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A NEW GENUS AND SPECIES OF BAT (KERIVOULINÆ) FROM THE SOLOMONS, WITH A REVIEW OF THE GENERA OF THE SUB-FAMILY.

By

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(Figure 1.)

A small but extremely interesting collection of bats was recently presented to the Australian Museum by Mr. J. H. L. Waterhouse, F.R.A.I., Headmaster of the School and Training College of the Methodist Mission at Roviana Island in the New Georgia Group of the Solomon Islands. They were secured with a view to obtaining ectoparasites as well as enriching the collection of Chiroptera, and the donor's trouble was rewarded in both respects. One of the bats proved to be of exceptional interest, a complexity of characters rendering allocation to its sub-family somewhat difficult, and involving the description of a new genus and species for its reception.

External features and dentition, with the skull *in situ*, suggested affinity with the genus *Myotis* (Vespertilioninæ), but the specific characters were not reconcilable with *moluccarum* Thomas,[1] the only species of that genus said to extend to the Solomons. It may be noted, however, that Thomas did not give details of the material on which this record was based, and, as the coloration of his species coincides generally with that of the new form, it is conceivable that his Solomon Island representatives may be identical with it, the distinction being easily overlooked in a superficial examination.

Closer examination and dissection to expose the sternum and its five attached ribs prove conclusively that the Roviana specimen belongs to the following sub-family, as defined by Miller, though apparently not reconcilable with any known genus within it.

Sub-family KERIVOULINÆ.

1878. *Vespertiliones* Dobson, Cat. Chiropt. Brit. Mus., p. 168 (part).

[1] Thomas.—Ann. Mag. Nat. Hist. (8), xv, 1915, p. 170.

1891. *Vespertilionidæ* (part; Vespertilionine division, part) Flower and Lydekker, Mammals, living and extinct, p. 661.

1907. *Kerivoulinæ* Miller, Bull. U.S. Nat. Mus., lvii, pp. 197 (key) and 232.

Distribution.—Africa, south of the Sahara; India and the Malay Region; New Guinea and northern Queensland to the Solomon Islands (first record).

Characters.—Externally as in the Vespertilioninæ. Sternum broad and greatly foreshortened, its median length less than twice the breadth of the presternum; median lobe of the presternum small but distinct, upright. Keel of mesosternum low. Only four or five ribs articulate with the sternum.

Principal subdivisions.—The three genera hitherto recognised are *Kerivoula, Phoniscus*, and *Chrysopteron.*

Remarks.—The peculiar shortened sternum and number of ribs readily distinguishes the members from those of all other subfamilies of Vespertilionidæ, but the complex inter-relation of minor characteristics between the various genera, and *Myotis* (Vespertilioninæ), renders generic differentiation more difficult.

Prior to Jentink's[2] description of *Chrysopteron* in 1910, the known genera, *Kerivoula* and *Phoniscus,* were characterised by having the premolars well developed, the upper middle one never being minute, and the mandibular ones always subequal. Miller[3] based *Phoniscus* upon the greatly enlarged and peculiarly shaped upper canine and the four-cusped inner mandibular incisor. *Chrysopteron* is distinguished from both these allies by having a minute upper middle premolar internal to the tooth row, and the middle mandibular one considerably smaller than the first, as in species of *Myotis.* It is further distinguished from *Kerivoula* in having the two inner lower incisors four- instead of three-cusped; this feature also distinguishes it from *Phoniscus,* in which only one incisor is four-cusped, though affinity with the latter is thus implied.

As a further complication, the Roviana specimen's premolars definitely ally it with *Chrysopteron,* though the two inner lower incisors are tricuspid as in *Kerivoula,* while the enlargement and grooving of the canine indicates a leaning towards *Phoniscus.* However, the specimen from the Solomons differs from the three allied genera in certain essential characters, and, in view of the present confusion as to the status and affinities of genera and individual species, it seems advisable to make it the type of a new genus, thus assisting the elucidation of complex inter-relationships,

[2] Jentink.—Notes Leyden Museum, xxxii, 1910, p. 74.
[3] Miller.—Proc. Biol. Soc. Wash., xviii, 1905, p. 229.

until there is a complete understanding of the variability and relative value of the characters shown by members of the subfamily.

The new genus may be diagnosed as follows:—

ANAMYGDON *gen. nov.*

Differential characters.—Externally a dull-coloured Kerivoulid, lacking the brilliant orange wing-markings of *Chrysopteron,* to which it is most nearly allied by the possession of a minute, internally placed, upper middle premolar, a character lacking in *Kerivoula* and *Phoniscus.* Clearly differentiated from its nearest ally, *Chrysopteron,* by the combination of these characters:—two inner lower incisors tricuspid; 1st and 2nd phalanges of the 3rd digit subequal. In *Chrysopteron* these incisors are four-cusped, and the 1st phalanx is decidedly longer than the 2nd (6·7 mm.). Ears simple in outline, without the deep concavities in the hinder margin existing in both species of *Chrysopteron.* Forearm 38·5 mm. (One species. *Habitat*: Solomon Islands.)

Skull.—Braincase not quite as elevated as in *Kerivoula* and *Phoniscus,* but apparently more so than in *Chrysopteron,* described as "flat, not inflated"; there is a low but definite sagittal crest, not present in the two former. Rostrum short and broad, considerably shorter than braincase. Nares differently shaped to those of *Kerivoula,* more acutely angled posteriorly, though comparatively broader, as in *Phoniscus*; viewed from above, the greatest breadth of the aperture appears equal to or very slightly less than its length, instead of scarcely, or not half the length as in *Kerivoula.* The width is rather greater than the length in *Phoniscus.*

Dentition.—Formula as in the allied genera.

Upper series.—Both incisors bicuspidate and almost equal in height, the outer one separated from the canine by a decided space about equal to the anterior width of the incisor. Canine long and strong, its appearance suggesting that described for *Phoniscus*; the point extending well beyond the cingulum (about $\frac{3}{4}$ mm.) of the opposing canine when jaws are closed. The inner side of the tooth strikingly flattened, even concave; a well defined longitudinal groove in front, and a decided posterior cutting edge. Middle premolar (p^3) minute, internally placed. Molars as described by Miller for *Kerivoula* and *Phoniscus,*[4] m^1 and m^2 without hypocone, m^3 with metacone and three commissures well developed. Cingula well developed around the inner side of m^1 and m^2.

[4] Miller, 1907, particularised only those characters of *Phoniscus* which contrasted with *Kerivoula,* the inference being that there is similarity in the other features.

Lower series.—Two inner incisors tricuspid, not imbricated, except that the outer cusp of i_2 slightly overlaps i_3; i_3 bulky, nearly as wide as long, higher than others and with four definite cusps, two outward and two inwardly placed. Premolars not subequal, the middle small, barely half as high and about one-quarter the bulk of p_1; p_4 somewhat larger and decidedly higher than p_1, about two-thirds the height of canine. Molars differing from *Kerivoula* and *Phoniscus* in showing a decided contrast in the height of the protoconid and hypoconid in m_1 and m_2, the hypoconid about three-quarters the height of protoconid.

Palate-ridges.—Seven, including three anterior undivided ridges, followed by four divided ones, and a short undivided one posteriorly.

External characters.—General coloration dark, without contrasted markings on the membranes. Ear reaching the nostril when laid forward, without deep emargination in the hind border. Tragus long, broadly convex in outer lower two-thirds, the tip attenuated. Third and fourth metacarpals about equal, the fourth a fraction longer, instead of slightly shorter (*Kerivoula* and *Phoniscus*) and decidedly (3 – 4·5 mm.) shorter (*Chrysopteron*). 1st and 2nd phalanges of 3rd digit subequal, the 2nd a fraction the longer, contrasting with *Chrysopteron* in which it is definitely shorter (6 – 7 mm.) than the 1st.

Affinities.—Though *Anamygdon* is allied to *Chrysopteron* by its minute p^3 and unequal lower premolars, the characters separating them are definite and so complexly intermingled with those of the allied genera as to suggest that the new form has been independently derived. Principal claims to distinction are the absence of crowding or marked imbrication of the lower incisors, of which the inner two are three- and not four-cusped; also in the marked differences in the relative lengths of the metacarpals and phalanges compared with those of its allies, and the complete absence of bright fur and contrasted wing coloration. In support of the theory of independent development, these differential characters may possibly illustrate the effect of habits resulting from isolation in a different environment. For instance, decided crowding and imbrication of the lower incisors in *Chrysopteron* implies shrinkage of the mandible anteriorly, which, associated with the two four-cusped inner incisors, probably indicates differences of diet and feeding habits. Furthermore, the marked contrasts in metacarpal and phalangeal dimensions noted above are possibly due to the more restricted insularity of the Solomon Island genus. In this respect the brilliant coloration of both species of *Chrysopteron* is also of some theoretical importance. Jentink has drawn attention to "an interesting biological observation" published in 1900[5] con-

[5] Flower.—Proc. Zool. Soc., 1900, p. 347.

cerning a Siamese specimen of the similarly coloured *Kerivoula picta* which says: "Orange-colored bat from a Swamp called Bang Falari at the Rangsit Canal: *it sleeps in the flower of the Cala Lilly.*" The italics are Jentink's, who remarked "It sounds like a wonderful tale, a golden and red and black colored bat sleeping in a Lilly-flower." It is reasonable to suppose that the parallelism shown in the equally brilliant coloration of *Chrysopteron,* which likewise extends to the membranes and ears, is proof of the adoption of similar habits involving a need for the same protective coloration; thus the sombre colour of the fur and membranes of *Anamygdon* is an additional indication of independent development in a different environment.

In brief review, it may be pointed out that the relative proportions of the phalanges of the 3rd digit separates *Anamygdon* from both *Chrysopteron* and *Kerivoula*; detailed dimensions of the phalanges of *Phoniscus* are not available. The definite sagittal crest of *Anamygdon* is lacking in *Kerivoula* and *Phoniscus,* a feature not dealt with by Jentink for *Chrysopteron.* On the contrary, the shape of the nares of *Anamygdon* is markedly different to that of *Kerivoula,* but apparently quite like that of *Phoniscus*; as yet undescribed for *Chrysopteron.* The lack of marked imbrication of the lower incisors appears to ally the two forms having these inner teeth three-cusped.

Interesting queries arising are as follows: In *Chrysopteron,* is the upper outer incisor separated from the canine by a decided space, is the upper canine grooved anteriorly and flattened internally, what is the relative width and length of the nares viewed from above, and is there a definite sagittal crest? What are the detailed dimensions of the wing-parts of various species of *Phoniscus*? Whatever the answers to these queries, there seems little doubt that the Solomon Island specimen represents a distinct generic form which has evolved independently at the southern extremity of the sub-family's range.

Genotype.—Described below.

Anamygdon solomonis *sp. nov.*

(Figure 1.)

A small, dull-coloured species without contrasted markings; the ear simple in outline, without deep emargination behind. Both upper incisors are bicuspidate, the outer one separated from the canine by a decided space. Greatest length of skull 15·4 mm. Forearm 38·5 mm.

External characters.—Ear narrowly oval, when laid forward reaching but not surpassing the nostril, the outline simple (much as figured for *M. adversus*); a slight notch in the middle of the outer

margin not seen in figures of that species, but no trace of the deep emargination described in species of the allied genera. The inner margin has a slight emargination succeeding its commencement, thence broadly and evenly convex in its upper two-thirds, the tip not emphasised by a flattening in front or a notch behind. Tragus with inner margin somewhat curved, slightly concave in lower and convex in upper fourth; outer margin serrated, the tip attenuated owing to the gradual but deep emargination of the upper fourth, thence evenly convex to its greatest width, opposite the base of the inner margin. Below this the outer margin slopes inwards and gives rise to a fleshy sub-triangular lobe at the base. Attachment of wings variable in the holotype, to the middle of metatarsus

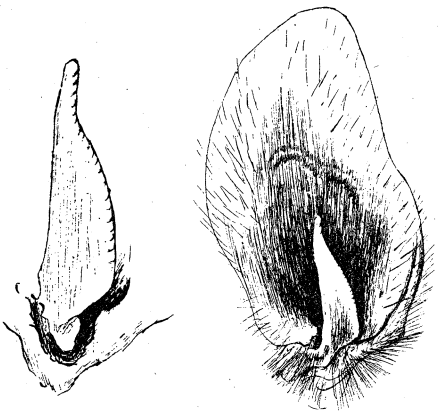

Figure 1.

on one side, and the base of the tibia on the other. Calcar extending for slightly less than two-thirds the length of the membrane-margin, the end not free.

Pelage.—Soft and fine, rather sparse over the fore part of the body, densest on the lower back; hairs on shoulders 6·5 – 7 mm., on lower back about 4·5 mm. Face below eye and between it and ear naked save for sparse long hairs, otherwise the lips, except around nostrils, and the snout, are evenly covered with short coarse hairs; forehead and crown well covered with long fur. Owing to the dark colour of the almost naked nasal region the face appears comparatively well furred. Above, the fur extends on to the wings to an irregular line between the upper third of the humerus and middle of the thigh; a few sparse hairs about the knee. Below, the hairs extend outward to about the same line, but long pale hairs are scattered to a line with the elbow. Wings otherwise naked. Interfemoral not very hairy above or below and without a fringe: above, the fur only surpasses the thighs

at their inner thirds in a v-shaped patch extending about 9 mm. along the tail; below, the interfemoral is entirely without hairs which only surpass the line of the thighs by sparsely covering the butt of the tail.

Colour.—Not strikingly bi-coloured, the undersurface decidedly paler but not sharply contrasted. Above, the fur is blackish-brown basally with a wash of sepia (Ridgway, 1912) on the tips, most evident on the lower back; the basal colour somewhat lightened by occasional greyish or sepia-toned hairs. Below, the extreme base of the fur appears whitish under the microscope, otherwise the basal two-thirds is of a somewhat warmer blackish-brown than above, similarly interspersed with lighter hairs; the tips are an uneven tone of light buffy-brown; some whitish avellaneous hairs fringe the inguinal region and the long hairs on the wing are avellaneous. Ears and wings about blackish-brown[3] of Ridgway, the interfemoral lighter. Membranes without trace of the conspicuous markings found in some allied forms.

Skull.—Braincase apparently not as inflated as in *Kerivoula* and *Phoniscus,* but seemingly more so than in *Chrysopteron,* the rostrum short and broad. Nares wide, the width almost equalling the length. Low sagittal crest present.

Dentition.—Upper inner incisor bicuspid, the secondary cusp at about two-thirds the height. Outer incisor bicuspid and separated from canine by a space equal to its width, with a decided concave surface directed toward canine; secondary cusp weaker than on inner tooth, formed owing to the extension obliquely upwards of the postero-external cingulum as a stout column terminating in a conical cusp resting against, and a little shorter than cusp of inner tooth. Outer incisor as bulky as inner but about three-quarters its height. Lower incisors not crowded or imbricated, except that the outer cusp of i_2 overlaps the inner one of i_3, the two inner ones tricuspid when viewed from any angle under high power binocular; outer incisor bulky, sub-terete, its antero-posterior width nearly equalling its length and equal to the length of either of the inner two, twice the width of either. Outer incisor higher than others and with four distinct but irregular cusps; a large outer one comprising almost half the crown, one antero-internally, and two postero-internally. Upper canine strongly flattened internally and with a decided groove anteriorly, traversing the upper two-thirds of tooth, also a posterior cutting-edge. Upper p^1 small, barely half the height of p^4 and about one-quarter the bulk; p^3 minute, rounded, flattened from above, internal to the tooth-row and not exceeding the height of the cingula of p^1 and p^4 which are in contact, therefore it is not visible from without. Lower p_1 decidedly larger than upper, p_3 half its height and about one-third its bulk; p_4 about one-quarter higher than p_1 and about two-thirds the height of canine.

Dimensions (the holotype in spirits, and its skull) :—

Forearm, 38·5 mm.

Head and body, c45; tail, 35·5; ear (inner edge), 11·5; tragus (inner edge), 5·8; tibia, 14·5; hind foot (c.u.), 10·2; calcar, 14·2. Complete dimensions, see table on p. 99.

Skull: Greatest length 15·4; zygomatic breadth, 9·8 – 10; breadth of braincase, 7·9; front of canines to back of m^3, 6; front of p^4 to back of m^2, 3·7.

Hab.—The Solomon Islands. Holotype from Roviana Island, New Georgia Group.

Holotype.—Adult female. Australian Museum No. M.4361. Collected in 1928 by Mr. J. H. L. Waterhouse, F.R.A.I.

Remarks.—Although characters already detailed render comparison with the forms of allied genera superfluous, some points of superficial differentiation from geographical neighbours may simplify the work of others. From *Myotis moluccarum,* said by Thomas to extend to the Solomons, which has a general similarity in colour and, apparently, dentition, it is superficially distinguished by its smaller foot which is 10·2 instead of 13, and shorter tibia, 14·5 instead of 17·5 mm. From *Kerivoula myrella* of the Admiralty Islands and Bismarck Archipelago it is readily distinguished by the simple outline of the ear, the hinder margin lacking a deep emargination in its upper fourth, and the bicuspid, instead of unicuspid, inner upper incisor.

My best thanks are due to Mr. Waterhouse for the opportunity to describe this interesting new form from the Solomons, which I have done in considerable detail in the hope that it will assist workers with more comprehensive material to unravel the uncertain affinities of allied forms. In this regard it may be pointed out, with all deference, that the brevity of overseas descriptions of local forms, associated with the lack of figures, often greatly increases the difficulties of local workers, involving unnecessary labour which might be considerably reduced if the wide knowledge of admitted authorities were published in more detailed form.

I am indebted to Miss Joyce K. Allan for preparing the single text-figure.

Key to the genera of KERIVOULINÆ.

A. Premolars evenly developed; the upper middle one never minute, mandibular ones subequal.

a. Upper canine normal; inner lower incisor with three cusps. Nares narrow, width viewed from above scarcely or not half length ..... *Kerivoula* Gray

b. Upper canine elongated, laterally compressed; a marked groove anteriorly; inner lower incisor with four cusps. Nares broader, width rather greater than length ..... *Phoniscus* Miller

B. Premolars markedly uneven; upper middle one minute, mandibular ones very unequal, the middle one about half the height of the first, which is smaller than the last.

c. Lower incisors crowded and much imbricated, the inner and second ones with four cusps. 1st phalanx of 3rd digit decidedly longer than 2nd phalanx ..... *Chrysopteron* Jentink

d. Lower incisors not crowded, only outer one slightly imbricated, inner and second ones three-cusped. 1st phalanx of 3rd digit subequal with 2nd phalanx ..... *Anamygdon* gen. nov.

A Brief Review of the Allied Genera and Their Forms.

Genus Chrysopteron *Jentink.*

1910 *Chrysopteron* Jentink, Notes Leyden Museum, xxxii, p. 74.
Genotype.—Kerivoula weberi Jentink.

Range and number of forms.—Jentink has described two brilliantly coloured forms with orange wing-markings, the genotype *"Kerivoula" weberi*[6] being from South Celebes, and *bartelsii,* from the 10,000 ft. top of the Pangerango Mountain, Java, described when the genus was founded.

Diagnosis.—Separated from *Kerivoula* and *Phoniscus* by the markedly uneven premolars, the upper middle one being minute, and the mandibular ones very unequal, and from its nearest ally, *Anamygdon,* by having the lower incisors crowded and much imbricated, with the two inner ones (i_{1-2}) four-cusped, and by the 1st phalanx of the 3rd digit being decidedly longer than the 2nd.

General remarks.—The description of *weberi* stated that its size distinguished it from any other *Kerivoula,* the forearm-length, given as 59 mm., being said to surpass that of any other member of the genus by about an inch, but the dimension quoted was subsequently amended by Jentink to 49 mm.

In describing *bartelsii* Jentink emphasised that it is larger in all dimensions than *weberi* [excepting the subequal hindfoot], but as the single representatives were of opposite sexes, uniformly smaller dimensions could have been compatible with differences of sex or age, and not necessarily of specific importance, while other superficial differences might have been due to similar causes. However, certain features mentioned by Jentink apparently leave no doubt of either species' validity, as in addition to differences of colour arrangement, there is a freely projecting end to the calcar,

[6] Jentink.—Weber's Zool. Ergebnisse Niederl. Ost-Indien, i, 1890, p. 129, pl. xi.

and a well-developed internal cusp on the outer upper incisor in *weberi,* not present in *bartelsii.*

The latter feature is not only the main differential character, but its presence or absence in the two forms of the genus is of significance concerning the relative generic importance of similar dental features, the inference being that as the four-cusped inner two lower incisors are constant in both species, their value as a generic character separating *Chrysopteron* from its allies appears to be established. Correspondingly, the generic value of the character has a distinct bearing upon the status of *Anamygdon,* the nearest ally, in which the inner two lower incisors are three-cusped. Furthermore, the size of the middle lower premolar in Jentink's two species appears to be variable, while the reduced middle upper one is consistently minute, thus indicating the stability of this character as a generic one allying *Chrysopteron* with *Anamygdon,* and separating both from *Kerivoula* and *Phoniscus.*

The canines of *bartelsii,* and presumably of *weberi,* were described as "strong, especially the upper ones," indicating a certain accord with those of *Phoniscus* and *Anamygdon,* though the description leaves doubt as to the extent of the similarity.

A possible third species of *Chrysopteron* was indicated by Jentink in 1910 (*loc. cit.,* p. 76) in *Vespertilio formosus* Hodgson,[7] later figured by Tomes,[8] which Jentink says "presents the same beautiful mode of coloration as *Weberi* and *Bartelsii*; it very likely is a species of our new genus *Chrysopteron.*" He points out, however, that the teeth of *formosus* have not been sufficiently studied to decide the matter with any certainty and that he never saw a true specimen of it.

Key to the species of CHRYSOPTERON.

A. Outer upper incisor with a well-developed cusp internally. End of calcar freely projecting ..... *weberi*

B. Outer upper incisor without a cusp internally. End of calcar not free or projecting ..... *bartelsii*

Genus KERIVOULA *Gray.*

Synonymy and diagnosis.—See Miller, Bull. U.S. Nat. Mus., 1907, p. 232, "The families and genera of bats," adding this reference, Jentink, Notes Leyden Museum, xxiv, 1904, p. 174-5, in which numerous references are quoted and the spelling of *"Kerivoula"* is supported.

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[7] Hodgson.—Journ. Asiatic Soc. Bengal, iv, 1835, p. 700.

[8] Tomes.—Proc. Zool. Soc., 1858, pl. lx.

Logotype.—Vespertilio hardwickii Horsfield.

Geographic distribution.—Africa, south of the Sahara; India and the Malay Region; New Guinea and adjacent islands; Admiralty Islands and Bismarck Archipelago.

Number of forms described.—In 1878 Dobson listed the following ten species in his British Museum Catalogue; *aerosa, africana, brunnea, hardwickii, jagorii, lanosa, papillosa, papuensis, pellucida, picta.* In 1907 Miller (*loc. cit.*) gave the recognised forms as eighteen but named only the species actually examined, making an addition of three to Dobson's list. Jentink (*loc. cit.*, 1910), however, added but six additional forms to that list, *i.e., smithii, javana* 1880, *harrisoni* 1900, *pusilla* and *whiteheadi* 1894, of Thomas, and *minuta* of Miller 1898. The following six, overlooked by Jentink, were also described prior to 1910—*bicolor* 1904, *muscilla* and *picta bellissima* 1906, of Thomas, *depressa* and *engana* 1906 of Miller, and *agnella* 1908 of Thomas. The nine forms described since 1910 are *bombifrons* Lyon 1911, *cuprosa* and *phalaena* Thomas 1912, *crypta* Wroughton and Ryley 1913, *myrella* 1914, *flora* and *lenis* 1916, of Thomas, *lucia* Hinton 1920, and *nidicola zuluensis* Roberts 1924. The total number of forms originally allotted to *Kerivoula,* so far as I am aware, is therefore thirty-two, counting the typical form of *nidicola.*

General remarks.—Jentink (Notes Leyden. Mus., 1910) provides instructive notes upon the sixteen species listed, and stresses the difficulty involved in a critical examination of the lower incisors, to which he attributes the failure of authors adequately to describe the important cusps. The incomplete Australian Museum material, as well as the incomprehensive descriptions of individual species, precludes any attempt at a general review of the members of this genus but it is hoped that the list of species, with the following brief comment, may assist those more fortunately armed with material.

Of the earlier species listed by Dobson, Jentink has pointed out that *pellucida* has lower incisors typical of *Phoniscus,* and it should apparently be transferred to that genus. Prior to this Jentink (*loc. cit.,* 1891, p. 204) recorded four specimens of *pellucida* from East Sumatra and agreed with Dobson in refuting Tomes' suggestion (P.Z.S., 1858) that the species was identical with *hardwickii,* also supplying characters and dimensions which separate them.

In my opinion, Tomes' *aerosa* with its "long, strong, and angular" canines may also prove to be a *Phoniscus,* while Thomas has confirmed Miller's suggestion, upon examination of the types, that *papuensis* and *javana* are also definitely referable to the allied genus. In his description of *myrella* of the Admiralty Islands and

Bismarck Archipelago, a specimen of which was referred to *hardwickii* by Dobson in 1878, Thomas notes characters in the skull and teeth approaching those of *Phoniscus* and expresses some uncertainty as to how far the status of that genus is affected by such characters, something of which is also found in his *agnella* of St. Aignan Island, S.E. New Guinea. Thomas has stated that his Austro-Malayan *flora* of South Flores has none of the *Phoniscus*-like characters of the two former, and that it is a large ally of *hardwickii.*

Regarding *brunnea,* described as of uncertain habitat (Madras or South Africa) by Dobson in his catalogue, it is of interest to note that Chubb[9] has reported its rediscovery in Portuguese East Africa; the original was not fully adult and in a very faded condition, so that the details of the fresh adult specimen assigned to *brunnea* with the concurrence of Thomas and Andersen, who compared it with the type, are of considerable importance.

The range of *picta* has been increased by the definite recording of a specimen from Sumatra (Deli) by Jentink (*loc. cit.,* 1904) and another from Tirhut, presumably the island in the Persian Gulf, by Inglis,[10] as well as the new subspecies, *picta bellissima* of Thomas, described from South China in 1906.

Excepting only *depressa* Miller 1906 in which the teeth are stated to be not obviously different from *hardwickii,* and *phalaena* Thomas 1912 in which the 1st and 2nd lower incisors are said to be tricuspid, authors since Dobson have usually failed to describe the lower incisors at all. This is most remarkable regarding species described since 1907 when Miller established the generic importance of these teeth. For instance, Lyon in describing *bombifrons* in 1911,[11] which he regarded as "apparently rather closely related" to *pellucida,* which is probably a *Phoniscus,* did not describe the diagnostic lower incisors. There is, in view of many such omissions, little to be said, in a comparative sense, regarding many of the species listed above, and the preparation of a key to the species must be left to someone adequately provided with material.

Genus PHONISCUS *Miller.*

1905 *Phoniscus* Miller, Proc. Biol. Soc. Washington, xviii, p. 229.

1907 *Phoniscus* Miller, Bull. U.S. Nat. Mus., lvii, p. 233 (diagnosis and remarks).

Genotype.—Phoniscus atrox Miller.

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[9] Chubb.—Ann. Transvaal Museum, iii, 1911, p. 56.

[10] Inglis.—Journ. Nat. Hist. Soc. Bombay, xxiv, 1916, p. 354.

[11] Lyon.—Proc. U.S. Nat. Mus., xl, 1911, p. 134.

Geographic distribution.—Eastern Sumatra, Java, Papua, north-eastern Australia.

Review of forms.—P. atrox was regarded as the sole species until Thomas,[12] at Miller's suggestion, examined the types of *K. papuensis* Dobson and *K. javana* Thomas and declared "both to be clearly referable to *Phoniscus*." According to Miller (*loc. cit.*, 1907) *papuensis* was amongst the species examined by him and it is remarkable that he retained it in the genus *Kerivoula* characterised by three-cusped inner lower incisors, whereas its subsequent relegation to *Phoniscus* implies the possession of the four cusps then regarded by Miller as typical of his genus. However, Dobson's description of *papuensis* said "all the lower incisors trifid," so that unless he was in error, or Miller's specimen was not authentic, the presence of four-cusped inner lower incisors apparently ceases to be generically characteristic of *Phoniscus*. It is notable that Thomas' *javana*[13] is described as having the teeth "quite similar to those of *K. papuensis*," the inner lower incisors therefore apparently being trilobate, so that the inclusion of these two forms in *Phoniscus* by Thomas suggests that he either did not check the feature, or did not consider it of diagnostic importance. Prior to this inclusion, Jentink (*loc. cit.*, 1910) had regarded the two forms as of the "true *Kerivoula*-genus" characterised by trilobate inner lower incisors.

Regarding *Kerivoula pellucida* Waterhouse, Dobson has described the middle lower incisors as "with four distinct cusps each." According to Miller's key the species would thus appear to be a *Phoniscus* as already indicated by Jentink (see above, genus *Kerivoula*). However, the relegation of forms with trilobate inner lower incisors to *Phoniscus*, coupled with the inference that the canines of *pellucida* were not unusual, as neither Waterhouse nor Dobson remarked upon them, affects not only the generic position of the species, but the status of the genus also.

In my opinion, *Kerivoula aerosa* of the eastern coast of South Africa, known only from Tomes' description,[14] is quite possibly a *Phoniscus*, as it was described as having the "Upper canines long, strong, and angular" and the outer upper incisor minute as in *papuensis*, which, being also small in *pellucida*, may later prove to be a generic character for *Phoniscus*; though the characters of the lower incisors were overlooked by Tomes, they have not been described for most of the later species. For example, as pointed out under the genus *Kerivoula*, Lyon described *K. bombifrons* as "apparently rather closely related" to *pellucida* which has the lower

[12] Thomas.—Ann. Mag. Nat. Hist., (8), xiii, 1914, p. 439.
[13] Thomas.—Ann. Mag. Nat. Hist., (5), v, 1880, p. 472.
[14] Tomes.—Proc. Zool. Soc., 1858, p. 333.

incisors originally characteristic of *Phoniscus,* but he did not describe these teeth for his species.

As already noted, Thomas (*loc. cit.,* 1914) described *K. myrella* of the Admiralty Islands and Bismarck Archipelago as being "readily distinguishable by the enlargement of its canines, a development which reaches its extreme in the great sabre-like canines of *Phoniscus.*" He further says, "Indeed, I do not feel sure how far the status of *Phoniscus* as a distinct genus will be affected by the condition found in *K. myrella* and *agnella,* in each of which something of its character is shown."

Generic status.—As *papuensis* and *javana,* which apparently possess canines typical of *Phoniscus* and the trilobate inner lower incisors of *Kerivoula,* have been relegated to *Phoniscus,* and *pellucida* with these teeth four-cusped as in *Phoniscus* apparently has the normal canines of *Kerivoula,* the status of the genus appears to be considerably weakened and may largely depend upon the condition of the canines in *pellucida,* undescribed hitherto. Thus, it seems evident that the major characteristics of *Phoniscus* are present in one degree or another in several forms of *Kerivoula* to an extent which strongly suggests that the genotype, *P. atrox,* may represent an extreme form in which these characteristics are brought together in their most concentrated state.

In the absence of essential material it may be suggested that examination of the canines of *pellucida,* and of the incisors of *aerosa,* should authentic specimens become available, together with a comparison of the phalangeal dimensions of those forms and of *papuensis* and *javana,* might possibly serve to confirm their association with *atrox* as isolating the genus *Phoniscus.* However, for the reasons cited, it is more probable that the characters reviewed above may so intergrade as to merge *Phoniscus* with its nearest ally *Kerivoula.*

Summary of Genera.

The new genus, *Anamygdon,* appears to represent a branch of the Kerivoulinæ nearest to the Vespertilioninæ, and it is not clear, upon the material and records available, to what extent its characteristics affect the sub-family relationships, or those of the three allied genera. However, *Anamygdon* is clearly differentiated from its nearest ally *Chrysopteron,* and from *Kerivoula,* though it is possible that further examination of some of the Kerivoulids more local to Australia may show them to be reconcilable to *Anamygdon,* or lead to the elucidation of the uncertain position of *Phoniscus* regarding those forms considered intermediate between it and *Kerivoula.*

Dimensions of the Species of *Anamygdon* and *Chrysopteron*.

	Anamygdon solomonis Roviana, New Georgia, Solomons.	*Chrysopteron weberi bartelsii.*	
		Celebes.	Java.
	♀	♂	♀
Forearm	38·5	49	53
2nd digit—Metacarpal	33	46·5	51
1st phalanx	2·5	3·5	5
3rd digit—Metacarpal	34·5	47·5	53
1st phalanx	13·5	20	22
2nd ,, ...	13·8	14	15
3rd ,, ...	5·8	5·5	5·5
4th digit—Metacarpal	34·7	43	50
1st phalanx	9·5	13·5	14
2nd ,, ...	10·3	11	14
5th digit—Metacarpal	34·5	44	49
1st phalanx	9	12	13
2nd ,, ...	7·8	9·5	10
Ear—Inner edge	11·5	—	—
Outer edge	13	16·5	20
Flattened	7·8	—	—
Tragus—Inner anterior edge	5·8	—	—
Outer posterior edge	7·3	9	10
Head and Body	c45	—	—
Tail	35·5	42·5	43
Tibia	14·5	25	27
Foot, s.u.	8·3	—	—
,, c.u.	10·2	12	12
Calcar.	14·2	14	16