over the Island after its return to Tasmania in the spring from its winter quarters on the Mainland, a number of 'swallow-cards' were sent to numerous correspondents during the years 1905-6-7. The result of the returns is given in the table below.

Montague	—	30-8-06	22-8-07
Smithton	—	11-9-06	8-9-07
Stanley	—	23-8-06	—
Ulverstone	27-8-05	15-8-06	3-9-07
Devonport	15-8-05	21-8-06	27-8-07
George Town	—	16-8-06	17-8-07
Boobyalla	—	28-8-06	4-9-07
Ringarooma	13-8-05	24-8-06	29-8-07
Westbury	29-8-05	30-8-06	30-8-07
Launceston	17-8-05	26-8-06	—
Lymington, N.	18-8-05	—	—
Cullenswood (St. Mary's)	26-8-05	—	3-9-07
Epping	25-8-05	23-8-06	19-9-07
Campbell Town	25-8-05	1-9-06	26-8-07
Ross	26-8-05	3-9-06	—
Oatlands	26-8-05	4-9-06	—
Kelvedon (Swansea)	25-8-05	17-8-06	19-8-07
Triabunna	—	22-8-06	25-8-07
Richmond	28-8-05	4-9-06	8-9-07
Forcett	28-8-05	23-8-06	6-9-07
Carnarvon	—	6-9-06	3-9-07
Hythe—Southport	31-8-05	10-9-06	9-9-07
Kingston	3-9-05	2-9-06	5-9-07
Hobart	26-8-05	12-9-06	2-9-07
Kempton	—	6-9-06	30-8-07
Bothwell	—	3-9-06	6-9-07
Great Lake	—	2-9-06	12-9-07
Waratah	16-10-05	—	—
Zeehan	5-9-05	10-9-06	7-9-07
Strahan	1-9-05	11-9-06	5-9-07

Examination of the above table proves that the swallows do not arrive in the State in a general body but rather in small flocks, and they may appear on the East Coast in the neighbourhood of Swansea before they are seen on the North Coast. Confusion sometimes is caused through only one or two birds being seen, and it is evident that a small number stay in the State during the whole year; on the 2nd July, 1909, I saw one flying in the streets of Hobart, and have heard of others from time to time being seen elsewhere.

During 1906 the swallows dispersed themselves over the Island in a fairly regularly manner, but in the following year, possibly owing to the very cold and wet spring, great variation in their movements was noticeable—records from places close together showing perhaps a fortnight between the dates of arrivals. Certainly these birds do not arrive in a body as when they leave on their migration in the autumn—this latter sight I once witnessed, there being a very large stream of birds, stretching from horizon to horizon, flying to the northwards.

Notes on Migrating-birds.

By ROBERT HALL, C.M.Z.S.

1. The Swift (Chaetura caudacuta, Lath.) left Tasmania for its northern home very late this year. That arch enemy of useful birds, the domestic cat, actually caught a Swift and as late in the year as April 7th, 1909. The bird was in poor condition and probably lent itself to easy capture. The April of this year was a specially good one: the air being warm and the grass in fine order. This affected the number of insects and possibly kept a few of the birds longer in their feeding area. Swifts of the present species were noted in Eastern Victoria, on April 10th, of this year.

On April 7th, Dr. J. A. Webster, Launceston, described to me how a flock of Spine-tailed Swifts, instead of being nearer Queensland than Tasmania were doing damage among his bees. They were crossing and circling over his and his neighbour's gardens. Three lines of bees were gathering their autumn food. The Swifts were continually breaking into these lines as they circled in their albatross-like flight. The bees did not appear to attempt to avoid the birds and were killed before they could lodge their sting. The Swifts kept returning to the chase. It was a new experience for the young bees as the Welcome—and Tree Swallows with whom they had been living had not disturbed them The Swifts came later to do the damage. Some years ago, near Port Phillip Bay, I remember getting a Spine-tailed Swift undergoing a moult.

2. The Welcome Swallow (Hirundo neoxena, Gld.) did not altogether leave Tasmania during the past winter. One pair remained about Macquarie Street, Hobart, throughout the year. Quite a number of people noted the occurrence from the tops of the trams as they passed through the quiet portion of the street.

On August 10th, 1909, a second pair was observed for the first time, this Spring, in Harrington Street, Hobart. There was an old nest a few yards away from them, and the birds looking very tired began to plume themselves as if they had neglected the duty for days. There were no other swallows about that part of the city. It was too early, in an ordinary season, for the incoming migrants. This early Spring brought many birds to Southern Tasmania soon after the middle of August. Mr. J. H. Jenkins came to the Museum to report the fact that his swallows had returned to their old home I know of a nest in Southern Victoria that has been used and added to during the past eighteen years. It may have been 'entailed' property.

An albino specimen was recently brought to the Museum by Mr. P. Mitchellmore. A pair of apparently normal birds had a white nestling in each of three broods:—

Brood A showed one white bird in the nest of normal birds. It fell from the nest or was turned out just as it was well feathered.

Brood B showed one white bird in the normally coloured brood. During the first day upon the wing a wild magpie (Gymnorhina hyperlenca, Gld.) killed it and tore it to pieces while upon the ground.

Brood C had one white one which left the nest apparently in poor health. For a few days it kept alighting upon the logs in a pond. It was found dying upon one of the logs and finally Mr. Mitchellmore actually saw the bird give up its life, presumably by reason of fatigue and cold. Most birds when ill hide away in the night expecting to see the morning light; but fail to.

This year, those who usually observe, will find the swallow family arrive a little earlier in the month.

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