

# AMERICAN MUSEUM NOVITATES

PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY  
CITY OF NEW YORK MAY 9, 1949 NUMBER 1418

---

## A NEW FROG OF THE GENUS *CORNUFER* FROM THE SOLOMON ISLANDS, WITH NOTES ON THE ENDEMIC NATURE OF THE FIJIAN FROG FAUNA

BY WALTER C. BROWN AND GEORGE S. MYERS<sup>1</sup>

*Cornufer dorsalis* Duméril, a frog described from Java, was identified by Boulenger (1882, p. 108) with a Fijian species. Barbour (1923) makes the same identifications, but neither he nor Boulenger saw the type specimen. Van Kampen (1923, p. 239) examined Duméril's type of *dorsalis* in Paris and placed it as a member of the genus or subgenus *Platymantis*, which some authors unite with *Rana*. Van Kampen points out that the locality "Java" is certainly incorrect, as, indeed, Boulenger had suspected in 1882, and he suggests that the type of *C. dorsalis* may have been from the Philippines. Van Kampen, having shown that "*C. dorsalis*" is not even generically identical with the Fijian frog, uses the earliest subsequent name based on Fijian material and calls the species *Cornufer vitiensis* (Girard).

Boulenger (1884, pp. 211-212; 1886, pp. 53-54, pl. 11, figs. 1-2) originally recorded two species of *Cornufer* from the Solomons, *C. guppyi* Boulenger and *C. solomonis* Boulenger, but of these, the latter is now also referred to *Platymantis* (Boulenger, 1918, p. 373; Van Kampen, 1923, pp. 191-192). In 1887 (p. 337), however, Boulenger recorded "*Cornufer dorsalis* Duméril" from Faro (Fauro) Island in the Solomons. Barbour (1921, p. 97) presumes that Boulenger's "*C. dorsalis*" was nothing but an example of *C. guppyi*. Thus at the present time, the genus *Cornufer* is represented in lists of the Solomons fauna by *C. guppyi* and Boulenger's doubtful record of "*C. dorsalis*" from Faro Island.

---

<sup>1</sup> Of the Natural History Museum, Stanford University.

That at least two distinct species of *Cornufer* do exist in the Solomons is demonstrated by the collections of the Whitney South Sea Expedition in the American Museum of Natural History, which we have recently had the opportunity to examine, thanks to the kindness of Mr. Charles M. Bogert. In the collection from Bougainville Island are both *C. guppyi* and another species readily distinguishable both from the former and from *C. vitiensis* (Girard), as represented by Fijian specimens kindly lent to us by Mr. Benjamin Shreve of the Museum of Comparative Zoölogy. While this new form may be identical with Boulenger's "*C. dorsalis*" from Faro Island, this is not necessarily so, since he gave no descriptive information and his material in the British Museum has not been seen by us.

We take great pleasure in naming this new frog for Mr. Walter L. Necker of Chicago, herpetological bibliographer and historian of the American Society of Ichthyologists and Herpetologists. Mr. Necker not only collected extensively in the Solomon Islands during the recent war but also is engaged in studies of the herpetofauna of the archipelago.

### ***Cornufer neckeri*, new species**

**HOLOTYPE:** American Museum of Natural History No. 34329, an adult female from Bougainville Island.<sup>1</sup>

**PARATYPES:** Twenty-one specimens<sup>1</sup> from Bougainville, A.M.N.H. Nos. 34268, 34270, 34309, 34311-34319, 34321-34323, 34325, and 35331-35335. One of these frogs, No. 34321, is now at Stanford, No. A 9335.<sup>1</sup>

**DEFINITION:** A *Cornufer* in which both fingers and toes, except for the innermost digit, have broad terminal dilations, the pad of ventral (lower) surface bordered distally and laterally by a flange of the dorsal portion. Snout pointed and strongly protruding beyond lower jaw, its length somewhat greater than diameter of eye, which is .25 to .33 of head width in the present series. Vomerine teeth strongly oblique, behind the choanae. Subarticular tubercles prominent, rounded-oval, and strongly projecting distally.

**DESCRIPTION OF HOLOTYPE:** Head width about 1.2 times the head length, scarcely wider than the body. Snout pointed,

---

<sup>1</sup> These 22 specimens, including the holotype, were assigned to *Cornufer guppyi* by Burt and Burt (1932, p. 489).

moderately projecting beyond lower lip, and slightly longer than horizontal diameter of eye. Upper eyelid as wide as interorbital space. Diameter of tympanum less than half that of eye. Canthus rostralis rather sharp, curved inwards just posterior to nostril, which is slightly closer to tip of snout than to eye. Upper part of loreal region almost vertical, lower strongly oblique. Vomerine teeth in two strongly oblique patches, posterior to the choanae and separated approximately by the length of one patch. The patches are smaller than those of *C. guppyi*. Tongue with a broad shallow notch posteriorly, bounded on either side by a short, broadly rounded horn; posteriorly the tongue bears a large, probably glandular swelling.

Fore limb well developed, the lower arm only slightly longer than the third finger. In increasing order of length the fingers are 1, 2, 4, 3, the first reaching approximately to base of expanded tip of second, the second and fourth reaching to a similar position on third. All fingers free of web. Finger tips very broadly dilated except on first (inner) finger, the tip of which is scarcely broader than the adjacent phalanx. The pads are narrowly elliptical, slightly more than twice as broad as long, each surrounded entirely by a shallow groove, the dorsal portion of the digital tip extending beyond the ventral pad as a flange. Breadth of disk of third finger greater than diameter of tympanum. Inner metacarpal tubercle prominent, almost twice as broad as long, its length greater than its distance from subarticular tubercle of inner finger. Middle and outer metacarpal tubercles distinct, flattened, the outer small. Subarticular tubercles large, roundish to oval, prominent, strongly projecting distally.

Tibiotarsal articulation reaching center of eye when hind limb is adpressed. Toes in increasing order of length, 1, 2, 5, 3, 4, webbed to the distal end of the subarticular tubercle on the outer side of the first and second toes, to the basal tubercle on the inside and between the basal and distal tubercles on the outside of the third, to just beyond the basal tubercle on the inside and not quite reaching it on the outside of the fourth, to between the basal and distal tubercles on the fifth. Tips of toes broadly dilated except on the inner toe. The dilations more than twice as broad as the adjacent phalanx on the outer toes. The inner metatarsal tubercle distinct, two to three times as long as broad; the outer distinct, smaller, oval. Subarticular tubercles prominent, round or oval, strongly projecting distally.

Skin on the dorsum and limbs comparatively smooth except for a few tubercles, especially along the dorsolateral surfaces, the loreal region, the posterior upper eyelid, and the sides of the head and body. Posterior and lower thighs, and venter posterior to the pectoral region, very granular.

COLOR: Dorsum (in preservative) reddish brown anteriorly, more grayish posteriorly, including the thighs which are marked by four somewhat indistinct, dark, transverse bands. Lower hind limbs somewhat darker, and fore limbs on the upper surface more uniformly dark. Venter light, strongly marbled with brown on the head, throat, pectoral region, and fore limbs, only moderately so posteriorly.

MEASUREMENTS (IN MILLIMETERS): Snout to vent 62, snout 10, head width 24.5, eye 8, eye to nostril 5.25, width of upper eyelid 5, interorbital space 5, tympanum 3.75, lower fore limb 14.25, third finger 14, tibia 31.

VARIATION: Several of the specimens are much lighter dorsally than the holotype, more grayish, as in A.M.N.H. No. 34313, which is also the smallest specimen examined, measuring 41.5 mm. from snout to vent; or occasionally the snout and anterior part of the head, including the anterior part of the upper eyelids, are lighter than the rest of the body, as in A.M.N.H. No. 34268. This specimen also exhibits a narrow white vertebral stripe from the tip of the snout to the anus similar to that in some specimens of *Batrachylodes vertebralis*. The snout is more strongly projecting and narrowly truncate at the tip in mature males, as in A.M.N.H. No. 34318. The head width is 1.0 to 1.25 times its length in the present series.

COMPARISONS: Boulenger (1886, p. 54) related *C. guppyi* to *C. vitiensis*, which at that time he regarded as identical with *C. dorsalis*. Comparison of *C. guppyi* and *C. neckeri* with two fine examples of *C. vitiensis* (M.C.Z. Nos. 8995-8996; Nasoqo, high interior of Viti Levu; W. M. Mann, collector) demonstrates that all three are related, but each possesses distinctive morphological characteristics.

*Cornufer neckeri* differs from *C. vitiensis* and *C. guppyi* in having the snout projecting much more strongly beyond the tip of the lower jaw. In *C. vitiensis* the canthus rostralis is much more sharply angular and the subarticular tubercles of the fingers are much narrower (compared to finger width) than in *C. neckeri* and especially *C. guppyi*. *C. vitiensis* also has a comparatively longer

inner toe, which reaches or surpasses the subarticular tubercle of the second toe, while in the two Solomons species the toe fails to reach or barely reaches this tubercle. *C. guppyi* has a noticeably broader head than *C. neckeri*.

**DIFFERENCES IN FINGER PADS:** Adequate descriptions of the finger pads of frogs are few and frequently confusing. In the three species of *Cornufer* considered here, structure of the pads is diagnostic. All three possess terminal, inferior pads on the expanded tips of the fingers of the hand, and in each case this pad is completely surrounded by a deep structural groove. In addition, there is another groove, less well developed, and not easily made

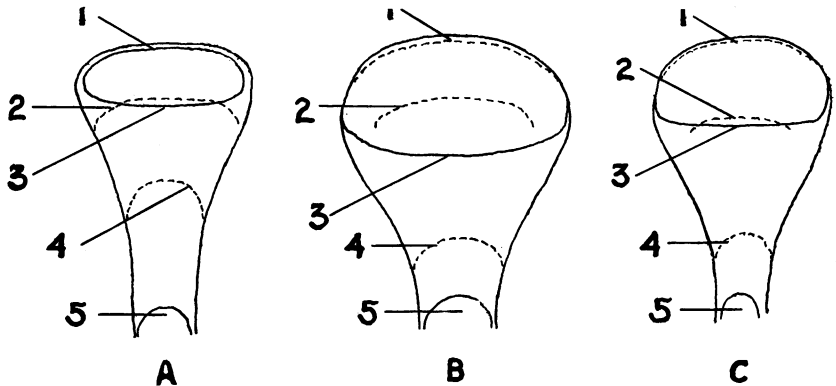


FIG. 1. Enlarged inferior diagrammatic views of ends of third finger in (A) *Cornufer neckeri*, (B) *C. guppyi*, (C) *C. vitiensis*. 1. Distal part of groove surrounding pad. 2. Superior crescentic groove. 3. Proximal part of groove surrounding pad. 4. Superior knob of end of penultimate phalanx. 5. Subarticular tubercle. Unbroken lines represent features seen only from below. Broken lines represent features seen only from above.

out in specimens preserved in alcohol that is either too strong or too weak. This crescentic groove is on the upper surface of the finger, near the end; it is curved in form with the convex side distal and the concave side proximal. The relative width of the terminal expansion of the fingers and the relative positions of the grooves are the diagnostic characters. We have figured the pads diagrammatically of the third finger in the three species discussed. The sketches (fig. 1) are inferior views, with the grooves showing on the under side indicated by unbroken lines and the grooves showing only on the upper side indicated by broken lines.

In *C. neckeri* the pad is wholly inferior, the entire groove surrounding it visible from beneath and hidden from above. The

finger tip is considerably flattened at the end. The superior crescentic groove subtends the proximal part of the pad groove in position and extends across nearly the whole finger.

In *C. vitiensis* the pad is much larger than in *C. neckeri*, and it is not entirely inferior in position. The pad forms the distal tip of the finger, and the groove surrounding it is therefore partly superior in position. The pad is much more broadly oval than in *C. neckeri*, and the finger tip is very rounded. This is seen also in Boulenger's figure (1882, p. 108). The superior crescentic groove subtends the proximal part of the pad groove in position, but does not extend to near the sides of the finger.

In *C. guppyi* the pad is even larger than in *C. vitiensis* and, like the latter, is not entirely inferior in position. The pad forms the distal tip of the finger, and the groove surrounding it is thus partly visible from above. The tip of the finger is more rounded (less flattened) than in *C. neckeri* but far less rounded than in *C. vitiensis*. The position of the superior crescentic groove differs from that seen in the other two species in being more distal in position; it is entirely distad of the proximal part of the pad groove.

#### KEY TO SOLOMONS AND FIJIAN *CORNUFER*

The following key will serve to separate the two members of this genus now known to occur in the Solomons and the one in the Fijis:

1. Head usually broader than long, snout rounded, not or scarcely projecting beyond the margin of the lower jaw; inferior pads of the fingers not bordered distally by a prominent flange of the dorsal portion, that is, the distal portion of the groove surrounding the ventral pad superior; isolated crescentic groove on superior surface of dilated finger tips not reaching the transverse plane of the proximal border of the ventral pad; subarticular tubercles large, not strongly projecting, and approximately as wide as the subtending digit (fig. 1B); vomerine teeth in two transverse or slightly oblique patches between or behind the posterior edges of the choanae.....*guppyi*
2. Head as broad as, or somewhat broader than, long; snout round pointed, not or scarcely projecting beyond the margin of the lower jaw; the distal portion of the groove surrounding the ventral pad of the finger tips superior; isolated crescentic groove on the superior surface of the dilated finger tips feeble, its ends extending beyond the transverse plane marking the proximal border of the ventral pad; subarticular tubercles moderate, narrower than the subtending digit, more strongly projecting distally (fig. 1C); vomerine teeth in two somewhat oblique patches between the posterior borders of the choanae.....*vitiensis*

3. Head as broad as, or only slightly broader than, long; snout rather pointed, projecting beyond the margin of the lower jaw; groove surrounding the ventral pad of the finger tip wholly inferior; ends of the isolated crescentic groove on superior surface of the dilated finger tips extending well beyond the transverse plane marking the proximal border of the ventral pad; subarticular tubercles rather large, approximately as broad as the subtending digit, more strongly projecting distally (fig. 1A); vomerine teeth in two strongly oblique small patches behind the choanae. .*neckeri*

#### NATURE OF THE FIJIAN FROG FAUNA

Amphibians, being unable to withstand salt water, have traditionally been accepted as indicators of the continental nature of island faunas which possess truly endemic forms of these vertebrates. That amphibians are, however, less reliable in this regard than primary fresh-water fishes has been strongly indicated by Myers (1938) and Darlington (1948). Nevertheless, the distribution of amphibians on island groups is still of great zoogeographical interest, and because primary fresh-water fishes are virtually absent east of Wallace's Line, the amphibians of the islands to the east of New Guinea assume prime distributional importance among vertebrates.

While the Bismarck Archipelago apparently possesses only an impoverished amphibian fauna of mixed Solomons-Papuan affinity, the Solomons display an important endemic frog fauna, including at least three endemic ranid genera. *Ceratobatrachus*, in particular, was long taken to represent a distinct family, but Boulenger (1910, p. 152) and others have more recently placed it in the Ranidae. The Santa Cruz, New Hebrides, Banks, and Loyalty groups are not reported to support a frog fauna, but, far beyond them, the Fiji group has long been known to have frogs.

The Fijian frogs have most recently been treated at length by Barbour (1923). He there recognizes two species, "*Cornufer dorsalis* Duméril," which we must now call *Cornufer vitiensis* (Girard), and *Platymanthis vitianus* (Duméril). We have shown above how Boulenger's record of "*C. dorsalis*" from Faro Island made it appear that a Fijian species occurred in the Solomons.

In his recent important distributional paper, Darlington (1948, p. 20) suggests that the Fijian frogs may have been carried to these islands by man. Darlington's suggestion is a very natural one in view of the evidence available when he wrote his paper. Our own work on *Cornufer*, however, and field notes on Fijian frogs recently published by Dr. William M. Mann, put a somewhat different light on the picture.

The only Fijian frog that has been presumed to be specifically identical with a non-Fijian species is the *Cornufer* and this solely because of (1) misidentification, by Boulenger (1882, p. 108) and others, with Duméril's supposed Javanese *C. dorsalis*, and (2) Boulenger's 1887 record of "*C. dorsalis*" from Faro Island. As we have already shown, Van Kampen disposed of the first point. In regard to the second point, we do not know what Boulenger's Faro Island material represents, but we feel morally certain that it could not be Fijian *C. vitiensis*. It is much more likely to turn out to be *C. neckeri* or a so far unrecognized species, or even aberrant *C. guppyi*. Certainly the Fijian specimens from Nasoqo, Viti Levu, examined by us are perfectly distinct from both *C. guppyi* and *C. neckeri*.

One of us (Brown) has carefully examined recently two examples of the Fijian *Platymantis vitianus* (M.C.Z. Nos. 8992–8993; Levuka, Ovalau Island; W. M. Mann) and is quite sure that these specimens are not particularly closely related to *P. solomonis* (Boulenger), *P. weberi* Schmidt, and much less closely to *P. myersi* Brown, than originally presumed. Although we have only descriptions of other related species to depend on, Brown believes the Fijian specimens are perhaps much more closely allied to *P. boulengeri* (Boettger) of the Bismarcks than to any known Solomons *Platymantis*.

Fijian frogs are excessively rare in collections. Dr. William M. Mann, who collected most of the small series reported by Barbour (1923), has recently published an account of his Fijian travels, including field notes on the frogs which supplement those given by Barbour (see Mann, 1948, pp. 191–271). It is evident that the frogs are to be found only in those stands of native forest that have been spared by man, and that these areas are now greatly restricted on several islands. The frogs that survive are forest frogs, apparently with the direct development characteristic of some Solomons species and of many tropical rain-forest frogs in different parts of the world. While much more needs to be done on their classification and habits, all indications point to the conclusion that the species are autochthonous.

Barbour (1923) suspects that subspecies or races of the two genera of Fijian frogs exist, but points out that his material (probably the most extensive available) was insufficient to prove the point. Certainly his account suggests that such races may exist, or have existed before the extensive deforestation of the islands.

The four native names for frogs, which Barbour says Mann recorded, form another piece of evidence, tenuous, it is true, that several recognizable kinds occur.

One statement in Barbour's paper might be held to cast doubt on the endemic nature of Fijian frogs. On page 114 he says: "Dr. Mann also tells me that frogs are eaten by the natives, and that everything which is eaten is carried from one island or[to?] another, and this may account for the obviously close affinity of the frogs upon the different islands." Lizards, snakes, birds, and mammals might easily be carried about, and it is even possible that an occasional frog or its terrestrial egg mass might be carried from one island to a near-by one. But forest frogs of any kind, and their eggs, are so susceptible to desiccation, to salt water, and especially to the heat of the sun that it is quite inconceivable to us that frogs in quantity and condition sufficient to colonize the Fijian forests could have been brought from the Solomons by men in canoes. It would be difficult enough to do so by modern scientific methods.

The immediate need is for careful exploration of the remnants of the native forest of the Fiji Islands by a herpetologist who knows how to find, study, and collect forest frogs, and for adequate study of these frogs in the light of similar explorations in the Solomons. Finally, examination of the intermediate island groups should be made, to determine whether the absence of frogs is real or only apparent.

#### LITERATURE CITED

BARBOUR, THOMAS

- 1921. Reptiles and amphibians from the British Solomon Islands. Proc. New England Zool. Club, vol. 7, pp. 91-112, pls. 2-6.
- 1923. The frogs of the Fiji Islands. Proc. Acad. Nat. Sci. Philadelphia, vol. 75, pp. 111-115.

BOULENGER, GEORGE ALBERT

- 1882. Catalogue of the Batrachia Salientia (s. Ecaudata) in the collection of the British Museum. Ed. 2. London, xvi + 503 pp., 30 pls.
- 1884. Diagnoses of new reptiles and batrachians from the Solomon Islands, collected and presented to the British Museum by H. B. Guppy, Esq. Proc. Zool. Soc. London, 1884, pp. 210-213.
- 1886. On the reptiles and batrachians of the Solomon Islands. Trans. Zool. Soc. London, vol. 12, no. 3, pp. 35-62, pls. 7-13.
- 1887. Second contribution to the herpetology of the Solomon Islands. Proc. Zool. Soc. London, 1887, pp. 333-338, pl. 28.
- 1910. Les batraciens et principalement ceux d'Europe. Paris, Octave Doin et Fils, 305 pp., 55 figs.

1918. Remarks on the batrachian genera *Cornufer* Tschudi, *Platymanthis* Günther, *Simomantis*, g.n., and *Staurois* Cope. Ann. Mag. Nat. Hist., ser. 9, vol. 1, pp. 372-375.
- BURT, CHARLES EARLE, AND MAY DANHEIM BURT
1932. Herpetological results of the Whitney South Sea expedition. VI. Bull. Amer. Mus. Nat. Hist., vol. 63, pp. 461-597, 38 figs.
- DARLINGTON, PHILIP JACKSON, JR.
1948. The geographical distribution of cold-blooded vertebrates. Quart. Rev. Biol., vol. 23, no. 1, pp. 1-26; no. 2, pp. 105-123.
- MANN, WILLIAM MONTANA
1948. Ant hill odyssey. New York, 338 pp.
- MYERS, GEORGE SPRAGUE
1938. Fresh-water fishes and West Indian zoogeography. Ann. Rept. Smithsonian Inst., for 1937, pp. 339-364, 3 pls.
- VAN KAMPEN, P. N.
1923. The Amphibia of the Indo-Australian Archipelago. Leiden, E. J. Brill, Ltd., xii + 304 pp., 29 figs.