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Polynesian Spiders¹

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Due to war conditions in Europe, the author was unable to see the edited manuscript of this paper. Bishop Museum is publishing it in the best form possible under the circumstances, rather than withhold publication indefinitely.—
EDITOR.

Through the kindness of Bernice P. Bishop Museum, I have been able to study an interesting collection of spiders found in various parts of Polynesia by E. C. Zimmerman during the Mangarevan Expedition in 1934. To this collection, made chiefly in the Austral Islands, the Society Islands, the Tuamotus, and Pitcairn Island, I have added some specimens collected in 1924 by E. H. Bryan, Jr. in the Phoenix Islands. This material consists of 46 species and 1 variety, of which 2 genera, 12 species and 1 variety are new. It is a valuable contribution to our knowledge of the spider fauna of the Pacific islands, especially that of Rapa, Marotiri, and the summits of Tahiti. It also adds much to our comprehension of some problems of biogeographic affinities of this region.

Spiders of Polynesia are found to fall into three main groups. The first, that of an archipelago, is rather uniform, there being no important differentiation of species between the separate islands. For instance, the remarkable thomisid, *Misumenops rapaensis* Berland, which has not been found outside of the Austral Islands, is common in Rapa, and is also found in Raivavae, Rurutu, and Tubuai of the same archipelago. Many other instances occur, and it may be said that endemism applies only to the group and not to each of the separate islands comprising that group. This endemism reaches 50 percent or more of the general fauna.

¹ Mangarevan Expedition publication 35.

Together with these endemics, there is a second, more widely distributed group of spiders which may be said to constitute a Polynesian, or even a Pacific fauna. This is true of some salticids—*Athamas whitmeei* Cambridge (Samoa, Tahiti, Marquesas, Fiji, Australs, Mangareva, Loyalty, Solomons, New Hebrides); *Mollica microphthalma* L. Koch (Tahiti, Hawaii, Marquesas, Rarotonga, New Caledonia) and one pholcid, *Pholcus ancoralis* L. Koch (Samoa, Tahiti, Marquesas, Australs, Tonga). Some extend westward even to the Asiatic region; for instance, the salticid, *Bavia aericeps* Simon (Philippines, Marianas, Hawaii, Samoa, Marquesas, Society Islands, Rarotonga and Australs).

A third element is represented by the cosmopolitan species. Their number does not exceed 10 in the Pacific, and, as their list is constant, it may be said that it is not increasing; they are distributed by man, but their extent is nearly fixed now.

Each collecting trip may be expected to modify our previous concepts of distribution, as results of the Mangarevan Expedition show. *Ariadna lebronneci* Berland, 1933, described from the Marquesas, where it was considered as endemic, is now known from Rapa and Marotiri. *Sandalodes calvus* Simon, 1902, described from Queensland, Australia, was found in the Marquesas, and is known also from Tahiti, Raiatea and Mangareva. *Theridion adamsoni* Berland, 1934, from Tahiti, exists also in Rapa, Raivavae and Marotiri. The genus *Hivaoa* Berland, 1935, is no longer localized in the Marquesas, but represented by two new species at Rapa. *Cyclosa tauraii* Berland, 1933, described from the Marquesas, was found in Tahiti. *Cyrtophora moluccensis* Doleschall, a common Malayan and west-Pacific spider, was supposed to extend no farther eastward than Tahiti, but one female was found in Henderson Island, near Pitcairn.

I wish to call attention to three points of special interest resulting from the study of this material. The first concerns the fauna of Rapa. This small and isolated island possesses an interesting fauna, richer than the other Austral Islands. Of about 20 species of spiders, many are Polynesian, related to those of Tahiti, or even those of the Marquesas. Zimmerman found many indigenous species of Coleoptera (Curculionidae) there. Spiders, however, although as well isolated, seem to have evolved less rapidly into distinct species. Five species are endemic to Rapa: *Trite rapaensis* Berland, *Theridion rapanac*

Berland, *Hivaoa phalangiops* Berland, *H. chamberlini* Berland, and *Paro simoni* Berland. Of these, *Trite rapaensis* is peculiar in showing affinities to the fauna of the west part of the Pacific, the genus *Trite* being, until now, limited to Australia, New Caledonia and New Zealand, a region whose affinities with Polynesia were very poor, if they even existed. Similarly, *Paro simoni* is allied to *Mynoglenes*, a genus known from New Zealand and the subantarctic islands. The fauna of Marotiri (Bass Island) is also of great interest. This group of small rocks is 50 miles east of Rapa and even more isolated (Murphy, J. C., photograph, National Geographic Mag. 48: 367, Oct. 1925; Zimmerman, B. P. Bishop Mus., Occ. Papers 12: 21, 1936). It is very remarkable that on these rocks the following spiders may be found: *Ariadna lebronneci* Berland, *Theridion adamsoni* Berland, *Ostearius melanopygius* Cambridge, *Lycosa tanna* Strand, *Australaena hystricina* Berland, *Pseudomaevia insulana* Berland. *Ariadna lebronneci* and *Theridion adamsoni* are also known from the Marquesas. *Australaena hystricina* and *Pseudomaevia insulana* are new forms, but another species of each of these genera is found in the mountains of Tahiti. *Ostearius melanopygius* is known from New Zealand and the St. Paul Islands, and from the north part of the Atlantic (England, Azores, Madeira, Portugal) where it is supposed to have been introduced. Its original country was most probably New Zealand and Marotiri.²

The third case is represented by the summits of Tahiti. As observed by A. M. Adamson when he visited this island, Tahiti is not well known to entomologists, because little collecting has been done in mountains which are not easily accessible. Zimmerman collected above 1,500 meters and found interesting forms, chiefly a variety of *Pseudomaevia insulana* Berland (the typical form in Rapa), and *Australaena zimmermani* Berland (another species in Marotiri). The *Pseudomaevia*, if it belongs to this genus, is related to a form described from Lord Howe Island. The *Australaena*, however, is more curious for it belongs to the clubionids of the group Anyphaenae, which previously had no representative in the Pacific (very numerous in South America); this form, however, is more allied to the European genus *Any-*

² "It is possible that it was introduced by man to Marotiri. The Polynesians have for long been going from Rapa to Marotiri to fish and gather young sea birds and eggs for food. The species probably has been introduced to Rapa, but my brief stay there is not to be taken as adequate for a comprehensive survey of the spiders of the island. Our knowledge of the distribution of the spiders of these islands is based on inadequate collections."—E. C. Zimmerman.

phaena than to the American genera, but it shows a relation to America, where this group is characteristic.

The well known affinities between Australia and America were possibly established through a south Pacific route, there having been no proof of a passage via Polynesia. These spiders, however, may be one "temoin" of such a passage. The fauna of the summits of some high Polynesian islands, which may be peculiar and quite different from the fauna of the lowlands may thus be of great interest, as I have noted in my previous studies on the spiders of the Marquesas.

FAMILY SICARIIDAE

Genus **SCYTODES** Latreille, 1804

1. **Scytodes striatipes** L. Koch.

Austral Islands: Rurutu, Aug. 28, 1934, one female; Tubuai, Mt. Taita, Aug. 1934, four females.

Rapa: south ridge of Mt. Perahu, July 13, 1934, one female.

Society Islands: Huahine, valley west of Mt. Tahateao, Sept. 20, 1934, one female.

A widespread species, known from nearly all the Pacific: Samoa, Fiji, Tonga, Tahiti, Loyalty Islands, Ellice Islands, and the Marquesas.

FAMILY DYSDERIDAE

Genus **ARIADNA** Audouin, 1825

2. **Ariadna lebronneci** Berland, B. P. Bishop Mus., Bull. 114: 43, figs. 1-5, 1935.

Rapa: Mangaoa Peak, alt. 300-500 m., July 2-6, 1934, three females.

Marotiri: three immature females.

This species was described from the Marquesas, where it is not rare in some of the islands, but is only found above 3,000 feet in the forest region. Until recently, it was the only *Ariadna* known from Polynesia, but there is a Hawaiian species *A. perkinsi* Simon, a species in Christmas Island, and some others in the outer limits of the Pacific: New Caledonia, Galapagos, Juan Fernandez. The genus is nearly cosmopolitan.

FAMILY OONOPIDAE

Genus **GAMASOMORPHA** Karsch, 18813. **Gamasomorpha loricata** L. Koch.

Austral Islands: Raivavae, Aug. 1934, one female.

Mangareva Islands: Mangareva, Agakau-i-tai, May 8, 1934, one female.

Pitcairn: June 14, 1934, two females.

The females of *Gamasomorpha* are not easily named with certainty. *G. loricata*, described from Samoa, is also known from Australia, Lord Howe Island, and the Marquesas; but all the specimens from these localities may not belong to the same species. The capture of males would decide the question, but only one was found in the Marquesas (Berland, B. P. Bishop Mus., Bull. 114: 46, 1935).

4. **Gamasomorpha minima**, new species (fig. 1, *a*).

Characterized by the palp (fig. 1, *a*); the bulb is whitish, well separated from the tarsus, ovoid, prolonged by a cylindrical portion, which bears a short stylus. General color pale yellow; sternum broad, as broad as long. Length, 1.5 mm.

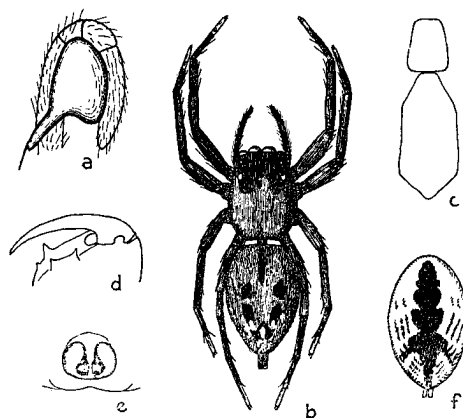


FIGURE 1.—*Gamasomorpha minima*, n. sp.: *a*, bulb seen from outside; *Pseudomaevia insulana*, n. sp.: *b*, female $\times 2.5$; *c*, sternum and labium; *d*, chelicera; *e*, epigyn. *Pseudomaevia insulana aorai*, n. var.: *f*, dorsal view of abdomen.

Phoenix Islands: Canton Island, March 17, 1924, E. H. Bryan, Jr., one male (holotype), one female; Enderbury Island, March 11, 1924, Bryan, one male, one female.

The male is very different from that of *G. loricata*, found once in the Marquesas, so I am obliged to consider this species as new. *G. loricata*, found in some parts of the Pacific, is the commoner of the two species.

FAMILY THOMISIDAE

Genus **MISUMENOPS** F. Cambridge, 1900

5. **Misumenops rapaensis** Berland, Soc. ent. France, Ann. 103: 329, figs. 9-13, 1934.

Austral Islands: Raivavae, Aug. 1934, male, females, young; Rurutu, Aug. 1934, females, young; Tubuai, Mt. Taita, six females.

Rapa: south slope of Mt. Tepiahu, July 16, 1934, alt. 400-600 ft., one female, subadult; near Area, June 30, 1934, males, females; Morongota, July 11, 1934, alt. 500-900 ft., males, females.

This pretty spider, a large *Misumenops* with characteristic markings on the back of the abdomen, is fairly common in Rapa and seems to extend to many of the islands of the Austral group.

6. **Misumenops melloleitaoi**, new name.

Misumenops pallida Berland, B. P. Bishop Mus., Bull. 113: 98, figs. 1-5, 1935.

Dr. Mello-Leitao kindly wrote me that *pallida* was preoccupied in *Misumenops*. I am glad to name this species in honor of the distinguished Brazilian arachnologist.

FAMILY SALTICIDAE

The salticids are rather numerous in the Pacific. In addition to some very common Polynesian species, such as *Bavia aericeps*, *Thorcellia ensifera*, *Athamas whitmeei*, the Mangarevan Expedition collected some new species of great interest. Among these, the group Fissidentati is the most abundantly represented; the Pluridentati, so common in Africa, are scarce.

Genus **BAVIA** Simon, 1877.

7. **Bavia aericeps** Simon.

Austral Islands: Raivavae, Aug. 1934, males, females, young.
Society Islands: Tahiti, Aru, March 6, 1934, one male; Bora-

bora, Mt. Pahio, Oct. 13, 1934, one female; Raiatea, Oct. 5, 1934, one male.

Known from the Philippines, Malaya, Marianas, Samoa, Funafuti, Hawaii, and the Marquesas.

Genus **THORELLIA** Keyserling, 1882

8. **Thorellia ensifera** (Thorell).

Austral Islands: Raivavae, Aug. 1934, females, young; Tubuai, Tapapatauai, Aug. 19, 1934, one male, young; Murivai, Aug. 16, 1934, one female, without locality, Aug. 1934, two females; Rurutu, Aug. 30, 1934, three females; Maria, Sept. 6, 1934, two females.

Rapa: entire island, common.

Society Islands: Meeticia, June 13, 1934, one female; Raiatea, Oct. 6, 1934, females.

Mangareva Islands: Mangareva, May 24, 1934, males, females, young; Taraururoa, May 28, 1934, males, females.

Tuamotus: Anaa, May 13, 1934, females; Hao, May 19, 1934, females.

Pitcairn: June 14, 1934, two males, young.

Henderson Island: June 1934, one male, one female.

This species is probably the commonest salticid in the Pacific. Recorded from Malaya, the Marquesas, and Marshall Islands.

Genus **ATHAMAS** Cambridge, 1877

9. **Athamas whitmeei** Cambridge.

Austral Islands: Rurutu, Aug. 30, 1934, one male, one young.

Society Islands: Tahiti, one male.

Mangareva Islands: Mangareva, Agakau-i-tai, May 8, 1934, one male.

Described from Samoa, this small, pretty salticid is fairly common in Polynesia; known also from the Loyalty Islands.

Genus **PSEUDOMAEVIA** Rainbow, 1920

10. **Pseudomaevia (?) insulana**, new species (fig. 1, *b-e*).

Female (fig. 1, *b*). Color: cephalothorax very dark, castaneous, the head black; chelae, labium, maxillae, legs dark castaneous and without rings, the tarsi pale yellow; abdomen grayish on the back with testaceous spots, in the posterior part, two series each of three brown spots (fig. 1, *b*), the ventral face testaceous,

the median part grayish; spinnerets grayish. Eyes: the group wider than long, the eyes of the second row nearer to the anterior than to the posterior eyes, first row recurved by the upper margin, the lateral eyes do not reach the median; clypeus nearly wanting. Chelae (fig. 1, *d*), anterior margin with two teeth, the superior larger, posterior margin bearing a large carina with acute angles. Sternum long and narrow (fig. 1, *c*), very narrow in the anterior part, labium nearly as long as the half of the sternum. Legs rather short, strong, tibiae I with 3-3 spines, tibiae II, with 2-2. Epigyn (fig. 1, *e*). Total length 9 mm., cephalothorax, length 4 mm., width 3 mm.

Marotiri, July 22, 1934, one female (holotype), four females (paratypes), young.

10a. *Pseudomaevia insulana* var. *aorai*, new variety (fig. 1, *f*).

Differs from *insulana* chiefly by the pattern of the abdomen (fig. 1, *f*), by the dark rings on the legs, and by the broader sternum, a little less than twice as long as broad.

Society Islands: Tahiti, Mt. Aorai, alt. 1,500-1,800 m., Sept. 15, 1934, one female (holotype), four females (paratypes).

This spider apparently belongs to the group *Maeviae*, which is chiefly known from North America, where it is abundantly represented in the north; it has the same type of very narrow sternum, and labium. Formerly many Australian salticids were named *Maevia*, but it was recognized afterwards that this was not correct, this genus being limited to North America. Recently, Rainbow described the genus *Pseudomaevia* from Lord Howe Island with which the spiders I describe here agree fairly well. I cannot separate the salticids collected in the mountains of Tahiti from those of Marotiri; they have the same form of carapace, the same disposition of eyes, the same chelae, with the characteristic tooth on the hind margin, the epigyn is nearly identical; the only differences are in the pattern, especially the markings of the abdomen (fig. 1, *f*), and in the slightly broader sternum. The five Tahitian specimens seem to present a greater variability among themselves than those of Marotiri.

Genus **TRITE** Simon, 1885

11. *Trite rapaensis*, new species (fig. 2, *a-g*).

Male. Color: carapace dark castaneous, fast [almost ?] black, the middle of the thorax clearer; chelae, maxillae, labium castaneous; sternum brown; legs pale yellow, the first pair castaneous, all the legs with different brown rings (fig. 2, *a*); back of abdomen with a median clear stripe, margins dark and sinuous, ventral side white, with a median brown stripe reaching the spinnerets and mottled with white spots arranged in longitudinal rows. Hairs not very numer-

ous, no scales, some white hairs on the thoracic part of the carapace. Chelae with a large tooth on the hind margin (fig. 2, *b*), the superior angle of it prolonged like a beak, on the anterior margin two small teeth and, near the insertion of the claw, a large round carina (fig. 2, *d*). Sternum and labium (see fig. 2, *e*). Legs I-II-IV-III, the first stronger, their tibiae with 2-2-2 spines, metatarsi with 2-2, legs III and IV with only few spines; palp and bulb (see fig. 2, *f*). Total length 6.2 mm., carapace, length 3 mm., width 2.5 mm. Female abdomen uniformly dark without pattern on the back; tooth of the posterior margin not beaklike (fig. 2, *c*); epigyn (fig. 2, *g*).

Rapa: Mangaoa Peak, alt. 300-400 m., July 6, 1934, one male (holotype); Mt. Perahu, alt. 500-800 ft., July 24, 1934, males, females, young.

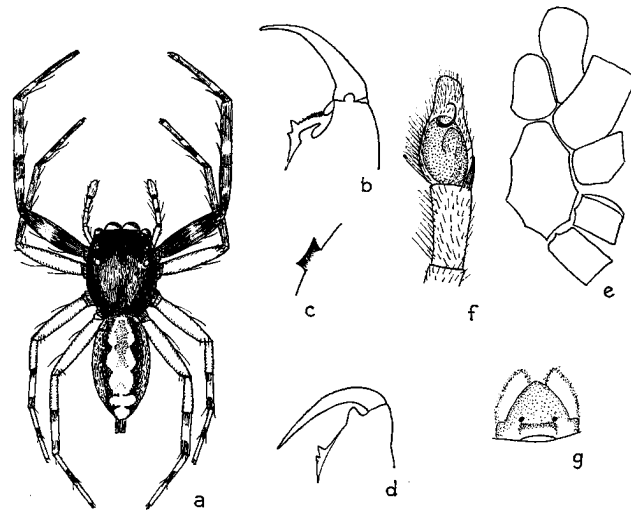


FIGURE 2.—*Trite rapaensis*, n. sp.: a, male $\times 2.5$; b, male chelicera, posterior side; c, female, tooth of the posterior margin; d, male, chelicera, front side; e, sternum, mouthparts, coxae; f, male, pedipalp and bulb; g, female, epigyn.

The genus *Trite*, with the closely allied genus *Opisthoncus*, has been known only from New Zealand and New Caledonia in the west of the Pacific. Its presence in Rapa is interesting and shows some extension of the canac [Pacific ?] fauna to the east across the southern Pacific region.

Genus **SANDALODES** Keyserling, 1883

12. *Sandalodes calvus* Simon, Berland, B. P. Bishop Mus., Bull. 114: 55, figs. 22-26, 1935; Bull. 113: 100, 1935.

Society Islands: Tahiti, Vairoa, March 20, 1934, one male, one female; Mt. Aorai, alt. 1,200-1,500 m., one female; Raiatea, Oct. 5, 1934, Sept. 13, 1934, some females; Moorea, Mt. Teaharoa, alt. 500-700 m., Sept. 25, 1934, one female.

Mangareva Islands: Mangareva, May 23, 1934, one male.

The genus *Sandalodes* is known from India, Celebes and Australia. Several species occur also in Hawaii and in the Marquesas.³ Unlike most of the species of the genus, *S. calvus* is not localized, but dispersed throughout the whole Pacific. Described from Australia, it was found later in the Marquesas and in the Society Islands, to which localities is now added Mangareva. This species seems to be subject to actual dispersal, whereas, the others are strictly localized.

Genus **MOLLICA** Peckham, 1901

13. **Mollica microphthalma** L. Koch.

Austral Islands: Raivavae, Aug. 1934, one female, one young; Rurutu, Aug. 29, 1934, one male.

Rapa: Area, July 1934, one male; Morongota, July 11, 1934, one female.

Society Islands: Moorea, Sept. 26, 1934, one female, one young.

Known also from New Caledonia, Loyalty Islands, Tahiti, Hawaii, and Rarotonga.

Genus **PLEXIPPUS** C. Koch, 1850

14. **Plexippus paykulli** Audouin.

Austral Islands: Rurutu, Aug. 28, 1934, one male.

Mangareva Islands: Mangareva, May 24, 1934, some females and young.

A cosmopolitan species.

FAMILY CLUBIONIDAE

Genus **AUSTRALAENA**, new genus

Belonging to the group Anyphaenae and very near *Anyphaena*. Tracheal spiracle nearer to the epigastrium than to the spinnerets; chelae bearing on the anterior margin 4 or 5 teeth, on the hind margin a row of 3 to 5 small teeth followed by a series of minute ones.

³ *Sandalodes nigrescens*, a species I described in 1933 (B. P. Bishop Mus., Bull. 114:59, figs. 36-38, 1935) is in reality a very dark form of the cosmopolitan species *Plexippus paykulli* Audouin; therefore its name is now *Plexippus paykulli* var. *nigrescens* Berland.

Genotype: *Australaena hystricina*, new species.

The genus *Australaena* belongs to the group Anyphaenae, considered by some authors as a separate family. These spiders, except for the position of the hind spiracle, resemble the genus *Clubiona*; they are characteristic of the South American fauna, where they are represented by numerous genera and species; outside South America they are known by the genus *Anyphaena*, common in North America and in Europe. Until now, no spider of this group had been found in the Pacific, and the fact is of great importance for the comprehension of the Pacific fauna. It is worthy of remark that not only was a species found at Marotiri, but another one in the mountains of Tahiti.

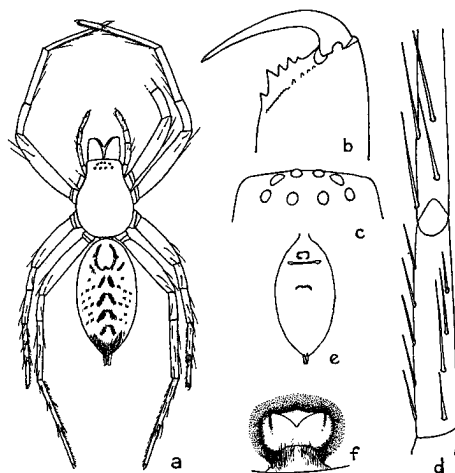


FIGURE 3.—*Australaena hystricina*, n. sp.: a, female $\times 2$; b, female, chelera, posterior side; c, female, eyes; d, female, tibia and metatarsus, inferior side; e, female, ventral side of abdomen; f, epigyn.

15. *Australaena hystricina*, new species (fig. 3, a-f).

Female. Color: carapace, chelae, labium, legs, pale yellow; sternum, coxae and inferior side of femora, testaceous; abdomen grayish with darker spots (fig. 3, a), ventral side grayish; hairs on tegument, and also other erected [?], black, numerous on the carapace and the anterior side of chelae; scopulae particularly strong on tarsus, metatarsus, and a part of the tibiae of legs II. Eyes, median anterior a little smaller than the others (fig. 3, c), separated from each other by less than their diameter, and still less from the lateral anterior, 2d row procurved; chelae slightly geniculate, anterior margin with 5 teeth, one of them stronger (fig. 3, b), posterior margin with 4 small teeth, and a series of very

