

Tasmanian Araneae of the Family Hahniidae with Notes on their Respiratory Systems

By

V. V. HICKMAN

Ralston Professor of Biology, University of Tasmania

(Read 11th November, 1947)

FIGURES 1-28

Spiders belonging to the family Hahniidae are usually small, rarely being more than two or three millimetres in length. Most of them live near the ground in grass tussocks, low shrubs, moss or under stones. A few species are found under the bark of trees.

Members of the family are characterised by having the six spinnerets arranged in a single transverse row. The tracheal spiracle is somewhat in advance of the spinnerets, and the tracheal system extends into the cephalothorax. In some cases, more than three hundred fine tubules pass through the narrow petiolus, which joins the abdomen to the cephalothorax. The chelicerae lack lateral condyles. The margins of the cheliceral furrow are oblique and provided with teeth. The labium is free. Maxillae are converging and furnished with a scopula. The sternum is shield-shaped, about as wide as it is long and broadly truncated in front. In some exotic species a stridulating apparatus is present. This consists of two groups of short spines on the front of the abdomen, which rub against a roughened area on the posterior part of the carapace. The legs are provided with three tarsal claws, but are without scopulae and claw-tufts. Trichobothria are present on tibiae, metatarsi, and tarsi.

Little is known of the habits of the members of this family. Some of the species spin delicate sheet webs, which are suspended in shallow depressions in the ground. *Scotopsilus bicolor* Simon makes a small sheet web under the loose bark on eucalypts. The spider rests on the upper surface of the web, which is not provided with a retreat.

In spite of the fact that members of the Hahniidae are not uncommon, very few seem to have been recorded from either Australia or New Zealand. Those described from these regions are as follows:—

Scotopsilus bicolor Simon (1886, p. LXI) from Tasmania.

Scotopsilus sp. Simon (1909, p. 181) from West Australia.

Nannonymphaeus pusillus Rainbow (1920, p. 259) from Lord Howe Island.

Neoaviola insolens Butler (1929, p. 45) from Victoria.

Hahnia solitaria Bryant (1935, p. 80) from New Zealand.

The present paper deals with four Tasmanian species, three of which are new. Some features of the respiratory systems of three of the species are given in brief notes as an appendix to the paper.

Family HAHNIIDAE

Genus **Hahnia** C. Koch, 1841**Hahnia astrolomae**, sp. n.

(Figs 1-7)

Male

	mm.
Total length	1.564
Length of carapace	0.812
Width of carapace	0.580
Length of abdomen	0.928
Width of abdomen	0.696

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	0.726	0.247	0.644	0.479	0.356	2.452
2	0.617	0.233	0.493	0.397	0.329	2.069
3	0.617	0.206	0.329	0.329	0.288	1.769
4	0.589	0.206	0.452	0.397	0.315	1.959
Palp	0.315	0.164	0.137	.....	0.206	0.822

Colour. Carapace, chelicerae, maxillae, labium and sternum brown. Front and sides of abdomen dark-grey. Dorsal surface cream with a dark-grey triangular patch on anterior half and four dark-grey chevrons, incomplete in mid line, on posterior half. Ventral surface cream in the middle merging into dark-grey speckled with cream spots at the sides. Coxae cream. First pair of legs and palpi brown. Other legs cream ringed with brown on metatarsi, tibiae, patellae and distal part of femora.

Carapace. Widest between second and third coxae. Thoracic groove longitudinal. Radial grooves distinct. An irregular longitudinal row of about eight hairs extends from the front of the thoracic groove to the eye-group.

Eyes. The eight eyes are arranged in two rows. Viewed from above the front row is slightly recurved and the posterior row procurved. The eyes are subequal in size. The ratio of the eyes AME : ALE : PME : PLE = 13 : 12 : 11 : 11. AME are mounted on a small black tubercle and are separated from each other by 6/13 of their diameter and from ALE by 4/13 of their diameter. The lateral eyes are contiguous. PME are separated from each other by 19/11 of their diameter and from PLE by 9/11 of their diameter. The median ocular quadrangle is wider behind than in front in ratio 37 : 31. Its length is shorter than its posterior width in ratio 32 : 37. The distance from AME to margin of clypeus is 20/13 of the diameter of AME. There is a single seta in front of AME and one on each side of clypeus.

Chelicerae. Vertical. Condyles absent. Fang moderately long. Two teeth are present on promargin and two on the retromargin. A light scopula of five or six barbed hairs is situated on the promargin (fig. 1).

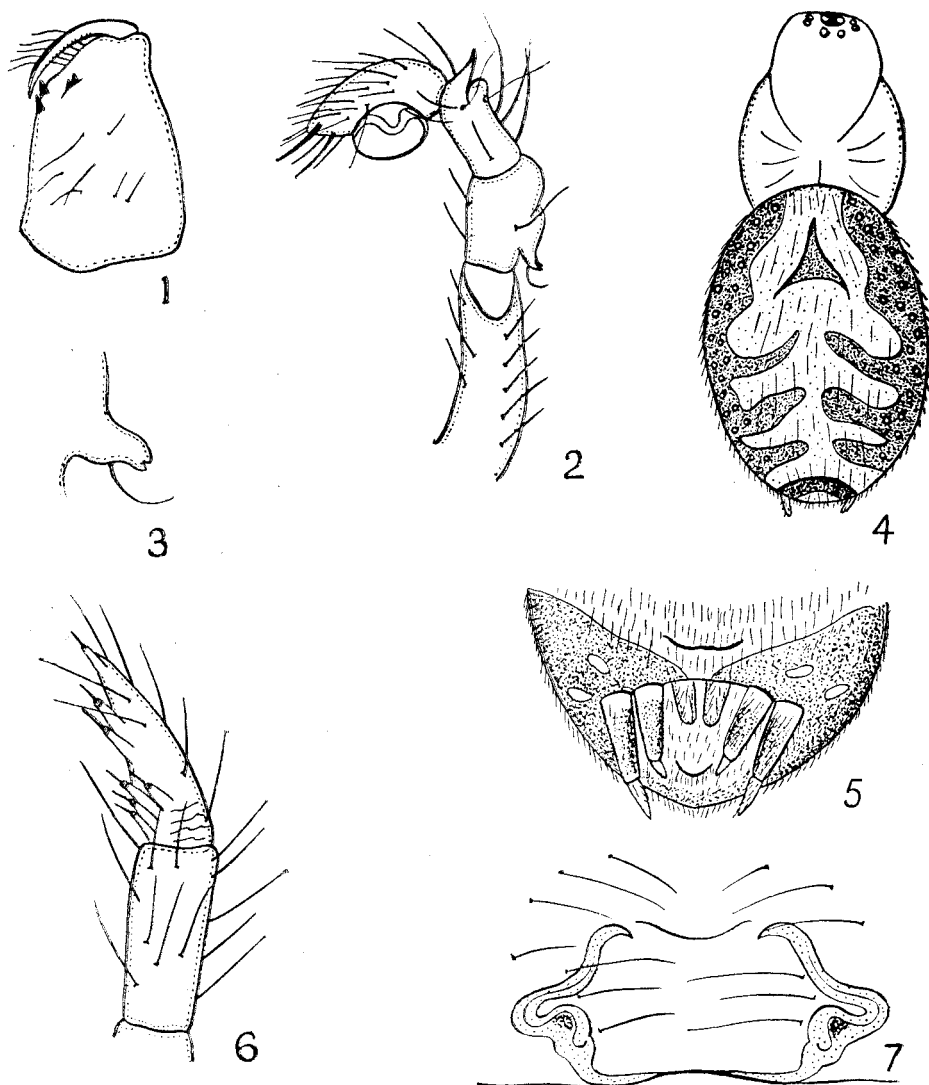
Maxillae. Somewhat rectangular, slightly converging, a light scopula on inner apical angle. The front margin is slightly curved and provided with a serrula which does not extend onto the side.

Labium. Wider than long in ratio 23 : 19. Rounded in front and clothed with a few long hairs.

Sternum. Longer than wide in ratio 26 : 25, convex, shield-shaped, lightly clothed with long hairs. Fourth coxae separated by about 2/3 of their width.

Legs. 1.2.4.3. Lightly clothed with finely barbed hairs. Two trichobothria on each tarsus, two on the apical half of each metatarsus and five on each tibia. Scopulae and claw-tufts absent. Three tarsal claws, the lower claw with two

teeth, the upper claws with about five teeth. A small 'drum' is present on the dorsal surface of each tarsus in the distal quarter. The first two pairs of legs have one prolateral spine near the apex of the femora and one ventral spine near the apex of the metatarsi. The last two pairs of legs have one dorsal spine at the apex of the patellae, 1 - 1 on the dorsal side of the tibiae, and 1 prolateral, 1 ventral and 1 retrolateral at the apex of the metatarsi. Elsewhere on the legs spines are absent.



FIGS 1-7.

Hahnia astrolomae, sp. n. Fig. 1: Retrolateral view of left chelicera of male. Fig. 2: Left palpus of male. Fig. 3: Apophysis on patella of male palpus. Fig. 4: Dorsal view of female. Fig. 5: Spinnerets of female. Fig. 6: Hind spinneret of female. Fig. 7: Epigynum of female.

Palpi. On the retrolateral side of the patella near the base is a short blunt tooth-like apophysis provided with a single curved hair (figs. 2 and 3). On the dorsal side at the apex is a long stout bristle. The tibia, which is nearly as long as the patella, has a stout bristle and four trichobothria on its dorsal side. On the retrolateral side at the apex the tibia is produced into a short curved apophysis. The tarsus is small and spoon-shaped. On its retrolateral margin it is furnished with four spine-like setae.

Abdomen. Ovoid, clothed with long coarse hairs on the dorsal surface and finer hairs on the ventral surface. The spinnerets are arranged in a transverse row. The apical segment of the hind spinnerets is $\frac{7}{8}$ the length of the basal segment. The fore spinnerets are longer than the basal segment of the hind spinnerets in ratio 15 : 11. The middle spinnerets are about $\frac{7}{11}$ as long as the fore spinnerets. The apical segment of the hind spinnerets has about seven spinning tubes. The fore spinnerets have one large and two very small tubes, and the middle spinnerets have four tubes. The tracheal spiracle is situated a short distance in front of the spinnerets.

Female

							mm.
Total length	.....	.....	.....	.....	.....	.....	1.624
Length of carapace	.....	.....	.....	.....	.....	.....	0.696
Width of carapace	.....	.....	.....	.....	.....	.....	0.580
Length of abdomen	.....	.....	.....	.....	.....	.....	1.044
Width of abdomen	.....	.....	.....	.....	.....	.....	0.754
Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total	
1	0.507	0.206	0.356	0.288	0.288	1.645	
2	0.466	0.206	0.301	0.274	0.288	1.535	
3	0.397	0.178	0.274	0.247	0.233	1.329	
4	0.521	0.192	0.370	0.315	0.288	1.686	
Palp	0.206	0.123	0.151	.....	0.192	0.672	

Colour. As in the male but the dorsal surface of the abdomen shows a larger area of cream and not so much dark grey. The four chevrons are more pronounced (fig. 4).

The form of the carapace, eyes, chelicerae, maxillae, labium and sternum as in the male.

Legs. 4.1.2.3. The two front pairs of legs are much shorter than those of the male. Trichobothria and spines are arranged as in the male. The superior tarsal claws are similar and provided with seven teeth, which decrease in length towards the base of the claws. Inferior claw with two teeth. A 'drum' is present on the dorsal side of each tarsus in the distal quarter of the segment as in the male.

Palpi. Tarsus slightly longer than tibia, clothed with a number of coarse setae. Tibia has four trichobothria, but 'drum' and trichobothria are absent from the tarsus. The tarsal claw is slightly curved and provided with three small teeth.

Abdomen. Ovoid. Spinnerets in a transverse row (fig. 5). Middle spinnerets with six spinning tubes. Fore spinnerets with one large and two small tubes. The apical segment of the hind spinnerets about equal in length to the basal segment and provided with seven spinning tubes (fig. 6).

Epigynum. The form of the epigynum as seen in transparent preparations is shown in fig. 7.

Locality. The type specimens were collected in small recumbent shrubs, especially in *Astroloma humifusum*, on the Domain, Hobart, 24th August, 1942. The spider is quite common. It also occurs at Risdon and at the Punch Bowl, Launceston.

Hahnia ampullaria, sp. n.

(Figs 8-14)

Male		mm.				
Total length		1.682				
Length of carapace		0.754				
Width of carapace		0.696				
Length of abdomen		1.044				
Width of abdomen		0.750				
Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	0.822	0.288	0.726	0.589	0.493	2.918
2	0.685	0.260	0.603	0.493	0.466	2.507
3	0.548	0.233	0.452	0.438	0.411	2.082
4	0.685	0.233	0.617	0.548	0.480	2.563
Palp	0.274	0.206	0.110		0.329	0.919

Colour. Carapace dull yellow with a dark-grey patch in the middle and four dark-grey patches on each side. The eye-group is set in black pigment. Legs, chelicerae, palpi, maxillae and labium dull yellow. Sternum yellowish with dark-grey margin. Dorsal surface of abdomen light yellow with dark-grey markings. Ventral surface of abdomen light yellow with dark-grey areas in the middle and in front of the spinnerets. The spinnerets are light yellow.

Carapace. Widest between second coxae. Thoracic groove longitudinal. A median row of four or five long hairs on the dark area in front of the groove.

Eyes. The eight eyes are arranged in two rows. Viewed from above the first row is slightly recurved and the second row slightly procurved. AME dark, the other eyes pearly white. Ratio of eyes AME : ALE : PME : PLE = 11 : 20 : 17 : 17. Laterals contiguous. AME almost contiguous with ALE but separated from each other by 5/11 of their diameter. PME separated from each other by 15/17 of their diameter and from PLE by 3/17 of their diameter. The median ocular quadrangle wider behind than in front in ratio 48 : 26. The length of the quadrangle is less than its width behind in ratio 35 : 48. Height of clypeus in front of AME is almost three times the diameter of AME.

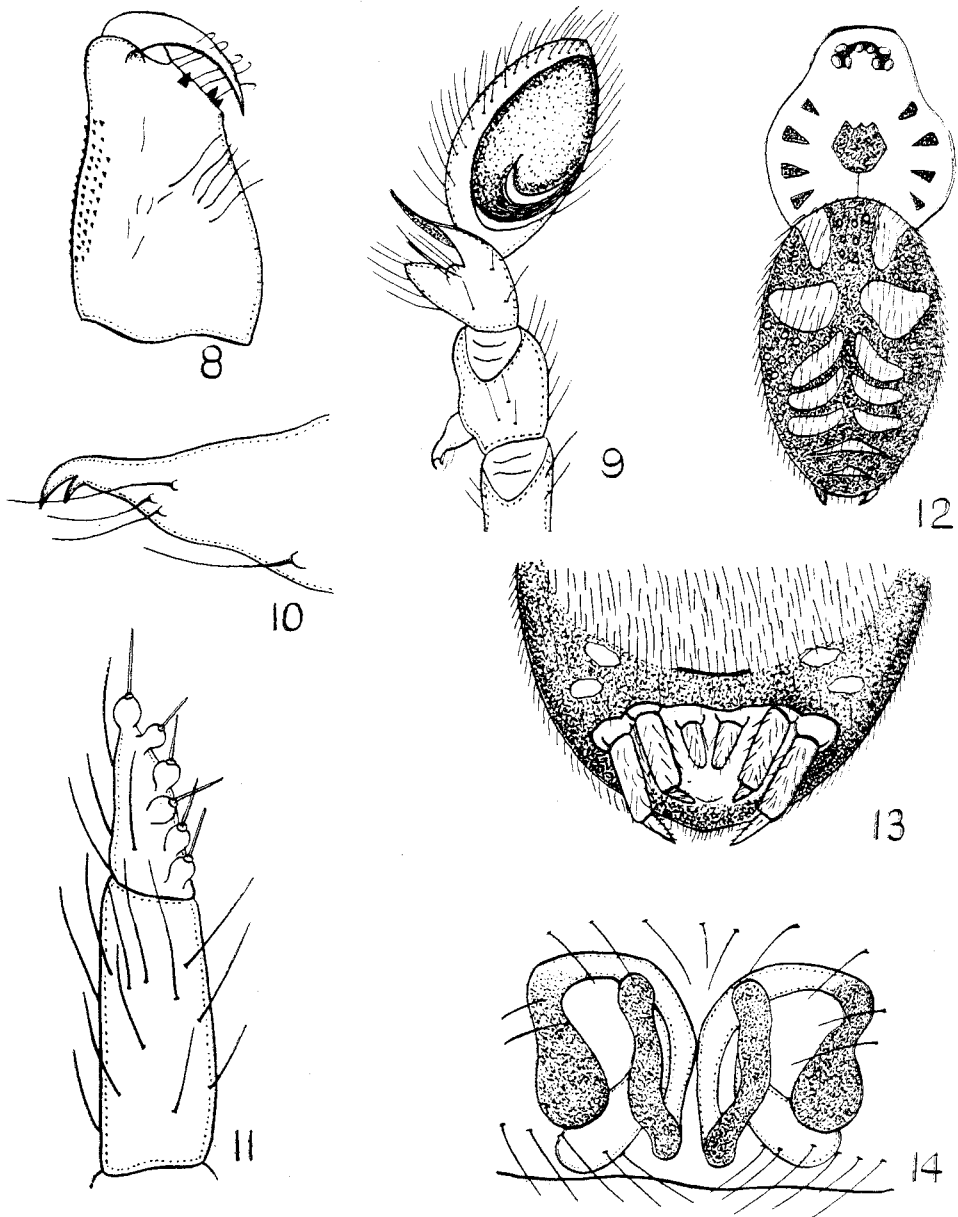
Chelicerae. Vertical, conical, devoid of lateral condyles. Outer surface of paturon coarsely granular. Furrow oblique. Retromargin provided with one tooth, the promargin with two teeth (fig. 8). A light scopula of five or six barbed hairs along promargin.

Maxillae. Converging. A light scopula at inner apical angle. Front margin rounded and provided with a serrula.

Labium. Wider than long in ratio 39 : 25. Rounded in front and fringed with a few long hairs.

Sternum. Shield-shaped, convex, longer than wide in ratio 30 : 29. Clothed with a few long hairs, which are more numerous round the margin than in the centre. The fourth coxae are separated by about once their diameter.

Legs. 1.4.2.3. Lightly clothed with long finely barbed hairs. Two trichobothria on each tarsus, two on the apical half of each metatarsus and six on each tibia. A small 'drum' is present on the dorsal side of each tarsus in the apical quarter. Scopulae and claw-tufts absent. Three tarsal claws, the upper claws similar with



FIGS 8-14.

Hahnia ampullaria, sp. n. Fig. 8: Retrolateral view of right chelicera of male. Fig. 9: Right palpus of male. Fig. 10: Apophysis on patella of male palpus. Fig. 11: Hind spinneret of male. Fig. 12: Dorsal view of female. Fig. 13: Spinnerets of female. Fig. 14: Epigynum of female.

six teeth, the lower claw with two teeth. No spines are present on any of the segments. The hairs on the ventral surface of the femora are longer and coarser than elsewhere.

Palpi. Tarsus spoon-shaped. Tibia short and produced into a long sharp apophysis as shown in fig. 9. Near the base of the apophysis is a small tubercle bearing a group of five setae. There are four trichobothria on the dorsal side of the tibia. The patella is nearly twice the length of the tibia and is provided with a hook-like apophysis on the retrolateral side near the base. The apophysis has a tooth near the hook-like end and is provided with three setae (fig. 10).

Abdomen. Ovoid, clothed with long hairs. Spinnerets in a transverse row. Apical segment of the hind spinnerets slightly shorter than the basal segment, and provided with six spinning tubes, which have the form of small bulbs or ampullae (fig. 11). The fore spinnerets are longer than the basal segment of the hind spinnerets in ratio 3 : 2. Each is provided with one large and one small bulbous spinning tube on the small conical segment at the apex. The middle spinnerets are shorter than the basal segment of the hind spinnerets and are furnished with four bulbous spinning tubes. The tracheal spiracle is a short distance in front of the spinnerets.

Female

							mm.
Total length	.....	.....	.....	.....	.....	.....	1.740
Length of carapace	.....	.....	.....	.....	.....	.....	0.812
Width of carapace	.....	.....	.....	.....	.....	.....	0.638
Length of abdomen	.....	.....	.....	.....	.....	.....	1.160
Width of abdomen	.....	.....	.....	.....	.....	.....	0.812

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	0.699	0.247	0.589	0.493	0.466	2.494
2	0.617	0.247	0.507	0.425	0.438	2.234
3	0.548	0.219	0.411	0.411	0.384	1.973
4	0.671	0.247	0.575	0.548	0.452	2.493
Palp	0.233	0.137	0.205	.....	0.274	0.849

The female resembles the male in coloration and markings (fig. 12). Only the following features need be described.

Legs. 1.4.2.3. The first and fourth pairs are almost equal in length. Trichobothria, spines and tarsal 'drum' are present as in the male.

Palpi. The tarsal segment is clothed with hairs and stiff bristles but lacks trichobothria and a 'drum'. The tarsal claw is almost straight and has one small tooth. The tibia is slightly shorter than the tarsus and is provided with four trichobothria.

Abdomen. Ovoid. Spinnerets as in the male (fig. 13), but the spinning tubes on the apical segment of the hind spinnerets are more numerous.

Epigynum. The form of the epigynum as seen in transparent preparations is shown in fig. 14.

Locality. The type specimens were collected on the Domain, Hobart, 20th August, 1947. This spider is found on the under side of stones, especially on those lying amongst the debris at the foot of Casuarina trees.

Genus *Neoaviola* Butler, 1929*Neoaviola wellingtoni*, sp. n.

(Figs 15-21)

Male

	mm.
Total length	1.276
Length of carapace	0.638
Width of carapace	0.522
Length of abdomen	0.754
Width of abdomen	0.580

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	0.466	0.192	0.329	0.288	0.329	1.604
2	0.452	0.178	0.301	0.274	0.329	1.534
3	0.411	0.178	0.274	0.274	0.315	1.452
4	0.507	0.178	0.411	0.384	0.369	1.849
Palp	0.178	0.150	0.082	.....	0.233	0.643

Colour. Carapace light brown marked with a dark brown area in front of the thoracic groove, a dark brown margin and four triangular brown patches on each side (fig. 15). Legs brown but lighter in colour on basal half of femora. Palpi, chelicerae and labium yellowish. Sternum light brown in the centre, darker at the sides. Maxillae and coxae dull yellow. Abdomen above and at the sides very dark-grey, nearly black. The dorsal surface ornamented with a pair of yellowish spots on anterior half and six thin yellowish chevrons on posterior half. These markings on both carapace and abdomen are not constant and in some specimens the dark brown markings on the carapace are very faint or absent.

Carapace. Widest between second and third coxae. Thoracic groove longitudinal. Radial grooves distinct. An irregular double row of hairs is situated in a median longitudinal line between thoracic groove and eyes.

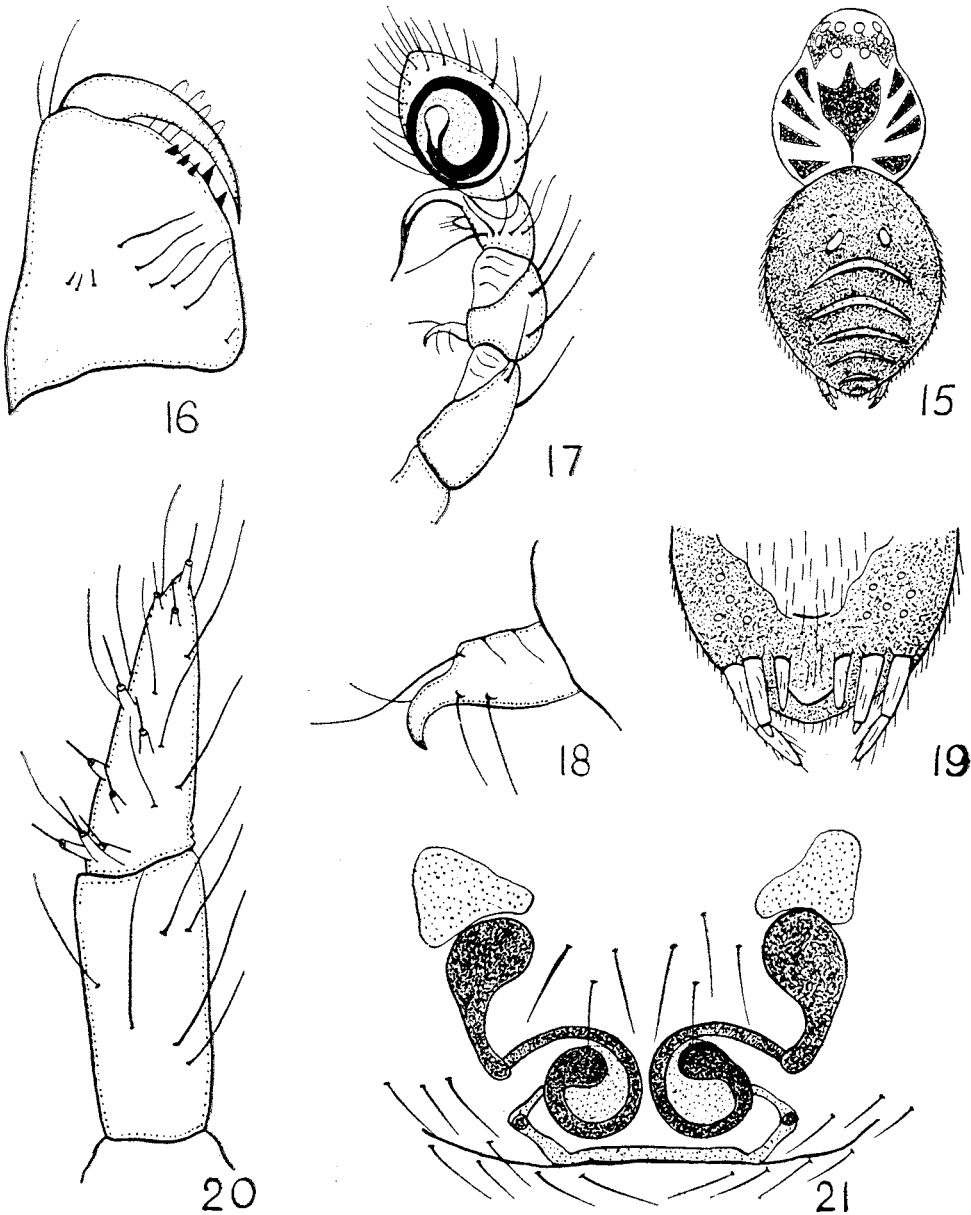
Eyes. The eight eyes are arranged in two rows. Viewed from above the front row is slightly procurved and the hind row distinctly procurved. AME dark, other eyes pearly white. The eye-group occupies almost the full width of the head. Ratio of eyes AME : ALE : PME : PLE = 13 : 14 : 14 : 17. The laterals are contiguous. AME are almost contiguous with ALE but are separated from each other by 4/13 of their diameter. PME are separated from each other by 15/14 of their diameter and from PLE by 9/14 of their diameter. The median ocular quadrangle is wider behind than in front in ratio 44 : 31, and is shorter than its posterior width in ratio 38 : 44. The height of the clypeus is 20/13 of the diameter of AME.

Chelicerae. Vertical, clothed with a few long hairs in front. Lateral condyles absent. Fang moderately curved. Furrow oblique with three small teeth on the retromargin and one large and one small tooth on the promargin (fig. 16). There is a light scopula of six or seven barbed hairs on the promargin.

Maxillae. Short, broad and convex. Slightly converging, anterior margin with a well developed serrula. The inner anterior angle is furnished with a slight scopula.

Labium. Wider than long in ratio 3 : 2. Rounded in front and fringed with a few long hairs.

Sternum. Shield-shaped, longer than wide in ratio 12 : 11. Convex, truncate between the fourth coxae, which are separated by about once their diameter. Surface clothed with a few long hairs.



FIGS 15-21.

Neoaviola wellingtoni, sp. n. Fig. 15: Dorsal view of male. Fig. 16: Retrolateral view of right chelicera of male. Fig. 17: Ventral view of right palpus of male. Fig. 18: Apophysis on patella of male palp. Fig. 19: Spinnerets of male. Fig. 20: Hind spinneret of male. Fig. 21: Epigynum of female.

Legs. 4.1.2.3. Lightly clothed with long hairs. Two trichobothria on basal half of each tarsus, two on each metatarsus and five on each tibia. A 'drum' is present on the dorsal side of each tarsus in the apical quarter. Scopulae and claw-tufts absent. Three tarsal claws present. Upper claws similar and with a row of six teeth. Lower claw with two teeth. The teeth on the upper claws of the third and fourth tarsi are much smaller than those on the first and second tarsi. There is a slender dorsal spine at the base and apex of each patella. On each tibia there is a slender dorsal spine and a prolateral spine near the base. Elsewhere on the legs spines are absent.

Palpi. Tarsus spoon-shaped. Tibia much shorter than patella and produced into a long curved sharp apophysis on the retrolateral side at the apex (fig. 17). In the normal flexed condition of the appendage the tip of the apophysis is almost in contact with a hook-like projection from the retrolateral side of the patella (fig. 18). There are four trichobothria on the tibia.

Abdomen. Ovoid, clothed with barbed hairs. Tracheal spiracle a short distance in front of spinnerets. The six spinnerets are in a transverse row (fig. 19). The middle pair are separated from each other by little more than once their diameter. They are slightly shorter than the basal segment of the fore spinnerets and are provided with six spinning tubes. The apical segment of the fore spinnerets is small and conical. It is provided with one spinning tube. The hind spinnerets are nearly twice the length of the fore spinnerets. The apical segment of the hind spinnerets is longer than the basal segment in ratio 10 : 7 and is provided with ten spinning tubes (fig. 20).

Female

							mm.
Total length	.....	.....	.....	.....	.....	.....	1.624
Length of carapace	.....	.....	.....	.....	.....	.....	0.638
Width of carapace	.....	.....	.....	.....	.....	.....	0.580
Length of abdomen	.....	.....	.....	.....	.....	.....	0.928
Width of abdomen	.....	.....	.....	.....	.....	.....	0.812
Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total	
1	0.521	0.219	0.343	0.315	0.343	1.741	
2	0.493	0.219	0.343	0.328	0.343	1.726	
3	0.466	0.206	0.301	0.315	0.343	1.631	
4	0.603	0.206	0.493	0.424	0.411	2.137	
Palp	0.219	0.123	0.164	.....	0.247	0.753	

The female is somewhat lighter in coloration than the male but otherwise resembles it in appearance and only the following characters need be described.

Palpi. There are four trichobothria on the tibia but none on the tarsus. A tarsal 'drum' is also lacking. The claw is almost straight and appears to lack teeth. Spines are present and arranged as follows. Patella: dorsal 1-1. Tibia: dorsal 1. Tarsus: dorsal 1-1, prolateral 1-1, ventral 1-1. Elsewhere 0.

Epigynum. The form of the epigynum as seen in transparent preparations is shown in fig. 21.

Spinnerets. Arranged in a transverse row as in the male. The middle spinnerets are $\frac{2}{3}$ the length of the fore spinnerets and are furnished with eight spinning tubes. The fore spinnerets are about half as long as the hind spinnerets and have a short apical segment carrying three spinning tubes. The hind spinnerets are long and slender, the apical segment being nearly twice as long as the basal segment and bearing 12 spinning tubes.

Locality. The type specimens were collected on Mount Wellington, 19th December, 1944. The spiders were found in moss.

Genus *Scotopsilus* Simon, 1886*Scotopsilus bicolor* Simon

(Figs 22-26)

This species is the type of the genus and was described by Simon (1886, p. LXI) from a female specimen taken at Launceston. The description is very brief and is not illustrated. However, in a later publication Simon (1898, p. 271) gave a figure of the spinnerets.

The following account deals with the hitherto unknown male and gives some additional notes on the female.

Male						mm.
Total length						4.176
Length of carapace						1.856
Width of carapace						1.566
Length of abdomen						2.494
Width of abdomen						1.972
Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
1	1.276	0.580	1.102	0.928	0.696	4.582
2	1.160	0.580	1.044	0.928	0.638	4.350
3	1.044	0.464	0.870	0.986	0.638	4.002
4	1.334	0.580	1.160	1.160	0.754	4.988
Palp	0.522	0.348	0.174		0.464	1.508

There are considerable variations in size, some mature specimens being little more than half the size of the specimen selected for description.

Colour. Carapace, legs, maxillae and sternum golden yellow. Clypeus, chelicerae and sides of head brown. Black pigment between the eyes. Palpi brownish yellow. Abdomen black above and at the sides, lighter underneath. Specimens preserved in alcohol show the black dorsal surface of the abdomen speckled with small grey dots, which tend to be arranged in oblique rows at the sides and to form five indistinct chevrons on the posterior half of dorsal surface.

Carapace. Widest between second coxae. Thoracic groove longitudinal. Radial grooves distinct. A group of about eleven hairs in front of thoracic groove and a median row of hairs leading forward to the eyes. A few short hairs on the dorsal surface of the head. Thoracic region of the carapace smooth and without hairs.

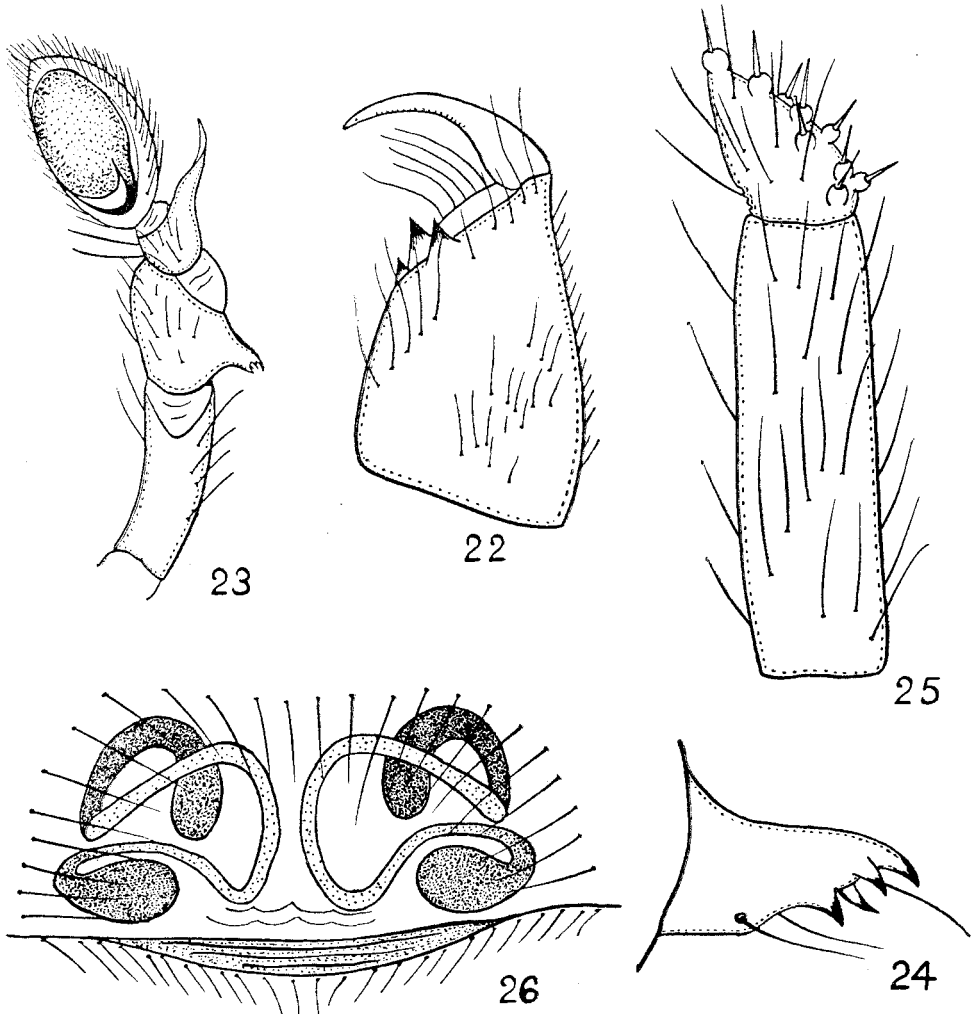
Eyes. The eight eyes are arranged in two rows. Viewed from above the front row appears slightly recurved and the hind row distinctly procurved. The eye-group is shorter than the width of the head in ratio 5 : 8. AME are the smallest of the group. The ratio of the eyes AME : ALE : PME : PLE = 5 : 10 : 7 : 9. AME are separated from each other by $2/5$ of their diameter and from ALE by the same distance. Lateral eyes almost contiguous. PME separated from each other by $8/7$ of their diameter and from PLE by $5/7$ of their diameter. Median ocular quadrangle wider behind than in front in ratio 22 : 12. The posterior width is greater than the length in ratio 22 : 18. The height of the clypeus below AME is $9/5$ of the diameter of AME. The margin of the clypeus is fringed with about ten long hairs.

Chelicerae. Conical and vertical. Clothed with a few stiff hairs in front. Lateral condyles absent. Fang moderately long and curved. Furrow oblique. Promargin with a light scapula and one large and one small tooth. Retromargin with a single large tooth (fig. 22).

Maxillae. Broad, rectangular, somewhat converging and slightly depressed in the middle. A small scopula on the inner anterior angle. Serrula confined to front margin and not extending onto side.

Labium. Wider than long in ratio 6 : 5. Truncate in front and fringed with a few hairs. Depressed in the middle. Extending forward for more than half the length of the maxillae.

Sternum. Shield-shaped. Longer than wide in ratio 20 : 18. Clothed with short black hairs, which are more numerous at the sides than at the centre. Posterior coxae separated by slightly more than their diameter.



FIGS 22-26.

Scotopsilus bicolor Simon. Fig. 22: Retrolateral view of left chelicera of male. Fig. 23: Ventral view of left palpus of male. Fig. 24: Apophysis on patella of male palp. Fig. 25: Right hind spinneret with apical segment extended. Fig. 26: Epigynum of female.

Legs. 4.2.1.3. Clothed with black hairs which are more numerous on the sides of the tibiae, metatarsi and tarsi than elsewhere. True spines are absent, but there is a short dorsal bristle at the apex of each patella and one near the base of each tibia. There are two trichobothria and a 'drum' on the apical half of each tarsus, two trichobothria towards the apex of each metatarsus and five in two rows on each tibia. Three tarsal claws are present. The upper claws similar and with about nine teeth. Lower claw with two teeth. Scopulae and claw-tufts absent.

Palpi. Tarsal segment spoon-shaped. Tibia very short and produced into a long sharp curved apophysis on the retrolateral side at the apex. Patella is twice the length of the tibia and, on the retrolateral side, is produced into a short stout apophysis which has four curved teeth at the apex and is furnished with several setae (figs 23 and 24). There are four trichobothria on the tibia.

Abdomen. Ovoid, clothed with black hairs. Tracheal spiracle a short distance in front of the spinnerets. The spinnerets are cylindrical and arranged in a slightly curved transverse row, the hind spinnerets being external to and slightly above the fore spinnerets. The apical segment of the hind spinnerets is very short, being only $\frac{2}{5}$ of the length of the basal segment. It is furnished with nine short bulbous spinning tubes, and in the living spider, is turned inwards (fig. 25). The fore spinnerets are slightly shorter than the basal segment of the hind spinnerets and are provided with two bulbous spinning tubes at the apex. The middle spinnerets are about $\frac{2}{3}$ the length of the fore spinnerets and are furnished with about twelve bulbous spinning tubes.

Female

							mm.
Total length	.....	.....	.....	.....	.....	.....	3.190
Length of carapace	.....	.....	.....	.....	.....	.....	1.392
Width of carapace	.....	.....	.....	.....	.....	.....	1.102
Length of abdomen	.....	.....	.....	.....	.....	.....	2.030
Width of abdomen	.....	.....	.....	.....	.....	.....	1.566
Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total	
1	1.044	0.406	0.870	0.754	0.580	3.654	
2	0.986	0.406	0.812	0.696	0.580	3.480	
3	0.870	0.348	0.754	0.754	0.522	3.248	
4	1.044	0.406	0.928	0.928	0.580	3.886	
Palp	0.406	0.174	0.290	.....	0.348	1.218	

The female resembles the male in coloration and in the form of the carapace, eyes, chelicerae, maxillae, labium, sternum and legs.

Palpi. The tarsal claw is almost straight and devoid of teeth. The tarsus is clothed with barbed hairs and stout spine-like setae, but lacks trichobothria and a 'drum'. The tibia is furnished with four trichobothria and several stout setae.

Abdomen. Ovoid. The spinnerets are cylindrical and arranged as in the male but their relative lengths differ from those of the male. The apical segment of the hind spinnerets is a little less than half the length of the basal segment and is furnished with eleven bulbous spinning tubes, one near the base being much larger than the others. The fore spinnerets are slightly longer than the basal segment of the hind spinnerets in ratio 25 : 22, and are provided with four bulbous spinning tubes at the apex. The middle spinnerets are $\frac{3}{5}$ of the length of the fore spinnerets and are furnished with about twelve spinning tubes. The distance of the tracheal spiracle from the base of the spinnerets is equal to about $\frac{1}{3}$ of the distance from the base of the spinnerets to the epigastric furrow.

Epigynum. The form of the epigynum as seen in transparent preparations is shown in fig. 26.

Locality. The allotype male was collected at Risdon during January. The spider lives under the loose bark on eucalypts, and is widely distributed throughout the State. It has been collected at Trevallyn, The Cascades, Fern Tree and elsewhere. Specimens kept in the laboratory spun small sheet webs.

APPENDIX

NOTES ON THE RESPIRATORY SYSTEMS OF SCOTOPSILUS, HAHNIA AND NEOAVIOLA (FIGS 27 AND 28)

In *Scotopsilus bicolor* Simon the tracheal spiracle opens into a wide atrium, which gives off two stout trunks. These pass forward for a short distance and then each divides into a short outer branch and a slightly longer inner branch (fig. 27). The inner branches lie between the longitudinal muscle bands, whilst the outer branches lie outside them. Each inner branch divides to form a bundle of about 150 tracheal tubes and each outer branch divides to form a bundle of 26 tracheal tubes. The two inner bundles pass forward to the petiolus. The two outer bundles pass forward on the outer side of the dorso-ventral muscles and genital ducts until in line with the book-lungs. Here they bend inwards towards the petiolus. The tubes of the four bundles now come together and pass through the petiolus into the cephalothorax. In the petiolus they lie below the gut (fig. 28), the tubes from the outer bundles being above those from the inner bundles. There is a noticeable difference in the size of the tubes forming the inner and outer bundles. The average diameter of those forming the outer bundles is about 8 micra, whilst that of those composing the inner bundles is about 5 micra. The total number of tubes entering the cephalothorax is about 312. This number includes nearly all the tubes from the two outer bundles and most of those from the two inner bundles, very few supplying the abdomen. The two book-lungs are in the usual position. Each has about 13 leaves.

The respiratory systems of *Hahnia astrolomae* sp. n. and *Neoaviola wellingtoni* sp. n. resemble that of *Scotopsilus bicolor*. The tracheal spiracle leads into a wide atrium, which gives off two trunks. These divide into inner and outer branches from which tracheal tubes arise and pass forward to the petiolus. In the case of *Hahnia astrolomae* the outer branches each give rise to about 25 tubes having an average diameter of 5 micra, whilst the inner branches each give rise to about 35 tubes having an average diameter of 3 micra. About 113 tubes pass through the petiolus into the cephalothorax. The book-lungs have six leaves.

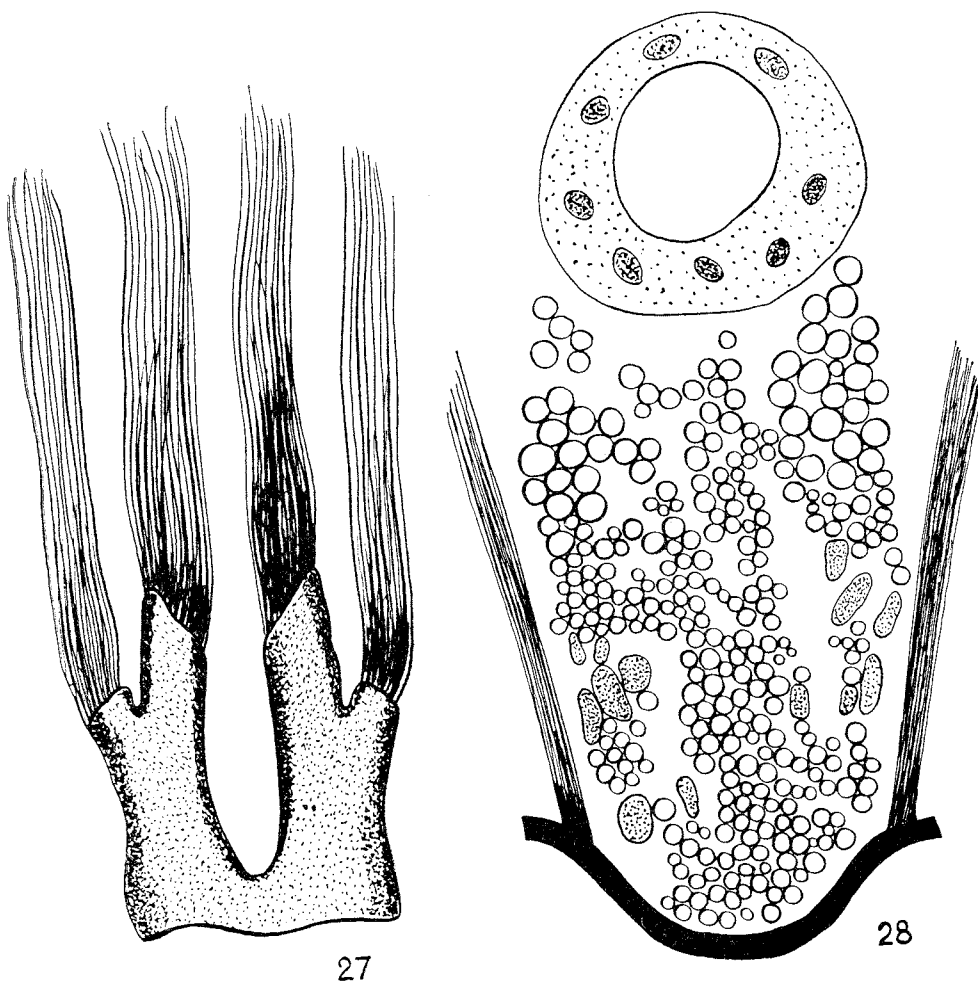
In *Neoaviola wellingtoni* each inner bundle is made up of 19 tubes having an average diameter of 4 micra. Each outer bundle is composed of 13 tubes having an average diameter of 5 micra. About 55 tubes pass into the cephalothorax. The book-lungs have four leaves.

Acknowledgments are made to the Trustees of the John Ralston Bequest under whose auspices the above work was carried out.

REFERENCES

- EBRYANT, E. E. 1935.—Some New and Little Known Species of New Zealand Spiders. *Rec. Cant. Mus.*, vol. IV, No. 2, pp. 71-94.
 BUTLER, L. S. G. 1929.—Studies in Victorian Spiders, No. 1. *Proc. Roy. Soc. Victoria*, vol. 42 (N.S.), Pt. 1, pp. 41-52.

- RAINBOW, W. J., 1920.—Arachnida from Lord Howe and Norfolk Islands. *Rec. S. Austral. Mus.*, vol. I, No. 3, pp. 229-272.
- SIMON, E., 1886.—Descriptions de quelques espèces nouvelles de la famille des Agelenidae. *Ann. Soc. ent Belg.*, vol. 30, C.R., pp. LVI-LXI.
- , 1898.—Histoire naturelle des Araignées. Tome 2, fascicule 2, Paris, pp. 193-380.
- , 1909.—Araneae, 2e partie. in *Die Fauna Südwest-Australiens*, Bd. II, Lief. 12. Jena, pp. 155-212.



FIGS 27-28.

Scotopsilus bicolor Simon. Fig. 27: Atrium and tracheal trunks giving rise to the inner and outer bundles of tracheal tubes. Fig. 28: Transverse section through the petiolus showing the large number of tracheal tubes below the gut.