AN ACCOUNT OF MONEY SPIDERS FROM DOWN UNDER (ARANEIDA, LINYPHIIDAE)

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With 24 figures

The Australian and New Zealand regions so far were left out of consideration when studying the Linyphiidae (Linyphiinae) on a world-wide basis. When revising the genus *Linyphia* it appeared that a fair number of species had been described from these regions; but it also became very clear, by a superficial investigation, that these species were so completely different from our European concept of *Linyphia* and related genera, that they were best put aside then with a view to paying more attention to that part of the world at a later time.

A small collection of Linyphiidae from Australian caves, recently received from Mrs. Barbara York Main, Nedlands, Western Australia, offered an excellent opportunity to become better acquainted with the interesting fauna of this continent and the adjacent regions. Together with a number of specimens gathered in the course of years from different museum collections this formed a small but useful basis to start from. The specimens received from Australia and from other musea were used as nuclei of investigation into the literature of this region. Of the formerly described species only those were re-investigated that were considered to be closely related to the species already at hand.

The number of species of Linyphiidae that have been described from Australia is very small, only nine. Four more are known from Tasmania. New Zealand (Auckland Island, Campbell Island, and Antipodes Island included, each with one species) is by far the richest, as far as our knowledge of this family goes at present, with 25 species, two of which are more widely distributed over the world. Going north we know one species from Lord Howe Island, one from Norfolk Island, two from New Caledonia, one from the New Hebrides, and one from New Guinea. Furthermore there are four species of Linyphiidae known from Samoa, two from the Marquesas, and two from Hawaii, but these islands were not included in the present study. Knowing that Dr. R. R. Forster, Dunedin, New Zealand, has the intention to include the Linyphiidae in his general revision of the spider fauna of his country, I have restricted myself to Australia, indicating, however, what

species from the other regions and islands mentioned earlier are to be included in the Australian genera dealt with in the present paper. Type-specimens have been examined when necessary and available.

Of the nine known Linyphiid species from the Australian mainland five have been recognized and are discussed here. Of the four remaining species *Linyphia deplanata* MacLeay and *L. incerta* Walckenaer are nomina dubia, while it is clear from the descriptions of *Bathyphantes montanus* Rainbow and *Laetesia egregia* Simon that they belong to other genera than they were described in or that are dealt with in the present paper. Two more species, one of which is described as new, are added to the known Australian mainland fauna.

Altogether seven species are removed from *Linyphia* (two in Australia, one on Tasmania, four on New Zealand and Auckland Island), and one from *Bathyphantes* (on the New Hebrides). Most likely this process will continue when the New Zealand fauna will be properly studied. *Linyphia* is a strictly Palaearctic genus. *Bathyphantes* is known for certain to occur in the Holarctic and Ethiopian regions, while the species described from other regions are expected to eventually be found to belong to other genera.

Instead, *Laperousea* and *Laetesia* can now be stated to occupy an important place in the Linyphiid fauna of the Australian and New Zealand regions in their widest sense. *Laperousea,* for the time being with three species, most strikingly differs from Northern Hemisphere genera by its genitalia. A short embolus correlates with a spermduct-bearing scape in the epigyne. The scape does not have a terminal socket and reminds one of the epigyne of the European *Oreonetides abnormis* (Blackwall). A second scape, springing forth from the dorsal side of the epigyne makes it a unique and striking structure. The male palp is so highly modified as to its distal parts that it is difficult to find the homologies with the familiar elements of the Linyphiid palp.

The male palps of the *Laetesia* species at first sight closely resemble the palps of the *Bathyphantes pullatus* group (subgenus *Coniphantes* Ivie). The epigynes, however, are distinguished by the pair of latero-ventral scapes with a terminal socket each, a character that has not been observed before. Sockets of this kind usually occur in the mesal plane, or, when present in pairs, are found on the tip of a folded scape. This character at once distinguishes *Laetesia* from *Bathyphantes,* from which it also differs in the consistent presence of a dorsal spine on all metatarsi.

Laperousea Dalmas, 1918

Laperousea Dalmas, 1918, Ann. Soc. ent. France, 86: 437.

Type-species: *Laperousea arenaria* Dalmas, 1918 [= *Laperousea cupidinea* (Simon)], by original designation.

Dalmas created *Laperousea* for the reception of two new species that he described from Australia, viz., *Laperousea arenaria* from Port Adelaide, South Australia, and *Laperousea occidentalis* from Perth, Western Australia. The former was indicated as the type-species of the genus. Dalmas thought the two species to be very closely related, and he listed a number of characters to separate them, referring mostly to colour-patterns and sizes. I have seen type-specimens of both species, and not only found them to belong to the same species, but I also can state now that they are junior synonyms of *Linyphia cupidinea* Simon. *Laperousea* thus can serve as generic name for *Linyphia cupidinea* since that species cannot remain in the Palaearctic genus *Linyphia*, while it is equally out of place in one of the genera to which I could transfer many of the *Linyphia* species from other geographic regions when revising *Linyphia* in its original sense (Van Helsdingen, 1969, 1970).

Besides *L. cupidinea* (Simon) (= *occidentalis* Dalmas, = *arenaria* Dalmas), I also include in *Laperousea* two species described by Urquhart, viz., *Linyphia blattifer* and *Linyphia quindecimpunctata*. *Linyphia blattifer* was described from New Zealand (Urquhart, 1887: 99, ♀ and ♂). The description shows the agreement in structure of the genitalia with *L. cupidinea*, and this is confirmed by the figure given with the original description (pl. 8 fig. 7: male palp), as well as by the illustrations by Bryant (1933: figs. 8, 34, 50: epigyne and male palp), who re-examined the type-material of Urquhart. Subsequently the species was transferred to *Stylophora* (Bryant, 1933), its replacement name *Diplostyla* (Bonnet, 1956), and *Bathyphantes* (Parrott, 1946). I see no grounds for the inclusion in one of these genera. I have examined a few specimens from New Zealand, probably belonging to this species, and they seem hardly different from *L. cupidinea*, although the ventral scape of the epigyne is slightly more slender. Since I do not know whether my specimens really belong to *Laperousea blattifera* (Urquhart), **comb. nov.** (I have not seen the type, which is said (Forster, in litt.) to be in very poor condition), I cannot give any opinion here on the specific status of this New Zealand species.

Laperousea quindecimpunctata (Urquhart), **comb. nov.**, described in the genus *Linyphia* from a single female from Tasmania, was also transferred to *Bathyphantes* (Hickman, 1967). Hickman gives a redescription of the species with illustrations that unmistakably show the relationship with *L. cupidinea*. The male palp looks hardly different from that of *L. cupidinea*, nor from my New Zealand specimens, but the epigyne has a more slender ventral scape, clearly more slender than in my specimens from New Zealand. *L. quindecimpunctata* also seems much larger than *cupidinea* and *blattifera*, and all metatarsi are reported to bear a dorsal spine, with an additional pro-

lateral spine on metatarsus I. In *L. cupidinea* as well as in my New Zealand specimens the metatarsi are spineless. I have not seen any material from Tasmania myself.

From these observations it is apparent that *Laperousea* comprises a number of closely related forms or species.

A diagnosis of the genus, based on *L. cupidinea* (Simon) and on the descriptions of the other species, runs as follows.

Small-sized spiders (up to 5 mm) with slender, annulated legs. All eyes of equal size, lateral eyes touching. Chelicerae without stridulating files; three dorsal and four ventral teeth. All femora with one spine at least, tibia I with dorsal, ventral, pro- and retro-lateral spines, other tibiae with at least the dorsal spines. Position of basal dorsal spine on tibia I between 0.15 and 0.25. Tm I in basal third, metatarsus IV without trichobothrium. Abdomen with leaf-shaped dorsal pattern basically present. Male palp with simple paracymbium; large ventral portion of palp strongly diverging in anterior direction from dorsal parts. Median apophysis a slender and straight, shallowly incised element. Epigyne consisting of a long and broad ventral scape from below which a slender dorsal scape projects; dorsal scape with a terminal socket.

Laperousea cupidinea (Simon, 1908) **comb. nov.**

(figs. 1-8)

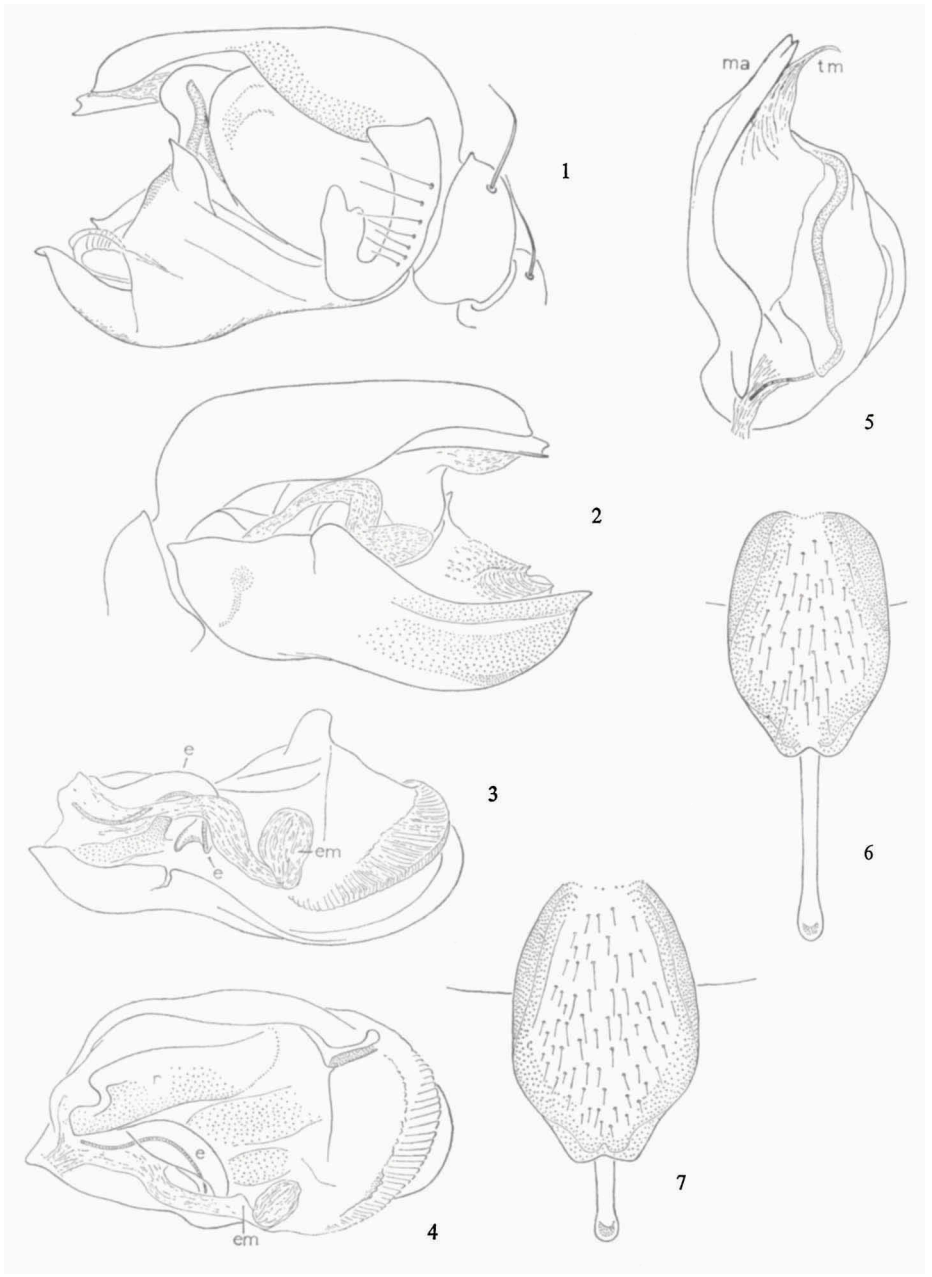
Linyphia cupidinea Simon, 1908, Fauna Südwest-Australiens, 1: 417 (descr. ♀ ♂, Western Australia). — Rainbow, 1911, Rec. Austral. Mus., 9: 164 (catalogue). — Rack, 1971, Mitt. Hamburg. Zool. Mus. Inst., 67: 133 (type-catalogue; does not belong to *Linyphia, Neriene,* or *Microlinyphia*).

Laperousea occidentalis Dalmas, 1918, Ann. Soc. ent. France, 86: 433 (diagn. ♀ ♂, compared with *L. arenaria*; Perth). **syn. nov.**

Laperousea arenaria Dalmas, 1918, Ann. Soc. ent. France, 86: 432 (descr. ♀ ♂, Port Adelaide). **syn. nov.**

The species may have to change of name when it eventually appears to be synonymous with the older *Laperousea blattifera* (*Linyphia blattifer*) from New Zealand (see under remarks on the genus).

Types. — ♂ lectotype of *Linyphia cupidinea* from Western Australia, northern part of Subiaco NW of Perth, 1905, present designation (ZMH); five paralectotypes from the same locality (ZMH: 1 ♂, 1 subadult ♂; MNP: 1♂ 2♀). — ♂ lectotype of *Laperousea occidentalis* Dalmas from Western Australia, Perth, present designation; 1 ♀ paralectotype from same locality (both MNP). — ♂ lectotype and 3 ♀ paralectotypes of *Laperousea arenaria* Dalmas, by present designation, from South Australia, Port Adelaide (MNP). — All specimens mentioned have been examined.



Figs. 1-7. *Laperousea cupidinea* (Simon). 1, male palp, lateral aspect; 2, do., mesal aspect; 3, terminal complex of male palp, meso-dorsal aspect; 4, do., dorsal aspect; 5, tegulum with median apophysis; 6, epigyne of paralectotype of *Laperousea occidentalis* Dalmas; 7, epigyne of paralectotype of *Linyphia cupidinea* Simon. 1-7, × 80.

Dalmas separated *Laperousea occidentalis*, described by him from Perth, from *L. arenaria*, that he described from a series of specimens from Port Adelaide. I have re-examined original specimens of both as far as they were available; of *L. arenaria* only 1 ♂ and 3 ♀ could be found, 1 ♂ and 1 ♀ were missing (lost?). Altogether I have seen now 5 ♂ and 5 ♀ (the type-material of *Linyphia cupidinea* Simon included) from the environs of Perth, and the amount of variation found in these specimens clearly shows that there is no difference between the Western Australian population and the series from Port Adelaide. Both names are now listed as junior synonyms of *Laperousea cupidinea* (Simon). I have also seen a single ♂ specimen from New South Wales (Dorrigo, W. of Coff's Harbour), indicating that *L. cupidinea* reaches the east coast of the continent.

Concerning the differences between *L. occidentalis* and *L. arenaria* summed up by Dalmas, it may be pointed out that (1) the sizes reported for *arenaria* are also found in specimens from Western Australia; (2) the dorsal abdominal pattern is variable; well-defined leaf-patterns as well as barely visible folia occur amongst West Australian specimens; moreover, only one female specimen from what is left of the original series of *arenaria* has a distinct folium, a character said to occur only in *arenaria*, while the other specimens rather agree with Dalmas' conception of *occidentalis* in this respect; (3) in the specimens of *occidentalis* the median ocular area is slightly longer than wide and not as long as wide as indicated by Dalmas; (4) the length of the dorsal scape of the epigyne and the degree in which it extends beyond the tip of the ventral scape depends on the position of the dorsal scape within the concavity of the ventral scape (following the curvature of the ventral scape, or pulled straight and hence projecting further backwards); the same amount of variation occurs among the specimens from Perth, but the larger part of it is accounted for by the described differences in the position of the dorsal scape.

To the descriptions of Simon and De Dalmas I can add the following remarks.

Measurements (in mm). — Male, total length 2.4-2.8; cephalothorax, length 1.25-1.50, width 0.95-1.17; chelicerae, length 0.55-0.67, width 0.25-0.27. Female, total length 2.3-3.1; cephalothorax, length 0.95-1.32, width 0.77-1.05; chelicerae, length 0.41-0.62, width 0.21-0.28.

Cephalothorax yellow-brown to reddish brown, legs yellow-brown, always lighter than cephalothorax but bearing rings: half rings ventrally on half length and sub-apically on femora I and II, only sub-apical rings on femora III and IV; patellae narrowly dirty grey apically; tibiae with sub-basal, median and sub-apical rings, rings often not continuous but composed of

small blackish dots; median and apical rings on metatarsi, and faint apical rings on tarsi. Rings less distinct in males. Abdomen with many white blotches on a light-brown background, giving it a more or less complete white appearance; or a dorsal leaf-like pattern present with faintly to well-pigmented black margins and few white blotches; laterally white, ventrally a light-brown or greyish field between epigastric furrow and spinnerets.

Eyes. — All eyes of about equal size. All posterior eyes separated from each other by their own diameter. Distance between AME and PME more than one diameter. Anterior eyes one half diameter apart, lateral eyes touching.

Chelicerae. — Of same colour as cephalothorax. Three teeth in dorsal row, four small teeth in ventral row. Stridulating files not visible. Labium, gnathocoxae and sternum suffused with grey. Sternum broadly truncated between coxae IV.

Legs. — Slender and with long spines. Femur I slightly longer than cephalothorax in both sexes, tibia I as long as cephalothorax or nearly so. Tibia I 8-9.5 diams. long in female, more slender in male (10-12 diams.). Measurements of segments in mm for two syntypes of *Linyphia cupidinea* from the Paris Museum:

	♂					♀			
	I	II	III	IV		I	II	III	IV
Fe	1.58	1.38	1.00	1.25	Fe	1.20	1.07	0.77	1.00
Pa	0.38	0.38	0.30	0.33	Pa	0.35	0.30	0.25	0.27
Ti	1.43	1.18	0.68	0.98	Ti	1.02	0.85	0.52	0.77
Mt	1.40	1.18	0.78	1.10	Mt	0.97	0.85	0.62	0.82
Ta	0.78	0.70	0.48	0.58	Ta	0.62	0.55	0.42	0.45

Chaetotaxy. — Fe I d l′; II-IV d. Pa I-IV d_a (a basal d-spine seems to be absent).

Ti	I-II	d″ l′	(v′v″)	l″ d′	[l'_a l''_a v'_a v''_a]
	III	d″		d′	[l'_a l''_a v'_a v''_a]
	IV	d″ l′		d′	[l'_a l''_a v'_a v''_a]

Metatarsi spineless. Position of d″-spine on tibia I 0.15-0.20 (♂) or 0.17-0.24 (♀). Length of d″-spine on tibia I 0.25-0.31 mm in males, 0.22-0.32 mm in females. Tm I (very difficult to observe in most specimens!) between 0.2 and 0.3.

Male palp (figs. 1-5). — Cymbium with slender tip. Paracymbium a simple, curved element with its free tip indented postero-apically; basal arm with long but inconspicuous hairs. Tegulum (fig. 5) apically produced into a

slender, slightly twisted membraneous appendage, the tegular membrane, usually visible between the tip of the cymbium and the ventro-apical part of the bulb (figs. 2, 5, *tm*). Median apophysis (figs. 1-2, 5, *ma*) slightly projecting with its grooved tip from below the tip of the cymbium; element arising from the proximal part of the tegulum, its base bearing a short branch that points in proximal direction, spermduct leaving tegulum at base of median apophysis close to latter branch. Remainder of bulb (figs. 3-4) a very large shield with strongly curved ventral surface, an evenly rounded apical margin, and drawn into a blunt angle meso-proximally; element composed of a number of sclerites — the different elements of the more conventional type of palp, e.g. radix, lamella, etc. — that have been fused into one large structure resembling a bivalvular shell, especially when looked at from the meso-distal side, where it appears to be deeply cleft; apical margin of dorsal shell finely serrate with a striated rim and a submarginal row of chitinous denticles or tiny scale-like projections; one proximo-dorsal sclerite possibly derived from the radix (fig. 4, *r*), homologies of other parts not easily traceable. A short and curved embolus (figs. 3-4, *e*) present meso-dorsally close to the "radix", bearing a short appendage next to its spermduct-tooth (fig. 3). Embolic membrane (figs. 3-4, *em*) arising from membraneous sheath surrounding the spermduct where it passes from "radix" to embolus. Length of cymbium 0.57-0.65 mm, length of ventral bivalvular structure 0.64-0.71 mm.

Epigyne (figs. 6-7) and vulva (fig. 8). — Ventral scape long and wide, ventral surface convex, hairy, shiny brown with dark brown spermducts along the margins from tip to base visible through the integument. Very long and narrow dorsal scape arising from broad basal plate near the epigastric furrow, its tip extending well beyond the tip of the ventral scape; dorsal scape often curved, following the concave dorsal surface of the ventral scape. Ventral scape, length 0.40-0.52 mm, width 0.27-0.39 mm; dorsal scape, distance from anterior margin of ventral scape to tip of dorsal scape 0.57-0.78 mm, width at tip 0.04-0.05 mm. Ratio length ventral scape to total length (to tip of dorsal scape) variable (compare figs. 6 and 7), depending on the position of the dorsal scape within the concavity of the ventral scape. Entrances of spermducts close to distal margin of ventral scape, ducts following margins of scape to the base where they turn dorsal and lateral to the thick-walled turning-points, from there inwards to the relatively small and slender receptacula seminis.

Habitat. — Only De Dalmas indicated where he collected his specimens: "Dans de petites toiles au pied des Eucalyptus" (*L. occidentalis*), and "sur les plantes sous-frutescentes isolées dans les sables maritimes" (*L. arenaria*).

Material examined.

Western Australia. — 2 ♂, 1 subadult ♂, 3 ♀, northern Subiaco NW of Perth, coastal area, forest, 1905, Hamburger Forschungsreise nach Südwest-Australien (♂ lectotype, subadult ♂ and 1 ♀ paralectotypes of *Linyphia cupidinea* Simon, ZMH; 1 ♀ and 2 ♀ paralectotypes, MNP). 1 ♂ 1 ♀, Perth, 25.iii.1913, Comte de Dalmas (♂ lectotype and ♀ paralectotype of *Laperousea occidentalis* Dalmas, MNP). 1 ♂ 1 ♀, Swan River (running into the Indian Ocean near Perth) (HDO). 1 ♂, Perth, Kings Park (bordering the Swan River), 7.x.1931, P. J. Darlington (MCZ).

South Australia. — 1 ♂ 3 ♀, Port Adelaide, on beach, 21.iii.1913, Comte de Dalmas (♂ lectotype and ♀ paralectotypes of *Laperousea arenaria* Dalmas, MNP).

New South Wales. — 1 ♂, Dorrigo (ca. 30 mi. inland W of Coff's Harbour), N. Heron (MCZ).

Laetesia Simon, 1908

Laetesia Simon, 1908, Fauna Südwest-Australiens, 1: 418. — Petrunkevitch, 1928, Trans. Connecticut Acad. Arts Sci., 29: 123 (selection of type-species).

Type-species: *Laetesia mollita* Simon, 1908.

Simon united into this genus two species that he described in the same paper from specimens from Western Australia. Of these two species, *Laetesia egregia* from Eradu (between Geraldton and Mullewa, about 60 km inland from the former locality), and *L. mollita* from Bunbury and Boyanup (both to the south of Perth), I have only seen a specimen of the latter species. Of the former species there was a single female specimen in the original material, the collections made by the expedition to southwest Australia by Michaelsen and Hartmeyer in 1905. The spiders collected during this expedition were studied by Simon and returned to Hamburg or, when there were more specimens of a species, divided between Hamburg and Simon's collection, now in the Paris Museum. Of *Linyphia cupidinea* Simon [= *Laperousea cupidinea* (Simon)], for instance, three specimens are still extant at Hamburg and three in the Paris Museum (see page 372). In the case of *Laetesia egregia* this would mean that the unique specimen should be present in the collection of the Hamburg Museum, but it could be found neither there nor in Paris. Of *Laetesia mollita* a single female specimen could be found in the Paris Museum, but the species was not represented at Hamburg. Since there were two localities mentioned in the original description, we may infer there have been at least two specimens when Simon described the species, both, or all, females. Apparently the type-material of the two *Laetesia* species has been destroyed, or lost otherwise, in Hamburg, and the single female of *Laetesia mollita* is all that remains now. For that reason it is considered fortunate that Petrunkevitch selected *L. mollita* as type-species of the genus. The single specimen in the Paris Museum is the objective lectotype of *L. mollita* because of loss of the other syntype(s).

Despite Simon's remarks about the similarity of the two species, I have the impression that they are not congeneric at all. Simon, according to his diagnosis of the genus, delimited *Laetesia* on the basis of the configuration of the eyes, and apparently both his *Laetesia* species answered to his diagnosis. However, from his description of the epigyne of *L. egregia* ("Tuberculum vulvae olivaceum, semicirculare, humile, haud productum, foveola parva subquadrata, costa fusca divisa, impressa") I cannot recognize anything that indicates a close relationship with *L. mollita*. This is, of course, too weak an argument to exclude *L. egregia* from the genus, where it has to stay until it can be recognized eventually with the aid of fresh material.

Diagnosis of the genus.

Small spiders, between 2 and 4 mm long. PME and lateral eyes of subequal size, AME smaller and close together; lateral eyes just touching or distinctly separated, but not more than one diameter apart. Chelicerae without stridulating files; dorsally three teeth, ventrally from three to five small teeth. Legs relatively long and slender, femur I longer than cephalothorax, ratio length to width of tibia I more than 8. Femora with or without spines, all tibiae with two dorsal spines (basal spine between 0.15 and 0.35), at least tibia I with additional spines. All metatarsi with one dorsal spine between 0.2 and 0.3. Tm I between 0.10 and 0.25; no trichobothrium on metatarsus IV. Abdomen with pattern of blackish pigmentation. Male palp with a simple paracymbium, a straight median apophysis, and with an awl-shaped embolus. Radix with a rather pointed ventro-lateral tip. Epigyne with a median dorsal scape, and with two latero-ventral scapes that are always shorter than the dorsal scape. All scapes with a terminal socket. A common opening leading to the atria.

Laetesia mollita Simon, 1908

(figs. 9-15)

Laetesia mollita Simon, 1908, Fauna Südwest-Australiens, 1: 119 (descr. ♀, Western Australia). — Rainbow, 1911, Rec. Austral. Mus., 9: 165 (catalogue). — Petrunkevitch, 1928, Trans. Connecticut Acad. Arts Sci., 29: 123 (selection as type-species for the genus).

Type. — ♀ lectotype by objective selection (through loss of other syntype or syntypes) from Bunbury or Boyanup, south of Perth, Western Australia (MNP), examined.

With some hesitance I have identified with *L. mollita* 1 ♂ and 1 ♀ from different caves in Western Australia, and 1 ♀ from a cave in Victoria, al-

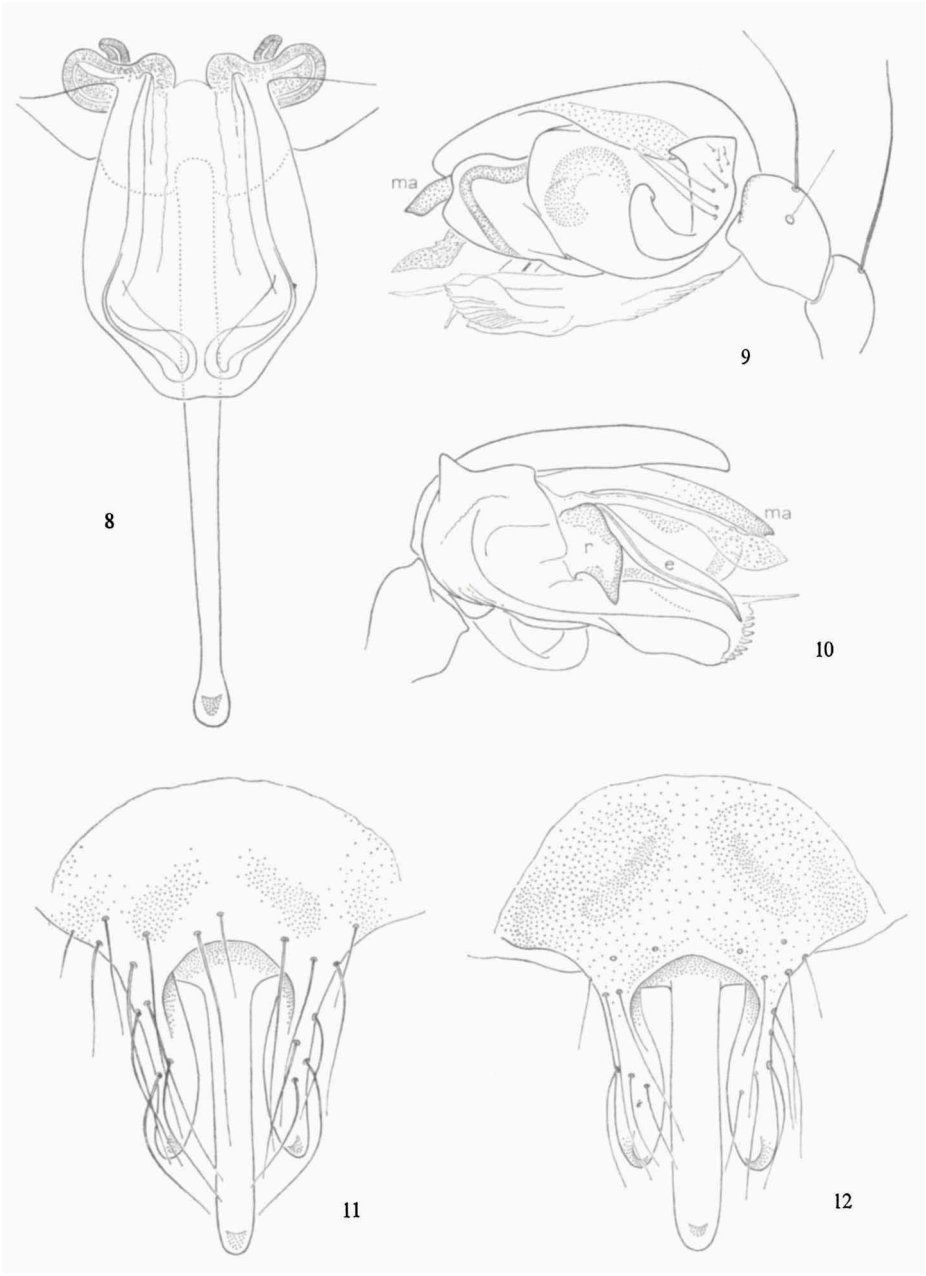


Fig. 8. *Laperousea cupidinea* (Simon), vulva, ventral aspect. Figs. 9-12. *Laetesia mollita* Simon. 9, male palp, lateral aspect; 10, do., mesal aspect; 11, epigyne, specimen from Super Cave; 12, epigyne, lectotype from Western Australia. 8, × 83; 9-10, × 80; 11, × 96; 12, × 114.

though *L. mollita* came from open country and not from caves. A number of differences between the new material and the single type-specimen of *mollita* are at once apparent. In *mollita* the legs are annulated; the abdominal pattern consists of paired light spots on the anterior half and light chevrons on the posterior half surrounded by grey suffusion, while the spots are whitish because of the many white blotches they are filled in with. In the new specimens the legs are not annulated, while the abdomen has but few small white blotches in the otherwise similar pattern. Another difference lies in the epigyne: in the new specimens the total length of the organ is slightly larger (but the specimens are larger too!), while the many spines that occur on the latero-ventral scapes and on the posterior margin of the ventral surface are much longer and heavier. The spines on the legs in the new specimens, too, are strikingly long, but here I cannot compare as all leg-spines in the holotype have been broken off. The shape of the epigyne and the relative lengths of dorsal and ventral scapes are the same in all specimens, and this I have considered decisive.

The male specimen, though from an other cave, agrees with the females in general habitus and size, but the abdominal pattern is different. Since males usually are aberrant in this respect, this cannot prevent us to consider it to be the male of *L. mollita*. It differs from *L. peramoena* (O. P.-Cambridge) from New Zealand in the length of the median apophysis, and in the shapes of radix and paracymbium.

Description of female.

Measurements in mm (lectotype in parentheses). Total length 2.9-3.6 (3.1); cephalothorax, length 1.35-1.55 (1.25), width 1.02-1.12 (0.95); abdomen, length 1.62-2.30 (1.90), width 1.05-1.52 (1.20); chelicerae, length 0.67-0.75 (0.62), width 0.32-0.36 (0.29).

Cephalothorax, chelicerae, mouthparts, and legs light brown to brown. In the lectotype legs with greyish rings on femora (basal and subapical rings), patellae completely greyish, tibiae (basal, median, and apical rings) and metatarsi (submedian and apical rings); cephalothorax with light grey suffusion. Sternum with dark grey suffusion. Abdomen with dark grey pigmentation in outer layer except for the following pattern, where the light, beige-coloured background is visible: dorsally four pairs of roundish spots on anterior half and three pairs of small spots (which may be united into chevrons) on posterior half, a broad, irregularly dented dorso-lateral band from front to half length, and a ventro-lateral row of faintly connected spots from opercula to above spinnerets. White blotches present in the light spots; lectotype with blotches close together, giving the spots a white appearance; in the other

specimens (all from caves) blotches smaller and farther apart (correlated with cave habitat?).

Eyes. PME separated by slightly more than their own diameter (0.075 mm) and by the same distance from the PLE. Lateral eyes touching. AME smaller (0.060 mm) and separated by less than their radius. Interspaces between AME and PME and between AME and ALE about 1 diam. of PME. Height of clypeus 0.17-0.19 of length of cephalothorax.

Chelicerae with rather bulging dorsal and lateral surfaces on basal halves, mesal surfaces about straight. Three teeth in dorsal row, 4-5 small teeth in ventral row. No stridulating files.

Legs fairly slender. Femur I 1.0-1.1 times as long as cephalothorax, tibia I 9-10 (8.5) diams. long. Measurements (of lectotype) in mm:

	I	II	III	IV
Fe	1.32	1.30	1.12	1.45
Pa	0.37	0.40	0.35	0.35
Ti	1.27	1.20	1.00	1.40
Mt	1.20	1.12	0.97	1.35
Ta	0.77	0.72	—	0.75

Chaetotaxy. Fe I d l′; II-IV d. Pa I-IV 2 d.

Ti	I	d″	v′v″	l′	l″	d′	[l′$_a$ l″$_a$ v′$_a$ v″$_a$]
	II	d″	v′v″		l″	d′	[l′$_a$ l″$_a$ v′$_a$ v″$_a$]
	III-IV	d″	v′			d′	[l′$_a$ l″$_a$ v′$_a$ v″$_a$]

Mt I-IV d (position on leg I appr. 0.30)

Length of d″-spine of tibia I 0.31-0.36 mm, position 0.29-0.31. Tm I 0.19-0.23.

Epigyne and vulva (figs. 11-14). General structure as described for the genus. Latero-ventral scapes about parallel, lateral surfaces very lightly concave, mesal surfaces slightly more convex (in the dissected and cleared epigyne scapes curved stronger than under natural conditions!), terminal sockets facing in meso-ventral direction. Dorsal scape straight. Latero-ventral scapes and ventral surface near posterior margin bearing strong, curved spines, that with their tips reach close to the tip of the dorsal scape; in the lectotype spines less strongly developed. Lengths of latero-ventral and dorsal scapes, measured from posterior margin of epigyne (between latero-ventral scapes) and tips of scapes (lectotype in parentheses): latero-ventral scapes 0.275-0.300 (0.262) mm, dorsal scape 0.412-0.425 (0.350) mm.

Description of male.

Measurements in mm. Total length 2.7; cephalothorax, length 1.42, width 1.15; abdomen, length 1.35, width 0.87, height 0.72; chelicerae, length 0.65, width 0.30.

Cephalothorax light brown, cephalic part slightly darker, chelicerae and lower mouthparts of same colour as cephalic part. Sternum light brown with grey suffusion. Legs light brown, femora slightly darker on basal halves; no rings present. Abdomen beige-coloured with an irregular grey spot dorsally on anterior half and some small median spots posteriorly; ventral surface greyish, darker towards the sides and around spinnerets.

Sizes and configuration of eyes as in female. Eye-region and upper half of clypeus with many stout hairs. Height of clypeus 0.28 of length of cephalothorax.

Chelicerae (fig. 15) conspicuously impressed on second quarter of mesal surface, broad at base but much more slender at apical half. Three teeth present, middle tooth largest and placed far backwards, other teeth certainly belonging to dorsal row. Stridulating file absent.

Legs longer and more slender than in female. Femur I 1.2 times as long as cephalothorax, tibia I 14 diams. long. Measurements in mm:

	I	II	III	IV
Fe	1.70	1.62	1.45	1.80
Pa	0.40	0.40	0.35	0.35
Ti	1.75	1.65	1.30	—
Mt	1.65	1.55	1.27	—
Ta	0.97	0.87	0.67	—

Chaetotaxy as in female. Length of d″-spine on tibia I 0.30 mm, position 0.31. Tm I 0.17. Position of d-spine on metatarsus 0.27-0.30.

Male palp (figs. 9-10) with simple paracymbium and long median apophysis (*ma*). Proximal arm of paracymbium with long and short hairs, distal branch without ventral lobe (cf. *L. peramoena*, fig. 22), border only lightly curved. Median apophysis (*ma*) distinctly projecting from below the tip of the cymbium, tip barely forked. Radix (fig. 10, *r*) tapering to a slender cone latero-ventrally. Embolus (fig. 10, *e*) awl-shaped, rather long. Lamella strongly curved proximally, distal margin bearing small teeth and a slender membraneous projection.

Distribution. Western Australia and Victoria, in caves but also in open country.

Material examined.

Western Australia. — 1 ♀, either from Bunbury or Boyanup (both in the coastal area approximately 150 km south of Perth), Michaelsen & Hartmeyer, 1905 (♀ lectotype of *Laetesia mollita* Simon; MNP). — 1 ♀, Nambung [Namban] River, Super Cave, 27.iv.1968, J. Lowry (ML). — 1 ♂, Green Head (on coast north of Jurien Bay), Tumbled-in Cave, 26.iv.1969, J. Lowry (WAM).

Victoria. — 1 ♀, Mt. Hamilton, Insect Cave, 7.vi.1967, A. M. Richards (NMM).

Laetesia leo spec. nov.

(fig. 16)

Among the specimens received from Mrs. Barbara York Main I found the single female described here. It is a pleasure to dedicate this species to Prof. Dr. Leo D. Brongersma on the occasion of his retirement as director of the Rijksmuseum van Natuurlijke Historie at Leiden.

Holotype. — ♀, South Australia, Nullarbor, Koonalda Cave, 3.iv.1970 J. Lowry (WAM).

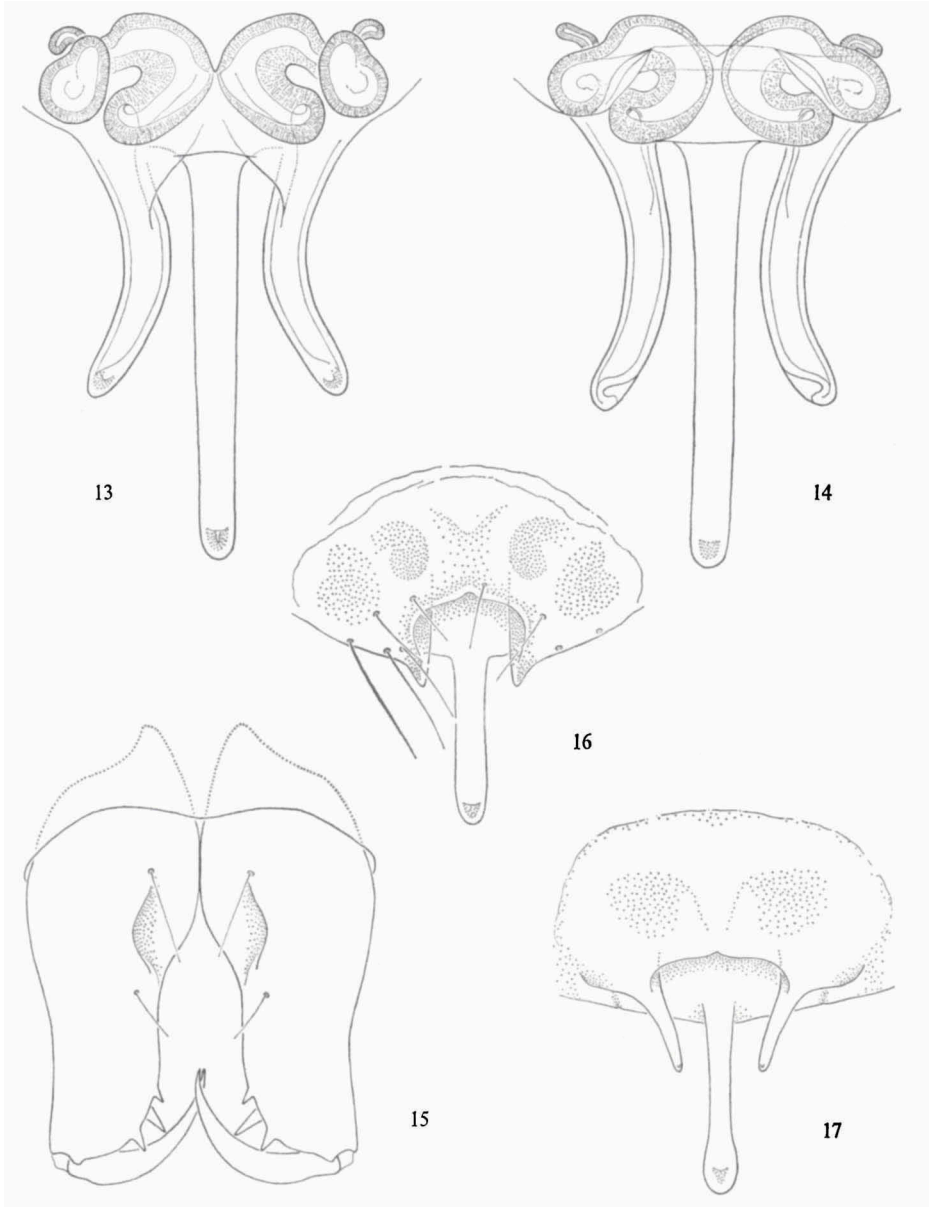
Measurements in mm. Total length 2.05; cephalothorax, length 0.90, width 0.67; abdomen, length 1.25, width 0.65, height 0.95; chelicerae, length 0.39, width 0.20.

Cephalothorax light beige-coloured with broad but ill-defined bands of grey suffusion, reaching from PLE to posterior margin, and leaving uncovered the lateral margins narrowly and a median area that is slightly narrower than the grey bands. Chelicerae, mouthparts, and sternum light brown. Legs light beige-coloured, patellae and distal tips of tibiae greyish, metatarsi and tarsi light brown. Abdomen beige-coloured with pattern of dark grey to blackish bars and streaks; light areas with evenly distributed silvery white blotches. Pattern consisting of a narrow streak middorsally on anterior half, connected with five narrow transverse bars on the posterior half; transverse bars connected with each other laterally, thus enclosing four pairs of light spots; lateral surface with a row of short oblique streaks, the posterior-most connected with the dorsal pattern, the row as a whole separated from the evenly grey ventral surface by a narrow beige-coloured area.

Posterior margin of cephalothorax about straight, lateral margins hardly constricted at border of head and thorax. PME separated from each other and from PLE by slightly less than their diam. (0.062 mm), distance to AME slightly less than 1.5 diam. AME smaller than PME, their diameter measuring 0.050 mm, separated by their radius and from ALE by slightly more than their radius. Lateral eyes just free from each other. Height of clypeus 0.12 of length of cephalothorax.

Chelicerae without stridulating ridges. Three teeth in dorsal row, middle tooth largest; ventral row with three small teeth, basal tooth opposite to middle dorsal tooth.

Legs long and slender. Femur I 1.65 times as long as cephalothorax, tibia I missing, tibia II 15 diams. long. Measurements in mm:



Figs. 13-15. *Laetesia mollita* Simon. 13, 14, vulva, ventral and dorsal aspects, respectively; 15, chelicerae of male. Fig. 16. *Laetesia leo* spec. nov., epigyne. Fig. 17. *Laetesia oceaniae* (Berland), epigyne. 13-14, × 106; 15, × 80; 16-17, × 120.

	I	II	III	IV
Fe	1.50	1.30	0.92	1.37
Pa	0.30	0.27	0.22	0.25
Ti	—	1.22	0.70	1.05
Mt	—	1.25	0.82	1.20
Ta	—	0.75	0.50	0.65

Chaetotaxy. Femora spineless. Pa I-IV 2 d, spines slender.

Ti I d″ l′l″ d′ [$l'_a l''_a$], missing, but probably as indicated.
II d″ l″ d′ [$l'_a l''_a$]
III-IV d″ d′ [$l'_a l''_a$]
Mt I-IV d (position on Mt II 0.31)

Length of d″-spine on tibia II 0.20 mm, position of this spine 0.22. Tm II 0.19.

Epigyne (fig. 16) with the latero-ventral "scapes" very short; terminal sockets invisible, but the tips are pigmented more intensely than the subterminal regions. Posterior margin of ventral surface lightly indented in the middle. Dorsal scape much longer than latero-ventral scapes. Lengths of scapes, measured from anterior margin of entrance to the atrium to tips of scapes: latero-ventral scapes 0.10 mm, dorsal scape 0.25 mm.

Laetesia leo resembles *L. oceaniae* (Berland) from the New Hebrides in size, abdominal pattern, slenderness of the legs, and the lack of femoral spines. The cephalothorax has a different pattern (dark brown with a light spot on the fovea in *L. oceaniae*), while the latero-ventral scapes of the epigyne of *L. oceaniae* are longer with small (still functional?) terminal sockets. In all other species of the genus the latero-ventral scapes are broader, and their tips bear well-developed sockets, and *L. oceaniae* and *L. leo* therefore also have in common the general shape of the epigyne.

Among the species in this genus we count two more that have been found in caves. One of them, *Laetesia mollita* Simon, has been described and depicted above and does not have to be reconsidered here. The other is *Laetesia weburdi* (Urquhart), a species that I do not know. From the description we may infer that it differs from *L. leo* in the abdominal pattern, and also in the chaetotaxy, since in *weburdi* the femora I and II are reported to bear spines. The description of the epigyne, too, does not agree with that of *L. leo*.

Other species to be included in *Laetesia*

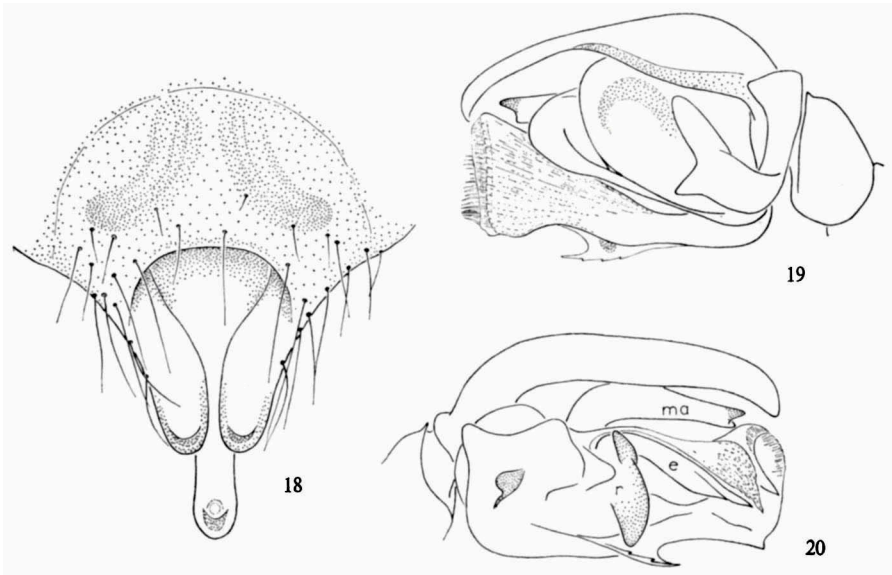
A superficial investigation into the known Linyphiidae of the Australian and New Zealand regions made me aware of a number of other species that clearly belong in this genus. They are listed alphabetically below. Only the

type-material or specimens mentioned in the literature have been examined, when available, and therefore no new data on the distributions of the species are given here. Figures of the genitalia have been made in order to facilitate recognition of the species in the future.

Laetesia aucklandensis (Forster, 1964), **comb. nov.**, Pacif. Ins. Monogr., 7 : 98, figs. 122-126 (in *Linyphia*), ♀ ♂, from Auckland Islands; ♀ holotype and ♂ "allotype" in Dominion Museum, Wellington, New Zealand; paratypes in BPBM. I have examined 3 ♀ paratypes (from Port Ross, Ocean Island, Auckland Islands) and 1 ♂ paratype (from Crozier Point track, Auckland Islands) (BPBM); genitalia depicted here (figs. 18-20).

Fair-sized spiders (up to 3.7 mm) with slender legs (ratio length cephalothorax to length femur I 1.2-1.25, tibia I l/d 12-14), though less slender than in *L. leo* and *L. oceaniae*. Femora bearing spines, anterior tibiae with ventral spines in addition to laterals and dorsals. Lateral eyes touching. Legs not or scarcely annulated. Abdomen light beige-coloured dorsally and ventrally, with dark streaks and light spots laterally. Rather close to *L. mollita* as regards size, close to *L. peramoena* in the structure of the genitalia, but smaller.

In the caption below the illustrations the species was called *Linyphia campbellensis* spec. nov., which is best considered a synonym of *L. aucklandensis* (Forster) (syn. nov.).



Figs. 18-20. *Laetesia aucklandensis* (Forster). 18, epigyne; 19, male palp, lateral aspect; 20, do., mesal aspect. 18, × 100; 19-20, × 80.

Laetesia oceaniae (Berland, 1938), **comb. nov.**, Ann. Soc. ent. France, 107: 167, figs. 110-111 (in *Bathyphantes*), ♀, from the New Hebrides; ♀ holotype in MNP, examined; epigyne depicted here (fig. 17).

The unique holotype is small (2.25 mm), has long and slender legs without annulations (ratio length cephalothorax to length femur I 1.44, tibia I l/d 1.35). Femora spineless, anterior tibiae bearing some ventral spines in addition to the dorsals and laterals (cf. *L. leo*). Lateral eyes touching. Cephalothorax dark brown with a light central area at fovea and backwards to posterior margin. Abdomen bearing a narrow blackish median line on the light anterior half, connected with narrow blackish chevrons on the posterior half, ventral surface grey. The species is close to *L. leo* spec. nov.

Laetesia peramoena (O. P.-Cambridge, 1879), **comb. nov.**, Proc. Zool. Soc. London, 1879: 694, pl. 53 figs. 12a-e (in *Linyphia)*, ♀♂, from Wellington, New Zealand; 1 ♀ and 2 ♂ in HDO and examined; one ♂ had been labelled lectotype, which designation to my knowledge never has been published; genitalia depicted here (figs. 21-23).

Spiders rather small (2.6-2.8 mm), with fairly slender legs (ratio length cephalothorax to length femur I 1.1-1.2, tibia I l/d 12.5 in ♀, 15 in ♂). Femora bearing spines, anterior tibiae with ventrals as well as dorsals and laterals. Lateral eyes separated by about 0.3 diam. of PLE. Cephalothorax dark grey-brown with light central area in front of fovea. Abdomen with a light antero-dorsal surface surrounded by a dark grey sinuate leaf-like band, posteriorly connected with dark chevrons, the latter enclosing three heart-shaped light spots.

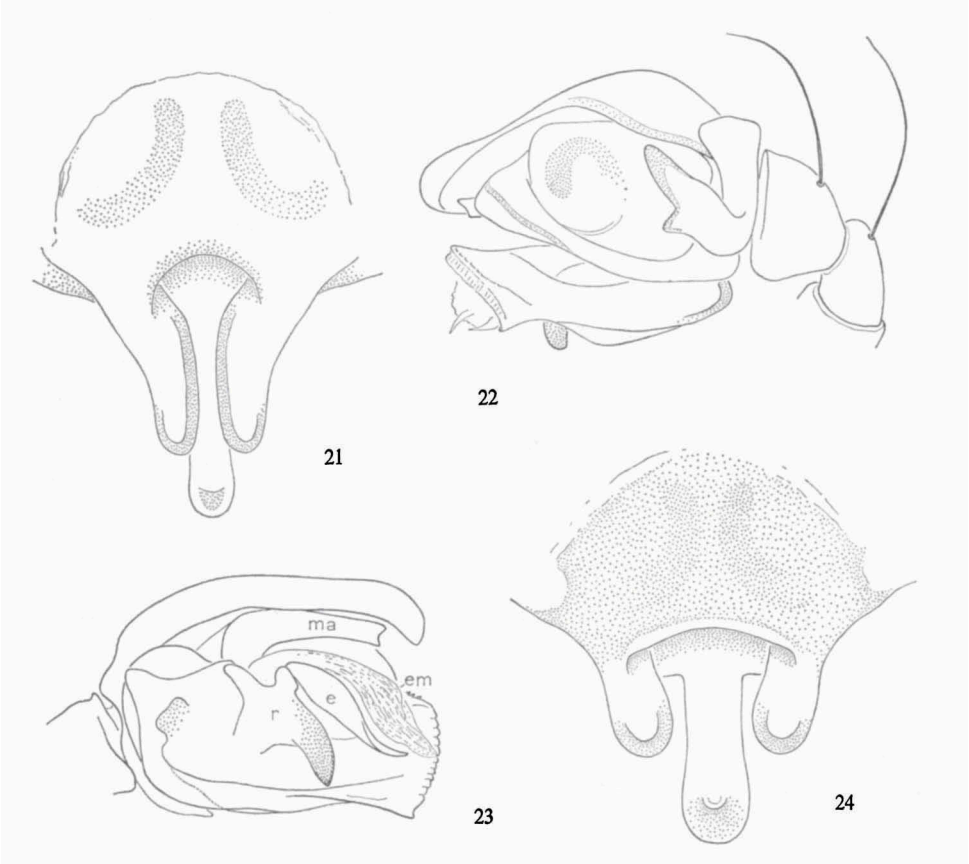
Laetesia trispathulata (Urquhart, 1885), **comb. nov.**, Trans. New Zealand Inst., 18: 186, pl. 6 figs. 2-2b (in *Linyphia*), ♀♂, from Auckland, New Zealand; type-material lost?; 3 ♀ in MNP, collected and identified by Dalmas, 1918, Ann. Soc. ent. France, 86: 364 (as *Lepthyphantes trispathulatus*), examined; epigyne depicted here (fig. 24).

It is not known from which part of New Zealand Dalmas' specimens originate, since no exact locality was given in his paper, while the tube-label is illegible to me. Dalmas' specimens agree with the original description to satisfaction. I have seen other specimens from New Zealand, that are close to *trispathulata* sensu Dalmas, but smaller (2.3 mm), with a cephalothorax that has a narrow black median vitta, and with an epigyne of a more compact build. Apparently there occurs another, closely related species in New Zealand, or the variability of the species is very large.

Dalmas' specimens are of medium size (2.9-3.3 mm) with fairly long legs (ratio length cephalothorax to length femur I 1.15-1.20, tibia I l/d 12).

Femora bearing spines, anterior tibiae with ventrals, dorsals and laterals. Lateral eyes separated by 0.8 of their diameter. Cephalothorax brown with broad median and lateral bands with grey suffusion. Legs faintly annulated. Abdomen dorsally on anterior half with pairs of black spots and on posterior half adorned with light chevrons, ventral surface blackish. Median and lateral scapes of epigyne much shorter than in other species.

Laetesia weburdi (Urquhart, 1890), **comb. nov.**, Trans. New Zealand Inst., 22: 236, pl. 16 fig. 2 (in *Linyphia*), ♀, from a cave in New South Wales; type not seen. Subsequently placed in *Bathyphantes* by Rainbow, 1911, Rec. Austral. Mus., 6: 331. The description of the epigyne in particular points to the genus it is put into now.



21 22 23 24

Figs. 21-24. *Laetesia peramoena* (O. P.-Cambridge). 21, epigyne; 22, male palp, lateral aspect; 23, do., mesal aspect. Fig. 24. *Laetesia trispathulata* (Urquhart), epigyne. 21, 24, × 120; 22-23, × 88.

Ostearius melanopygius (O. P.-Cambridge, 1879)

A single specimen of this species has been found in an Australian cave: 1 ♂, Insect Cave, Mt. Hamilton, Victoria, 7.vi.1967, A. M. Richards (NMM). This seems to be the first record for Australia. The species was originally described from New Zealand. Nearly thirty years later it was described under a different name from England. Since then there has been a steady stream of records from many different parts of the world. Much attention has been paid to its supposed passive distribution by man. Finds on Madeira, the Azores, in Portugal, France, and England suggest the course of this distribution, and it must be admitted that records from Japan, Hawaii (in press), St. Helena (in press), the Polynesian Archipelago, the coastal regions of South America, and Amsterdam and St. Paul Islands in the Indian Ocean, do not contradict the idea of distribution by man. More recently, however, it has been found to occur on the East African mountains (Holm, 1962; other record from Kenya, in press), a region that does not easily fit into the theory of transportation by man. It should be pointed out, moreover, that the Hawaiian records are from far above sea-level (Kilauea Crater: 1200 m), too. Add to this the find in an Australian cave (this paper), and a single male specimen I have seen from an ant-nest in São Paulo, Brazil, (unpublished data), and it becomes clear that this theory does not have a world-wide significance. Part of the distribution may be artificial, of course, but otherwise the data seem to point to a wide, general distribution throughout the Old and New World tropics and Southern Hemisphere.

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