OCCASIONAL PAPERS
THE MUSEUM
TEXAS TECH UNIVERSITY

NUMBER 94 30 NOVEMBER 1984

FIELD KEY TO ANTILLEAN BATS

ROBERT J. BAKER, JANE A. GROEN, AND ROBERT D. OWEN

The following field key was prepared for use with live or freshly killed specimens of bats from the Greater and Lesser Antilles (not including Trinidad and Tobago). Also, one of our goals was to construct a key that would be usable by the novice. Materials that will be valuable in using the key are a millimeter rule and a hand lens. All measurements are in millimeters.

A diagramatic drawing of a bat is shown in Fig. 1. This and the several figures following it demonstrate critical features used in this key. We also have provided a photograph of the face of a specimen from each genus that is recorded from the Antilles in order that the general characters can be noted. *Mormopterus* is not shown, but is similar in appearance to *Tadarida*. These pictures are arranged systematically following Baker and Genoways (1978), and an alphabetical list of the genera also is provided (page 9). Unless otherwise acknowledged, photographs are by RJB.

We have followed the systematic arrangement of Baker and Genoways (1978), with the following exceptions. *Natalus micropus* includes *N. macer* (Ottenwalder and Genoways, 1982). The correct name for *Pteronotus fuliginosus* is *P. quadridens* (Hall, 1981; Silva Taboada, 1979). *Brachyphylla nana* includes *B. pumila* (Honacki *et al.*, 1982; Swanepoel and Genoways, 1978); and *Erophylla sezekorni* includes *E. bombifrons* (Buden, 1976; Honacki *et al.*, 1982). Distributions reported here also agree with Baker and Genoways (1978), with two exceptions. The earlier record of *Glossophaga longirostris* from Dominica is almost

certainly erroneous (W. D. Webster, personal communication) and has been disregarded. Also, the distribution of *Eptesicus fuscus* now is known to include Dominica (J. E. Hill, personal communication).

We thank the following people for critically reviewing earlier drafts of the manuscript: Dilford C. Carter, Hugh H. Genoways, J. Knox Jones, Jr., Timothy J. McCarthy, Suzanne B. McLaren, W. David Webster, Steven L. Williams, and Michael L. Willig. Photographs of the bats were taken during several trips to the Caribbean. These trips were sponsored in part by the following sources: The John Archbold Family Trust; the M. Graham Netting Research Fund, Carnegie Museum of Natural History, through a grant from the Cordelia Scaife May Charitable Trust; National Science Foundation Grants GB-41105 (to Baker and Genoways) and DEB-76-20580 (to Baker and Ira F. Greenbaum); and the Institute of Museum Research.

Key to Species

1. Tail vertebrae visible, extending into uropatagium (Figs. 2, 3, 4, and 5) 13
   Tail vertebrae not visible (Figs. 6 and 7) 2

2. Lower incisors absent; tail membrane like Fig. 6 except that calcar length greater than 2 (known only from Grenada, FA 40-44) ..... *Anoura geoffroyi*
   Lower incisors present; tail membrane like Fig. 7 or, if like Fig. 6, calcar absent or merely a bump on side of foot 3

3. Tail membrane like Fig. 6; calcar absent or merely a bump on side of foot; width of tail membrane less than 5 at knee; yellow shoulder patch sometimes present 4
   Tail membrane like Fig. 7; calcar distinct, longer than 3; width of tail membrane at knee greater than 5; no yellow shoulder patch 5

4. Forearm greater than 45 (known only from Guadeloupe, FA 45-49) ..... *Sturnira thomasi*
   Forearm less than 45 (known from Lesser Antillean islands south of Guadeloupe to the Grenadines, FA 38-45 ..... *Sturnira lilium*

5. White spot on shoulder (where antebrachial membrane joins body) and/or conspicuous fringe of hair along entire edge of uropatagium 6
   Neither white spot on shoulder nor conspicuous fringe of hair along uropatagium edge 10

6. Forearm greater than 45 7
   Forearm less than 45 8

7. Width of uropatagium at knee greater than 8. White spot present on fur ventral to posterior edge of ear (this spot is in addition to the white spot at the junction of antebrachial membrane) (known from Puerto Rico and the Virgin Islands, FA 45-52) ..... *Stenoderma rufum*
   Width of uropatagium at knee less than 8. White spot on fur ventral to posterior edge of ear absent or much smaller than shown in Fig. 28 (known from St. Eustatius, Montserrat, Guadeloupe and all islands south through St. Vincent, FA 45-52) ..... *Ardops nichollsi*

8. Hair extending beyond posterior edge of uropatagium longer than calcar (known only from Jamaica, FA 36-44) ..... *Ariteus flavescens*
   Hair extending beyond posterior edge of uropatagium shorter than calcar (known only from Cuba and Hispaniola, FA 39-44) 9

9. Known only from Cuba (FA 42-44) ..... *Phyllops falcatus*
   Known only from Hispaniola (FA 39-44) ... *Phyllops haitiensis*

10. Forearm less than 45 (known only from Grenada, FA 37-43) ..... *Artibeus cinereus*
    Forearm greater than 45 11

11. Medial upper incisor spikelike; white line down center of back (known from Guadeloupe and Montserrat, FA 57-58) ..... *Chiroderma improvisum*
    Medial upper incisor bilobed 12

12. Distinct white lines above and below eye; slight fringe of hair at medial posterior edge of uropatagium (known from St. Vincent and Grenada, FA 65-76) ..... *Artibeus lituratus*

White lines above and below eye indistinct; no fringe of hair at edge of uropatagium (known throughout the Antilles, FA 55-66) ..... *Artibeus jamaicensis*

13. Foot greater than 20 (known throughout the Antilles, FA 85-93) ..... *Noctilio leporinus*
Foot less than 20 14

14. Tail vertebrae approximately as long as, or longer than, hind limb (Figs. 3 and 4) 15
Tail vertebrae shorter than hind limb (Figs. 2 and 5) 38

15. Tail vertebrae extending more than 10 beyond posterior border of uropatagium (Fig. 3) 16
Tail vertebrae terminating at, or within 7 of, posterior border of uropatagium (Fig. 4) 23

16. Upper lip wrinkled (Fig. 38) 17
Upper lip smooth (Fig. 40) 20

17. Forearm greater than 50 (known from Cuba, Jamaica, and Hispaniola, FA 56-63) ..... *Tadarida macrotis*
Forearm less than 50 18

18. Three lower incisors on each side (total six) (known throughout the Antilles, FA 36-46) ..... *Tadarida brasiliensis*
Two lower incisors on each side (total four) 19

19. Circular pad at base of thumb; ears distinctly separate (known only from Cuba, FA *ca.* 29) ..... *Mormopterus minutus*
No circular pad at base of thumb; ears large and joined at base (known only from Cuba, FA 42-45) .. *Tadarida laticaudata*

20. Forearm greater than 75 (known only from Cuba, FA 76-83) ..... *Eumops perotis*
Forearm less than 75 21

21. Forearm less than 50 (known throughout the Antilles, FA 37-41) ..... *Molossus molossus*
Forearm greater than 50 22

22. Ventral pelage grayish brown; ears extending to edge of, or beyond, nose when viewed from above (Fig. 8, left); tragus blunt and wide (known from Cuba and Jamaica, FA 56-62) .... *Eumops glaucinus*
Ventral pelage blackish brown; ears not extending to nose when viewed from above (Fig. 8, right); tragus pointed and long (known only from Jamaica, FA 55-66) ..... *Eumops auripendulus*

23. Long nose leaf present (questionably found in the Bahamas, FA 45-55) ..... *Lonchorhina aurita*
No nose leaf present 24

24. Length of tail greater than that of body; usually six tail vertebrae; fringe of hair on posterior border of uropatagium ... 25
Length of tail less than that of body; usually nine tail vertebrae; no fringe of hair on posterior border of uropatagium unless entire dorsal surface of uropatagium is hairy 29

25. Forearm greater than 40; wing membrane attached to leg at ankle (known from Cuba, Jamaica, and Hispaniola, FA 43-46) ..... *Natalus major*
Forearm less than 40; wing membrane attached to leg well above ankle 26

26. Forearm greater than 36 (known from Anguilla, Saba, Antigua, Montserrat, and Dominica, FA 36-40) ..... *Natalus stramineus*
Forearm less than 36 27

27. Forearm less than 31 (known from Cuba and the Bahamas, FA 27-31) ..... *Natalus lepidus*
Forearm greater than 31 28

28. Known from Cuba, Jamaica, and Hispaniola (FA 31-36) ..... *Natalus micropus*
Known only from the Bahamas (FA 33-35) *Natalus tumidifrons*

29. Ear greater than 22 (known only from Cuba, FA 49-62) ..... *Antrozous koopmani*
Ear less than 22 30

30. Tragus sharply pointed (Fig. 33); two upper premolars on each side (total four) 31
Tragus not sharply pointed; less than two upper premolars on each side (total two or none) 33

31. Forearm greater than 35 (known from Martinique and Barbados, FA 35-39) ..... *Myotis martiniquensis*
Forearm less than 35 32

32. Known only from Dominica, but possibly also from St. Martin (FA 33-35) ..... *Myotis dominicensis*
Known only from Grenada (FA 29-32) ..... *Myotis nigricans*

33. Two upper incisors on each side (total four) 34
One upper incisor on each side (total two) 36

34. Length of tibia greater than 24 (known only from Guadeloupe, FA 48-53) ..... *Eptesicus guadeloupensis*
Length of tibia less than 23 35

35. Forearm greater than 46 (known from Cuba, Hispaniola, Puerto Rico, the Bahamas, Dominica, and possibly Barbados, FA 46-53) ..... *Eptesicus fuscus*
Forearm less than 46 (known only from Jamaica, FA 42-46) ..... *Eptesicus lynni*

36. Anterior one-third or all of uropatagium covered with hair .. 37
Less than one-third of uropatagium covered with hair ..... *Nycticeius humeralis*

37. Forearm greater than 45; dorsal hair yellowish (known only from Cuba, FA 48-52) ..... *Lasiurus intermedius*
Forearm less than 44; dorsal hair reddish; white spot on shoulder where antebrachial membrane joins body (known from the Greater Antilles, FA 36-43) ..... *Lasiurus borealis*

38. Wing sac present on antebrachial membrane (Fig. 9); lower lip without flaps or folds; nose leaf absent; only one bone

(metacarpal) present in second finger (known only from Grenada, FA 43-48) ..... *Peropteryx macrotis*
No wing sac; lower lip with flaps and folds, or nose leaf present; second finger with metacarpal and one phalanx (phalanx minute in *Monophyllus*) 39

39. Nose leaf absent; lower lip with horizontal flaps and folds (Figs. 13 and 14) 40
Nose leaf present [much reduced in *Brachyphylla* (Fig. 29) and *Phyllonycteris* (Fig. 30)]; lower lip may have bumps and ridges but no horizontal flaps and folds 44

40. Wing membrane continuous across back (known from Maria Galante, Dominica, Martinique, and Grenada, FA 40-50) ..... *Pteronotus davyi*
Wing membrane not continuous across back, attached to side of body 41

41. Ears short, broad and rounded, joined across cranium; nose and chin as in Fig. 14 (known from the Greater Antilles, FA 43-48) ..... *Mormoops blainvillii*
Ears pointed and separated; nose simple 42

42. Forearm greater than 50 (known from the Greater Antilles, FA 51-55) ..... *Pteronotus parnellii*
Forearm less than 50 43

43. Forearm less than 41 (known from the Greater Antilles, FA 38-40) ..... *Pteronotus quadridens*
Forearm greater than 41 (known from Cuba and Jamaica, FA 42-46) ..... *Pteronotus macleayii*

44. Ear greater than 24 (known from the Greater Antilles, FA 52-56) ..... *Macrotus waterhousii*
Ear less than 24 45

45. Tail vertebrae not extending beyond edge of uropatagium (Fig. 5) 46
Tail vertebrae extending beyond edge of uropatagium (Fig. 2) 51

46. Forearm greater than 55 47
Forearm less than 55 48

47. Forearm greater than 61 (known from Puerto Rico southward, FA 61-70) ..... *Brachyphylla cavernarum*
Forearm less than 61 (known from Cuba and Hispaniola, FA 56-60) ..... *Brachyphylla nana*

48. Calcar longer than foot; ears attached by fold of skin (known only from Grenada, FA 31-36) ..... *Micronycteris megalotis*
Calcar shorter than foot; ears not attached 49

49. Forearm greater than 40 (known only from Grenada, FA 41-45) ..... *Carollia perspicillata*
Forearm less than 40 50

50. Medial upper incisors broadened into long cutting edge (Fig. 10, left); calcar does not extend to base of toes (known only from Jamaica, FA 32-39) ..... *Glossophaga soricina*
Medial upper incisors not broadened into long cutting edge (Fig. 10, right); calcar extends to base of toes (known from St. Vincent, the Grenadines, and Grenada, FA 35-40) ..... *Glossophaga longirostris*

51. Calcar present 54
Calcar absent 52

52. Known only from Jamaica (FA 44-49) ... *Phyllonycteris aphylla*
Known from Cuba or Hispaniola (FA 46-50) 53

53. Known only from Cuba (FA 46-48) ..... *Phyllonycteris poeyi*
Known only from Hispaniola (FA 46-50) ..... *Phyllonycteris obtusa*

54. Ventral fur pale tan or pale brown; nose leaf short (Fig. 31) (known from the Greater Antilles, FA 45-50) ..... *Erophylla sezekorni*
Ventral fur dark gray; nose leaf attenuated (Fig. 19) 55

55. Known from Anguilla, Barbuda, Antigua, Guadeloupe, Dominica, St. Lucia, St. Vincent, and Barbados (FA 40-43) ..... *Monophyllus plethodon*
Known from Cuba, Jamaica, Hispaniola, Puerto Rico, and the Bahamas (FA 39-42) ..... *Monophyllus redmani*

Literature Cited

Baker, R. J., and H. H. Genoways. 1978. Zoogeography of Antillean bats. Pp. 53-97, *in* Zoogeography in the Caribbean (F. B. Gill, ed.), Spec. Publ., Acad. Nat. Sci. Philadelphia, 13:1-128.

Buden, D. W. 1976. A review of the bats of the endemic West Indian genus *Erophylla*. Proc. Biol. Soc. Washington, 89:1-16.

Hall, E. R. 1981. The mammals of North America. John Wiley and Sons, New York 2nd ed, 1:xviii + 1-600 + *90*.

Honacki, J. H., K. E. Kinman, and J. W. Koeppl. 1982. Mammal species of the world. Allen Press and the Assoc. of Syst. Collections, Lawrence, Kansas, ix + 694 pp.

Ottenwalder, J. A., and H. H. Genoways. 1982. Systematic review of the Antillean bats of the *Natalus micropus*-complex (Chiroptera: Natalidae). Ann. Carnegie Mus., 51:17-38.

Silva Taboada, G. 1979. Los murciélagos de Cuba. Cien. Cuba, La Habana, xiii + 423 pp.

Swanepoel, P., and H. H. Genoways. 1978. Revision of the Antillean bats of the genus *Brachyphylla* (Mammalia: Phyllostomatidae). Bull. Carnegie Mus. Nat. Hist., 12:1-53.

Addresses of authors: R. J. Baker, *Department of Biological Sciences* and *The Museum, Texas Tech University, Lubbock, Texas 79409*, J. A. Groen, *The Museum, Texas Tech University*; present address of Groen, *Section of Mammals, Carnegie Museum of Natural History, 5800 Baum Blvd., Pittsburgh, Pennsylvania 15206*; R. D. Owen, *The Museum, Texas Tech University.* *Received 15 June, accepted 6 October 1983.*

Alphabetical list of bats figured, generic name followed by figure number.

Anoura, 20	*Micronycteris*, 15
Antrozous, 37	*Molossus*, 39
Ardops, 25	*Monophyllus*, 19
Ariteus, 27	*Mormoops*, 14
Artibeus, 24	*Myotis*, 33
Brachyphylla, 29	*Natalus*, 32
Carollia, 21	*Noctilio*, 12
Chiroderma, 23	*Nycticeius*, 36
Eptesicus, 34	*Peropteryx*, 11
Erophylla, 31	*Phyllonycteris* 30
Eumops, 40	*Phyllops*, 26
Glossophaga, 18	*Pteronotus*, 13
Lasiurus, 35	*Stenoderma*, 28
Lonchorhina, 17	*Sturnira*, 22
Macrotus, 16	*Tadarida*, 38

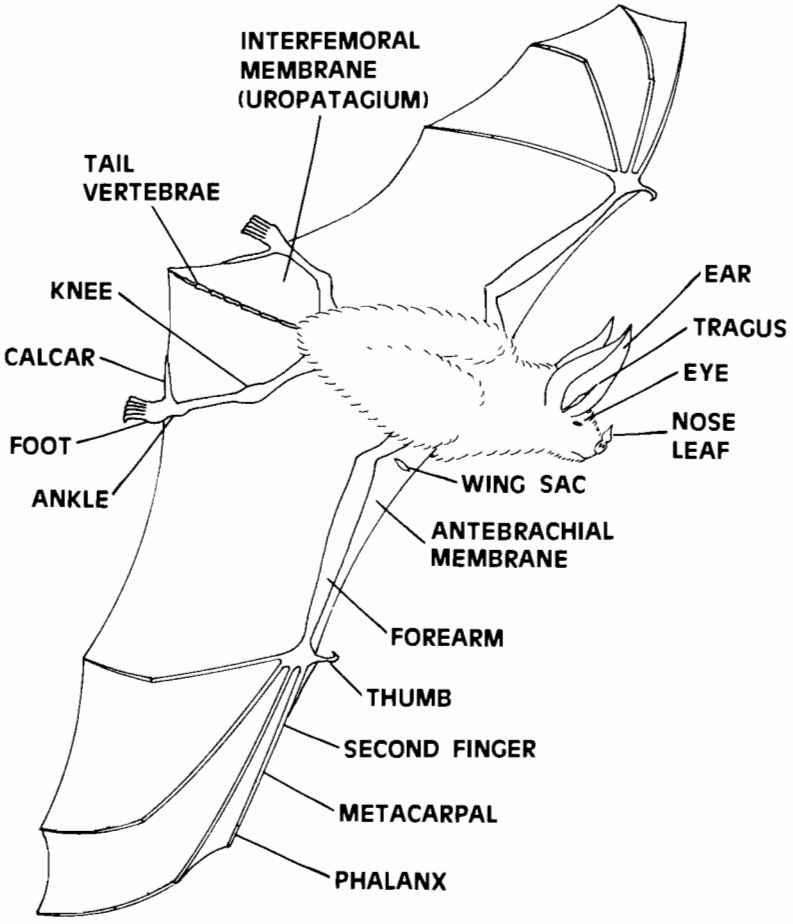
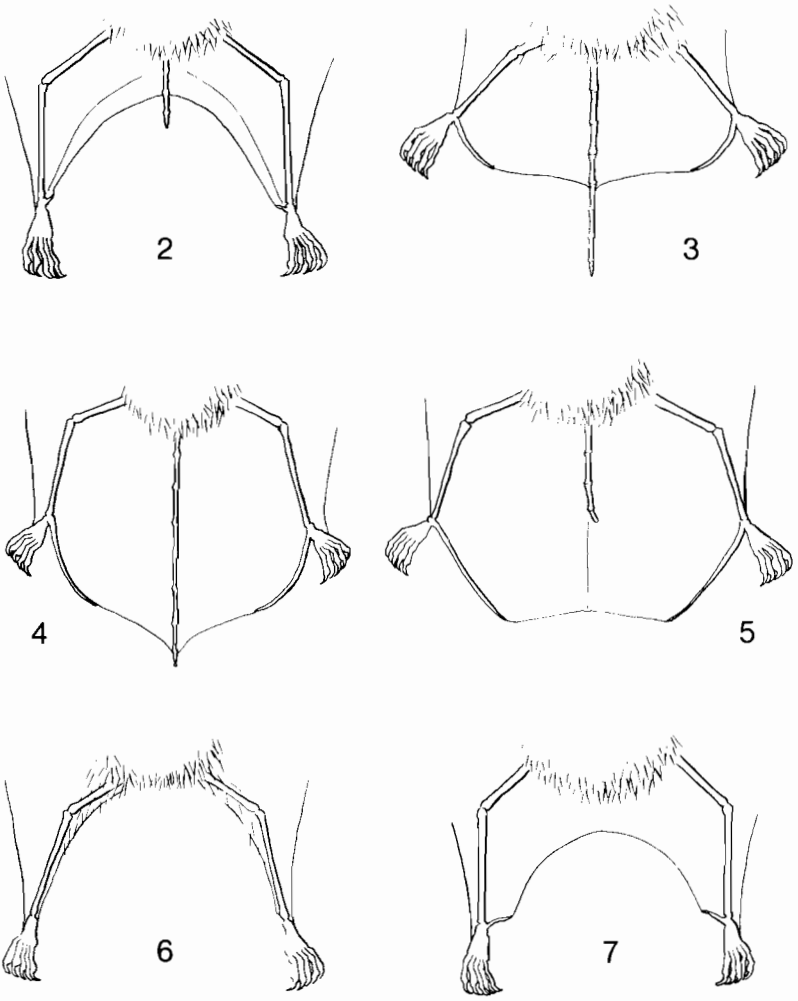


FIG. 1.—Diagramatic drawing of bat, illustrating terms used in this key. Drawing by E. M. Jones.



FIGS. 2-7.—Generalized drawings showing different forms of uropatagia and tails. Drawings by J. D. Davidson.

FIG. 8.—Photograph illustrating pelage and ear differences between *Eumops glaucinus* (left) and *E. auripendulus* (right).

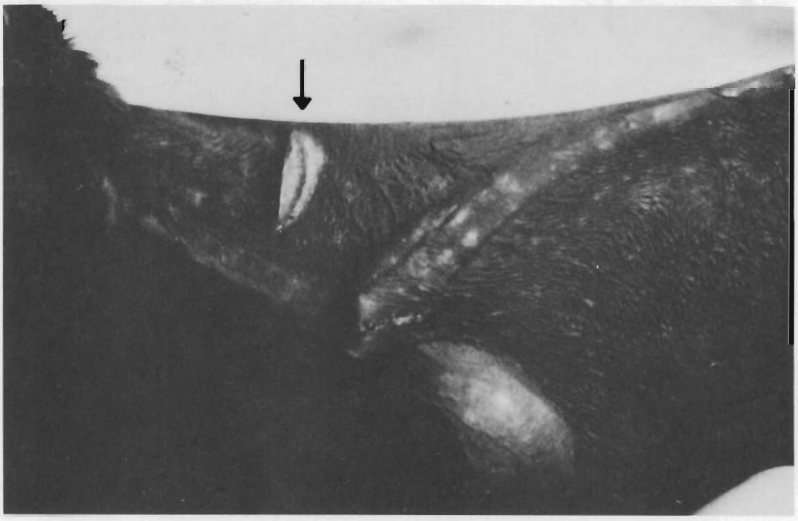


FIG. 9.—Photograph of antebrachial sac on *Peropteryx*. This sac is less developed in females.

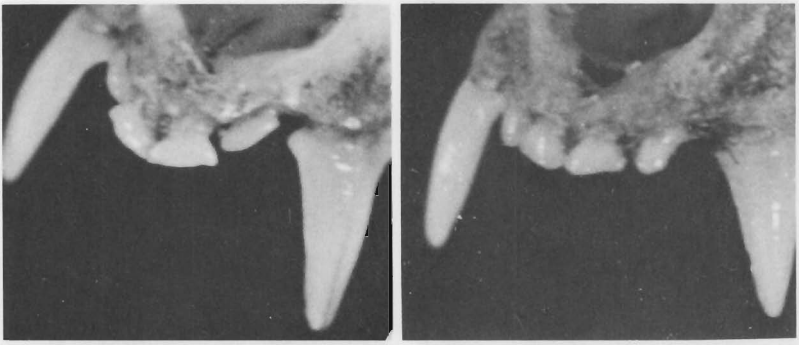


FIG. 10.—Photographs illustrating differences in medial upper incisors of *Glossophaga soricina* (left) and *G. longirostris*. Photos by W. D. Webster.

FIG. 11.—*Peropteryx macrotis*.

FIG. 12.—*Noctilio leporinus*.

FIG. 13.—*Pteronotus macleayii*.

FIG. 14.—*Mormoops blainvillii*.

FIG. 15.—*Micronycteris megalotis.*

FIG. 16.—*Macrotus waterhousii.*

FIG. 17.—*Lonchorhina aurita.*

FIG. 18.—*Glossophaga soricina.*

FIG. 19.—*Monophyllus redmani.*

FIG. 20.—*Anoura geoffroyi.*

FIG. 21.—*Carollia perspicillata.*

FIG. 22.—*Sturnira lilium.*

FIG. 23.—*Chiroderma improvisum.*

FIG. 24.—*Artibeus jamaicensis.*

FIG. 25.—*Ardops nichollsi.*

FIG. 26.—*Phyllops haitiensis.* Photo by Charles A. Woods

FIG. 27.—*Ariteus flavescens.*

FIG. 28.—*Stenoderma rufum.*

FIG. 29.—*Brachyphylla cavernarum.*

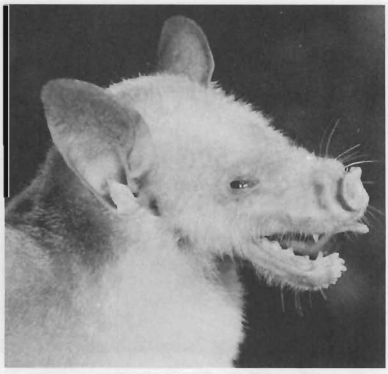


FIG. 30.—*Phyllonycteris aphylla.*

FIG. 31.—*Erophylla sezekorni.*

FIG. 32.—*Natalus major.*

FIG. 33.—*Myotis dominicensis.*

FIG. 34.—*Eptesicus lynni.*

FIG. 35.—*Lasiurus borealis.*

FIG. 36.—*Nycticeius humeralis.*

FIG. 37.—*Antrozous pallidus.*

FIG. 38.—*Tadarida brasiliensis.*

FIG. 39.—*Molossus molossus.*

FIG. 40.—*Eumops auripendulus.*

PUBLICATIONS OF THE MUSEUM
TEXAS TECH UNIVERSITY

Three publications of The Museum of Texas Tech University are issued under the auspices of the Dean of the Graduate School and Director of Academic Publications, and in cooperation with the International Center for Arid and Semi-Arid Land Studies. Short research studies are published as Occasional Papers whereas longer contributions appear as Special Publications. Papers of practical application to collection management and museum operations are issued in the Museology series. All are numbered separately and published on an irregular basis.

The preferred abbreviation for citing The Museum's Occasional Papers is Occas. Papers Mus., Texas Tech Univ.

Institutional subscriptions are available through Texas Tech Press, Texas Tech University, Lubbock, Texas 79409. Individuals can purchase separate numbers of the Occasional Papers for $2.00 each from Texas Tech Press. Remittance in U.S. currency check, money order, or bank draft must be enclosed with request (add $1.00 per title or 200 pages of publications requested for foreign postage; residents of the state of Texas must pay a 5 per cent sales tax on the total purchase price). Copies of the "Revised checklist of North American mammals north of Mexico, 1982" (Jones *et al.*, 1982, Occas. Papers Mus., Texas Tech Univ., 80:1-22) are available at $1.00 each in orders of 10 or more.

ISSN 0149-175X

Texas Tech Press
Lubbock, Texas 79409