

ART. XI.—*Notes from Canterbury College Mountain Biological Station, Cass.*

NO. 6.—THE INSECT-LIFE.

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[*Read before the Canterbury Philosophical Institute, 5th September, 1917; received by Editors, 31st December, 1917; issued separately, 24th May, 1918*]

INTRODUCTION.

THE general descriptions which have been written of the physiography and plant-associations in the neighbourhood of the station are essential starting-places for, as well as stimulants to, more detailed study. With the object of preparing a similar paper on the insect-life near the station I made some collections during the summer and autumn of 1917, and arranged the specimens thus captured in a small museum case deposited at the station for reference by future students. The notes on the collection were at first intended to be purely systematic, but it was soon recognized that the insects were so noticeably a part of the landscape that they should be dealt with in the order of their occurrence rather in that of their zoological classification. Thus on tussock or in swamp or forest different associations of insects are found, and in the following pages these associations are described, and in some cases attempts are made to explain their relationships to their environment. Of course, in dealing with several orders of insects no attempt at a complete catalogue can be made even when only a small area is under consideration, and so these notes deal only with the species that from their size or numbers come readily under the observation of the student.

A. THE ENVIRONMENT.

The topography and physiography of the neighbourhood of the station are described by Chilton\* and Speight†. The variation in land and water is such as to encourage a great diversity of insect-life. Within a radius of little more than a mile from the station there are a lake, a swamp, a sluggish stream, many rapid streams, a shingly river-bed, a stretch of open tussock country, open shrub-land, shrubby thicket, patches of forest, and areas of bare rock, with slopes of scree. Each topographic form is in general associated with a special kind of plant-covering, and this, of course, forms the dominant factor in the environment of the insect population. The plant-associations are described by Cockayne and Foweraker,‡ and such a description is essential as a basis for any attempt at detailing the modes of life of the insects.

The plant-life of the area is to a certain extent unaltered by the advent of man. The forest, the shrub-land, and the river-bed and rock plants are probably almost entirely primitive. Even the tussock-land has been altered but little, and the alteration that has occurred seems more in the direction of varying the proportions of the primitive plants than in their replacement by introduced species.

\* C. CHILTON, *Notes from Canterbury College, Mountain Biological Station, No. 1*, *Trans. N.Z. Inst.*, vol. 47, p. 331, 1915.

† R. SPEIGHT, *ibid.*, vol. 48, p. 145, 1916.

‡ L. COCKAYNE and C. E. FOWERAKER, *ibid.*, vol. 48, p. 166, 1916.

*Hypochaeris radicata*, however, is found all over the open country, and is freely visited by the small bee *Dasycolletes hirticeps*. *Trifolium minus*, too, which occurs in the gullies, is probably visited by some insect, as it sets seed freely, and the seeds have been germinated from sheep-dung. These are the only cases noted where change of vegetation may have influenced insect-habits.

In the animal world, however, or at least in the vertebrate world, the most profound changes have been made. Over practically the whole of the area the sheep reigns supreme, and the effect of its grazing upon certain flowers has doubtless been reflected on the insect population. With the sheep has been introduced *Oestrus ovis*, the sheep's nasal bot-fly, which lays its eggs in the sheep's nostrils, so that on hot days the persecuted beasts may be seen stamping their feet, tossing their heads, or standing huddled together with noses to the ground. Sheep's dung, too, must be fed upon by numerous maggots and beetles, and the animals that die have a marked effect upon the numbers of blow-flies that infest this and all similar localities. Except the sheep, the only mammal that could affect the vegetation is the hare, and of this only occasional specimens are seen. Bird-life is not at all plentiful, and has probably changed considerably as a result of human occupation. Of water-birds, the paradise duck (*Casarca variegata*) is the most common, flocks of twenty or thirty being frequently seen on Lake Sarah and in the swamps. Grey ducks (*Anas superciliosa*) and a very few black swans also occur on the lake. An odd pukeko (*Porphyrio melanotus*) may be seen in the swamp, and an occasional shag (*Phalacrocorax carbo*) passes from stream to stream. The black-cap tern (*Sterna albigriata*) and the seagull (*Larus dominicus*) are rather common on the river-beds. Of native land-birds the grey warbler (*Pseudogerygone igata*) is the commonest in shrub-land and forest-skirt. The kea (*Nestor notabilis*) occurs in flocks of ten to twenty above the line of about 4,000 ft., and traces of its scratching for earth-boring insects are frequently seen. The banded dotterel (*Ochthodromus bicinctus*) is common on the river-beds, an occasional hawk (*Circus gouldi*) nests in the swamps, and very rarely a morepork (*Ninox novae-zealandiae*) may be heard from the patches of forest. Introduced birds are much more numerous. The skylark (*Alauda arvensis*) is found everywhere, and a nest with eggs was seen among the rocks at an elevation of nearly 5,000 ft. Skylarks are in this locality almost purely insectivorous, though in the agricultural districts poisoned grain scattered over a field of sprouting wheat kills more larks than sparrows. The house-sparrow (*Passer domesticus*) and starling (*Sturnus vulgaris*) build about the railway-station, but, while the sparrow keeps near the buildings, the starling may be seen a mile away on the rocks and the tussock-land. Thrushes (*Turdus musicus*), blackbirds (*T. merula*), red-polls (*Linota rufescens*), and, most of all, yellowhammers (*Emberiza citrinella*) have invaded the shrub-land, and doubtless exert a considerable effect on the insect-life.

It seems likely that birds were once much more numerous than they are at present. This opinion is based upon two facts: (1) The development of protective coloration among all orders of insects is very perfect, and seems much more elaborate than is necessary to escape the meagre army of enemies now present. Further, many insects are abandoning (or, it may be, had never acquired) the habits that would conduce to safety from bird-attack. *Crambus flexuosellus*, the common yellowy-white moth of the tussocks, is a familiar example. While stationary it is invisible, but it rises before the walker at every step, and its movement when disturbed

would soon lead to its extermination if there were a hungry insectivorous-bird population. The highly protectively coloured *Scoparia philerga* of the forest-glades is quite invisible as it sits at rest on the trunks of the beech-trees, but if one walks noisily forward the moth will fill the air in its fluttering hundreds. It is true that in both these cases the kind of noise demanded is not that associated with a bird-attack, and the short zigzag flight and quick settling may lead to escape from other dangers. Still, protective coloration and the crouching habit are nearly always associated, and in many insects at Cass that association does not exist. (2) The second fact indicating a more plentiful bird-life in the past is the great profusion of berries and drupes borne by the shrubs. The close connection between the presence of birds and the production of succulent fruits is denied by Guppy,\* but his views do not appear to have received wide acceptance. The writer's view is that if there were no frugivorous animals, then the characteristic of producing brightly coloured, fleshy, and palatable fruits would not have been fixed in so high a degree as is commonly found, and that a large number of plants bearing such fruits is evidence of a large bird population. The suggestion that frugivorous birds would have no effect on the insect-life is of little weight, as the annual variation in the food of birds is not well known. The variation is probably considerable, as is indicated by the fact that so purely a grain-eating bird as the sparrow feeds its nestlings for about six weeks on nothing but insects. Of more importance is the suggestion that the birds probably visited certain districts only during the fruiting season of the plants they specially favoured, and at that time would almost entirely neglect insects as food.

Except the birds, the only native land vertebrate is the common-lizard (*Lygosoma moco*), which is found not infrequently on the tussock. In the lakes and streams, however, fish, especially trout, are very common, and the introduction of trout must have made an enormous difference to the insect and probably to the bird population of the district. Hudson† has shown that the stomachs of 60 trout taken from various localities contained 4,804 Neuroptera, 662 other insects, and 28 other animals. At this rate the reduction of Neuroptera in our streams must be enormous, and, as these insects, while aquatic in their immature stages, are aerial when adult, insect-eating birds may also have suffered a reduction in food-supplies sufficient either to drive them from the neighbourhood or at least to compel them to take to other food. In either case the reaction upon the general insect-life of the district must have been very considerable, and it becomes obvious that the insects are, on the whole, living in an environment that is much changed since the advent of the white man.

Two important factors in the environment are dead sheep and white flowers, for these are correlated with the two most striking features of the insect-life—namely, blow-flies by day and moths by night. The two common blow-flies are *Calliphora quadrimaculata*, the well-known bluebottle, and *C. oceanica*, which is somewhat smaller, and is covered with bright-yellow hairs below. Both these species occur in hundreds everywhere, and fill the air with their buzzing wherever a human being rests for a few minutes. When a sheep dies the blow-flies are attracted from near and far: each lays a hundred or more eggs upon it, and the resultant maggots are fully fed through their active life. But the thousands of flies thus

\* H. B. GUPPY, *Observations of a Naturalist in the Pacific*, vol. 2, p. 99, 1906.

† G. V. HUDSON, *New Zealand Neuroptera*, West and Newman, London, 1904.

produced do not always find a dead sheep on which to lay their eggs, and therefore they are urgently attracted to any place where there is the faintest scent of animal matter. I have seen *C. quadrimaculata* so violently impelled to lay her eggs somewhere that she has done so on a bicycle-tire where it had just been pressed with a perspiring hand.

After nightfall the swarms of moths are as insistent as are the blow-flies by day. These night-flying honey-suckers are represented by about twenty species, and, as these were obtained chiefly round the lamp in the living-room of the station, definite search would probably double the number of species. Now, the day-flying honey-suckers number only eight species, and the disproportion in individuals is much greater. The entomophilous flowers of the neighbourhood, therefore, must depend chiefly upon night-flying insects, and the colours of their flowers should be most commonly white, or some pale tint, rather than the darker colours of red, blue, or deep yellow.

An examination was made of the list of plants near the station as given by Cockayne and Foweraker, and the colours of such of them as produce nectar were taken from Cheeseman's *Manual of the New Zealand Flora*. The examination showed that fifty-one native plants were described as having flowers either white, rosy white, or pale blue or white, while only sixteen were described as yellow, red, blue, or brown. Dr. Cockayne has pointed out to me the undeniable fact that, to the human eye at least, white flowers are much more conspicuous even by day than those of any other colour, so that it would probably be quite incorrect to regard every white flower as cross-fertilized by night-flying insects. At the same time, given the nocturnal or crepuscular honey-suckers, it would obviously be advantageous for the plant to have white flowers: abundance of such flowers would encourage the multiplication of the insects that depend on them for their food; so that the large excess of plants bearing white or pale flowers is here regarded as an important factor in the character of the insect population.

#### B. THE INSECT-ASSOCIATIONS.

The above term has been used to indicate that, as the plants of the area are grouped into definite associations depending on environmental conditions, so the insects are grouped together according to their environment, of which, of course, the plant-covering is the most important factor. The insect-associations have been named more or less closely after the plant-associations, partly to avoid multiplication of names, and partly because the plant-covering is more conspicuous and forms the determining factor in the character of the insect-association. The range of species in an insect-association is, of course, not so clear-cut as in the plant-associations; for, while one may be able to say to a yard where tussock ends and swamp begins, the insects proper to one kind of environment may be found flying over the plants of another—as, for instance, when dragon-flies or sand-flies are found on the tussock. Again, insects that feed on the plants of one association may take shelter in another, as in the case of numerous moths which probably feed on the flowers of the shrub-land, but shelter by day in the forest, or may be attracted by night to a light on the tussock. The variety of plant-associations in close proximity to the station is a great advantage from most points of view, but in the present instance may lead to some errors in assigning certain insects to their proper associations.

1. *The Tussock Grass-land.*

Large numbers of yellowish-white moths rise from the tussocks at every step. These are chiefly *Crambus flexuosellus*, but *Scoparia salbulosella* is almost equally common. *Crambus simplex* and *C. ramosellus* also occur. These all have a wing-span of about 23 mm., and the *Scoparia* has pale-grey front wings. The metallic-blue butterfly *Chrysophanus boldenarum*, of 22 mm. wing-span, flutters about the open spaces a few inches from the ground, and sinks from sight as it folds its wings over its back and displays only their mottled-grey undersides. The large attractive butterfly *Argyrophenaga antipodum* flies lazily or sports merrily, usually in pairs, a few feet from the ground. This insect displays one of our best examples of protective coloration adapted to a special environment. The expanse of the wings is 45 mm., and their upper surfaces as well as the lower surfaces of the front pair have a rich brown background with bold orange masses, picked out with black and white spots. The remaining surfaces—namely, the lower ones of the back wings—have a buff background with longitudinal bright-silver stripes. The insect is most conspicuous while on the wing, but as soon as it settles on a tussock, its invariable resting-place, it becomes quite invisible: it exposes the buff and silver surfaces of its wings, which harmonize with the leaves of the tussock to an almost incredible degree of exactness. Occasionally *Chrysophanus salustius*, a yellow and black butterfly of 27 mm. wing-spread, may be seen flying low down, especially near the shrub-land, and a few moths of the night may be accidentally disturbed. The blow-flies will always be hovering round, and the eye will be caught by the furtive flights of several other Diptera, usually protectively coloured. The repulsive bristly *Hystieria pachyprocta*, with a stout yellow body 15 mm. in length, and the somewhat smaller *Macquartia kumaraensis* and *M. subtilis*, often remain stationary long enough to permit of observation; while the darting *Limnia striata*, 7 mm. long, and with curiously mottled wings, will usually require a grab with the hand to effect its capture. Two smaller flies that will hardly be noticed may be captured in scores by walking along with a net held near the surface of the tussock. One of these is probably an undescribed species of *Trypeta*, and the other may be a representative of a new genus of the family Dexiidae. *Itamus varius*, a predatory fly, 17 mm. in length, is very common.

Among the Hymenoptera the attractive *Ichneumon solicatorius*, with a yellow and black parti-coloured body, 15 mm. long, is frequently seen. *Lissonota flavopicta*, 10 mm. in length, with an ovipositor as long again, also occurs, as well as two other ichneumons that have not so far been identified. The common native bee, *Dasycolletes hirticeps*, with its bright-golden hairs on thorax and legs, is commonly seen working among the flowers of the introduced *Hypochaeris radicata*, and probably assists in the spread of this weed, which is the commonest introduced plant on the tussock-land. It may be noted here, for as far as it bears on insect-life, that this plant opens its flowers only from 8.30 a.m. till 3.30 p.m. even on the longest and most sunshiny days of the year. Another bee, 9 mm. in length, black but with downy white hairs on the thorax, also occurs on the tussock, but has not so far been identified. Specimens of the Coleoptera are not common. Down on the ground our handsome metallic black and green *Trichosternus antarcticus*, up to 30 mm. long, may be seen hurrying along, and dead specimens may be found in scores or hundreds lying on the gravel between the railway-lines. As this beetle is incapable of flight, it is difficult to see how it manages to climb over the rails, or how, once having

got between them, it cannot get out again. Six specimens of a new and handsome species of *Mecodema*, bright shining black and 25 mm. in length, have also been taken crawling along among the tussocks, as well as a few specimens of the handsome *Nascio enysi*, 9 mm. long, black with four large yellow spots, and the less common *Aemona separata*, a large pale-yellowish-brown beetle, and the small black *Anchomenus feredayi*. On clayey banks among the tussock *Cicindela feredayi*, or a closely allied species, with an intricate yellow edging to its brownish-black elytra, darts in and out of its holes in the ground or takes short flights to elude capture.

The only Orthoptera noted are the common grasshopper, *Phaulacridium marginale*, which varies in colour from brown to green but always has a pair of white lines along the sides of the back of the thorax, and *Paprides australis*. Members of the other orders are not common. The cicada *Melampsalta nervosa* is more frequently heard than seen, and one of the Coccidae sometimes produces a striking appearance in the heart of the wild-spaniard (*Aciphylla squarrosa*). At first glance it appears as if a cup of flour had been emptied into the centre of the rosette of leaves, but on examination this is seen to be the waxy excretion of *Pseudococcus oamaruensis*, living specimens of which may be seen crawling among the mass of mealy powder. Anywhere near the swamps sand-flies are bound to occur, and an occasional dragon-fly may dart past.

Here also must be mentioned three introduced insects: the house-fly, which occurs sparingly indoors; the European earwig (*Forficula auricularia*), which is very common under boards, &c., lying round the railway-station buildings; and the sheep's nasal bot-fly (*Oestrus ovis*), which lays its eggs in the sheep's nostrils.

## 2. The Lake and Swamp.

In the shallow water near the edge of the lake the water-boatman (*Anisops*) occurs freely, darting up to the surface for air and down again to feed. In the same position the larvae and nymphs of most of the dragon-flies may be found, but they are so effectively protected by their transparency or greenish tints that they easily escape observation despite their length of 20 mm. or over. In the swamp round the lake and lower down the Grassmere Stream the dragon-flies are the most conspicuous insects. The largest is *Uropetala caroveri*, which is 8 cm. or 9 cm. in length and 10 cm. or 11 cm. in wing-span. As well as being the largest it is the rarest of the dragon-flies, perhaps because its larva and nymph, which is found in Lake Sarah up to 4.5 cm. long, must afford such suitable food for the large trout which abound there. This dragon-fly shows in perfection the habit of many of the species in frequenting a favourite spot over which it ranges in its hawking flights. Besides the swamps it is common on the rock-faces that border the Waimakariri. Next in size and frequency is *Somatochlora smithei*, 4.5 cm. in length and 6 cm. in wing-span. The thorax is metallic green, and in the male the proximal segments of the abdomen are of reduced diameter. This species dives into the water of smooth pools and picks off the surface floating larvae of certain gnats. It appears to wet only its head, and may make ten or twenty dives in a minute. *Lestes colensois*, 4 cm. in length and with a very slender abdomen, is the commonest species, and the females seem to preponderate largely. Finally comes *Xanthagrion zealandicum*, 2.7 cm. in length, with an abdomen that is often reddish in the male and blue in the female.

Of the Diptera by far the commonest is the gnat *Chironomus*, about 7 mm. long, which frequently occurs in such numbers that its swarms appear at a distance like columns of smoke. Various crane-flies are also common, the most noticeable being *Tipula novaræ*, 25 mm. in length, and with a wing-span of 45 mm. *T. obscuripennis* and an unnamed species also occur. One particular moth, *Xanthorhoe clarata*, a handsome species with wavy lines of brown and yellow on the forewings, which are about 40 mm. across, has been captured only on the swamp-land, but its real home is probably in the adjacent shrubs.

### 3. The River-bed.

In the waters of the rapidly running streams are to be found the larvae of the sand-fly (*Simulium australense*) hanging to or crawling on the upper surface of the submerged stones, and there also occur underneath the stones larvae of the several Neuroptera to be mentioned immediately. These together with the sand-flies hover over the stony or shrubby banks of the river, or drift on to the tussock. The commonest species is *Coloburiscus humeralis*, with a wing-span of 30 mm., and three tails, the two outer of which are considerably longer than the body. *Pseudoeconesus mimus* occurs near streams in the forest. *Pseudonema obsoleta*, whose larva inhabits bored-out twigs in the forest-streams, is strongly attracted to light, and sometimes occurs in hundreds on the windows of the station. Its wing-expanse is about 35 mm. to 40 mm., and its antennae reach a length of 45 mm., being about three times as long as its body. *Hydriobiosis umbripennis*, whose larva is remarkable in that it does not live in any kind of case, occurs commonly. It has a wing-expanse of 25 mm., the front wings being sooty brown and the back ones transparent. Besides these there are one or perhaps two species of Ephemeridae that have not been so far identified, and the larva, but not the adult, of some species of *Oniscigaster* has been captured.

The river-bed is rich in other insects besides the Neuroptera. The moth *Crambus xanthogrammus* is very plentiful, flitting from stone to stone when disturbed. Its wings have a span of 25 mm., and the forewings are marked with broad wavy lines of black and white. I have not seen this moth elsewhere than on the river-bed, and regard it as very characteristic of this association. Several striking flies also occur, chiefly *Anabarhynchus innotatus*, with its bluish-grey body 14 mm. in length; *Calcager apertum*, of almost equal size; and the small *Trypeta* mentioned before as occurring on the tussock. At least one large but unidentified bee occurs on the river-bed, but nowhere else, so that, on the whole, this is a very distinct association, and a very numerous one considering the limited number of apparent food plants.

### 4. The Shrub-land.

The insects of this association are much fewer in number than would have been expected—unless, indeed, species more easily captured elsewhere in reality belong to the shrub. Among the beetles the green manuka-beetle (*Pyronota festiva*) is sometimes common, but remains unseen unless it is found away from its natural background. The rarer *P. sobrina*, with its bronze elytra, may also be found. Clay banks in the open spaces swarm with the active *Cicindela tuberculata*; and the yellow-spotted black ladybird, *Vedalia cardinalis*, occurs rarely. The same clay open spaces are frequented by great numbers of the hymenopterous *Dasycolletes purpureus*,

and fitting among these may be seen the slender *Gasteruption flavipes*, a black wasp-like insect 10 mm. in length. A single specimen of stick-insect, probably an immature *Clitarchus*, has been found; and these, with an unidentified bug, comprise the total of the insects readily noted on the shrub-land. There are, however, some twenty moths that have been captured by night on the tussock or by day in the forest, and it is probable that the feeding-ground of these insects is the shrub-land, where nectar-producing plants are commonest.

### 5. The Forest.

Although twenty-four species of plants are recorded as growing in the forest, thirteen of these grow only along the stream-banks, and, of the remaining nine, one outnumbers all the others together by thousands to one. This plant is the *Nothofagus cliffortioides*, the mountain-beech. It is the only plant that reaches tree-size, the others forming merely a very scattered undergrowth, which in many places is quite absent. From this description it would be expected that the insect-life would be scanty. Moths, however, are very numerous, especially in individuals. As mentioned before, the noisy advance of an intruder will fill the air with hundreds of darting, fluttering specimens of *Scoparia philerga*, of 25 mm. wing-span. The front wings are mottled grey, and when closed have a conspicuous pale band across their basal third.

*Hydriomena deltoidata*, of 35 mm. wing-span, an attractive moth with brown front wings crossed by wavy bands of white, and *Asaphodes megaspilata*, a reddish-yellow moth of 23 mm. wing-span, are very plentiful in the clear spaces within the forest, while round its edge one disturbs thousands of specimens of *Palaeomicra zonodoxa*, a small yellow moth with fringed wings that glance like gold in the sun as the insect darts from shelter to shelter.

All these, however, are probably shrub-land insects hiding in the forest shades by day, for the patches of forest are so small that no part of them is far away from the surrounding shrub-lands.

The case-moth, *Oeceticus omnivorus*, however, belongs to the forest, as is shown by the beech-leaves woven in to conceal its leathery case.

Approaching the forest-streams one finds the river-bed insects becoming common, the sand-flies, caddis-flies, and Ephemeroidea, with *Pseudonema obsoleta* specially numerous, as would be expected from the twig-boring habits of its larva. A single Dipteron, *Mycetophila fagi*, also occurs in large numbers.

### 6. The Rocks.

Large areas of bare rock occur at and above the 4,000 ft. line near the station, but none of these was visited except the small exposures on the Sugarloaf (4,475 ft.). Here the most conspicuous insect is a fat stone-grey grasshopper, up to 25 mm. in length. It is very distinct from all the species of which record has been found. The only other insect inhabiting these rocky spaces and not found on the tussock near by are three moths of about 25 mm. wing-span. *Notoreas ferox* has dark-brown almost black upper sides to its front wings, while the other wing surfaces are bright-orange with black wavy lines. *Dasyuris anceps* and an unidentifiable *Harmologa* are pale yellow on the wing-surfaces concealed when at rest, but stone-grey or brown on the surface exposed on alighting.



## C. LIST OF INSECTS CAPTURED NEAR THE STATION.

T = tussock; S = swamp; L = lake; R = river-bed; Sh = shrub-land; F = forest;  
R = rock ? means that owing to conditions of capture it is not certain that the  
insect really belongs to the association to which it is ascribed.

## Order HYMENOPTERA.

<i>Dasycolletes hirticeps.</i> T.	<i>Ichneumon sollicitorius.</i> T.
<i>D. purpureus.</i> Sh.	<i>I. spp.</i> T.
<i>Prosopis</i> sp. T.	<i>Lissonota flavopicta.</i> T.
<i>P. sp.</i> R.	<i>Gasteruption flavipes.</i> Sh.

## Order COLEOPTERA.

<i>Cicindela feredayi</i> (?). T.	<i>Pyronota festiva.</i> Sh.
<i>C. tuberculata.</i> Sh.	<i>P. sobrina.</i> Sh.
<i>Mecodema</i> n. sp. T.	<i>Aemona separata.</i> T.
<i>Trichosternus antarcticus.</i> T.	<i>Nascio enysi.</i> T.
<i>Anchomenus feredayi.</i> T.	<i>Vedalia cardinalis.</i> Sh.

## Order LEPIDOPTERA.

<i>Nyctemera annolata.</i> T.	<i>Sestra humeraria.</i> T. (?)
<i>Orthosia comma.</i> T. (?)	<i>Argyrophenga antipodum.</i> T.
<i>Physetica coerulea.</i> T. (?)	<i>Chrysophanus salustius.</i> T.
<i>Leucania propria.</i> T. (?)	<i>G. boldenarum.</i> T.
<i>L. nullifera.</i> T. (?)	<i>Scoparia philerga.</i> F.
<i>L. acontistis.</i> T. (?)	<i>S. salbulosella.</i> T.
<i>Melanchra compositis.</i> T. (?)	<i>Platiptilia falcatis.</i> T.
<i>M. insignis.</i> T. (?)	<i>Crambus flexuosellus.</i> T.
<i>Agrotis ypsilon.</i> T. (?)	<i>C. simplex.</i> T.
<i>Hydriomena deltoidata.</i> F. T. (?)	<i>C. ramosellus.</i> T.
<i>Venusia undosata.</i> T. (?)	<i>C. xanthogrammus.</i> R.
<i>Asaphodes megaspilata.</i> F. (?)	<i>Oeceticus omnivorus.</i> F.
<i>Xanthorhoe rosearia.</i> T. (?)	<i>Harmologa</i> sp. R.
<i>X. clarata.</i> S. (?)	<i>Proteodes carnifex.</i> T. (?)
<i>Dasyurus anceps.</i> R.	<i>Palaeomicra zonodoxa.</i> F. (?)
<i>Notoreas ferox.</i> R.	<i>Porina umbraculata.</i> T. (?)

## Order DIPTERA.

<i>Mycetophilus fagi.</i> F.	<i>Macquartia kumaraensis.</i> T.
<i>Chironomus zealandicus.</i> S.	<i>M. subtilis.</i> T.
<i>Tipula obscuripennis.</i> S.	<i>M. sp.</i> R.
<i>T. novarae.</i> S.	<i>Hystieria pachyprocta.</i> T.
<i>T. sp.</i> S.	<i>Calcager apertum.</i> T.
<i>Simulium australlense.</i> S.	Species of fam. Dexiidae. T.
<i>Ryphus</i> sp. T.	<i>Calliphora quadrimaculata.</i> T.
<i>Anabarhynchus innotatus.</i> R.	<i>C. oceana.</i> T.
<i>Itamus varius.</i> T.	<i>Musca domestica.</i> T.
<i>Limnia striata.</i> T.	<i>Oestrus ovis.</i> T.
<i>Trypeta</i> sp. T. R.	

## Order HEMIPTERA.

<i>Anisops wakefieldi.</i> L.	<i>Pseudococcus oamaruensis.</i> T.
<i>Melampsalta nervosa.</i> T. S.	

## Order NEUROPTERA.

<i>Uropetala carovei</i> . S.	<i>Oniscigaster</i> sp. R.
<i>Somatochlora smithii</i> . S.	<i>Pseudoeconesus mimus</i> . R.
<i>Lestes colenisonis</i> . S.	<i>Pseudonema obsoleta</i> . R. F.
<i>Xanthagrion zealandicum</i> . S.	<i>Hydrobiosis umbripennis</i> . R.
<i>Coloburiscus humeralis</i> . R.	

## Order ORTHOPTERA.

<i>Clitarchus</i> sp. S.	Species of Acridiidae. R.
<i>Phaulacridium marginale</i> . T.	<i>Forficula auriculata</i> . T.
<i>Paprides australis</i> . T.	

ART. XII.—On a Partially White Form of *Puffinus griseus* Gmelin.

By D. L. POPPELWELL.

[Read before the Otago Institute, 12th June, 1917; received by Editors. 22nd December, 1917: issued separately, 24th May, 1918.]

ALBINISM of a complete or partial nature has several times been reported in connection with New Zealand birds, but the cases of its occurrence are not so frequent but that they should be recorded. On the 26th April, 1916, when returning from a trip to Stewart Island, I was shown by Mr. John Smith, of the Bluff, a live specimen of a mutton-bird (*Puffinus griseus*) which showed partial albinism. This interesting specimen was captured by Mr. Smith on Piko-mamaku-iti, the most northerly of the Titi Islands, where Mr. Smith was mutton-birding. The bird was a young one, and was caught in a nest. It was almost fully fledged. The head, neck, and upper part of the breast of this interesting specimen were pure white, back and upper part of the wings partly black, abdomen brown, the tail white. The bird, as mentioned above, was a young one, and in parts still had the down attached. Its beak was of a pinkish white, its legs pink, and its eye greenish. I examined the bird closely, and took certain measurements and other particulars, which were as follows:—

	Inches.
Length from tip of beak to butt of tail .. ..	13.50
Length of side of beak .. ..	2.25
Length of beak from tip to nostrils .. ..	1.25
Length of wing from flexure .. ..	12.00
Total length of wing .. ..	19.00
Total spread of wings .. ..	42.50
Length of tarsus .. ..	2.25
Length of middle toe .. ..	2.75
Number of feathers in tail, fourteen.	

NOTE.—The above measurements are, I believe, correct; but, as the bird was alive and resented handling, some difficulty was experienced in