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NOTES ON THE ARCHITECTURE, NESTING HABITS, AND  
LIFE HISTORIES OF AUSTRALIAN ARANEIDÆ, BASED  
ON SPECIMENS IN THE AUSTRALIAN MUSEUM.

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(Figs. 53-54).

PART VI.—**ENTELEGYNÆ** (*Continued*).

*Family* ARGIOPIDÆ (=EPEIRIDÆ, *Auct.*).

Formerly this family was considered as including all and only those species whose snares are geometrical or orbicular. Dr. McCook in his great work<sup>1</sup> adopted this method. Since, however, some species, which cannot under any consideration be regarded as Argiopidæ, fabricate orbicular webs<sup>2</sup>, and some true Argiopids do not, any classification which has for its basic principal the method or style of architecture, must of necessity be artificial and unscientific. This doubtful system of classification, of course, is not by any means new; it was used by the old school of naturalists, and so far as McCook is concerned, is interesting only from the fact that so modern and capable a student still apparently adheres to and even justifies it.

The family is extensive and widely spread, and the species comprising it sedentary. Simon has divided it into four sub-families, viz., Linyphiinæ, Tetragnathinæ, Nephilinæ, and Argiopinæ, and these latter again into numerous groups or sections.

*Sub-family*, LINYPHIINÆ.

The Linyphiinæ are regarded by some authors as entitled to absolute family rank—Linyphiidæ, but Simon has included them in the Argiopidæ as a sub-family. In doing so, the author quoted, points out that though it is possible to trace a number of constant

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<sup>1</sup> McCook—*American Spiders and their Spinning Work*, i., 1889, p. 17.

<sup>2</sup> Rainbow—*Rec. Aust. Mus.*, iv., 3, 1901, p. 138.

characters that separate *Theridion* from *Linyphia*, it is not so easy to separate the latter from *Araneus*; the single feature relied upon by authors to distinguish the two latter, namely, the greater or lesser width of the clypeus being of little value and not even constant. On the other hand there exists between *Linyphia* and *Araneus* all possible passages, in which respect the sub-family Tetragnathinæ is particularly interesting<sup>3</sup>.

Linyphiinæ are divided into three natural groups: Erigoneæ, Formicineæ and Linyphiæ, and of these the first and third occur in Australia. The second includes two genera, namely, *Formicina*, Canest., and *Solenysa*, Sim. The former is apparently restricted to the Mediterranean region, and the latter Japan.

The head-quarters of Erigoneæ are apparently Palæarctica. The group contains upwards of sixty genera, and an immense number of species. Very few are known from Oceania, and only one species, *Neriene analis*, Sim., has so far been described from Australia (Victoria inter.<sup>4</sup>). The geographical range of *Neriene*, Blackw., is "Europa et Reg. mediterr.; Asia sept., centr. et orient; Amer. sept. et merid.; N.-Hollandia et N.-Zealandia."<sup>5</sup>

The Linyphiæ group embraces about twenty-seven genera, some of which are of world-wide distribution. Two only, however, are known to occur in Australasia: *Bathypantes*, Menge, and *Linyphia*, Latr. Of these the range of the former is "Europa; Reg. mediterr.; Asia sept., centr., orient. et merid.; N.-Hollandia et N.-Zealandia; America sept. et merid. andina,"<sup>6</sup> and of the latter, "Orbis reg. om. frigidæ, temp. et rarius calidæ."<sup>7</sup> *Bathypantes* is represented by *B. weburdi*; it was described by Urquhart as a species of *Linyphia*<sup>8</sup>, and was based upon a single specimen collected at the Jenolan Caves, N. S. Wales. Four other species, namely, *L. melanozantha*, *L. quindecim-punctata*, *L. sublutea*, and *L. nitens*, have been described by the same author from Tasmania.<sup>9</sup>

The webs of our native species have not been noted; nevertheless, wherever the Linyphiinæ have been studied, they have been found to make either a flat or dome-shaped web, supported above, below, and laterally by numerous irregular threads, the spider standing, usually, underneath in some corner out of sight. I once

<sup>3</sup> Simon—Hist. Nat. des Araignées, 2nd ed., i., 1892, p. 593.

<sup>4</sup> Simon—*Loc. cit.*, p. 667.

<sup>5</sup> Simon—*Loc. cit.*, p. 667.

<sup>6</sup> Simon—*Loc. cit.*, p. 705.

<sup>7</sup> Simon—*Loc. cit.*, p. 707.

<sup>8</sup> Urquhart—Trans. N. Z. Inst., xxii., 1889, p. 236, pl. xvi. fig. 2.

<sup>9</sup> Urquhart—Proc. Roy. Soc. Tas., 1892 (1893), pp. 103-108.

saw, at Guildford, among some coarse herbage, a small dome-shaped snare, such as described above, but the architect was not at home. Probably it had fallen as prey to some lizard. The dome of the web was very closely woven. These spiders are very small; they may be found among coarse herbage, under ledges of rocks, among reeds in marshes, and in angles between branches of trees. None of the Linyphiinæ construct orbicular snares. An immature *Linyphia*, sp. collected by me was taken with the sweep-net. They do not appear to be very numerous.

#### Sub-family TETRAGNATHINÆ.

This sub-family is divided into seven groups, for which Simon proposed the following names: Cyatholipeæ, Pachygnatheæ, Tetragnatheæ, Meteæ, Nesticeæ, Azilieæ, and Diphyeæ. The third and fourth of these are represented in the Australian fauna.

Seven genera have been assigned to Tetragnatheæ and two of these occur in Australia, namely *Tetragnatha*, Latr., and *Eucta*, Sim.

The genus *Tetragnatha* is very widely distributed, its geographical area being defined as follows: "Orbis totius reg. calid., temp. et frigida."<sup>10</sup> The majority of Australian species occur up north, but two, at any rate, are found in Tasmania: *T. margaritata*, L. K., Port Mackay; *T. jeroæ*, L. K., Bowen, Port Mackay, and Rockhampton; *T. rubriventris*, Dol. (= *lupata*, L. K.), Port Mackay and Bowen; *T. cylindrica*, Walck. (?), Sydney; *T. conica*, L. K., Bowen, Sydney, and Tasmania; *T. tuberculata*, L. K., Rockhampton, Bowen, Port Mackay, Peak Downs, Brisbane and Sydney; *T. demissa*, L. K., Bowen, Peak Downs, Rockhampton, Gayndah and Sydney; *T. gemmata*, L. K., Port Mackay; *T. valida*, Keys., Peak Downs, Gayndah and Sydney; *T. protensa*, Walck., Rockhampton, The Pelew Islands, and Ovalau, Fiji. *Eucta* is represented in Australia by two species, one apparently peculiar to our mainland, and the other a Malaisian form. They are *E. caudifera*, Keys., Sydney; and *E. anguilla*, Thor., Rockhampton and Malaisia. The range of this genus is: "Europa; Reg. mediterr.; Afr. occid. (*filum*, E. Sim.), India; Japonia (*caudicula*, Karsch); Malaisia (*anguilla*, *javana*, Thorell); Nova-Hollandia (*caudifera*, Keyserl.); Amer. sept. (*vermiformis*, Emert.)"<sup>11</sup>

<sup>10</sup> Simon—Hist. Nat. des Araignées, 2nd ed., i., 1892, p. 724.

<sup>11</sup> Simon—Loc. cit., p. 725.

Among orb-weavers, to which this group of spiders belongs, there are very distinct types, and their webs are equally so. Some of the latter are horizontal or slightly oblique and others perpendicular. The horizontal and oblique orbicular webs are almost invariably the work of species included in this sub-family. When a web is oblique, it is due to the nature of its surroundings. Tetragnathid snares are usually constructed over narrow running streams and creeks; hence, in the event of one bank being lower than the other, the natural result would be an oblique web. Although the species appear to prefer the neighbourhood of water, including not only creeks and water-holes, but also swampy areas, they may nevertheless be found at times considerable distances away, so that it is no uncommon experience for the collector to find a Tetragnathid spider and its snare among coarse herbage. When alarmed these spiders will sometimes simply drop from the web, and hang by a thread of silk in mid-air. Thus suspended the creature looks like a bit of stick; at other times they scuttle away from their webs with great rapidity and seek shelter among neighbouring plants and bushes. Upon these they rest, secure from persecution, owing to their colouration. Their long cylindrical bodies, and still longer attenuated legs, add to their protection. A Tetragnathid when concealing itself upon a shrub or coarse grass stretches itself along the stem upon which it has sought refuge. Here, with its body closely adpressed, its first and second pairs of legs stretched well forward, and the third and fourth pairs as carefully directed backwards, it rests in perfect security. When reposing at the centre of the web, the position just described is maintained, with the exception that the legs are not stretched quite so straight, nor are they placed quite so closely together. The webs of Tetragnathinæ consist of the usual outer lines and guys which go to make the framework, and which are, of course, attached to plants, rocks, posts and the like upon the banks, or between clumps of reeds growing in the water. From the outer lines the radii extend towards the centre or "hub"; the latter is open, and consists of a series of notched concentric lines, and these form a group by themselves. Beyond the hub there is a free space, and then a further series of larger and more widely separated concentric lines. The number of radii and concentrics varies somewhat, but the principle of construction is always the same. As a rule there are from eighteen to twenty-four radii, eight to fourteen concentrics, and five or six notched lines in the hub. The cocoon of *T. cylindrica* is round, about a quarter of an inch in diameter, fine and closely woven, white with green tufts; it is invariably fixed to some object near the web. In connection with the species just quoted, it is interesting to

note that it is able, when it drops upon still water, to skim across the surface. Certain spiders, such as those of the genus *Dolomedes*, Latr., have long been known to possess this habit, but one would hardly have associated such with the Argiopidæ. Personally, I am inclined to think that so far as *Tetragnatha* is concerned it is only resorted to as a last resource,—that is, when the creature finds itself so situated, and with its retreat cut off. Indeed, if a floating stick or leaf be near, it will instantly avail itself of it. Dr. H. C. McCook has recorded an American spider—*T. grallator*, Hentz<sup>12</sup>—that has acquired this aquatic habit, but he also points out that when it is skimming over the surface of the water, it stands high upon its legs, raises its abdomen, and pays out threadlets of silk, much after the manner of aeronautic spiders, and that these threadlets act as a sail.

The Metææ introduce the student to a group of comparatively small, yet extremely brilliant spiders. The group consists of ten genera and many species. Of these genera two, *i.e.*, *Meta*, C. Koch, and *Argyropeira*, Emert., occur in Australia. The range of *Meta* is “Orbis totius, reg. temp. et calidæ”<sup>13</sup>; and of *Argyropeira*, “Orbis totius reg. tropicæ rarius sub-tropicæ.”<sup>14</sup> The genus *Orsinome*, Thor., although not yet known to occur in Australia, may nevertheless be hereafter recorded, at any rate from the more northern and tropical areas; at present its range is defined as “Malaisia; Polynesia et ins. Madagascar.”<sup>15</sup>

All our Australian species have been assigned by authors to the genus *Meta*, but notwithstanding this some are undoubtedly *Argyropeira*. One species described by L. Koch (from an immature female) is regarded by Thorell as a very young *Nephila maculata*, Fab.<sup>16</sup> namely *Meta ornata*. I am inclined to regard this, however, (notwithstanding the eminent position of the authority quoted), an error. There is in our cabinets a species of *Meta* from the Jenolan Caves district, which agrees so closely with Koch's description and figure, that I have no hesitation in assigning it to that author's species, namely, *Meta ornata*. Further, I have examined many species of Araneidæ from the Jenolan Caves district, and have not yet met with a *Nephila*; indeed, I doubt if that genus occurs there; the winter is too cold.

<sup>12</sup> McCook—American Spiders and their Spinning Work, 1889, i., pp. 158-161, figs 151, 152.

<sup>13</sup> Simon—Hist. Nat. des Araignées, 2nd ed., i., 1892, p. 735-6.

<sup>14</sup> Simon—*Loc. cit.*, p. 736.

<sup>15</sup> Simon—*Op. cit.*

<sup>16</sup> Thorell—Ragni Malesi e Papuana, i, p. iv., 1889; also iii., 1881, p. 150.

<sup>17</sup> Koch—Arach. Austr., i, p. 134, pl. xi., fig. 6.

Of the two genera known to occur in Australia, the forms included in the genus *Argyropeira* are much the brightest. This genus embraces such well-known and widely distributed species as *A. celebesiana*, Walck., and *A. granulata*, Walck., both of which are exceedingly common.

The webs of these spiders are perpendicular, orbicular, and very regular; the free zone separating the hub from the spirals is rather large. Attached to the framework of the snare there are numerous irregular lines, and these form an exceedingly complicated network. The ova-sac is floccose, yellow, and filled with concolorous eggs; it is usually attached to a neighbouring branch. *A. celebesiana*, and *A. granulata* are numerous enough in orchards and gardens around Sydney; they are also common in scrub-lands, and in parts of the bush that have been cleared.

Sub-family NEPHILINÆ.

(Fig. 53).

This sub-family is divided into four groups, namely, Phonognatheæ, Nephileæ, Clitætreæ, and Heremnieæ, and of these the two first occur in Australia. The Phonognatheæ group containing three genera, is at present only known from Australia, and the species are few, but Simon considers that some Malaisian forms described under the generic names of *Epeira*, Auct., and *Milonia*, Thor., are in all probability referable to this group. The genera *Phonognatha*, occur in "N.-Hollandia et Tasmania," *Singotypna*, Sim., "N.-Hollandia," and *Deliochus*, Simon, "Nova-Hollandia et Tasmania."<sup>18</sup>

*Phonognatha graeffei*, L. K., = *Epeira graeffei*, L. K., and *Meta graeffei*, Keys.; *Singotypna melania*, L. K., = *Epeira melania*, L. K., and *Meta melania*, Keys.; *S. melanopygia*, L. K., = *E. melanopygia*, L. K.; and *Deliochus zelivira*, Keys., = *Meta zelivira*, Keys. All of these spiders are of medium size, and their webs and ova-sacs are similar to those of the Metææ.

The Nephileæ include, according to Simon's classification, only one genus, namely, *Nephila*, Leach. In 1872 L. Koch founded a genus which he named *Nephilengys*,<sup>19</sup> and which Simon afterwards retired into the cool shades of synonymy. But his argument that *Nephilengys* runs into *Nephila* would, as pointed out by Hogg,<sup>20</sup> (who later restored it) "equally serve for connecting through this species all the genera from *Nephila* to certainly *Gea*, and perhaps *Epeira* (*Araneus*, Simon)."

*Nephilengys*, if it be permitted to stand, as I think it should, would include of course L. Koch's *N. schmeltzii* (Philippine Islands)

<sup>18</sup> Simon—*Hist. Nat. des Araignées*. 2nd ed., i., 1892, pp. 748-9.

<sup>19</sup> Simon—*Loc. cit.*, pp. 750 and 755.

<sup>20</sup> Hogg—*Proc. Roy. Soc. Vict.*, xi., 1899, pp. 138-9.

and *N. hofmani* (Borneo) as well as Hogg's *N. rainbowi* from the Upper Endeavour River, Queensland.

*Nephila* is almost entirely a tropical genus. Its range is "Orbis totius reg. tropicæ et rarius sub-tropicæ."<sup>21</sup> About a dozen species occur in Australia, and one of them *N. maculata*, Fab., the type of the genus, occurs throughout tropical Asia, Malaisia, and Oceania. It is indeed, the commonest species collected by Island missionaries. L. Koch, has described ten species from this continent; W. S. Macleay, one; and myself, five. Some of these appear to be varieties of *N. maculata*. The species are remarkable for the great disparity in size of the sexes, the male being a veritable pigmy in comparison with the female. The act of approaching the female when pairing is often fraught with grave danger to the male, indeed he often falls to her as prey. Nevertheless, it is apparent from observation that "his size protects him," for being so small he may at times approach without attracting her attention seeing that he invariably does so from the rear, but woe betide him if in his anxiety he vibrates the web ever so little. Having safely approached, the male makes a sudden spring which lands him on one of the hind legs of the female, from whence he nimbly scrambles on to her back, eventually working his way to the ventral position, where with his legs thrown round and clasping the abdomen he inserts his palpi into the epigynum. The act of coition accomplished, the male has still to exercise some care in quitting the web, for delay would be disastrous to him. A couple of seasons ago I made a curious observation, which proved that the female may on occasion, notwithstanding her immense size, succumb to the voracious appetite of the male. I had discovered a *Nephila ventricosa*, mihi, in her web; she had a male upon her back (abdomen), and I noted that his fangs were buried therein, and he was apparently—doubtless, after the act of coition—enjoying a meal. McCook has recorded a similar act of cannibalism in connection with *Araneus strix*, Hentz,<sup>22</sup> and Baron Walckenaer,<sup>23</sup> to quote McCook, "saw a male of *Epeira inclinata* take advantage of a female of his species, which was not able to stir without difficulty being full of eggs, to attack, garrote, and eat her." This species of cannibalism does not appear to have been often observed, but I doubt not it is more common than generally supposed.

The ova-sac of *N. edwardsi* and *N. ventricosa*, mihi, may be noted around Sydney from the middle of March to the end of April, or the commencement of May. The cocoons are oval and (fig. 53) enveloped in a dense but loosely woven mass of bright yellow silk.

<sup>21</sup> Simon—Hist. Nat. des Araignées, 2nd ed., i., 1892, p. 755.

<sup>22</sup> McCook—American Spiders and the Spinning Work, ii., 1890 p. 24.

<sup>23</sup> McCook—Loc. cit., Walckenaer, Apteres, i., p. 143.



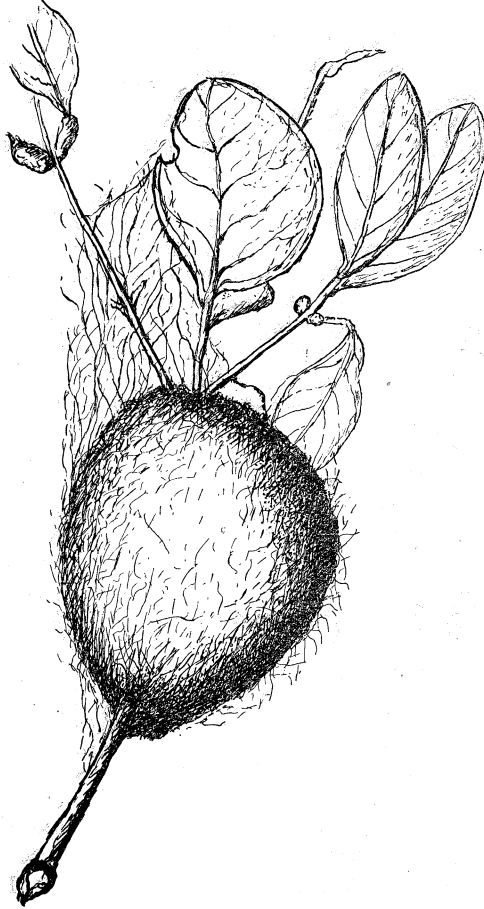


Fig. 53. Nest of *N. ve. tricola*, Ramb.

attached to and suspended amongst the stalks of plants adjacent to the web. The webs of our Sydney *Nephila*, and their strength to retain small birds accidentally ensnared have already been described by me.<sup>24</sup>

Much of the silk of these and congeneric spiders is employed by birds to line their nests. In addition to this *Nephila* silk is used by savage man for a variety of purposes. In some of the South Sea Islands it is sometimes applied by him to decorate

<sup>24</sup> Raintow—Proc Linn. Soc. N. S. Wales, xx., 1895, pp. 354-359.

carved images, and in New Britain it is used as a material in the manufacture of "Smothering Caps." A specimen of the latter has been presented to the Trustees of the Australian Museum by Dr. J. C. Cox, President of the Board of Trustees. It is conical in shape, about 2ft. 4½in. long and 8 inches round the base, somewhat flexible, and therefore capable of distension. In the manufacture of these caps a shaped frame is passed over and under the webs of orb-weaving spiders until a sufficiency of the material is felted thereon; it is then removed in one piece. It is said that these caps are used for smothering adulterous women. On the atoll of Funafuti, the natives utilise the webs of orb-weaving spiders for making nets to catch mosquitoes and other insects. A forked stick is converted into a hoop by tying together the extremities of the arms of the fork. This is then passed over and over through orbicular snares until the hoop is filled by a membrane of glutinous spider threads. With this implement any insect would be struck and meshed.<sup>25</sup>

Herennieæ is a small group consisting of only one genus and a very few species. The genus *Herennia*, Thor., ranges through "Asia tropica, Melaisia et Papuasias."<sup>26</sup> It is not unreasonable therefore to assume that it may hereafter be recorded from Northern Queensland.

Family HYPOCHILIDÆ.

ECTATOSTICA TROGLODYTES, *Higg and Pett.*

(Fig. 54).

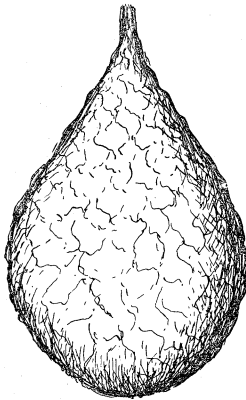


Fig. 54.

Nest of *E. troglodytes*,  
*Higg. and Pett.*

In a former volume of these Records I figured and redescribed Higgins and Petterd's species—*Ectatostica troglodytes* = *Theridion troglodytes*<sup>27</sup> and quoted from their paper<sup>28</sup> a note *re* the "nest" or cocoon of the species. Since the publication of my paper a cocoon has been added to the collection in the Australian Museum (fig. 54). It is pear shaped, and was suspended by a narrow neck; white, densely and closely woven, and filled with a large number of yellow eggs, the latter surrounded by a quantity of white loose flocculent silk. The female hangs over her cocoon, and stoutly defends eggs and young.

<sup>25</sup> Rainbow—Aust. Mus. Mem., iii., 2, 1897, p. 96.

<sup>26</sup> Simon—Hist. Nat. des Araignées, Ed. 2, i., 1892, p. 759.

<sup>27</sup> Rainbow—Rec. Aust. Mus., v., 5, 1904, pp. 326-9, pl. xlvi., figs 1-4.

<sup>28</sup> Higgins and Petterd—Proc. Roy. Soc. Tas., 1883, p. 198.