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A NEW SPECIES AND SUB-SPECIES OF FRUIT-BATS (*PTEROPUS*) FROM THE SANTA CRUZ GROUP.

By

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During a collecting expedition amongst some of the islands of the Santa Cruz Group from July to August, 1926, when Mr. A. A. Livingstone and myself had the good fortune to be guests of Mr. N. S. Heffernan, then District Officer of the Group, a very interesting collection of fruit-bats representing three species was obtained. Apart from the historical importance of Vanikoro Island because of the loss there in 1788 of La Pérouse's two ships, great zoological interest attaches to the fateful spot owing to the visitation of the famous naturalists Quoy and Gaimard, the first to make scientific observations and collections in that region. Their collections were naturally very incomplete and also subject to considerable confusion, as later researches in various branches have shown, doubtless owing to the conditions of work and storage aboard the "Astrolabe," as well as to the fact that the range of individual forms would not then be considered of so much importance.

Of the fruit-bats, the large and small species occurring on Vanikoro retain the maximum interest owing to the confusion in which they have become involved. The history of the two forms has been detailed by Andersen,¹ by whom doubt was cast upon the occurrence there of the smaller form, which he considered may have come from the Marianne Islands. This history was also reviewed in my paper,² in which specimens collected at Vanikoro by Livingstone and myself definitely fixed that island as the habitat of *Pteropus tuberculatus*.

Specimens of the larger Vanikoran species were also obtained by us at Santa Cruz Island and the nearby Reef Islands. Much to our disappointment we were unable to call at the outlying and seldom visited island of Tikopia, but later, Dr. Raymond Firth, well-known New Zealand anthropologist, very kindly took a collecting can on behalf of the Trustees, and collected a fine series of ten large bats and some birds, while engaged upon his researches there. These specimens from the various islands of the Group, constituting a series of twenty-six, confuse the issue regarding the larger Vanikoran species described as *P. vanikorensis* by Quoy and Gaimard, as the minimum dimensions of the recent very extensive series greatly exceed the external dimensions given by Andersen for *vanikorensis*, while certain cranial and dental measurements, particularly the lengths of the upper and lower molar rows, make it clear that two different forms are indicated.

¹ Andersen.—*Cat. Chiroptera, Brit. Mus.*, 1, 1912, p. 310.

² Troughton.—*Rac. Austr. Mus.*, xv, v, 1927, pp. 355-6.

That a certain amount of confusion existed in the French naturalists' material is shown by the fact that they erroneously associated a skull of *P. tuberculatus* with their much larger *vanikorensis*. It was owing to this error that Andersen discredited the occurrence of the former at Vanikoro, but, as our material definitely established the presence there of *tuberculatus*, it appears, as shown above, that it is unfortunately the occurrence of *vanikorensis* which is in doubt, contrary to Andersen's interpretation of the matter.

According to Andersen when discussing the habitat of *tuberculatus*, "So much only is sure, that Vanikoro and Guam are the only places visited by the 'Astrolabe' in which it can have been obtained." If this contention be also applied to *vanikorensis*, coupled with the fact that its external and, with one exception, cranial dimensions thoroughly accord with those of *P. mariannus* of Guam and other islands of the Marianne Group, there would seem to be no alternative to regarding *vanikorensis* as wrongly attributed to the Island of Vanikoro. Andersen separated the eight species of his *Pteropus mariannus* group of the genus into relatively smaller-eyed North Pacific and larger-eyed South Pacific forms, and it is the size of the orbit only which allies *vanikorensis* with the generally much larger southern forms. Therefore, in view of the fact that all other dimensions fail to agree with the larger form taken by us, one can only suppose that Quoy and Gaimard's specimens came from some other locality, and that Andersen, possibly influenced by the specific name, placed undue value upon the character of the orbital diameter; it may be noted that only one skull of the four specimens of *vanikorensis* was measured, and for the present it can only be conjectured that either the dimensions may vary considerably, that the specimen was abnormal, or that it came from a hitherto unsuspected locality, such as an outlying island of the Marianne Group.

Whatever proves to be the solution of the problem, the skin and skull dimensions of our material collected personally on Vanikoro fail to accord with those of *vanikorensis*. In view of the improbability of the occurrence of two such closely allied forms in the one place, or that we should have failed to secure the smaller of the two at Vanikoro or any other of the islands at which the larger one was secured, there is little doubt that the smaller, as represented by *vanikorensis*, is not an inhabitant of the Santa Cruz Group.

The larger-eyed South Pacific forms, apart from the very doubtful occurrence of *vanikorensis*, are *Pt. tonganus* Quoy and Gaimard, and *Pt. geddiei* MacGillivray. In his remarkable catalogue Anderson has stated that all three are closely related and chiefly characterized by size of wing, *tonganus* being diagnosed as "Similar to *Pt. vanikorensis*, but rather larger and with relatively longer wings" and *geddiei* as "Similar to *Pt. tonganus*, but skull, teeth, and external dimensions larger." As my Santa Cruz specimens of this group of the genus have external dimensions averaging larger than *geddiei*, said to be "the largest form of the group," and therefore greatly in excess of those recorded for *vanikorensis*, they are regarded as representative of a new form to be described below; in view of the close relationship and intergradation shown it is considered desirable to regard the Santa Cruz material and *Pt. geddiei* of the New Hebrides and New Caledonia as only sub-specifically distinct from *Pt. tonganus*.

Andersen has regarded it as axiomatic that "When two or more species of *Pteropus* occur together in one place, they are generally conspicuously different

in size," which proved to be the rule on Santa Cruz Island, where our party secured a series of a beautiful light-coloured species of the *Pt. hypomelanus* group, which has apparently not been described hitherto.

Pteropus tonganus heffernani sub-sp. nov.

Diagnosis.—Apparently quite similar in general coloration to the typical form but the external measurements average larger, and the cranial and dental dimensions display considerable differentiation. Length of the second digit metacarpal 76.5–88 mm., as opposed to 72.5–79 mm. in *Pt. geddiei*; width across canines (externally) greater, 15.5–16 as opposed to 13.7, and width between p^4 – p^4 (internally) less, 9.3–9.7 compared with 10.8 in *geddiei*. The maximum dimensions of m_1 in the holotype and allotype are 5.9×3.9 compared with 5.2×3.8 mm. for *geddiei*. Forearm 148–168 mm.

Palate-ridges.—Arrangement normally as in *tonganus* and described for the *Pt. hypomelanus* group. The male and female types from Tikopia show traces of the additional ridge between the normal 9th and 10th.

Colour.—Apparently quite as described for *geddiei*, which Andersen regarded as intergrading with *Pt. tonganus*.

Range and specimens examined.—A series of twenty-six, including sixteen collected by Messrs. E. Le Troughton and A. A. Livingstone of the Australian Museum Staff at Vanikoro and Santa Cruz Islands and the nearby Reef Islands, all of the Santa Cruz Group, and ten collected at the adjacent island of Tikopia by Dr. Raymond Firth. Male holotype No. M.4646, and female allotype M.4652 in the collection of the Australian Museum; collected and donated by Dr. Raymond Firth.

This apparently distinct sub-species is named in honour of Mr. N. S. Heffernan in appreciation of his great hospitality and assistance to the Museum officers during their expedition to the Santa Cruz Group.

Though it is possible that *Pt. vanikorensis*, when its definite habitat is known and the typical material can be studied in more detail, may also prove to be a sub-species of *tonganus*, it is most significant that, although one has collected bats of the *Pt. mariannus* group from four localities in the Santa Cruz islands, they are all much larger than the type series of *vanikorensis*, and that one found no trace on Vanikoro Island of specimens reconcilable with the dimensions of that species.

Pteropus sanctacrucis sp. nov.

Diagnosis.—Allied to *Pt. colonus* from the more distant West Solomons by its comparatively naked tibia and shorter m^1 , while it is thus separated from the nearer *Pt. solomonis* of the Central Solomons, which has a thickly furred tibia and a longer m^1 . It differs from both the above by having a longer forearm and narrower ears. Forearm 112–121 mm.

Skull.—Comparative dimensions show the rostrum to be shorter and broader than in either of the allied species, while the skull is also generally broader; the interorbital constriction is decidedly broader than in either, the palate being especially broader than in *colonus*. The mandible is distinguished by being shorter and having a higher coronoid process than in either ally.

Dentition.—The length of the molar rows allies it with *solomonis*, and the length of molar¹ with *colonus*.

External characters.—The ear, laid forward, extends about two-thirds of the distance to the posterior canthus of the eye. Tibia naked above in the holotype male save for a few scattered hairs; very sparsely haired in the female. Interfemoral distinctly continuous behind, from 3-7.5 mm. in depth. Wing attachments about 14 mm. apart.

Colour.—Males of a darker coloration throughout; back, rump, and crown of a shining golden-brown. Mantle rich russet, the colour extending around to the breast. Cheeks russet-brown sprinkled with greyish hairs. Belly soft wood-brown. The females, which are of a considerably paler coloration, have the back and crown of a pale golden-yellow, the mantle a light shade of cinnamon-brown, contrasting but little and reduced to an indefinite band, which is weakest in the centre. Cheeks and sides of neck as dark as the slight mantle, with a light yellow area around the eye. On the undersurface the ochraceous-buff of the upper chest extends down the centre; sides of belly pale wood-brown washed with light to warm buff.

Measurements.—The holotype male in spirits: forearm 118.5; 3rd digit metacarpal 80.5; 5th digit metacarpal 85; ear, length from orifice 20.5, maximum width flattened 14.8; lower leg 49.3; foot 39.5.

Skull of allotype female: total length to gnathion 54; palation to incisive foramina 24.5; front of orbit to tip of nasals 14.3; zygomatic width 32.5; width across m¹ (externally) 15.9; width across canines (externally) 13; interorbital constriction 8.6; orbital diameter 12.5; mandible length 40.9, coronoid height 23; teeth, upper c-m² 20, lower c-m₃ 22; upper incisors, combined width, 7; dimensions of m¹, 4.5 × 2.7 mm.

Specimens examined.—A series of seven specimens from Santa Cruz Island, Santa Cruz Group, collected by Messrs. E. Le G. Troughton and A. A. Livingstone. Male holotype registered No. M.4763 and the female allotype No. M.4761 in the Australian Museum collection.

This delicately coloured and apparently quite distinct species of the *Pt. hypomelanus* group was observed and taken only on Santa Cruz or Ndeni Island; this island, from which the group takes its name, was discovered by the Spanish navigator Alvaro de Mendana in 1595 when an ill-fated attempt at settlement was made.