

The Leaf-mining Insects of New Zealand: Part 5—The Genus Nepticula (Lepidoptera), and the Agromyzidae (Diptera) continued, and Gracilaria selenitis Meyr. (Lepidoptera).

By MORRIS N. WATT, F.E.S.

[Read before the Wanganui Philosophical Society, 5th November, 1923; received by Editor 31st December, 1923; issued separately, 28th August, 1924.]

Plates 67, 68.

(27.) *Nepticula lucida* Philp. (The Beech-nepticulid).

Nepticula lucida Philp., *Trans. N.Z. Inst.*, vol. 51, p. 225, 1919; vol. 53, p. 197, 1921.

The Imago.

Philpott's Original Description.—See *Trans. N.Z. Inst.*, vol. 51, p. 225, 1919.

Type in Mr. C. Clark's collection, Dunedin.

General Notes.—There is very little variation in this moth. During the past season a series of several hundred was reared. The white band at $\frac{5}{8}$ is formed by junction of apices of two triangular areas—one on dorsum (the larger), one on costa; dorsal area together with its fellow on opposite wing form a well-marked diamond saddle on back when moth is in resting position. In a few specimens the dorsal and costal spots were not united, and in one both were wanting. Anterior three-fifths of forewing is shining dark grey with bronzy reflections viewed in bright light; apical two-fifths densely irrorated with black scales, and there is a distinct black ciliary line. Head light yellowish-brown, basal joint of antenna and eyecap white. Thorax dark grey. Ventral surface of abdomen, and legs silver-grey. Wing-shape similar, though smaller, to *N. perissopa*, and venation the same as in species already described. Flight erratic and fast, and if a resting moth be disturbed it will run and jump with considerable activity.

Distribution.

So far this beautiful Nepticulid has been found in only one very restricted locality, on the banks of Waitati Stream, about five miles from Waitati (Dunedin). Considering the wide distribution of the food-plant, the moth should be found in other localities, and careful searching at the right time will no doubt bring it to light. Originally found by Mr. Clark on 7th December, 1919, by beating imagines from birch-trees. The locality was visited on 13th November, 1920, but neither mines nor imagines were found. On 20th August, 1921, large numbers of mines, larvae, and pupae were obtained; on some branches about 6 ft. from ground almost every leaf was infested. A large number of actively-mining larvae were secured and placed in breeding-jars: most had spun their cocoons and pupated by 30th August, 1921; first imagines emerged 22nd September, and others continued emerging till 26th October, the greatest number emerging during first week of October. A visit to the locality on 23rd October revealed only a few active larvae.

Food-plant.

The silver southern-beech, *Nothofagus Menziesii* (tawhi, tawai), known variously as "brown-birch," "red-birch," "white-birch," and "silver-birch," a tall evergreen forest-tree with small tough serrate leaves, occurring usually in subalpine belt throughout South Island, and as far north as South Auckland district in the North Island, being found on Mount Ruapehu but not on Mount Egmont.

Ovum and Egg-laying.

Ova laid singly and well attached, persisting more or less undamaged long after larva has vacated mine. Egg occupies an almost invariable position on upper surface of leaf, close to or alongside midrib, rarely more than $\frac{1}{2}$ in. from junction of stem and leaf. Fresh ova have not yet been seen, and the following description is taken from empty shells: Class flat (?); shape

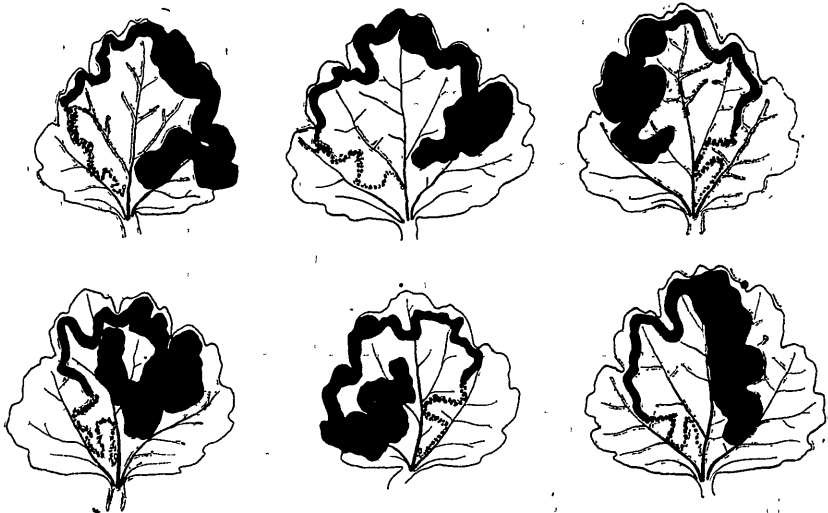


FIG. 1. — Typical mines of *N. lucida* in leaves of *Nothofagus Menziesii*. The white line in the expanded terminal portion indicates the course taken by the larva in formation of the blotch. (Camera-lucida sketches.)

oval, well rounded above, wafer-like, a slight fringe round outer margin of base; no decided sculpturing beyond a slight roughening of shell; shell strong, transparent, shiny, white, becoming more or less filled with frass-granules as soon as larva commences mining; average dimensions, 0.36 mm. by 0.26 mm.

The Mine. (Fig. 1.)

A small narrow more or less tortuous gallery. In its first part it is carried close against lower cuticle, reaching upper only here and there within leaf-cells, this part of mine therefore appearing on upper surface of leaf as a line of minute irregular pale-coloured spots, very much the same as in the case of *N. fulva*. Remainder of mine close against upper cuticle, and entire course of gallery is plainly discernible on both surfaces of leaf. Colour dark grey to brown, but not conspicuous, chiefly owing to small size. From

egg-attachment larva mines directly into leaf and courses outwards towards circumference in more or less indirect manner in region between two of the coarser veins; having reached outer margin, mine follows approximately the serrated edge of leaf towards tip of midrib, and, crossing this, continues along margin for some distance, finally turning inwards towards centre of leaf; about this time larva is full-grown, and emerges from mine by cutting small slit in roof of gallery near termination. Latter third of mine generally somewhat vermiform, and may be so coiled upon itself as to form small blotch.

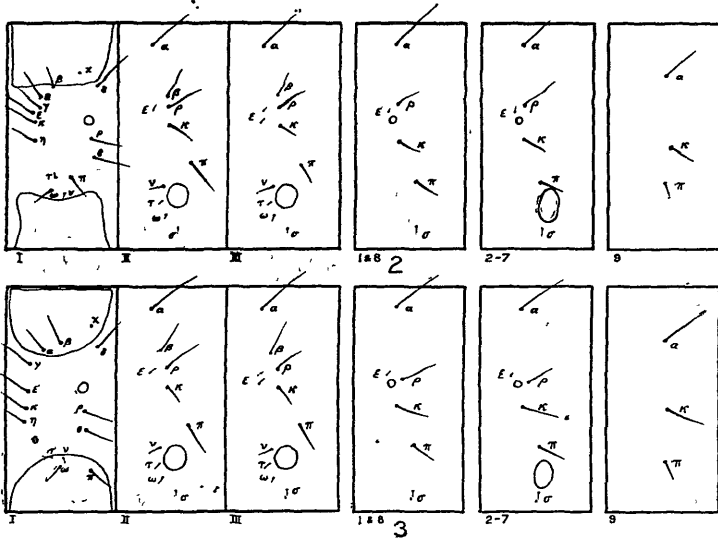


FIG. 2.—Setal map of adult larva of *N. lucida*, *N. ogygia*,
N. erechitius, and *N. perissopa*.

FIG. 3.—Setal map of adult larva of *N. fulva*.

Three distinct parts of the mine can be distinguished; first at or near the junction of these parts the two moults take place, the third (final) moult occurring within cocoon, the cast skin remaining round caudal extremity. In almost every case the expanded portion of mine is in that half of leaf opposite the one on which egg is laid. There is no tendency to the formation of branches. Frass finely granular, brown, and tightly packed in gallery, completely blocking it except for terminal 3 mm.; occasionally in expanded mine frass will leave a narrow clear area along either side. Colour of mine depends upon age, but as a rule the earlier part is dark grey to black and expanded portion brown. Rarely more than one mine to a leaf. Average length of gallery about 25 mm. Character of mine can most readily be studied by transmitted light.

The Larva. (Text-figs. 2, 4, 11, and Plate 67, fig. 1.)

Length when full-grown, 3.5–4 mm. Ground-colour pale greyish-green, with the greenish-brown alimentary canal showing clearly through transparent dorsal wall. Dorsum of tenth abdominal segment with strong black chitinous rod on either side (fig. 11) and a third in mid-line. Body

cylindrical, slightly attenuated caudad, segments well rounded but not deeply incised; prolegs on II, III, 2, 3, 4, 5, 6, 7, without hooklets. Head flattened, retractile, black. Prothoracic shield black. Cephalic ganglia reddish-brown; ventral chain of ganglia very distinct, reddish-brown, the ganglia connected by double cords. Mines dorsum uppermost. Skin thickly covered with a coarse pile. (Plate 67, fig. 1.)

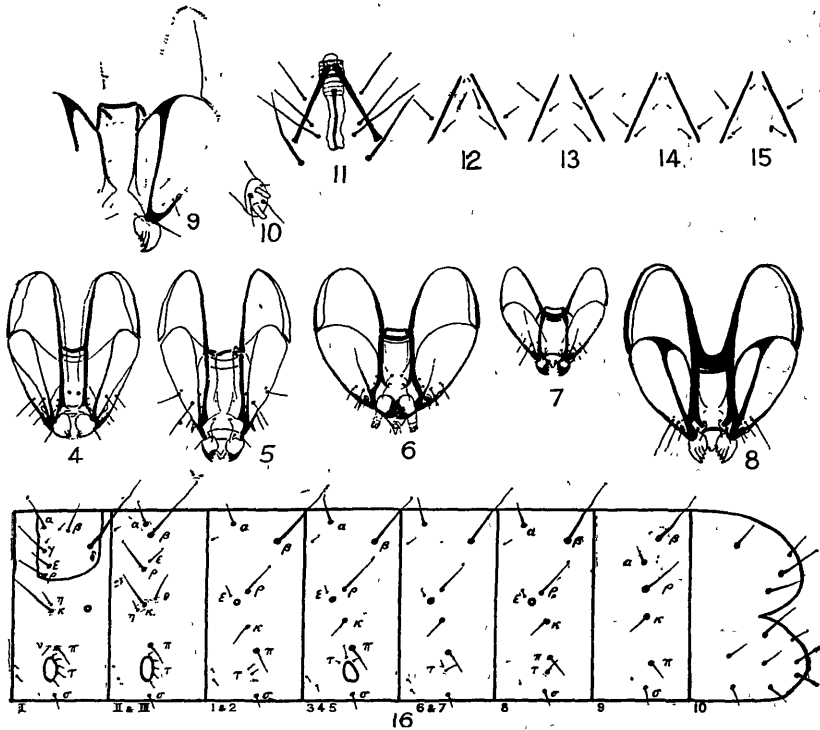


FIG. 4.—Adult larval head-piece of *N. lucida*.

FIG. 5.—Adult larval head-piece of *N. fulva*.

FIG. 6.—Adult larval head-piece of *N. ogygia*.

FIG. 7.—Adult larval head-piece of *N. erectitius*.

FIG. 8.—Adult larval head-piece of *N. perissopa*.

FIG. 9.—Ventral view of a cleared Nepticulid larval head-piece, showing the nature of the internal skeleton.

FIG. 10.—Antenna of a Nepticulid larva.

FIG. 11.—Setal plan of tenth abdominal segment of *N. lucida*.

FIG. 12.—Setal plan of tenth abdominal segment of *N. fulva*.

FIG. 13.—Setal plan of tenth abdominal segment of *N. ogygia*.

FIG. 14.—Setal plan of tenth abdominal segment of *N. erectitius*.

FIG. 15.—Setal plan of tenth abdominal segment of *N. perissopa*.

FIG. 16.—Setal map of adult larva of *G. selenitis*.

The larval chaetotaxy of the five species so far dealt with may here be compared. Only larvae in their third (final) instar have been examined, since the setae in the earlier instars are so fine and transparent as to make their charting extremely difficult. The setal plan of adult Nepticulid larva is shown in the figures. The plans of *N. lucida*, *N. perissopa*, *N. ogygia*, and *N. erectitius* (excluding the tenth abdominal segment), were

found to be identical, whereas that of *N. fulva* differed in pi of the prothorax being placed far caudad of the tau group, and rho in the abdominal segments taking up a position behind and below epsilon, behind and level with the top of the spiracle. In all species beta is absent in the abdominal segments, and an extra minute seta appears above epsilon in the meta-thorax. In searching for good specific characteristics the chaetotaxy of the tenth abdominal segment was found to offer a slight clue (see figs. 11-15), but the most marked specific characteristics were found in the clothing of the larval skin; these are shown and described in Plate 67. The presence of a minute sensory organ or puncture on the prothoracic shield (marked \times in figs. 2 and 3) was found in all specimens.

Camera-lucida sketches of the head-pieces were made, and appear in figs. 4-8; size and shape appear to be the best specific characteristics; all in common have front narrowed caudad, lobes of epicranium extending caudad to a considerable distance behind meeting-point of front and vertical triangle, and the single ocellus on either side.

The Cocoon.

2.5 mm. by 1.5 mm. A small ovoid structure of fine white silk. Unlike the silk of the four species already dealt with, it does not change to brown on exposure to moisture. Cocoon constructed outside mine amidst foliage of food-plant, either in crevices in bark, in angles of branches, or between two leaves. Closely woven and surrounded by a fair amount of loose flossy silk, by which it is attached to its support. At anterior end is a prepared transverse slit, which is kept closed by the loose silk. Construction occupies about three days.

The Pupa. (Fig. 23.)

Female. Ventral aspect: Body roughly oval in outline, flattened dorso-ventrally, about twice as long as broad, front bluntly rounded. Maxillary palp stretching from antenna to labrum; labial palpi short, slightly divergent caudad and slightly longer than maxillae. First legs stout, reaching to caudal extremities of second coxae; only a very slight slip of first femur to be seen between leg and maxilla; second legs extend to about half-way between caudal extremities of first and third; a short length of tibiae of 3 extends caudad from beneath extremity of 2, while tibia of 2 extends slightly caudad of extremity of 1; third legs appear from beneath caudal extremities of antennae and second legs, and, meeting in mid-line, extend as far as segment 10, farther in the male. Antennae segmented, extend to just beyond second legs, but in male nearly to caudal extremities of third legs. Coxae of about equal length, first about twice as long as broad; they entirely cover ventral abdominal wall beneath. Forewings extend caudad beyond third legs; no sign of hindwings on ventral aspect.

Dorsal aspect: Prothorax extremely narrow, almost obliterated in mid-dorsal line; spiracles on prominent elevations on segments 1-8. Indications of slight mid-dorsal ridge on abdominal segments. Segments 3-7 inclusive in female, and 3-8 inclusive in male, bear anteriorly a single row of about seven small spines directed caudad. A pair of small upturned hooks on segment 9 in female and segment 10 in male. Movement can take place between all abdominal segments excepting last three. Colour at first pale green, a black V-shaped area directed cephalad on dorsum of segment 6.

AVERAGE MEASUREMENTS OF PUPA.

Measurement at	Length from Extreme Front.	Transverse Diameter.	Ventro-dorsal Diameter.
	Mm.	Mm.	Mm.
Upper border of maxillary palpi	0.25	0.62	0.60
Bottom of labial palpi	0.52	0.70	0.60
Bottom of first legs	1.00	0.76	0.62
Bottom of second legs	1.50	0.70	0.70
Bottom of third legs	2.00	0.28	0.35
Extreme length	2.06

Dehiscence.

Pupa is normally extruded from cocoon to about level of second legs; vertical and transverse splitting occurs as in other Nepticulids already dealt with. In many cases, where the imagines were reared from larvae, dehiscence took place entirely within cocoon.

COMPARATIVE TABLE OF MAIN CHARACTERISTICS.

	The Larva.			The Mine.		The Cocoon.		The Pupa.
	Food-plant.	Skin.	Ventral Chain or Ganglia.	Class.	Average Size.	Position.	Colour.	Dorsal Abdominal Spines.
<i>N. fulva</i> ..	<i>Olearia</i>	Pile excessively minute	Not noticeable	Blotch ..	2-3 sq. cm	Outside mine	Brown	Single row.
<i>N. ogygia</i> ..	<i>Olearia</i>	Pile minute, sparse	Very distinct	Gallery ..	4-6 cm.	Outside mine	Brown	Single row.
<i>N. erectatus</i>	<i>Erechtites</i>	Pile minute, plentiful	Not noticeable	Gallery ..	3-4 in.	Outside mine	Brown	More than one row.
<i>N. lucida</i> ..	Beech ..	Pile very coarse	Very distinct	Gallery ..	25 mm.	Outside mine	White	Single row.
<i>N. perissopa</i>	Rangiora	Minute chitinous plates	Not noticeable	Gallery + blotch	Gallery 4-6 in. Blotch $\frac{1}{2}$ sq. in.	Within mine	White	More than one row.

(28.) *Gracilaria selenitis* Meyr. (The Beech-gracilaria).

Gracilaria selenitis Meyr., *Trans. N.Z. Inst.*, vol. 41, p. 15, 1909; vol. 47, p. 228, 1915; *Genera Insectorum*, vol. 20, fasc. 128, p. 28, 1912.

The Imago.

Meyrick's Original Description.—See *Trans. N.Z. Inst.*, vol. 41, p. 15, 1909.

Wing-venation is as shown in fig. 24. Note cross-vein below retinaculum (either M_5 or basal portion of M_{1-4} fusing with Cu_1), and Cu_{1b} arising close to base of cell; both these peculiarities were present in the five specimens examined. Male slightly smaller than female, and lighter-coloured, more reddish. There appears to be little or no range of variation.

Type in Mr. Meyrick's collection.

Distribution.

Apparently to be found in any of the silver southern-beech forests. Has been taken plentifully in bush on banks of Waitati Stream, Dunedin; imagos being caught September to December. Mr. Clark has taken it also at Tuatapere, The Hump (Southland), and at Longwood, in December.

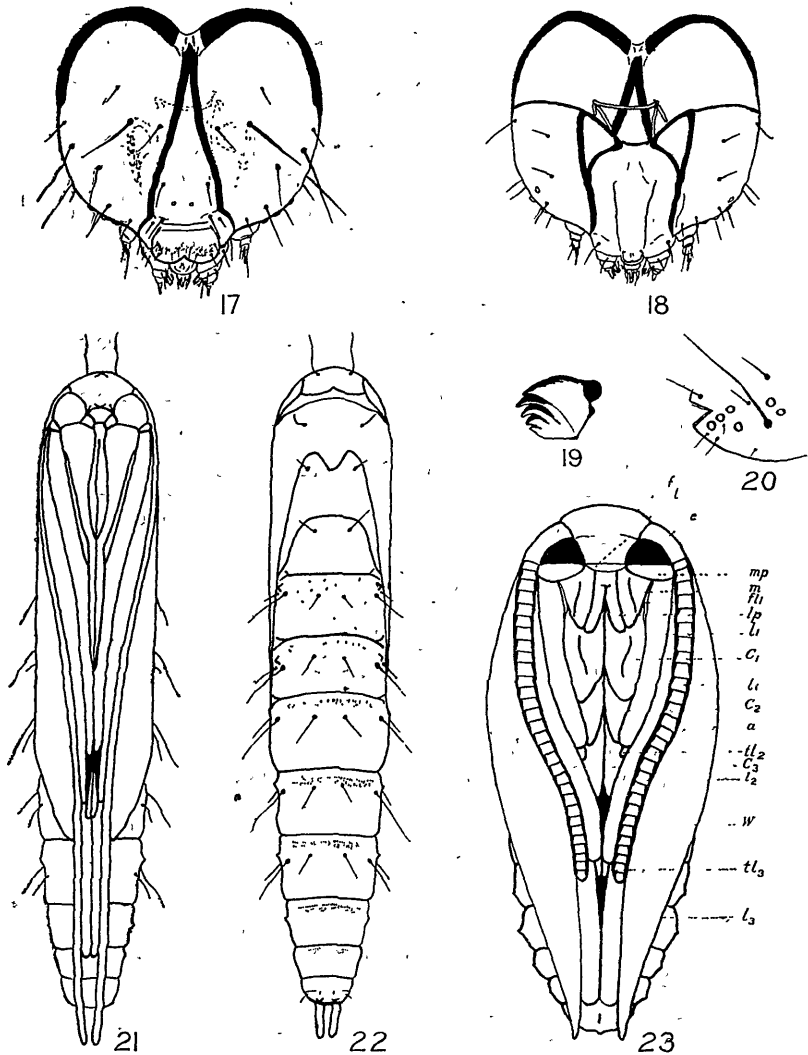


FIG. 17.—Head-capsule of adult larva of *G. selenitis*. Camera-lucida sketch from a cleared specimen. The dotted lines indicate the internal skeleton. View from above.

FIG. 18.—Ventral view of head-capsule.

FIG. 19.—Mandible of adult larva of *G. selenitis*.

FIG. 20.—The arrangement of the eyes in adult larva, *G. selenitis*.

FIG. 21.—Pupa of *G. selenitis*, ventral aspect.

FIG. 22.—Pupa of *G. selenitis*, dorsal aspect.

FIG. 23.—Pupa of *N. lucida*, ventral aspect: *f*, front; *l*, labrum; *e*, eye; *mp*, maxillary palp; *m*, maxilla; *fl*₁, femur of first leg; *lp*, labial palp; *l*₁, first leg; *c*₁, first coxa; *c*₂, second coxa; *a*, antenna; *tl*₂, tibia of second leg; *c*₃, third coxa; *l*₂, second leg; *w*, forewing; *tl*₃, tibia third leg; *l*₃, third leg.

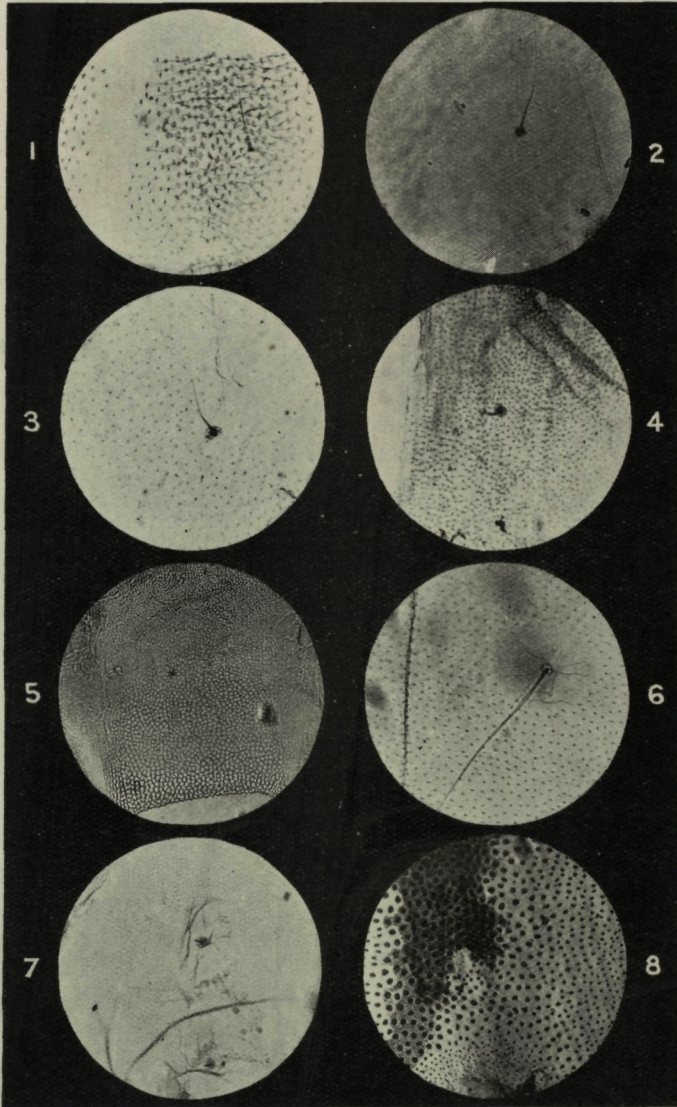


FIG. 1.—Skin of adult larva, *N. lucida*; $\times 290$; unstained. Note character of pile and compare length with that of seta shown.
 FIG. 2.—Skin of adult larva, *N. fulva*; $\times 290$; eosine. Note minuteness of body-pile.
 FIG. 3.—Skin of adult larva, *N. ogygia*; $\times 290$; al. carmine. Note comparative sparseness of pile.
 FIG. 4.—Skin of adult larva, *N. erechitius*; $\times 290$; al. carmine.
 FIG. 5.—Skin of adult larva, *N. perissopa*; $\times 290$; eosine. Note entire absence of pile, its place being taken by minute plates or thickenings of skin.
 FIG. 6.—Skin of adult larva, *P. polypodii*; $\times 290$; unstained. Note absence of pile around root of seta.
 FIG. 7.—Skin of adult larva, *G. selenitis*; $\times 290$; al. carmine. Note pile consisting of minute triangular points.
 FIG. 8.—Skin of adult larva, *A. melanombra*; $\times 290$; al. carmine. Note absence of pile, but thickened platelets of chitin; portion of denser dorsal saddle shown.

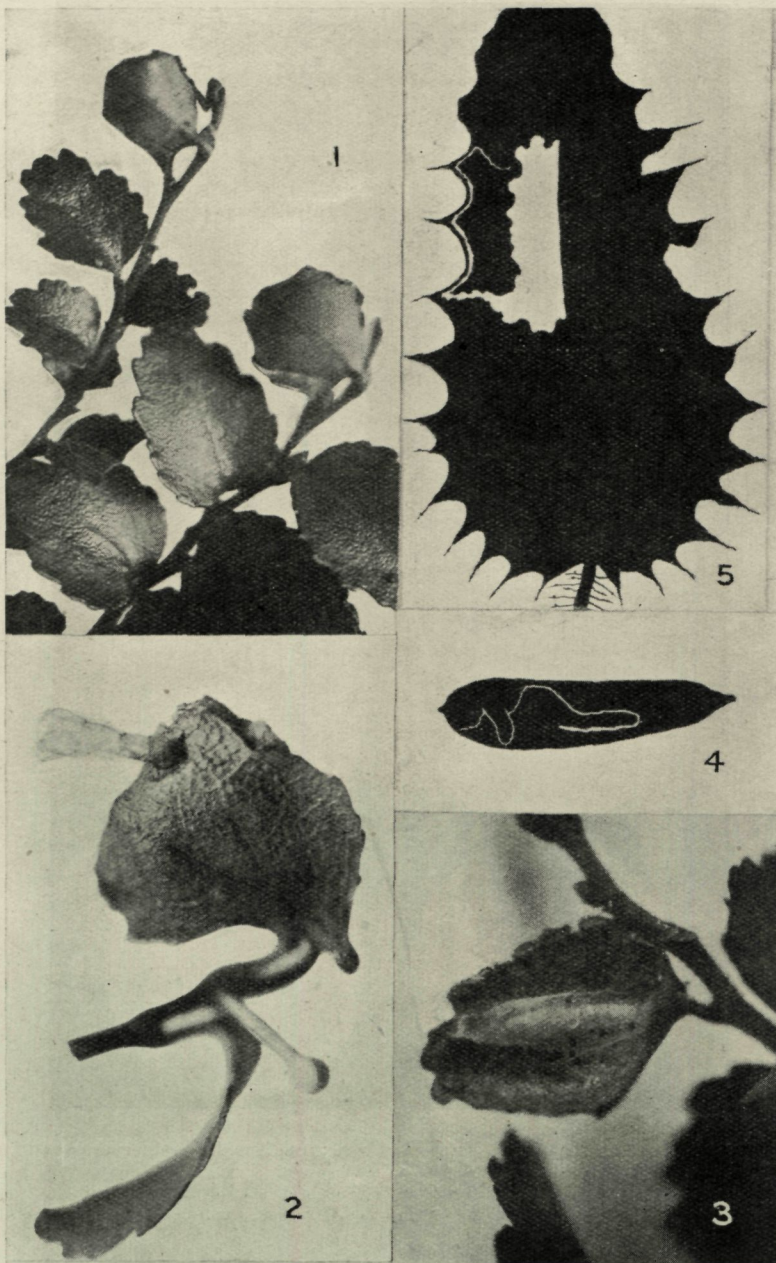


FIG. 1.—Terminal leaves of *N. Menziesii* bound together by larvae of *G. selenitis*; very slightly enlarged.
 FIG. 2.—The same, showing dehiscence; \times about 4.
 FIG. 3.—The same; one of the leaves having been removed to show cocoon of *G. selenitis* and contained pupa. Note frass collected to one side of cocoon. \times about 4.
 FIG. 4.—Mine of *H. chenopodii* in leaf of common chickweed. Tracing, natural size.
 FIG. 5.—Mine of *A. urticae* in leaf of nettle. Tracing, natural size.

Mr. Hudson records it from Mount Holdsworth, Tararua Range, 3,000 ft., 22nd January, 1907 (the first discovery of the species); Mount Earnslaw, 3,000 ft., 15th January, 1914; Mount Arthur, 3,500 ft., 7th January, 1919, and 18th January, 1920. Mr. Philpott has found it plentiful in all the Otago *Nothofagus* forests he has collected in, from 2,500 ft. to 3,000 ft., in December and January, mentioning particularly The Hump, Billow Mountains, Hunter Mountains, Wakatipu generally, Takitimu Mountain, Manapouri region; very sparingly on the Dun Mountain, Nelson. Imagines best caught by beating in vicinity of food-plant, but may quite easily be reared from cocoons. Cocoons were collected on 20th August, 1921, and imagines emerged from 9th to 30th September, the greatest number emerging on 18th.

Food-plant.

The silver southern-beech, *Nothofagus Menziesii* (tawhi, tawai).

Egg-laying.

Nothing at present known.

The Mine.

Characteristics not yet definitely known, but amongst leaves on branchlets holding cocoons were many containing empty narrow galleries on underside of leaves; there is no sign whatever of these galleries on upper surface; mines shallow, and dry cuticle over them had a silvery appearance; it would appear that larva mines more than one leaf. In other

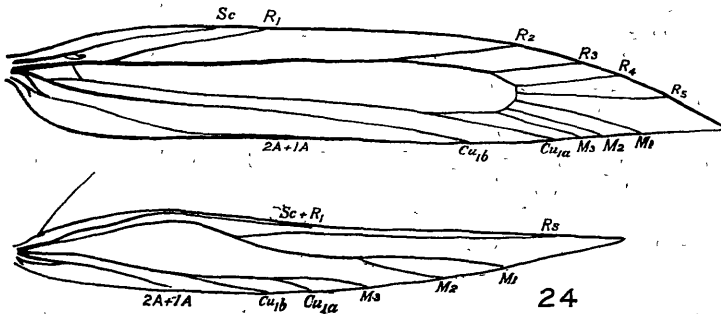


FIG. 24.—Wing venation of *G. selenitis*.

leaves part or all of leaf-substance had been removed, leaving only the two dried cuticles much wrinkled, the under one contracted so as to cause leaf to curl, and in it was the hole by which larva left; hollow within leaf contained a small amount of fine black granular frass. It would seem safe to assume that the larva does not confine itself to one leaf, that the mine is at first a narrow gallery on underside of leaf, and finally the larva blotches entire leaf and possibly more than one. Mines should be looked for during August and November.

The Larva. (Text-figs. 16-20, and Plate 67, fig. 7.)

Full-grown larva, prior to pupating, about 1 cm. in length; pale cream to white, with a narrow pale-green dorsal streak; head pale grey, sutures darker brown, tubercles and setae colourless.

Head with setae shown in figures, which were taken from a specimen cleared in potash and mounted without pressure. Mandible and eyes are shown in figs. 19 and 20.

Larva cylindrical, segmental incisions shallow; thoracic legs well developed; ventral prolegs on segments 3, 4, 5, these and anal prolegs possessing crochets arranged in a lateral penellipse enclosing a transverse series, all uniordinal. Skin thickly covered with microscopic triangular points, except in tubercular areas, which are bare save for setae.

Alpha is a smaller seta than beta, and is situated above and in front of the latter in all segments excepting 9, where it is below; on mesothorax and metathorax and segment 9 it occupies a common tubercular area with beta, rho also being included in this area in the latter segment; rho is placed below epsilon on the thoracic segments, epsilon being absent in 9; eta is directly above kappa in prothorax, but below and in front in remaining thoracic segments, where kappa is closely associated with theta caudad; pi is normal; tau is a varying group as shown; sigma is normal. Several minute subsidiary setae appear as shown in fig. 16.

The Cocoon. (Plate 68. figs. 1-3.)

Two (occasionally three) leaves are cemented together with silk around their outer margins, two opposing leaves, one on either side of branchlet, being chosen; their bases close to stems are first connected and gradually drawn together with silk, then the opposing margins. Should the leaves be more than usually difficult to draw together, the stem of one will be partly cut. In most cases leaves at ends of branchlets were chosen (see Plate 68, fig. 1). A fine thin cylindrical cocoon is constructed, slung like a hammock across the interior between the leaves, usually in the direction of the long axis (Plate 68, fig. 3). The silk is exceedingly fine and strong; is at first white but becomes later pale brown. Length, 6-7 mm.; diameter, 1.5-2 mm. Anterior end attached to surface of one of the leaves near, but never at, the attached margin; here, just prior to pupating, larva prepares a small circular exit, the leaf being eaten away till only the thin transparent outer cuticle remains. Besides the cocoon the space between the leaves contains a variable amount of dry frass-granules, mostly collected to one side of cocoon and more or less adherent to it. Cast larval skin remains within cocoon.

The Pupa. (Figs. 21, 22.)

Cylindrical, extremities bluntly rounded; abdomen slightly attenuated caudad from fifth segment; free movement in male between 4-5, 5-6, 6-7, in female between 4-5, 5-6.

Ventral aspect: Head—cutting-plate small and non-serrate; eye only slightly overlapped by antenna; a small area representing maxillary palp separates lower margin of eye from cephalic extremities of first and second legs; a small seta on either side of clypeus near caudo-lateral angle; mandibular area well defined; labial palpi narrow; maxillae broad above, meeting in mid-line below labial palpi, they pass beneath the first legs and reappear lower beyond caudal extremities of these latter, terminating just beyond second legs; femora of first legs encroach upon lateral margins of upper third of maxillae; first legs extending from maxillary palpi above to about level of junction between fourth and fifth abdominal segments, meeting in mid-line in their lower fourth they here overlap maxillae; second legs occupy interval between antennae and first legs, extending from maxillary palpi above as far as or slightly farther than caudal extremities of maxillae; third legs occupy mid-line from caudal extremities of maxillae and second legs to junction of seventh and eighth abdominal

segments, occasionally as long as or slightly longer than body; antennae narrow, segmented, extending beyond abdomen; forewings occupy only about one-fourth of ventral aspect of pupa, and extend to junction of fifth and sixth segments.

Dorsal aspect: Front possesses two well-developed setae, one on either side of and behind prominence of cutting-plate; prothorax widest against antennae, narrow across dorsum but slightly produced cephalad in mid-line; mesothorax possesses a pair of small lateral setae in upper part; metathorax of about same length as upper abdominal segments, hindwings extending only as far as second abdominal segment, a pair of small setae cephalad; indications of a slight median ridge on thoracic segments. Abdominal segments—spiracles small, circular, slightly elevated, those on first segment covered by wings, absent in 9 and 10, those on 8 smaller and situated more ventrad than the rest; a pair of dorsal setae on every segment excepting last four, a long slender dorso-lateral seta on each segment below and behind spiracle, and a smaller lateral one below and in front of the spiracle in segments 2-6 inclusive; on upper part of dorsum of segments 2-8 inclusive is a narrow belt of two or three irregular series of short stout bristles directed caudad, and over remainder of dorsum of these segments, excepting 8, are irregularly scattered a number of very minute spines, most marked in 2 and least developed in 7; segment 10 bears two pairs of very minute tubercles—one pair ventro-lateral, the other dorsal.

AVERAGE MEASUREMENTS OF PUPA.

Measurement at	Length from Extreme Front.	Transverse Diameter.	Ventro-dorsal Diameter.
	Mm.	Mm.	Mm.
Bottom of eyes	0.47	0.76	0.70
Bottom of labial palpi	1.27	0.93	0.93
Bottom of first legs	2.96	0.90	0.93
Bottom of maxillae	3.44	0.86	0.93
Bottom of second legs	3.55	0.80	0.93
Bottom of forewings	3.86	0.73	0.86
Bottom of third legs	4.69	0.42	0.42
Bottom of antennae	5.58
Bottom of tenth segment	4.86

Dehiscence. (Plate 68, fig. 2.)

Pupa extruded as far as seventh or eighth abdominal segment. Vertical splitting takes place dorsally along mid-line of vertex, prothorax, and mesothorax, but not extending into metathorax. The front, with antennae, portion of eyecaps, mandibles, maxillae, and labial palpi, becomes almost totally removed, being retained only by caudal extremities of maxillae. Thoracic appendages become more or less freed, but retain their connection caudad.

(29.) *Haplomyza chenopodii* n. sp. (The Beet-fly).*The Imago.*

Female. Frons, antennae, proboscis, palpi, and genae lemon-yellow; ocelli yellow; ocellar triangle black; eyes and occiput black; arista black, pubescent; each orbit with three strong bristles; post-vertical bristles longer than ocellar.

Thorax jet-black, shiny on dorsum; pleurae almost entirely lemon-yellow; two or three small blackish areas ventrad, a larger black area between anterior coxae; scutellum broadly lemon-yellow with a narrow brighter medial stripe; four pairs of dorso-central bristles, anterior two pairs very weak; two series of about four setulae each between the two anterior pairs of dorso-centrals; apical scutellar bristles arise from yellow area, while lateral scutellar bristles are outside yellow area.

Abdomen—dorsum black, posterior margins of tergites obscurely yellowish; sides yellow; under-surface dark-greyish.

Legs—coxae, and femora yellow with a slight obscure blackening externally; tibiae and tarsi dark-grey.

Wings greyish, veins black; costa to end of fourth vein at tip of wing; hind cross-vein absent; halteres lemon-yellow

Length, 1.3 mm.; length of wing, 1.6 mm.

Type in author's collection; reared from mines in silver-beet, Wanganui.

Distribution.

Recorded from Wanganui, Auckland, and Napier (L. A. Hay), Governor's Bay, Christchurch (Tapley), and is probably widely distributed throughout New Zealand. Appears to be most plentiful about December.

Food-plants.

Has been reared from white and silver beet, spinach, mouse-ear chickweed (*Cerastium vulgatum*), common chickweed (*Stellaria media*), and fat-hen (*Chenopodium album*).

Egg-laying and Larva.

Eggs laid singly in minute semicircular pockets forced under upper cuticle of leaf. Average diameter of egg-pocket, 0.7 mm.

Full-grown larva cylindrical, intestinal tract filled with dark-green food and very conspicuous through the transparent skin. Colour whitish anteriorly, greenish posteriorly, extreme posterior end yellow. Posterior respiratory processes long and prominent. Average length of full-grown larva, about 1.7 mm. Each half of mandibular sclerite with two very prominent teeth. First moult occurs about 8 mm. along mine from egg-pocket; length of cast pharyngeal skeleton, 0.1 mm. Second moult about 18 mm. from pocket; cast pharyngeal skeleton, 0.15 mm. in length.

The Mine. (Plate 68, fig. 4.)

A simple gallery, more or less narrow, tortuous, and gradually expanding. Greatest final width averages 1 mm.; average length, 40–60 mm.; width at commencement, 0.14 mm. Best seen on upper surface of leaves, but may be in part or wholly on under-surface. Colour pale green when fresh, rapidly becoming white; there is no discoloration of leaf other than this. Sometimes short blind branches may be found; margins of gallery are somewhat uneven under a lens. In small leaves, or when several larvae are mining in the vicinity of one another, mines may cross and recross and become much involved, but there is never blotch-formation. Mines found mostly in leaves nearest the ground. Frass is black, scanty, semi-viscid, in a thin irregular line broken into short lengths, first on one side of gallery and then on the other. The larva escapes from terminal part

of mine before pupating. In trying to rear these flies I have noticed numbers of immature larvae leave their mines; these have not again entered a leaf, but have crawled about the jar for some hours and then died without pupating. Numbers of immature mines are also to be found in plants growing naturally; I think such larvae have been the victims of parasites and that larvae do not otherwise leave the mine before maturity. Average duration of larval existence, fourteen days.

The Pupa.

Pupation occurs outside mine and generally on ground beneath food-plant. Healthy pupa brown; segments moderately rounded, of about equal length; surface very slightly roughened with minute transverse rugae; intersegmental areas bearing several series of very minute spines; anterior respiratory processes small, slightly expanded at tips, black-tipped, only half as far apart as posterior, which are comparatively thick with black expanded tips. Average length of pupa, 1.33 mm.; greatest transverse diameter, 0.62 mm.; greatest ventro-dorsal diameter, 0.58 mm. Average duration of pupal period, twelve days.

When pupating, larvae shun light as much as possible, seeking the darkest corner, but not penetrating beneath the surface of the soil.

(30.) *Agromyza urticae* n. sp. (The Nettle-fly).

The Imago.

Male. Frons orange; ocellar triangle, eyes, and antennae black; arista pubescent. Each orbit with four strong bristles; post-vertical bristles longer than ocellar.

Thorax—dorsum black, sides lemon-yellow with a relatively large rectangular black area below and in front of wing-base, and several smaller irregular patches below base. Halteres lemon-yellow. Scutellum broadly lemon-yellow. Four pairs of dorso-central bristles with three or four series of setulae between anterior three pairs.

Abdominal tergites black, yellowish posteriorly.

Legs black, lower joint of femur yellowish.

Wings pale grey, veins dark grey; costa to fourth vein at tip of wing; penultimate section of fourth vein one-sixth as long as ultimate; and one-fourth as long as ultimate section of fifth. Length of wing, 2.4 mm.

Length, about 2 mm.

Type in author's collection; reared from mines collected by Mr. Tapley at Governor's Bay, Christchurch.

Distribution.

First discovered by Mr. Tapley at Governor's Bay, in December, 1921. I have succeeded in rearing only a single specimen from numerous mines sent me by Mr. Tapley, who also obtained for me a number of the flies caught on the food-plant. The larvae suffer greatly from the attacks of hymenopterous parasites. The fly would appear to be common at Governor's Bay, but has not been recorded elsewhere.

Food-plant.

The common nettle (*Urtica ferox*).

Egg-laying and Larva.

Ova deposited singly in small pockets forced beneath the under-cuticle of leaf. Larva when full-grown 2-2.5 mm. in length, pale lemon-yellow, brighter orange posteriorly, with a black spot on dorsum of terminal three segments. Respiratory processes short and black-tipped.

The Mine. (Plate 68, fig. 5.)

A gallery expanding in its latter half into a somewhat irregular lobed blotch. Though visible on the under-surface of leaf, more conspicuous on upper, lying as it does immediately under this cuticle. Earlier part of the mine usually directed towards outer margin of leaf, which it follows for a longer or shorter distance, whereas blotch portion is usually in middle part of leaf against the midrib, which it does not cross. Average total length of mine, 2-3 in., the blotch occupying about $\frac{1}{4}$ square inch. Colour of mine pale green. Frass black, granular, scanty and scattered, tending to collect into small heaps, especially in blotch portion. When there are several larvae mining in close proximity their mines usually coalesce, and a large composite blotch results. Larva escapes through a cut in floor of mine and descends to ground to pupate. There is a certain amount of dark discoloration of the leaf on either side of first portion of gallery.

The Pupa.

Pupation takes place outside the mine (occasionally inside when parasited) amongst rubbish on the ground. Length of pupal period, about three weeks. The pupa itself is dark brown in colour, similar in type to that of *A. citreifemorata*.

ADDENDA AND CORRIGENDA.

Nepticula ogygia.

New localities: Catlins (W. G. Howes); Stewart Island (Miss Scott); Mount Ruapehu (Waimarino side), 3,700 ft., common (M. N. W.). The larvae inhabiting the very young leaves of *O. arborescens* (= *nitida*) are uniform pale yellow when full-grown.

Nepticula fulva.

New localities: Nelson (A. Philpott); Governor's Bay, Christchurch (J. F. Tapley); Mount Ruapehu, north side, 3,700 ft. (M. N. W.).

Nepticula progonopis Meyr. (*Trans. N.Z. Inst.*, vol. 53, p. 336, 1921).

Add this to the list in beginning of Part II of this series.

Nepticula tricentra (*Trans. N.Z. Inst.*, vol. 53, p. 212).

Mr. Meyrick, who has seen bred specimens of this moth, says it is not *tricentra*, but a new species. I describe it below as *N. erectitius*; its life-history is as given under the name *tricentra* (No. 11) in Part II.

Nepticula erectitius n. sp.

♀. 5 mm. Head and palpi pale brownish-white. Antennae, thorax, and abdomen grey. Legs dark grey. Forewings, ground-colour pale brownish-white, irrorated with dark-grey to black scales more or less

condensed into three rather diffuse transverse bars across wing—one at base, one at $\frac{1}{2}$ which is somewhat constricted in middle, the third occupying terminal one-fourth of wing; the dark scales are more closely packed in middle of each bar: cilia light grey, a black ciliary line. Hindwings and cilia light grey.

Food-plant: *Erechtites arguta* (not *Senecio bellidioides*, as previously stated). Also found mining in *E. prenanthoides* in the same localities.

Three further species of *Nepticula* are under observation—one mining in the lacebark (*Hoheria populnea*), one in the yellow kowhai (*Sophora tetragyna*), and one in a small-leaved ground-plant on Mount Egmont.

Phytomyza albiceps (*Trans. N.Z. Inst.*, vol. 54, 1923, p. 485).

The following note is from Dr. Martin Hering, of Berlin: "The fly, mining in the sow-thistle, which you call *P. albiceps* Mg. does not belong to this species, but is *P. atricornis* Mg. This insect is mining in Europe also in the sow-thistle (*Sonchus*), and in a great number of other plants. It is the most polyphagous leaf-miner in the world. I have compared your specimen with ours, and there is no difference. *P. albiceps* Mg., the *Artemisia* leaf-miner never pupates in the mine."

On the Identity of Eurytoma oleariae Maskell.

By A. B. GAHAN, of the U.S. Department of Agriculture, Bureau of Entomology.

Communicated by David Miller.

[Read before the Wellington Philosophical Society, 29th October, 1923; received by Editor, 5th November, 1923; issued separately, 28th August, 1924.]

IN January, 1922, the Bureau of Entomology of the United States Department of Agriculture received from E. S. Gourlay, of the Biological Department, Canterbury College, Christchurch, New Zealand, fifteen specimens of a small hymenopteron which he had determined as *Eurytoma oleariae* Maskell. According to the correspondent, these specimens were reared from galls on *Olearia furfuracea*, which were also inhabited by a species of Cecidomyid. Samples of the galls were also received. Comparison of the specimens and the galls with Maskell's description and figures (*Trans. N.Z. Inst.*, vol. 21, 1888, p. 255, pl. xi, figs. 1-16) left no doubt that the species had been correctly identified.

This species is not an *Eurytoma*, however, nor even a Chalcidoid, but belongs to the Serphoidea and to the family Platygasteridae, where it agrees best with the genus *Metachisis* Foerster of the tribe Inostemini. *Metachisis* is said to have the scutellum flat and the antennal club of the female three-jointed. In the present species the scutellum is not wholly flat, but transversely pillow-shaped as in many species of the genus *Platygaster*, while the antennal club is not very well defined but appears to be six-jointed. One might with justice, perhaps, propose a new genus for it, but the relation to *Metachisis* is apparently close, and it is deemed best to place it in that genus for the present.

Maskell's description is obviously inaccurate in some respects. The following descriptive notes will aid in recognition of the species.