

Article XVIII.—HISTORY AND CHARACTERS OF THE FAMILY NATALIDÆ.

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PLATE X.

On examining a specimen of *Furipterus* among the 'free-tailed bats' in the American Museum of Natural History, I was impressed by the animal's resemblance to members of the genus *Natalus*, for one of which, in fact, I at first glance mistook it. Further study convinces me that this similarity is due to actual relationship, and that *Natalus*, *Thyroptera*, *Furipterus*, and *Amorphochilus* should be united to form a family *Natalidæ* distinct from the *Vespertilionidæ*, *Phyllostomidæ*, and *Emballonuridæ*, to each of which members of the group have been assigned. This family is exactly equivalent to the subfamily *Natalini* of Winge, regarded by its author as part of the *Vespertilionidæ*, and essentially the same as the *Natalinæ* of Harrison Allen, founded as a group of *Phyllostomidæ*. Before examining the characters of the group it will be of interest briefly to review the history of the four genera. In this I make no attempt at completeness of detail.

The first member of the family *Natalidæ* to be brought to the notice of naturalists was the genus *Thyroptera*, described by Spix in 1823 ('23, p. 61, pl. xxxvi). Five years later a second genus, *Furia*, was published by F. Cuvier ('28, p. 149). As the name *Furia* had been previously used in another sense by Linnæus ('58, p. 647) it was changed to *Furipterus* by Bonaparte ('37-'37, under *Plecotus auritus*). The third genus, *Natalus*, was described in 1838 by J. E. Gray ('38, p. 496). Gray's account of the original specimen of *Natalus stramineus*, from an unknown locality, was so unsatisfactory that the genus received in 1855 a second and a third name, *Spectrellum* Gervais and *Nyctiellus* Gervais ('55, pp. 51, 84). The year 1854 had brought still another synonym to the group, *Hyonycteris* Lichtenstein and Peters ('54, p. 335). This afterward proved to be the same as the *Thyroptera* of Spix (Peters, '65 b, pp. 580-581). The fourth and last known genus, *Amorphochilus*, was not described until 1877 (Peters, '77, p. 185). Still more recently, however, two species

of *Natalus* have been separated from the typical members of the genus under the subgeneric name *Chilonatalus* (Miller, '98, p. 326).

In the systematic arrangement of these few genera authors have shown the widest variance of opinion. Spix regarded *Thyroptera* as a member of the family Anistiophori, a group including all the American bats without nasal appendages ('23, p. 55). F. Cuvier ('28, p. 154) compared the genus *Furipterus* (= '*Furia*') with the Asiatic *Kerivoula*, a member of the family Vespertilionidæ, though without assuming any close relationship. G. Cuvier regarded *Thyroptera* as nearly related to *Molossus* ('29, p. 116); an opinion in which he was followed by Bonaparte ('31, p. 15), Wagner ('40, p. 482) and Cantraine ('45, p. 492). Bonaparte, however, afterward referred the allied genus *Furipterus* to the Vespertilionidæ ('37, in text under *Plecotus auritus*). Gray, in 1838, placed *Furipterus* next to *Natalus* in the 'tribe Vespertilionina' ('38, p. 496). During the same year Gervais described the Cuban *Natalus lepidus* as a member of the genus *Vespertilio* ('38, p. 32). In 1840 the same species was redescribed by Gundlach, who also regarded it as a *Vespertilio*. Wagner's reference of *Thyroptera* to the Gymnura, a group about equivalent to the Molossidæ, was made with much hesitation; at the same time he placed *Furipterus* among the Vespertilionina ('40, p. 549). Afterward, he described a species of *Natalus* under the generic name *Vespertilio* ('45, p. 148). The genus *Mosia*, at first supposed to have come from Brazil, was described by Gray in 1843 ('43, p. 117) and figured during the following year ('44, p. 25, pl. vi.). It proved, however, to be one of the Old World Emballonuridæ (Peters, '65 b, p. 480, Dobson, '78, p. 363). Except for Gray's subsequent confusion of this genus with *Furipterus* ('66) it would not be mentioned here. Gervais in 1855 arranged the genera of Natalidæ known to him as follows: *Thyroptera* and *Furipterus* among the 'Emballonurine Vespertilionidæ' ('55, pp. 56, 69), and *Natalus*, specimens of which he supposed to represent two genera, divided between the 'Vampyrine Phyllostomidæ' ('*Spectrellum*,' '55, p. 51), and the 'Nycticeine Vespertilionidæ' ('*Nyctiellus*,' '55, p. 84). Tomes, on the other hand, grouped the same three genera under the Vespertilionidæ ('65, pp. 172-181). He was thus

the first writer to recognize their close relationship. In 1865 Peters published his synopsis of the genera of bats. Here the natural grouping adopted by Tomes is done away with. *Natalus* and *Thyroptera*, it is true, are left in the Vespertilionidæ, but *Furipterus* is removed to the 'Brachyura,' a group containing also the genera *Mystacina*, *Noctilio*, *Taphozous*, *Emballonura* (with *Saccopteryx*, etc., as subgenera), and *Diclidurus* ('65, p. 258). During the following year Gray proposed an arrangement of the Vespertilionidæ and Noctilionidæ differing considerably from the system adopted by Peters. The genera *Natalus*, *Furipterus* (renamed *Furiella*),¹ and *Thyroptera*, all of which Gray appears to have known at first hand, are united with the Old World *Miniopterus* to form a subfamily Natalinia of the family Vespertilionidæ. For the *Nyctiellus* of Gervais (spelled *Nycticellus*), the same as *Natalus*, but unknown to Gray directly, a new subfamily of the Vespertilionidæ, Nycticellina is formed. Another genus based on a species of *Natalus*, *Spectrellum* Gervais, likewise known to Gray by the description only, is made a subfamily (Spectrellina) of the Noctilionidæ. Finally the '*Furipterus* of Bonaparte,'² which Gray had never seen, but which he wrongly supposed to be different from that of Tomes, forms the 'subfamily Furipterina,' placed also under the Noctilionidæ. This was apparently due to the misidentification of the *Furia* of F. Cuvier and *Furipterus* of Bonaparte with Gray's own *Mosia* ('66, pp. 90-93). The Natalinia of Gray thus coincides with the Natalini of Winge except that the former includes *Miniopterus* and does not contain *Amorphochilus*, then unknown. Gill essentially followed Peters, though he regarded the genus *Furia* (= *Furipterus*) as representative of a subfamily Furiinæ ('72, p. 18). In 1877 Peters again associated *Furipterus* with the 'Brachyura,' now, however, placing *Amorphochilus* with it and recognizing the two genera as a group 'Furiæ' ('77, p. 185). The classification adopted by Dobson is essentially that of Peters. *Furipterus* ('*Furia*') and *Amorphochilus* are placed among the Emballonuridæ as a group Furiæ, while *Thyroptera* and *Natalus* are united with *Miniopterus* to form the third division of the Vespertilionidæ, the group Miniopteri ('78, pp. 170,

¹ "*Furia*, Temm., *Furipterus*, Tomes, not Bonap."

² "*Furipterus*, Bonap. and Gervais, not Tomes = *Mosia*, Gray, *Furia*, F. Cuv."

345). Flower and Lydekker follow Dobson, though removing *Thyroptera* from association with *Natalus* and *Miniopterus*, and placing it alone in the 'Thyropterine division' of the Vespertilionidæ ('91, pp. 664-665, 666). Two important papers on the classification of the Natalidæ appeared in 1892, one by Harrison Allen, the other by Winge. The latter is probably the earlier in point of date. In it for the first time since the publication of Tomes's paper in 1865, *Natalus*, *Thyroptera*, and *Furipterus* are brought together without association with *Miniopterus*. To these is added the genus *Amorphochilus*, unknown to Tomes. The group thus formed, exactly equivalent to the family Natalidæ of the present paper, stands as one of the three primary divisions of the Vespertilionidæ ('92, p. 36). Harrison Allen, from a study of *Natalus* alone, concluded that the genus could not be retained among the Vespertilionidæ. Like Gervais he was impressed by the resemblance of the genus to some of those usually placed among the Phyllostomidæ. To this family he therefore referred the genus as sole representative of the subfamily Natalinæ ('92, pp. 437-439). In a later work, however, he refers to *Thyroptera*, *Furipterus*, and *Natalus* as 'allied' genera, adding that "*Thyroptera* is in close relation with *Natalus*." Though he does not actually refer either to the subfamily Natalinæ, he clearly does so by inference ('94, pp. 23, 55). Zittel mentions *Natalus* among the Vespertilionidæ ('93, p. 578). In the most recent work to treat of the bats as a whole Trouessart divides the genera of Natalidæ among no less than three families. *Thyroptera* forms a section of the Vespertilionidæ, *Furipterus* and *Amorphochilus* stand as a section of the Emballonuridæ, while *Natalus* is removed to the Phyllostomidæ ('97, pp. 134, 135-136). This grouping is simply that of Flower and Lydekker as modified by Harrison Allen in 1892.

The history of the family Natalidæ is summarized in the following table :

HISTORY OF THE FAMILY NATALIDÆ.

| Year. | Author. | Family in which Genus was Placed. | | |
|-------|-------------------------|-------------------------------------|----------------|--------------------------------------|
| | | Vespertilionidæ. | Emballonuridæ. | Phyllostomidæ. |
| 1828 | F. Cuvier. | Furipterus. | | |
| 1829 | G. Cuvier. | | Thyroptera. | |
| 1831 | Bonaparte. | | Thyroptera. | |
| 1837 | " | Furipterus. | | |
| 1838 | Gray. | Furipterus. | | |
| " | " | Natalus. | | |
| " | Gervais. | Natalus. | | |
| 1840 | Gundlach. | Natalus. | | |
| " | Wagner. | Furipterus. | Thyroptera. | |
| 1845 | " | Natalus. | | |
| " | Cantraine. | | Thyroptera. | |
| 1855 | Gervais. | Natalus (<i>'Nyctiellus'</i>). | Thyroptera. | Natalus (<i>'Spectrellum'</i>). |
| " | " | | Furipterus. | |
| 1865 | Tomes. | Thyroptera. | | |
| " | " | Furipterus. | | |
| " | " | Natalus. | | |
| " | Peters. | Natalus. | Furipterus. | |
| " | " | Thyroptera. | | |
| 1866 | Gray. | Natalus. | Natalus. | |
| " | " | Furipterus. | Furipterus. | |
| " | " | Thyroptera. | | |
| 1872 | Gill. | | Furipterus. | |
| 1877 | Peters. | | Amorphochilus. | |
| 1878 | Dobson. | Natalus. | Furipterus. | |
| " | " | Thyroptera. | Amorphochilus. | |
| 1891 | Flower and Lydekker. | Natalus. | Furipterus. | |
| " | " " | Thyroptera. | Amorphochilus. | |
| 1892 | Winge. | Natalus. | | |
| " | " | Thyroptera. | | |
| " | " | Furipterus. | | |
| " | " | Amorphochilus. | | |
| " | H. Allen. | | | Natalus. |
| 1894 | " | | | Natalus. |
| " | " | | | Furipterus. |
| " | " | | | Thyroptera. |
| " | Zittel. | Natalus. | | |
| 1897 | Trouessart. | Thyroptera. | Furipterus. | Natalus. |
| " | " | | Amorphochilus. | |
| 1898 | Miller. | | | Natalus. |

The characters of the group are as follows :

FAMILY NATALIDÆ.

Small, delicately formed bats with general aspect of the members of the Vespertilionine genus *Kerivoula*. Ears widely separate, funnel form, the

opening directed forward; inner surface of conch smooth or papillose, without cross striations. Muzzle neither simple nor with leaf-like outgrowths, its form occasionally (*Chilonatalus*, *Amorphochilus*) suggesting that of the Lobostomine Phyllostomidæ. Membranes ample, thin, and delicate. Thumb variable in form, its phalanges sometimes (*Furipterus*, *Amorphochilus*) rudimentary, the metacarpal never wholly free from membrane. Third manal digit normally with two phalanges, the second of which is longer than the first (in *Thyroptera* the distal phalanx is divided into two). Skull Vespertilionine in form, the braincase abruptly elevated above faceline. Vomer large, generally fused with posterior edge of bony palate, the anterior extremity always produced as a median spicule appearing at bottom of anterior palatine emargination. In *Thyroptera* the anterior extremity of the vomer is slightly bifurcate, while in *Natalus* it is joined by the palatine processes of the premaxillaries, thus isolating the two small palatine vacuities. Upper incisors four, in pairs, each pair widely separated from that of opposite side and from canine. Lower incisors six, small but well developed. Anterior premolars, both above and below, large, compressed laterally, and with well developed cutting edges. Maxillary molars with inner (lingual) side of crown narrow, the protocone well developed, but hypocone rudimentary or absent.

The family Natalidæ unites in a curious manner the characters of the Vespertilionidæ and Phyllostomidæ. In aspect the species are distinctly Vespertilionine, though the peculiar structure of the muzzle, notably in *Amorphochilus* and *Chilonatalus*, distinctly suggests the Lobostomine Phyllostomidæ. The skull is Vespertilionine in form, though the relation of the anterior end of the vomer to the premaxillaries is distinctly Phyllostomine. While the molar teeth and the incisors are perfectly Vespertilionine, the premolars are as clearly Phyllostomine in both size and form. Finally the third manal digit normally contains two phalanges as in the Vespertilionidæ, the distal, however, of unusual length. This long phalanx is divided into two in *Thyroptera*, thus exactly reproducing the normal condition in the Phyllostomidæ. With the Emballonuridæ the group has no close relationship.

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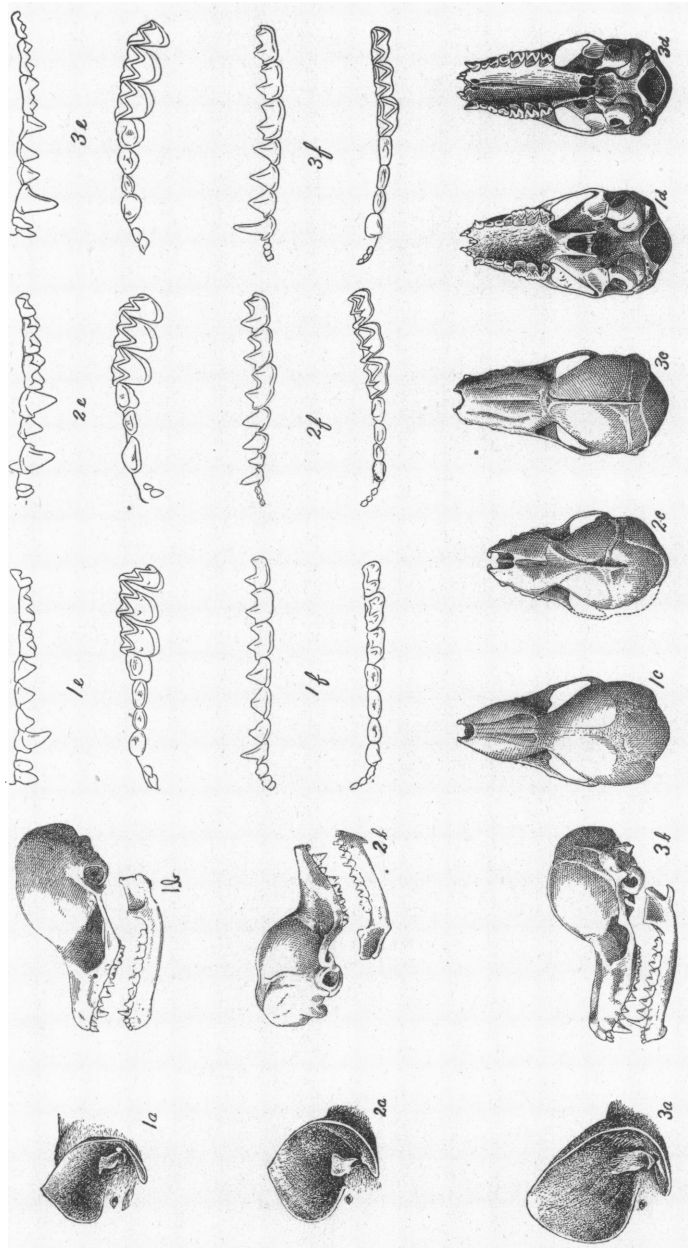
EXPLANATION OF PLATE X.

Fig. 1.—*Thyroptera discifera* (Lischtenstein and Peters).

Fig. 2.—*Furipterus horrens* (F. Cuvier).

Fig. 3.—*Natalus micropus* (Dobson).

For each species *a* = ear (x $1\frac{1}{2}$), *b* = side view of skull (x 2), *c* = dorsal view of skull (x 2), *d* = palatal view of skull (x 2), *e* = maxillary teeth (x 4), *f* = mandibular teeth (x 4).



SPECIES OF NATALIDÆ.

Fig. 1, *Thyroptera discifera* (Licht. & Peters); Fig. 2, *Furipterus horrens* (F. Cuv.); Fig. 3, *Natalus micropus* (Dobson).

