

THE TASMANIAN NATURALIST

THE JOURNAL OF THE
Tasmanian Field Naturalists' Club.

Vol. 1.

APRIL, 1907.

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No. I.

Ourselves.

The Tasmanian Field Naturalists' Club, having been in existence for over two years, has felt the need of a journal of its own, and at the annual meeting in September, 1906, it was decided that such a journal should be issued, under the title of "The Tasmanian Naturalist," the first number of which now appears. One copy of the journal is to be issued free to all members whose subscriptions have been paid; for those not belonging to the Club a small charge is to be made.

The journal is intended to deal with Natural History in its widest sense, particular, but not exclusive, attention being paid to subjects of Tasmanian interest.

It is hoped in time that descriptions of new forms of life will appear in its pages, but for some time at least the articles will be of a more or less popular character, and under arrangement with the proprietors of "The Weekly Courier," many of them will first appear in that widely-read journal.

Members and others interested are invited to contribute, addressing all communications to the editor. Thirty copies of their papers will be supplied free to all authors of articles of more than one page. Unless for special reasons papers should not exceed 3000 words in length, and under 2000 are preferred. Short paragraphs will also be acceptable.

Previous to the establishing of our journal the following papers were published for the club:—

The Black-Headed Honey-Eater (with drawing), A. E. Brent.

Tasmanian Orchids (with drawings), L. Rodway.

Club's Camp Out (with photographs), E. A. Elliott.

Tasmanian Ferns, L. Rodway.

The Scrub Tit, A. L. Butler.

The Myrtaceae of Tasmania (with photographs), L. Rodway.

The Coccidæ: A Family of Remarkable Insects.

By ARTHUR M. LEA, F.E.S., etc. (Government Entomologist).

Amongst the different orders of insects, there are many kinds that are remarkable for their shapes or transformations. But of the various orders there is not one which contains species of such queer forms, or in which the changes are so singular, as in the homoptera. Little attention, however, is paid to this order by the majority of naturalists, except by those officially employed to deal with

pests, the reasons being that the majority of the species are of small size, of sober colours, and frequently difficult to preserve. The order is comparatively small in numbers, and very fortunately so as few of them are useful to man, and many are highly destructive. The aphides (including "phylloxera vastatrix," so remarkable on account of its life history and

for the immense damage it has done to the vineyards of Europe), frog-spittle insects, frog-hoppers, cicadas (frequently but erroneously known as locusts) lantern bugs, lemps, and scale insects ("cochine"). all belong to this order. It is only, however, with the last family that we are now concerned. The scale insects derive their name from the fact that a great many of the species appear like small scaly excrescences on the leaves, bark, or fruit of various plants. The family may be roughly divided into three sections, the first consisting of species which retain their legs during the whole of their life, the second consisting of species in which the legs are lost by one sex and scaly coverings (entirely separated from the insects but serving to protect them) are formed, and the third in which the legs may or may not be lost, and which live within woody excrescences they cause to grow upon the stems or leaves of the plants attacked. To the first section belong the mealy bugs, cochineal insects, and the cottony cushion scale; the latter was accidentally introduced to California and elsewhere, and did enormous damage before it was kept in check by the introduction of its natural enemies. The cochineal insect is one of the very few useful insects of the group; the mealy bugs are nearly all destructive, but a few of the root-feeding species serve as "cows" for various kinds of ants. To this section also belong the "paradise" flies, a group of insects of which the males are very beautiful, with two fine wings, bright red eyes and long tails of shining, glassy filaments. The females are much larger, of a dark brown colour, and without wings and tail. In fact, in the whole of the family the females are always wingless, and the males winged, when full-grown; with some of the species the males vastly exceed the females in number, whilst in others the males have never been seen. In the second section many of the accepted definitions of insects do not hold good, for the larva is frequently of more perfect shape and with more senses than the adult insect. The section contains more species than the others combined, and the members of it are known as "armoured" scales, one of them being only too well known to Tasmanian orchardists; this is the introduced mussel scale (*Mytilaspis pomorum*). The females of this species lay eggs which are protected against other insects and the weather by covering scales; from the eggs in the summer active larvae are hatched; these larvae each possess six legs, a pair of antennae, and a pair of compound eyes. In this stage the sexes cannot be distinguished.

After scurrying over the plant attacked (usually the apple) in search of a suitable place to settle, one is selected, and the larva inserts its rostrum into the bark or fruit to suck up its juices; it grows rapidly, forming a protecting scale over itself as it develops, and soon completely loses its legs, eyes, and antennae; with the female these are never regained. The male not only regains them, but obtains a pair of wings as well; he loses his sucking apparatus, however, whilst this is retained by the female throughout her life. The body of the winged male is divided into the usual parts of a mature insect, namely, the head, thorax, and abdomen; whilst the mature female has the head and thorax in one piece, and not distinctly separated from the abdomen. It might be thought that the females of this section being wingless and legless, no insects would be less liable to be transported, but several of them have become acclimatised practically all over the world. In West Australia the females of one species of this group live fully half an inch beneath the bark, their only communication with the air being by means of a long glassy filament or tail, which is usually first noticed on account of its having a small drop of nectar-like substance oozing from its tip. Many species of all three sections, however, give off a substance known as "honey dew," and which is greatly relished by ants and other insects. The species of the third or gall-forming section have their headquarters in Australia, and all of them are highly remarkable. By puncturing the leaves or stems of trees they cause peculiar woody growths or "galls" to form, and these growths are constant in appearance. Thus in the genus "Brachy-celid"; (the species of which attack the eucalypti) one gall is about six inches in length, and supported by a long thin stalk, another is pear-shaped, another apple-shaped, another has the crown turret-shaped, and so on. One species is greedily eaten by the blacks of North West Australia. In the majority of species the gall contains but one chamber, but several contain two. With some the male gall grows on the female gall, in others the female galls grow on twigs, whilst the males grow in dense mushroom-shaped masses on leaves. In one species the gall is formed in the solid wood itself. The insects themselves are usually able to move up and down within the galls. The male on attaining his wings leaves his gall, but the female is confined for life. She either produces living young or dies full of eggs, these eventually hatch out, but in either case the young leave by an opening at the top of the gall.

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Perhaps the most remarkable of all the gall forming insects are the species of *Frenchia* (a genus named after the genial Victorian entomologist), the species of which attack the casuarinas, or she-oaks. There are two species of this genus known, one from Sydney, where it appears to be very rare, the other from

Victoria and Tasmania. The latter species is known as *Frenchia casuarinae*, and frequently kills branches of she-oaks. Its larvae, when young, are in appearance much like those of other members of the family, being provided with three pairs of legs, a pair of compound eyes, and a pair of antennae. After leaving their



- A—Larva of *Frenchia casuarinae*, with legs, eyes and antennae, and capable of free motion.
B—Second stage as enclosed in gall, and having lost legs, eyes and antennae.
C—Third stage.
D—Fourth or wad-like stage, with removable cap.



E— The enclosed gall insect of *Cyllindrococcus*.

mother's gall, they wander over the bark, and finally settle down; here they cause galls to form, the galls in time completely covering them. The galls continue to grow, and eventually from the middle of each gall a cylindrical woody growth appears, which may be readily detached. Meanwhile changes have been taking place in the insect itself; it loses its legs, antennae, and eyes, and even its mouth parts (henceforth receiving its nourishment through its skin by the process known as osmosis), and appears as a little brownish-red object, of irregular shape, but having a small node at its lower end, and a sort of thick tail at one side. As growth continues, the tail becomes thinner and increases in length, extending almost the whole length of the cylindrical woody growth; its bottom also becomes almost saucer-shaped, but still with the small node, which is fitted into a depression of the wood; it is doubtless at this stage that pairing takes place. Later on the tail collapses, bends over, and appears fitted to a removable cap, which is joined to the body by an irregular suture—much as the sutures between the bones of the human skull. The body itself is now shaped like a wad, and on removing the cap the top can be seen to be completely covered by fine concentric rings with a small opening in the centre, from which the young can nearly always be seen escaping. A heavy coating of white mealy substance is always attached to the walls of the enclosing galls,

whilst the insects are healthy, but when these are attacked by parasites, as is often the case, this substance disappears. When full fed, the lower portion of the gall is completely filled, and doubtless gives to the insect its peculiar wad-like shape. The trees attacked by these insects are often killed by them, and the galls are frequently to be seen in immense numbers. Common as the females are, the male has never yet been described, and has probably never been seen, although it has keenly been searched for; it will probably be much the same, however, as many others of the family. Briefly summed up, the life history of this insect, probably the most remarkable in Australia, if not in the whole world, is as follows:

1. Born in possession of six legs, two compound eyes, a pair of antennae, and with mouth parts.
2. Attacks bark, and causes compound galls to form.
3. Gains a tail, but loses its legs, antennae, eyes, and mouth parts; at this stage completely cut off from the outer air. From now onwards nourished through its skin.
4. Again changes its shape, and greatly increases the length of its tail, again becoming connected with the outer air.
5. Again changes its shape, tail becomes semi-detached from the body, the upper surface of which is marked by numerous concentric rings.
6. Females abundant; male unknown.

Another highly remarkable genus, the species of which also form galls on she-oaks, is *Cylindrococcens*. The species of this genus are fairly numerous in Australia and Tasmania, but of none is the male known. In a common Tasmanian species the height of absurdity in shape appears to be reached. After the first stage the insect is not fixed, but is capable of moving up and down its gall. It has no rostrum, and receives all its nourishment through its skin (in part of the second stage it appears to be attached by the whole top of its head to the base of the gall). The antennae are present, but are little more than two feebly pointed projections. There are no eyes. There are three pairs of legs, each apparently without claws (few other insects with legs are known in which these are not terminated by claws); the front pair are the smallest, and are narrow and produced; the hind pair are much larger, and are bladder like, whilst the middle pair are much larger still. The front and hind legs appear to be composed of only one part, instead of five (coxa, trochanter, femur, tibia, and tarsus), whilst the middle are composed of two. The legs moreover, after in proportion, as the insect grows. The hinder parts of the body are clothed with long golden hairs. The whole insect, however, is so densely clothed with whitish meal that until this is re-

moved the different parts cannot be clearly seen. A remarkable feature of this insect is the fact that when attacked by parasites it appears to grow much more rapidly, and to a much larger size than when healthy. The proof of this is that in the galls dead coccids may frequently be seen that have become bloated to four or five times their normal size, and exactly filling the galls for the greater part of their length; when so bloated the legs can be traced with great difficulty only. The gall of this species is narrow, about an inch in length, and tapers to a point; in colour it is green, but light brown at the top and bottom; at the bottom scale-like growths are formed, so that the whole is remarkably like the young leaves of the tree on which it grows. Another gall formed by a species of this genus is so unlike the work of an insect and so much like that of a part of the tree itself that it deceived a botanist, who described it as the fruit of the tree. The drawings (published in the "Courier" of March 9) show various stages in the life histories of these insects. (a) Larva of *Frenodia* Casuarinae, with legs, eyes, and antennae, and capable of free motion. (b) Second stage, as enclosed in gall, and having lost legs, eyes, and antennae. (c) Third stage. (d) Fourth, or wad-like stage, with removable cap. (e) The enclosed gall insect of *Cylindrococcens*.

January Meeting.

The monthly meeting was held in the Masonic Hall on January 21st. Mr. S. Clemes presided, and there was a good attendance.

Miss D. Kermodé and Master Wm. Kermodé were elected members of the Club.

Mr. A. M. Lea, Government Entomologist, showed two cases of beetles, etc., obtained by him at King Island, and described some of them. He also mentioned that some bones of the extinct emu had been taken by him. Mr. Morton gave some information regarding the bones that are to be found there. Two clutches of eggs of the Brush Wattle-bird (*Acanthochoera mellivora*) were exhibited by Mr. E. A. Elliott, and descriptions given of the nests and nesting grounds of these birds. Some eggs of one of the Cat-birds of Australia were shown by Mr. H. Pottenger.

Mr. A. Morton, Director of the Tasmanian Museum, gave an account of his recent trip to the islands of the Pacific.

He stated that he went to New Zealand from Hobart, and thence to the islands, many of which appear to be in a very prosperous condition, especially those under British control. Fruits, such as oranges, bananas, and pineapples, are grown in large quantities, and are very profitable, while the chief industry of the islands is drying cocoanut for copra, which is worth about £25 per ton. The natives are well developed, and good workers, their efficiency in the management of boats in the surf and loading of vessels being quite remarkable. Descriptions of the scenery were also given by the lecturer.

Dr. Gerard Smith then showed a number of microscopic lantern slides of polyzoa, hydrozoa, and radiolaria, mounted at the Marine Biological Station at Jersey. At the conclusion the chairman read the following letter:—"Hobart, 21st January, 1907. Dear Sir,—The news of your departure from amongst us has been received very regretfully by the members of this Club, and we desire to

express our thanks for, and have placed on record, the whole-hearted interest you have taken in the Club's welfare. You kindly undertook the chairmanship of the Club at its inception, and its present successful standing is due in large measure to the scientific ability you displayed as its leader. The members will long remember your usefulness, and hope that in the wider circle you are returning to the formation, growth, and scientific endeavours of the Tasmanian Field Naturalists' Club will be a source of pleasure to you in hours of reverie.—We

are, dear sir, yours very truly, on behalf of members, Samuel Clemes (chairman), E. A. Elliott (hon. secretary), To Gerard Smith, Esq., M.R.C.S., L.S.A., etc., Hobart."

Dr. Smith expressed his pleasure at receiving this letter from his fellow-members, and said he regretted very much leaving them, and envied them the beautiful collecting grounds of Hobart. His connection with the Club had been very enjoyable, and if he had been of any service he was glad.

March Meeting.

The monthly meeting of the Club was held in the Masonic Hall on the 7th March. Mr. J. Edgar Smith presided, and there was a good attendance.

Mr. P. Lockwood, Nile, was elected a member of the club.

A specimen, growing in a pot, of a fern new to Tasmania was shown by Mr. L. Rodway, Government Botanist, sent from Duck River, N.E. Tas., by Mr. K. Harrison. Fronds or leaves only had previously been sent, and had already been exhibited before the Club, when Mr. Rodway had considered it to be *Polypodium Hillii*, but with whole plants to hand he recognised it as *P. pennigerum*, hitherto only found in New Zealand, and now making two species of ferns found in Tasmania and New Zealand and nowhere else. The secretary (Mr. E. A. Elliott) exhibited a live young black swan (*Chenopsis atrata*) about eight weeks old, which he had obtained from the Swan River. This bird attracted considerable attention from those present, and made

its piping call frequently throughout the meeting. It was covered with down of a dark fawn colour, the under surface being lighter. Mr. A. M. Lea, Government Entomologist, exhibited some cases of showy moths and butterflies from Queensland and India, and some of the smallest beetles found in Tasmania. Mr. J. E. Smith showed some curious "faulted pebbles" obtained from Scotland.

Mr. A. L. Butler then read a paper on "Bad Life," written by Mrs. H. L. Roberts, of Beaumaris, and which appears in this issue.

Dr. F. Noetling, Ph.D., gave a lecture on the geological formations at South Bridgewater, which he did in an able manner, avoiding the use of technical terms, for the sake of the juniors, and illustrating his remarks by mentioning occurrences which may be witnessed every day, representing on a small scale the great works of Nature in forming sedimentary rocks.

Swan Shooting on the East Coast of Tasmania

By E. A. ELLIOTT, M.A.O.U.

An opportunity of visiting the East Coast to attend the opening day of the swan shooting season (February 1) was taken this year, in order to see how it was carried on, and whether the numbers of birds were greatly reduced, as reports from year to year notify that hundreds are killed then. Leaving Hobart on Wednesday, January 29, at 5 p.m., I cycled through during the night, when a full moon and clear sky, helped to make the ride pleasant. At Lisillon, first traces of dawn were

noticed, and as the sky brightened more and more in the east, birds began to make their presence known. One of the first of these was the little scaup; a crow, some white-eyes (*Zosterops*), and crescent honeyeaters, also seemed to be early risers. Kelvedon was reached at sunrise. This is well-known to be the estate of Mr. Edward Cotton, our leader at the club's Easter camp-out at the Seloutens in 1906; and through the kindness of his sons the present trip was undertaken. At 10 a.m.

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Mr. Tynney Cotton, two others, and myself started in a whaleboat to reach the banks in Moulting Lagoon, 25 miles distant, where the shooting takes place. In an hour or two we crossed the bar of the Swan River, which was difficult to find as it is always shallow and shifts its position. The tide was running strongly out of Moulting Lagoon through the narrow channel of the river, and as the wind was unfavourable, we had to start rowing. Some little way up the river we landed, and had lunch, and a much appreciated rest of about an hour, when we got into the boat again, and after pulling a little further were able to sail. The Swan River soon broadened, but kept a tortuous channel, with extensive shallows first on one side and tensive shallows first on one side and then on the other. What numbers of birds were to be seen now. Flocks of twenty, forty, or fifty white-fronted pelicans rose continually from the mud flats. Many white-breasted, and a few sooty, oystercatchers were there too, with several species of petrels and terns flying up and down; the latter were chiefly the Bass Straits' tern, and two of these, flying just ahead of the boat, were secured for specimens, proving on close examination to be a young bird and an old one; the latter measured 4ft. 1in. in full wing measurement, and 11. 7 $\frac{1}{2}$ in. from tip of bill to end of tail. The former was slightly smaller; the feathers of the crown were not so dark as with the mature bird, and it had brown spots on the tips of its wing coverts. The light bluish bodies, dark heads, and brightly coloured bills of these graceful birds, make them very attractive. Of other species noted were the four kinds of cormorants found in Tasmania. Amongst their innumerable resorts, the Pacific and silver gulls consider this place with favour, the latter gulls being seen in big flocks, and the harsh cries of the former were constantly heard as they were flying along. The Pacific gulls are scheduled amongst our protected birds, yet they worry the black swans considerably, and devour their eggs if the swans leave their nests for a little time. Several hawks, both brown and swamp, were seen on the wing, and also a wedge-tailed eagle, while on a large dead tree were three sea eagles, together with other birds. Several tall white objects could be seen in the distance, which my companions said were pelicans, and on approach these were identified as such; although the boat could not get close to them. When disturbed they flew high in the air, and their large bills and throats could be distinctly noticed. The pelicans were formerly more numerous, and through being seen at certain places

more frequently than at others, the name "Pelican Rocks" has been given to a ridge stretching across the mouth of Pelican Bay, one of the first bays met in sailing up Swan River. Pelican Bay is on the north-east side of Swan River, and here the first black swans (*Chenopus atrata*) were seen. On the other side of the river a few miles higher up is King's Bay, extending probably for some four miles at least. The whole shore of King's Bay was lined fairly thickly with swans, and this bay is only one of many where these birds are to be found in numbers. Above King's Bay, Moulting Lagoon narrows somewhat being perhaps two miles broad, and here is the lower bank, 10 miles from the mouth of Swan River. This bank is under about 18in. of water—the navigable channel being in the middle—and the swan shooters line the bank from shore to shore, standing in the water. There were many wild ducks of various species about, and very large flocks of them were seen. During the shooting on the opening day they were flying overhead, but very high, and it was said local residents had been shooting them for three or four weeks previously to the opening of the season. We camped on Thursday night a few miles below the bank above referred to, and to save time on the following morning did not put up the tent, but spread it out upon the ground, putting our rugs upon this, and covered all with the tent-fly. In this way we were comfortable enough, and had a fair amount of rest. The crews of two other boats were camping near by, while further up were more parties. Before daybreak on Friday, February 1, we were astir, and were having the morning meal as the sun rose. We had to wait some little time for the others, but made a start shortly after 5 a.m. The bank was some three miles away direct, yet the winding channel made it at least twice that distance to row; while a little way below the bank reports of several guns drew our attention to a few figures there, and one or two dark objects falling with a splash into the water told that the first birds of the day were now shot. At 7 o'clock our party reached the bank, and, taking their guns and ammunition, stepped into the water and waded towards the shore, extending in a line across the lagoon; and when the remaining boats had come up there were 44 shooters stretched across at intervals of 80 yards or so. It was learnt on arrival that one boat of "ronsers" had been sent up the bays, so our party sent another downstream, in the endeavour to keep the swans continually on the move, and, as they always keep above

the water when flying (never across land), they must pass over the "guns" if the birds fly in their direction. The boats were taken back into the channel, and I stayed in the whaleboat, as that was the best spot to witness the proceedings from. Birds were already flying—sometimes only one, or two and three together; sometimes in flocks of twenty or thirty. At other times they would come in very big flocks, and by counting 100 birds, then taking an approximately equal number further along the line, this total (200) being repeated in like manner, it would soon be found that there were at least from 1000 to 1500 swans in one flight. The shooting was mostly over by 9.30, and during this time many flocks flew past, although it was said later that the birds did not fly well on that day. How many swans there were on the wing (which only formed a small part of the countless numbers left in the bays) would be beyond my present means of even guessing—suffice it to say there were many thousands. When a flock is flying the black bodies of the swans do not show out against the dark background of the hills, but only the large feathers of the wings (the primaries and secondaries), which are white, and the birds are therefore called in that part "white wings"—a name I have not heard applied to them elsewhere. Sometimes these primaries are shaded with black, and one quite black swan has been seen. On the other hand, two birds quite white have been seen there—probably albino specimens. Full-grown swans measure about 4ft. 6in. from bill to end of tail and 6ft. 6in. from tip to tip of outstretched wings, but they vary considerably. Actual measurements of two are:—(a) Bill to tail, 4ft. 6in.; tip to tip of wings, 5ft. 10in.; each wing, 2ft. 7½in. (b) Bill to tail, 4ft. 1in.; tip to tip of wings, 6ft. 7in.; each wing, 2ft. 11in. Ten swans which were killed on this occasion were weighed, and the average was 13.6½, but they vary in weight from 10lb. to nearly 20lb. Mr. Cotton said the heaviest bird he had weighed was 19½lb. It is a curious fact that the large primary feathers of these swans come out at a slight pull, as in stretching their wings to measure them, widely differing in this respect from the eagles, as some little effort is required to extract the large flight feathers of the latter birds. The skin covering the bills of swans is somewhat loose, bright red, with a pink top, the shade of colour varying more or less with the age of the bird. Soon after death the colour becomes rather dull. The peculiar rustling noise of their wings makes the presence of swans known as they fly overhead,

and on turning to them their heads are seen to move first on one side and then on the other, looking on the scene around them, and it is small wonder that their eyes have a wild and startled look. The rouser sent down to King's Bay could be seen in his white dinghy, and occasionally his voice was heard as he shouted at the birds, trying to frighten them and drive them to the guns. Most of them flew just a little way up or right down the bay, only small parties (up to perhaps 1000 birds) flying towards the shooters, and sometimes these would be wise enough to turn back before getting within range. In rising, the swans flap along the surface for some distance before getting support from the air, and the noise of their myriad wings beating the water can readily be imagined; it is like a loud clapping of hands in a concert hall. It was heard then from some miles distance, though when a large flock is fired at from short range with one barrel of a gun and they rise, the noise of their wings will drown the report of the second barrel. The swans always follow a leader when flying, and this is usually an old tough gander; therefore the shooters let that one pass and pick out other birds in the flock, the young and tender, which are not so black in colour. They are fired at first when nearly up to the line, and if the first barrel fails to stop a bird, it has the second just as it passes. Their breast feathers may be thick and close, but the swift flight of the bird makes the shot hit all the harder when fired at as they are coming to the guns. Flying with a good breeze they will travel at the rate of 60 to 80 miles an hour, so that it is not of much use to fire when they have passed. Those accustomed to swan shooting aim some 15 or 20 feet ahead of the birds. A record was established on this occasion by a swan being shot dead at 120 yards range with a shot gun, and a flock coming down just as the shooter had waded out for this bird, he fired both barrels and secured two others; loading quickly, he fired again, and got two more, so that when he reached the firing line he was towing five behind him. At another time five birds were seen to drop into the water simultaneously. What endless ways they fall through the air! Sometimes when killed outright at a good elevation they hit the water with a loud splash, making the spray fly, sometimes turning over and over, or again falling as if they would skim the water, being loth to leave their flight, and would drop slowly to the surface. The spent shot dropped in the water with a constant patter, sometimes hitting the boats or fall-

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ing round the sportsmen. When swans are hit hard, but not killed outright, they fly with motionless, slightly drooping wings ever nearer the surface of the water, skim over it for a long way, and then settle, perhaps two miles away, and swim further on. I counted eight or ten that thus got out of sight. It was said that the "rousters" when returning would pick them up. At 9.30 a.m. the majority ceased firing, and dragged their birds to the boats, where they were divided—some shooters having been out-classed in guns and skill had not a single bird, while several shot many more than they needed, so that no dead birds were left behind, and all were made use of. In this respect these sportsmen proved themselves true, and were content when they had shot as many birds as they could easily dispose of, although had they been bent upon slaughter, by staying the day, many more must have been killed. During the rest of the season the few small parties that go there shooting would not kill more swans than are shot on the opening day. Perhaps eight hundred or one thousand even, are killed in each season. This would mean, say, ten taken out of a flock of 500 as they were flying past, and those on the wing were only a small part of the swans left in the bays. Only the lower portion of Moulting Lagoon was traversed, and it is said that these birds are even more numerous higher up. Unless the number of sportsmen who go there to shoot largely increases, there does not appear to be much likelihood of the numbers of these birds being materially

reduced by this means. There is a real danger, however, in the large numbers of eggs taken every season by fishermen and local residents. Thousands are sent to Melbourne confectioners. If vigorous action was taken in enforcing the £1 penalty for having an egg of the black swan in one's possession, then there would certainly be no fear of this beautiful bird ever becoming extinct in Tasmania, or even becoming less in numbers. The birds nest in the shallows, and eggs may be found during nine or ten months of the year. On the way both up and down the river eggnets were seen, ranging in age from a few weeks' old upwards. When of full size the young swans remain for some time unable to fly, as their flight feathers are the last to grow; they are most prized for the table if they can be obtained when at this stage. In moulting, the primaries appear to be shed at the one time, so that the birds are unable to fly; these are termed "moulters," and it is a common practice to row or sail after these to capture them. Parents of young birds found during the open season are not shot, as they keep with their young, and do not fly far from them, even on the approach of a boat. They do not join, until later, the large flocks which are shot at during the Drives, and are certainly left alone by the sportsmen. The return trip was commenced about 10 o'clock, and a favourable wind enabled us to sail most of the way. For several miles after leaving the bank dead birds were occasionally seen, and one or two were picked up, the others being left for later boats. About



A YOUNG BLACK SWAN (*Chenopsis atrata*).

four or five miles down the water was seen to be covered with feathers, which Pacific gulls had torn from a swan. Wishing to capture a little eggnet, one of a party of three or four swimming in front of the boat, was singled out, and as it was rapidly gained upon, the bird was soon lifted from the water and placed in the boat. On being brought to Hobart it became exceedingly tame, and evidently enjoyed life, in less than five weeks gaining in weight from 1lb 10oz. to over 4lb. When caught it was supposed to be about four weeks old, and a photo of it (reproduced in the illustrated section) was taken a week after. The bills and eyes of young swans are black, but change to red later. When

the feathers are plucked from a black swan it then looks snowy white, the down not being attached to the feathers but separate. With the young captured bird it was noticed that the nest down with which many young birds are covered on hatching from the shell did not give place to feathers, which is the general rule, but to the true down, and the feathers appear later. This down was not white, but a fawn colour. We arrived at Kelveon again on Friday afternoon with some of the swans. The following day I started on the return to Hobart, after having witnessed in those large flocks of magnificent birds one of the finest sights of its kind, and long may it remain.

List of Members.

(An asterisk denotes Original Member.)

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|---|--|
| *Anthony, E. S., Elizabeth and Davey streets, Hobart. | *Harcourt, Alec., Mary street, Hobart. |
| *Atkins, C. J., Audley-street, Hobart. | Hardeastle, Dr. C., Macquarie-street, Hobart. |
| *Atkins, W. N., Moonah. | *Harrison, M. W., Glenorchy. |
| Atkinson, R. H., Friends' High School, Hobart. | Hovey, R. C., Macquarie-street, Hobart. |
| Baynton, H. J., Box Vista-road, North Hobart. | Irvine, Miss, Friends' High School, Hobart. |
| *Beattie, J. W., Elizabeth-street, Hobart. | Johnson, J. A., Training College, Hobart. |
| Bredham, Miss, Warwick-street, Hobart. | *Johnston, R. M., L.S.O., Government Statistician, Hobart. |
| Bredham, L., Warwick-street, Hobart. | Kermode, Miss D., "Corona," Battery Point, Hobart. |
| *Bell, Miss, Lindisfarne. | Kermode, W., "Corona," Battery Point, Hobart. |
| *Black, R. A., Dept. Agriculture, Hobart. | *Lee, A. M., Council of Agriculture, Hobart. |
| Boxall, J., c/o Messrs. Burgess Bros., Hobart. | Lee, Mrs. A. M., Murray-street, Hobart. |
| *Brent, A. E., Austin's Ferry. | Lockwood, P., Sale. |
| Brownell, F. L., Stoke-street, Hobart. | *Lord, Clive, Sandy Bay, Hobart. |
| *Butler, A. L., Murray-street, Hobart. | Lodder, Miss, Elphin-road, Launceston. |
| Cato, W. C., Linds Dept., Davey-street. | M'Alister, Miss, Friends' High School. |
| Chapmell, H. C. D., Swan street, Hobart. | *McDonald, B. E., 91 Brisbane-street, Hobart. |
| *Clemes, S., Leslie House, New Town. | *May, W. L., Forest Hill, Sandford. |
| *Colbourn, H. J., Council of Agriculture, Hobart. | *Maxwell, E., Stone Buildings, Hobart. |
| *Conlon, A., Council of Agriculture, Hobart. | *Morton, A., Tasmanian Museum, Hobart. |
| *Cook, J. V., Domain-street, Hobart. | *Nairn, C. C., Park-street, Hobart. |
| Crookall, W., Smith-street, Hobart. | *Nairn, Mrs. C. C., Park-street, Hobart. |
| D'Emden, Frank, Mt. Stuart, Hobart. | *Nairn, Miss, Park-street, Hobart. |
| D'Emden, Thos., Mt. Stuart, Hobart. | Naden, Miss, Quayle-street, Hobart. |
| Dove, H., Stuart, Devonport West. | Naden, N., Quayle-street, Hobart. |
| Duthoit, N., Bellerive. | Nicholls, H. M., Garden Island Creek, Honn. |
| *Elliott, C. H., High-street, Hobart. | Noetling, Dr. J., Sandy Bay, Hobart. |
| *Elliott, E. A., High-street, Hobart. | |
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 *Simson, Aug., High-street, Launceston.

*Smith, D. G., London.
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 *Watchorn, A. D., Battery Point, Hobart.
 Wardman, J., Botanic Gardens, Hobart.
 Watson, H., Sandy Bay, Hobart.
 *White, A., Broomhill, Mangalore.
 Woolley, C. E., Ludisfarné.
 Wright, C., Trinity Hill State School,
 Hobart.

The Breeding Habits of Bronzewing Pigeons

By MARY G. ROBERTS, M.A.S.E., M.A.O.U.

(The birds here dealt with are our common bronzewing (*Phaps chalcoptera*) and the crested bronzewing of New South Wales (*Ocyphaps lophotes*.)

In my aviaries, where these varieties have been kept season after season under exactly the same conditions, I find the time of year in which they begin to build, and the period nesting lasts, vary considerably; influenced, no doubt, by the severity or otherwise of weather conditions. For instance, in 1904 they both began to lay in July and August, and both sat five times and carried on breeding operations until quite the end of March. It is almost needless to say that all the eggs were not hatched, nor all the young reared; in one instance a pair of our own bronzewings fell from the nest and died when a few days old, and another time one egg was laid and forsaken. Some untoward circumstance also befell the crested variety, and, from my experience, I conclude that three times nesting in one season would be the normal or outside number. In the following year (1905) operations commenced still earlier, and, to my surprise, on June 27 I found eggs in the nest of the New South Wales crested, and two days later in that of our common bronze-wing. There are many disappointments in a venture, the crested bronze-wings deserted the nest owing to being disturbed during some alterations to the aviary, and the young of our bronzewings hatched out only to fall victims to a sudden and severe change of temperature. The hen nested again at the end of August, but on September 16 a heavy fall of snow was responsible for

the death of one squab; next morning the other died, and the following morning the mother—a matter of keen regret to me, as during her short and interesting life she had engrafted very much pleasure into mine. The last season (1906) was much later than usual, owing to the frequent and intermittent snowstorms which fell upon the mountain up to the beginning of December. The birds showed no sign of nesting until October, and it was November before the first common bronzewing was hatched; they were not only later in beginning, but earlier in leaving off, and by the end of November this variety had finished, the result being two young from the first nesting, and one from the second; the crested variety had begun somewhat earlier. It has been a great pleasure to me watching the nesting operations of these two varieties being carried on simultaneously, although denizens of different states. In speaking to country residents, they invariably tell me that Christmas is the best time to obtain young birds, but I fail to agree with them, as the facts which I have given prove the opposite. They may probably see more birds about during that time, as, doubtless either for work or pleasure they ramble in the bush much more frequently in summer than during the cold weather, and, judging by my experience, probably many of the early-hatched do not survive through the inclement weather. After hatching, the young are for some time well protected in the day by the presence of both birds on the nest, who are most attentive to their duties; but when night comes and the cock retires to his perch, the hen, owing

to the rapid growth of the squabs, is no longer able to protect them from the cold; hence I have found them dead in the morning on more than one occasion. I have an idea that by removing the young ones to the house during the night, when a sudden fall of temperature takes place, these disastrous results might be averted. Besides these two varieties, I have many others, including the brush bronzewing (*Phaps elegans*), which is now almost unobtainable, and which is thought by English aviculturists much handsomer than the commoner variety, the Wonga-Wonga (*Leucosarcia picta*) of New South Wales, well known for its size and as being the possessor of white flesh; the partridge bronzewing (*Geophaps scripta*), commonly called the squatter—the only remaining white-flesh variety, and considered by Gould the most delicious of all pigeons; the plumed ground dove (*Geophaps plumifera*), the latter one of the most attractive of birds; both of these breed upon the ground, and are believed to be a connecting link between the partridge and the pigeon; the young leaves the nest, if not as early as quail, much earlier than pigeons do; the little green pigeon (*Chalcophaps chrysochloris*), of New South Wales, a charming bird of small size, with bright green wings and vinaceous breast, also the Java necklace and white Barbary doves. Both these varieties have bred with me, and I hope to acclimatise the former, for it is evidently hardy, is now very common about the suburbs of Sydney, and is constantly to be heard cooing from the pine trees. The bird may also be seen about the lawns, or often feeding with the sparrows from any seed-box that is near at hand. I had the misfortune to lose a pair of crowned New Guinea pigeons (*Columba D'Albertysi*), celebrated both for size and beauty. This pigeon is of a light slate colour, with rich maroon breast. Other distinguishing features are bright red eyes and a large fan-shaped crest. It is believed in New Guinea that in captivity they lose all pride in this remarkable adornment, but such is not the case, as I frequently noticed that when sitting on the ground they found occupation in dressing with the beak the crest of each other. The finer of the two fell a victim to the bad temper of a silver pheasant, their companion, always a delicate bird, died from natural causes. I have never ceased to grieve over my loss, as under present conditions there is little chance

of having them replaced. The Government of British New Guinea has now a protective policy with regard to these birds, and will not allow them to be exported. I understand that the only chance would be to try for them in German New Guinea. In thinking over the merits of these different varieties there is none I think so charming to keep, nor more worthy of our admiration in many ways, than our common bronzewing. It is not necessary to consider the ways of the ants only to find wisdom; we can obtain it, and many other lessons, by making ourselves familiar with the habits and disposition of these birds. The cock especially is worthy of notice; as soon as we hear him cooing to attract the attention of his mate we know that nesting operations are about to begin, and by watching we soon see him flying from place to place in search of a good foundation to build upon. As soon as this important matter is settled, and although the nest at first is composed of a few twigs or small sticks only, each one is carefully tested before being taken up, and I have often been surprised to see how many have been rejected as unsuitable. During incubation, and afterwards, I have often seen them adding fresh material, as if to enhance the comfort and security of the abode. Does not all this show a great amount of intelligence and reasoning power? Beyond this the birds are brave in defence of the eggs and young, both before and after hatching. Although I have often tried, I have never succeeded in driving them from the nest—either parent would flip my hand with his or her wing, and with flashing eye utter a note of disapproval with all the voice it could command. I always turned away vanquished, but with increased admiration of their bravery. When feeding with the pheasants I have noticed them attempt to strike the latter with their wings, which shows them to be possessed of a good amount of courage. At the present time an effort is being made by the Avicultural Society of England to introduce both varieties of these pigeons into the public parks about London, but I doubt if our bronze-wing will lend itself to acclimatisation in a colder climate than this. Already, however, the crested variety of New South Wales is at liberty in the grounds of Woburn Abbey, the residence of the Duchess of Bedford, one of the members of the Australian Ornithological Union.

As autumn approaches many scarlet-breasted robins (*Petroeca Leggii*) make their way from the bush into the gardens

of Hobart. This year the first were seen on the 11th March, and they are now fairly common.

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