AN. INST. BIOL. UNIV. NAL. AUTÓN. MÉXICO 47, SER. ZOOLOGÍA (2): 183-196 (1976)

CONCERNING CERTAIN BATS DESCRIBED AND RECORDED FROM ESPIRITO SANTO, BRAZIL

RONALD H. PINE *
AUGUSTO RUSCHI **

ABSTRACT

A review of Ruschi's publications dealing with the bats of Espírito Santo, Brazil is presented. These publications, which appeared over a period of twenty years, have been almost completely ignored in the zoological literature. The identities of certain bats described by Ruschi are elucidated and especially norteworthy and/or controversial observations on natural history are summarized and discussed.

RESUMEN

Se presenta una revisión de las publicaciones de Ruschi acerca de los murciélagos de Espírito Santo, Brasil. Estas publicaciones, que aparecieron a lo largo de un periodo de veinte años, han sido casi completamente ignoradas en la literatura zoológica. Se dilucida la identificación de ciertos murciélagos descritos por Ruschi y se discuten y resumen, especialmente las observaciones sobre la historia natural, dignas de atención y/o de controversia.

INTRODUCTION

Starting in 1951 and extending into 1971 Ruschi published 30 articles on mammals. These mostly concerned bats from the state of Espírito Santo, Brazil. Ruschi's paper have apparently not come to the attention of the great mejority of mammalogists and therefore they will all be cited here. The papers are: Ruschi (1951a-h, 1952a-b, 1953a-n 1954, 1964, 1965, 1970 and 1971). The publications in question included descriptions of supposedly new forms and presented natural history information for a large number of species. The identities of the forms discussed in these papers present taxonomic difficulties in a number of cases. These difficulties are dealt with below and several are resolved. Some observations concerning the natural history of certain forms are without parallel and involve controversial implications. Although these observations have already appeared in print we feel justified in briefly summarizing them in yet another publication. As the original accounts are scattered widely throughout Ruschi's 30 publications, grouping them together in one short paper should prove a convenience to other workers. More importantly, as noted above, the original

* *Mammal Identification Service, Smithsonian Institution, Washington, D. C.* Present address: Institute for Environmental Awareness, George Williams College, 555 Thirty-first Street, Downers Grove, Illinois 60515.

** *Museu de Biologia "Prof. Mello Leitão", Santa Teresa, Espírito Santo, Brazil.*

publications have been overlooked, apparently owing to limited circulation of the series in which they appeared.

CONCERNING NATALUS ESPIRITOSANTENSIS (RUSCHI) AND RELATED MATTERS

In Ruschi (1951a) the following *nomina nuda* appear: *Myotis espiritosantensis, Molossops planirostris espiritosantensis, Tadarida espiritosantensis.* In the same paper Ruschi noted that *"Hemiderma perspicillatum* Linnaeus" had been recorded for the state and listed *"Tonatia brasiliense* (Peters)" for the state for the first time.

Ruschi later (1951d) made the name *Myotis espiritosantensis* available and in 1970 he redescribed this bat under the name *Natalus espiritosantensis.* A perusal of the figure provided of *Myotis espiritosantensis* and examination of "cootipo" (paratype) no. 1019 reveals that the name is a junior synonym of *Natalus stramineus* Gray. On geographic grounds the specimens from Espírito Santo woul be expected to be *Natalus stramineus natalensis* Goodwin. As *N. s. natalensis* is a subspecies of small dimensions (Goodwin, 1959) and the specimens from Espírito Santo are apparently large for the species (although stated to be smaller than *N. stramineus* in the 1970 paper) it seems appropriate to designate them as *Natalus stramineus espiritosantensis* (Ruschi) at least until a full-fledged revisionary study is undertaken. For recent treatments of the genus *Natalus* see Goodwin (1959) and Linares (1971). The *Natalus* were taken in a cave inhabited by *"Tonatia brasiliense"* and *"Hemiderma perspicillatum"* among other bats.

CONCERNING LASIURUS IN ESPÍRITO SANTO

Ruschi (1951e) reported *"Lasiurus borealis mexicanus* (Saussure)" from Espírito Santo. According to Hall and Kelson (1959) *A[talapha]. mexicana* Saussure = *Lasiurus cinereus cinereus* (Palisot de Beauvois). Following Handley (1960) the red bat of Espírito Santo should probably be *Lasiurus borealis blossevillii* (Lesson and Garnot). In Ruschi (1954 and subsequently) this bat was referred to as *"Lasiurus borealis bonariensis* (Lesson & Garnot)". The head as figured for this animal little resembles that of a *Lasiurus borealis* although the body is shown as having the two pairs of mammae which are characteristic of *Lasiurus.* The skull, as figured, is obviously that of a *Lasiurus.* It is of note that Ruschi reported that this species will eat fruit in captivity. In the same paper Ruschi reported *"Dasypterus intermedius* (Allen)". Judging from Cabrera (1958) and Handley (1960) this animal would now be called *Lasiurus ega argentinus* (Thomas). Ruschi (*op. cit.*) reported this species will also eat fruit in captivity. Ruschi and Bauer (1957) categorized the Vespertilionidae in general as "Insectívoros e frugívoros". They also reported *"Dasipterus* [*sic*] *egregius"* [= *Lasiurus egregius* (Peters)] from Rio Grande do Sul. This form is otherwise known from but one specimen from Santa Catarina and another from Panamá [see Handley (1966)].

CERTAIN MOLOSSID BATS OF ESPÍRITO SANTO

In Ruschi (1951f) the name *Molossops planirostris espiritosantensis* became available. Examination of the figures of the holotype and comparisons of paratype no. 1577 with specimens in the Smithsonian Institution reveal that this bat is conspecific with what is sometimes known as *Molossus molossus crassicaudatus* É. Geoffroy Saint-Hilaire. There seems to be some question concerning the proper name for this bat as Husson (1962) avoided the use of the trinomial

for populations in Surinam and Wetzel and Lovett (1974) used the combination *Molossus crassicaudatus* for a Paraguayan specimen. Ruschi and Bauer (1957) reported *Molossus "obscurus"* from two localities in Rio Grande do Sul.

Comparison of a specimen of bat identified by Ruschi (1951f) as *Molossus rufus rufus* É. Geoffroy Saint-Hilaire with specimens in the Smithsonian Institution reveals that this bat was correctly identified for the time although according to present usage it would be known as *Molossus ater ater* É. Geoffroy Saint-Hilaire (see Goodwin, 1960), assuming the populations in Espírito Santo belong to the nominate subspecies. Ruschi used the latter name in 1954, 1970 and 1971. The specimen available for comparison (original no. 266) was taken in Santa Teresa (19°55'S, 40°36'W) and bore a ♀ sticktight flea of the species *Rhynchopsyllus pulex* Haller (identified by Dr. Robert Traub) in each ear. In addition, this individual carried an insect tibia 3.5 mm long which had become firmly imbedded in the tissue at the junction of the upper lip and the gum at a point directly above the right upper canine tooth. The tibia, judged unidentificable to order by Dr. Paul Spangler, was covered with distally projecting spines. The proximal end of the tibia had penetrated the bat's tissue and the spines held the tibia fast as if it were a harpoon. This is apparently the first recorded instance of penetration of a bat's oral tissues by a chitinous insect part although ant heads have been reported as attached to the heads of bats [see Handley (1956), Wilson (1958), Martin (1971), Ross (1961, 1967) and Harris (1971)].

At the present time we have no additional information to convey concerning the affinities of *Tadarida espiritosantensis*. Ruschi made this name available in 1951f.

CONCERNING TONATIA BRASILIENSIS AFTER RUSCHI, AND CAROLLIA PERSPICILLATA PERSPICILLATA, AFTER RUSCHI

In a discussion of chiropteran inhabitants of various caves Ruschi (1952a) mentioned both *"Hemiderma perspicillatum* (Linnaeus)" and *"Tonatia brasiliense* (Peters)" [see also Ruschi (1953c and 1953k)]. The animal once known by the former name is now called *Carollia perspicillata* (Linnaeus) [see Miller (1924), Sanborn (1949), and Miller and Kellogg (1955)] while the animal once known by the latter name is now called *Tonatia brasiliensis* a name used by Ruschi in 1954, 1970 and 1971. We have not established the identity of *Hemiderma perspicillatum*: Ruschi (referred to in 1970 by the name *Carollia perspicillata perspicillata*) but examination of the illustrations of *Tonatia brasiliense*: Ruschi reveal that it is a *Carollia* as noted by Pine (1972). Comparison of one of Ruschi's specimens (no. 203) reveals that it is a *Carollia perspicillata*. It had been hoped that it might have proved to be *Carollia brevicauda* as understood by Pine for the type locality of *Carollia brevicauda* (Schinz) is in Espírito Santo. Pine has not seen the remaining syntype of *C. brevicauda* and has recorded specimens examined from no nearer to Espírito Santo than Belém, Pará, and the vicinity of Buenavista, Bolivia. A specimen taken by R. E. Mumford at Uba, Minas Gerais (original no. = REM 7 566) may represent *Carollia brevicauda*, however, and if so, this would bring the known distribution of the species Pine called by that name closer to the type locality for Schinz's bat.

Ruschi's specimen, like a number of other southern *Carollia perspicillata*, resembles externally what Pine calls *Carollia brevicauda*. More work is needed on *Carollia* from south of the

Amazon Basin as it is in this area that the genus is most poorly understood.

The animal referred to as *"Hemiderma perspicillatum"* in Ruschi (1953k) and elsewhere was described as having a lower lip provided with a V-shaped furrow margined by rows of oblong warts. This is not characteristic of *Carollia* so the animal in question must have been incorrectly identified.

SACCOPTERYX LEPTURA, AFTER RUSCHI

In 1952 Ruschi discussed *Saccopteryx leptura* (Schreber). There may be some question concerning the identification of this bat as the author carefully described it but failed to mention its most conspicuous feature, namely, the paired dorsal stripes (although the vernacular name, "Morceguinho de lista branca" was used by Ruschi in 1954 and 1965). Ruschi reported that the species as understood by him roosted in caves (and in other places as well).

SANGUINIVOROUS BEHAVIOR OF VAMPIRES AND OTHER BATS

In a paper concerning bats that feed on blood (Ruschi, 1953d) a number of conclusions and observations were reported which should be of interest to students of bats. These include discussions bearing on carnivorous and/or haemotophagous activity on the part of *"Artibeus jamaicensis lituratus"* = *Artibeus lituratus* ssp. [probably *Artibeus lituratus lituratus* (Olfers)] and *Phyllostomus hastatus hastatus* (Pallas) [see also Ruschi (1953n)]. Also of note are observations showing that wild barn owls feed on *"Tonatia brasiliense"* [= *Carollia perspicillata* (Linnaeus)], *"Lonchoglossa ecaudata"* (= ?), *Propteryx* [*sic*] *macrotis macrotis* [= *Peropteryx macrotis macrotis* (*Wagner*)], *"Molossus rufus rufus"* (= *Molossus ater ater* É. Geoffroy Saint-Hilaire) and *"Myotis nigricans nigricans"*. The identity of the *Myotis* could be expected to be doubtful as LaVal (1973) has demonstrated that *Myotis nigricans* of authors is a composite and more than one species of *Myotis* may be expected in Espírito Santo. However, LaVal has written us that the skull drawings and measurements are those of *Myotis nigricans nigricans* (Schinz). Ruschi also found that the above kinds of bats would be fed upon by captive owls but that the latter would not touch *Desmodus* or *Diphylla*. On the contrary, the vampires would often feed upon and kill the owls. In this connection, see also Ruschi (1953a, 1953n). Ruschi (1951b, 1971) did note that owls feed on young *Desmodus*. In further regard to predation upon bats, Ruschi (1953d) found remains of *"Artibeus jamaicensis lituratus"* [= *Artibeus lituratus* (Olfers) ssp.] in the stomach contents of the Black Hawk-Eagle, *Spizaetus tyrranus* (Wied-Neuwied).

The portion of Ruschi's (1953d) paper of most interest is probably the discussion of *Diphylla ecaudata ecaudata* Spix feeding on a human (see also Ruschi, 1953n). Information concerning this vampire's attacking a hog is also contained in that (1953d) paper. Mention of *Diphylla* feeding on other mammals is to be found in Ruschi (1951c, 1951d, 1953n and 1971).

In a paper by Ruschi (1953e) on food habits of bats which was overlooked by Forman (1972), Pine (1969), Tuttle (1967), Wilson (1973) and others, *Phyllostomus hastatus hastatus* was reported as feeding on a cow, *"Molossus rufus"* (= *Molossus ater*) was reported as feeding largely on beetles (especially Carabidae) and seeds of solanaceous plants were found in its feces. Blood was found in its stomach, intestines and apparently in its feces. *"Molossus rufus"*

was also reported as eating bananas, milk and citrated blood in captivity. In the same paper an account was given in which *Chrotopterus auritus australis* Thomas figured in a predatory attack on *Bos taurus* Linnaeus. Bird vertebrae were found among the feces of wild individuals and the feces contained solanaceous seeds and evidence of blood. Bauer (1957) seems to have implied that *Crotopterus* my be responsible for rabies in cattle in areas where vampires have not been found. See also Ruschi (1953a) for remarks concerning *Phyllostomus hastatus* and *Artibeus* as sanblood sucking bat.

More than one authority on Latin bats have expressed skepticism to Pine (personal communications) concerning Ruschi's observations concerning nondesmodids attacking large vertebrates and the finding of blood in the stomachs of such bats. This skepticism is shared by Pine. In dealing with this matter it should not be overlooked, however, that Ruschi's statements do not stand completely alone. Rengger (1830), for example, reported finding blood in the stomachs of what appear to have been glossophagines (*Anoura?*) and Haupt and Rehaag (1921) reported blood from two stomachs of leafnosed bats and gave instances of other leaf-nosed bats [including apparent *Artibeus lituratus* (Olfers)] attacking and transmitting rabies to livestock. Pawan (1936) reported a rabid specimen of *Diclidurus albus* (Wied-Neuwied) resting on a cow. Pawan later (1948) demonstrated that a rabid *Artibeus* in captivity is capable of attacking a calf and infecting it with rabies. Healthy (or even rabid) nondesmodids feeding on blood is, of course, a different matter. Arata, Vaughn and Thomas (1967) found evidence of cannibalism on the part of *Carollia perspicillata* (Linnaeus) and carnivorous habits in the case of *Glossophaga soricina* (Pallas) but found no evidence of blood-eating during examination of 167 stomachs of assorted bats in Colombia. If occasional feeding on blood occurs in New World bats other than desmodids, the evolution of forms especially modified for sanguinivorous habits becomes more understandable.

FEEDING HABITS OF NOCTILIO LEPORINUS AND CERTAIN OTHER BATS

A portion of Ruschi's (1953e) paper deals with *Noctilio leporinus leporinus* (Linnaeus) which is described as catching fish that leap out of the water (see also Ruschi, 1963n). Food items from the bats' stomachs included the fishes, "*Sardinella aurita* Cuv. & Val.", "*Harengula pensacolae* God & Bean", "*Anchoviella epsetus* (Bonaterre)", "*Anchoviella mitchilli* (Cuv. & Val.)" and the Shrimp, "*Penaeus setiferus*". The bats were seen to occasionally enter the water, swin easily and then re-launch themselves into the air. In an earlier paper (1951g) Ruschi had stated that this form ate the fish "*Lycengraulis grossidens* (Agass.)" and sphingid moths. In Ruschi (1953a) the species was said to be exclusively piscivorous.

In 1953g and 1953h respectively Ruschi wrote that *Mimon bennetti* (Gray) and "*Dolichophyllum macrophyllum*" [= *Macrophyllum macrophyllum* (Wied-Neuwied) see Ruschi (1970)] feed on insects and fruits. The data upon which these conclusions are based were not presented. In the latter paper Ruschi stated that the diet of "*Chrotopterus auritus australis* (Thomas)" (= *Chrotopterus auritus australis* Thomas) consisted of small mammals, young birds, fruit, insects and blood. This statement was also made without elaboration except for in the case of the blood where the reader was referred to a previous paper. Records of *Chrotopterus* feeding

on small vertebrates may be found in Constantine (1966), Tuttle (1967) and in Villa-R. and Villa-Cornejo (1971).

THE NAMES GLOSSOPHAGA ECAUDATA GEOFFROY, ANURA WIEDII PETERS AND LONCHOGLOSSA ECAUDATA, AFTER RUSCHI

The question of the identity of *Lonchoglossa ecaudata* is most relevant to Ruschi (1953j) although the name had been used in earlier papers by Ruschi (and was used subsequently). The uncertainty concerning the use of this name is considerable and worthy of presentation although the problem has not been dealt with or acknowledged to exist by the most recent authors.

In 1818 É. Geoffroy SaintHilaire named *Glossaphaga ecaudata,* a form with an abbreviated hairy interfemoral membrane and no tail. According to Geoffroy all his "glossophages" had four lower incisors. Assuming contemporary workers are correct in their identification of *Glossophaga caudifer* É. Geoffroy Saint-Hilaire (=*Anoura caudifer* or "*Anoura caudifera*" according to recent authors), Geoffroy was in error in his contention that lower incisors were present in all of the "glossophages" recognized by him.

In 1826 Wied-Neuwied discussed a bat which he identified as Geoffroy's *Glossophaga ecaudata,* stating, among other things, that his (Wied-Neuwied's) specimen (s) had four lower incisors, no tail and a fringed interfemoral membrance. In a footnote, however, he included in this taxon a specimen provided by Natterer which along with other differences lacked lower incisors.

Gray (1838) named the genus *Anoura* and the species *Anoura Geoffroyi.* He regarded this form as conspecific with Geoffroy's *Glossophaga ecaudata* and the bat identified by that name in some figure (s?) of Wied's which we have not been able to locate. Gray noted an absence of lower teeth. Peters (1869) claimed that Geoffroy's *Glossophaga ecaudata* and *Glossophaga caudifer* were the same species, using the name "*Lonchoglossa caudifera*" for the taxon. According to Peters the species has two pairs of lower incisors. Peters later (1870) stated that Wied's "*Glossophaga ecaudata*" had nothing to do with Geoffroy's and that it was, indeed, truly tailless. We think Peters can probably be trusted on this last point (at least in regard to the specimens he had seen regardless of whether they were conspecific with Wied's or not) as earlier (1869) he had demostrated full knowledge of the ways in which the extremely short-tailed phyllostomids may come to be mistakenly regarded as tailless. In addition to lack of a tail, Wied's animal was said to be larger and with a more hairy interfemoral membrane. The cranial and dental characters were said to be quite similar to those of "*Lonchoglossa caudifera*" [= *Anoura caudifer* (É. Geoffroy Saint-Hilaire)] and externally the animal was supposed to be similar to *Glossonycteris lasiopyga* Peters [= *Anoura geoffroyi lasiopyga* (Peters)]. The latter bat, named by Peters in 1869, was also stated to have two pairs of lower incisors although his figures show quite clearly that no such incisors exist. We must assume that what Peters thought to be *Glossophaga ecaudata* after Wied-Neuwied possessed complete zygomatic arches or Peters would have said otherwise — especially since he emphasized (1870) their absence in his "*Glossonycteris lasiopyga.*" In Peters' paper of 1870 the species which Peters thought conspecific with "Wied-Neuwied's" *Glossophaga ecaudata* [there is no indication that Peters ever saw Wied's specimen (s)] was named *Anura Wiedii.* No comments were made concerning dental

formulae. Measurements were given for an adult male in the museum National d'Histoire Naturelle in Paris which was taken by Gaudichaud near Rio de Janeiro in 1833. As this is the only specimen known to have been examined by Peters it must be regarded as the holotype. It is to be hoped that this specimen is still extant and that it was not listed in Rode's (1941) catalogue of types owing to the specimen's significance having been overlooked. Dobson (1878) is the only person other than Peters who claims to have studied the holotype.

With the publication of Dobson's (1878) "Catalogue of the Chiroptera", *Anura Wiedii* Peters (now under the name *Lonchoglossa wiedii*) would seem to have archieved complete taxonomic respectability. According to Dobson, the members of the genus *Lonchoglossa* have two pairs of lower incisors but they are "deciduous" — thus effecting a compromise between the continental chiropterologists who insisted on perceiving teeth where there were none and Gray, who, although not without his faults, could nonetheless tell when teeth are absent. Dobson noted that in "*Lonchoglossa*" the zygomatic arches were complete but incomplete in "*Glossonycteris geoffroyii*" (= *Anoura geoffroyi* Gray). In later papers (1880a, 1880b) Dobson reported "*Lonchoglossa wiedii*" (which he also called *Lonchoglossa wiedi*) from Popayán, Colombia and noted that the zygomatic arches were cartilaginous. He also noted the presence of a tail! This is the specimen Tamsitt and Valdivieso (1966) referred to "*Anoura* (*Lonchoglossa*) *caudifer* (Geoffroy)" although they had not seen the specimen and presented no evidence to support their allocation. Tamsitt and Valdivieso stated that Lönnberg (1921) had referred to the locality for this specimen as "Popagan, New Granada" — actually it was "Popagan, New Grenada."

Allen's (1898) treatment of the Glossophaginae included accounts of supposed "*Anoura wiedii*" and "*Lonchoglossa caudifera*". According to Allen, the former differs from latter in lacking a tail, calcars, and phalanges on the second wing digit. Both forms, according to Allen, have cartilaginous zygomatic arches and the text states that there are two pairs of lower incisors (in the "*Anoura*". At least and presumably in the "*Lonchoglossa*" as well) although, as usual, the figures show no such teeth. Allen pointed out that Rengger's (1830) description of *Glossophaga villosa* indicated an animal similar (at least) to an "*Anoura*." It certainly did, but as the usual early accounts at least some of the individuals had lower incisors.

Thomas (1898, 1900) clearly regarded the name "*Lonchoglossa wiedii*" as applying to a "good" species.

Although he had seen no specimens, Miller (1907) implied doubt that *Anura wiedii* Peters is not the same as *Anoura geoffroyi* Gray. Miller unequivocally noted the absence of lower incisors in "*Lonchoglossa caudifer*" (= *Anoura caudifer* É. Geoffroy Saint-Hilaire). Miller agreed with Dobson (1878) that the zygomatic arches of what is now known as *Anoura geoffroyi* Gray are incomplete.

In 1921 Lönnberg named "*Lonchoglossa wiedii aequatoris*". This name is a junior synonym of *Anoura caudifer* É. Geoffroy Saint-Hilaire according to Carter (1968) who examined the type specimen. The form was treated as "*Lonchoglossa caudifera aequatoris*" by Sanborn (1933) and as "*Anoura caudifera aequatoris*" by Cabrera (1958). Lönnberg described his supposedly new subspecies as lacking a tail but with complete zygomatic arches.

A strange Brazilian and Paraguayan nomenclatural practice seems to have begun with Lima (1926) who discussed a bat he called "*Lonchoglossa ecaudata* Wied". Such terminology for a bat can-

not be justified because Wied-Neuwied did not propose a new name when he used the term "*Glossophaga ecaudata*" but was merely using É. Geoffroy Saint-Hilaire's name for bats he (Wied-Neuwied) had encountered in Brazil. Wied-Neuwied attributed the name to Geoffroy Saint-Hilaire in unequivocal terms and even if he had intended it as a new name it would have been merely a junior homonym of *Glossophaga ecaudata* É. Geoffroy Saint-Hilaire. Lima (1926) recognized "*Anoura Geoffroy*" [*sic*] in addition to "*Lonchoglossa ecaudata*". Differences noted between the two did not include characters of the zygomatic arches. Both forms were apparently regarded as lacking lower incisors.

The person who may have solved the problem of the identity of *Anura Wiedii* Peters was Sanborn (1933) although his findings have been overlooked. Sanborn found that the zygomatic arches are sometimes ossified in specimens he assigned to *Anoura geoffroyi* Gray [a point ignored by Tamsitt and Valdivieso (1966)] and concluded that *Anura Wiedii* Peters must have been based on an individual of *Anoura geoffroyi* Gray which had bony zygomata. If *Anura Wiedii* Peters must be snyonymized with either *Anoura geoffroyi* Gray or *Anoura caudifer* (É. Geoffroy Saint-Hilaire), then it is clear on the basis of Peters' description that if all the specimens Sanborn (1933) referred to *Anoura geoffroyi* Gray are conspecific then Sanborn's treatment of *Anura Wiedii* Peters as a junior synonym of *Anoura geoffroyi* (É. Geoffroy Saint-Hilaire) is the more reasonable. Yet Cabrera (1958) and Tamsitt and Valdivieso (1966) placed *Anura Wiedii* Peters in the synonymy of *Anoura caudifer* (É. Geoffroy Saint-Hilaire) without mentioning Sanborn's findings or stating the basis of their contrary opinion. Husson (1962), however, was aware of Sanborn's conclusions. Husson noted that in *Anoura geoffroyi* Gray the zygomatic arches are "incomplete or imperfectly ossified" but also stated in regard to specimens from Surinam that "in three specimens the zygomata are cartilaginous, in three others they are ossified". Husson, unlike most other authors, used É. Geoffroy Saint-Hilaire's original spelling of the specific epithet "*caudifer*". In this Husson appears to be correct. The adjectival form would be "*caudifera*" but as a noun in apposition the form "*caudifer*" is perfectly acceptable.

Like certain Brazilian authors, Podtiaguin in his (1944) work on bats of Paraguay apparently followed Lima (1926) in usage of the term "*Lonchoglossa ecaudata* (Wied)". According to Podtiaguin, "*Lonchoglossa ecaudata*" differs from *Anoura geoffroyi* [*sic*] Gray in having a much more deeply grooved lower lip —a character used in Ruschi's (1970) key.

Vieira (1942) also recognized "*Lonchoglossa ecaudata* (Wied)" and stated it differed from "*Lonchoglossa caudifera* (Geoffroy)" in having a somewhat shorter snout, ears which are less concave on their posterior margin and a complete zygomatic arch. This is the only statement with which we are familiar which implies that *Anoura caudifer* lacks complete zygomatic arches. Compared with "*Lonchoglossa caudifera*", "*Lonchoglossa ecaudata*" was also said to be larger and to completely lack a tail. According to Vieira, Lima's "*Lonchoglossa ecaudata*" was a mixture of "*Lonchoglossa caudifera*" and "*Lonchoglossa ecaudata*". The original form of É. Geoffroy Saint-Hilaire's name for what is now known as *Anoura caudifer* was given as *Glossophaga caudifera et eucaudata* [*sic*]. Geoffroy never used this phrase. The bat was simply called *Glossophaga caudifer* on plate 17 (between pages 384 and 385 in the copy at hand) and on page 418. See also Ruschi (1953j). Vieira later (1955)

continued to recognize "*Lonchoglossa ecaudata* (Wied)".

Ruschi (1953j) did not compare "*Lonchogloss* [*sic*] *ecaudata* (Wied)" with *Anoura geoffroyi* Gray [the latter was discussed in Ruschi (1953i)]. "*Lonchogloss ecaudata*" was said to have a hairy interfemoral membrance and complete zygomatic arches. Ruschi later (1954) stated it had incomplete zygomatic arches. Ruschi later (1954) stated it had incomplete zygomatic arches.

The extreme confusion concerning the identity of *Anoura Wiedii* Peters and its alter ego "*Lonchoglossa ecaudata*: Wied-Neuwied" seems to be at least mostly owing to the variable degree of ossification of the zygomatic arches in *Anoura geoffroyi* Gray. The difficulty involved in demonstrating the presence of a tail in *Anoura caudifer* (É. Geoffroy Saint-Hilaire) has also resulted in problems. At the present time, the affinities of "*Lonchogloss ecaudata*": Ruschi are still unclear.

ADDITIONAL INFORMATION CONCERNING BATS

Bats identified as *Lonchophylla mordax* Thomas were discussed in Ruschi (1953k). The text stated the zygomatic arches are incomplete but they are shown as complete (one side) and broken (the other side) in the illustrations.

Ruschi (1953l) deals in part with "*Artibeus jamaicensis lituratus* (Lichtensteia)" [*sic*]. Examination of the figures shows that the bat in question is the one now called *Artibeus lituratus lituratus* (Olfers) —see Hershkovitz (1949), Cabrera (1958) and Davis (1970). In addition to a list of fruits eaten by this species, the second author reported having seen it pursue and capture hawk moths (Sphingidae) attracted to lights in rooms. For an account of *Artibeus jamaicensis* Leach catching and eating flies, see Tuttle (1968). Ruschi also reported having observed predation in the wild on the young of the Rufous-bellied Thrush, *Turdus rufiventris rufiventris* Vieillot. Three wild-caught individuals were said to have had blood in their stomachs and captive individuals were reported to feed on citrated blood as well as on fruits and insects. In Ruschi (1954) this bat was referred to as "*Artibeus jamaicensis planirostris* (Spix)". In Ruschi (1953l) bats identified as "*Vampyrops lineatus* (Geoffroy)" were reported to feed on fruits and insects, especially hawk moths (Sphingidae). In Ruschi (1954, 1971) this bat was referred to as "*Vampyrops lineatus sacrillus* Thomas". Usage of the last-mentioned names for the *Artibeus* and *Vampyrops* are also to be found in Ruschi (1970) but without attribution.

In another paper (1953m) Ruschi asserted that *Tonatia bidens* (Spix), *Sturnira lilium lilium* (É. Geoffroy Saint-Hilaire), "*Eptesicus hilarii* (Geoffroy)" and "*Eptesicus brasiliensis* (Desmarest)" all feed on fruit and insects. Until comparisons have been made of Ruschi's *Eptesicus* with specimens in other museums we are unable to fit them into the classificatory scheme of Davis (1966). According to Thomas (1920) and Cabrera (1958) *Eptesicus hilarii* (I. Geoffroy Saint-Hilaire) is a junior synonym of *Eptesicus brasiliensis brasiliensis* (Desmarest). Davis (1966) implied that *Eptesicus hilarii* (I. Geoffroy Saint-Hilaire) might prove to be conspecific with *Eptesicus fuscus* (Palisot de Beauvois) but felt it best that the name *E. hilarii* remain in the synonymy of *E. b. brasiliensis* until the holotype could be examined. It seems to us more likely that B. M. 7.1.1.365 from "St. Cath. Brazil" is from some unspecified locality in the state of Santa Catarina rather than from "Santa Catharina, Minas Gerais" as surmised by Davis (1966). Early localities were often vague. Even if a specific lo-

cality was intended by the notation "St. Cath., Brazil" it could have been any of several places in Brazil by that name.

The remainder of Ruschi's (1953m) paper deals with a bat identified as "*Eumops abrasus abrasus* (Temminck)". The bat usually referred to by earlier authors as *Eumops abrasus* is now called *Eumops auripendulus* (Shaw) —see Goodwin (1960) and Husson (1962).

In Ruschi (1953n) blood-eating bats in a state of nature were said to feed during the daytime in dark situations. The same paper stated a species of blood-sucking ectoparasite had been found on all the bats of Espírito Santo. This parasite was said to be capable of transmitting diseases between the various species of bats and to offer a means of biological control of vampires.

ACKNOWLEDGMENTS

We are indebted to Paul Abravaya for transporting specimens of bats from Espírito Santo to Washington. Robert Traub kindly identified fleas for us, Paul Spangler examined an insect part and George C. Steyskal and Curtis W. Sabrosky provided advice on problems of nomenclature. Richard K. LaVal gave advice concerning the genus *Myotis*. Larry M. Carpenter, Luz Berd, Nobuko Etoh Pine, Margaret Selenis, Ellen Goldberg and Helen Hutchinson were most helpful to Pine during the writing of the manuscript. Alfred L. Gardner, Andrew Starrett and John O. Matson read the manuscript and made useful suggestions. Portions of the research upon which this publication is based were performed pursuant to Contract No. PH-43-67-59 with the National Institutes of Health, Public Health Service, Department of Health, Education and Welfare.

LITERATURE CITED

ALLEN, H., 1898. On the Glossophaginae. *Trans. Amer. Philos. Soc.*, n.s., 19 (2), art. 5: 237-266, 10 pls.

ARATA, A. A., J. B. VAUGHN y M. E. THOMAS, 1967. Food habits of certain Colombian bats. *J. Mamm., 48* (4): 653-655, 1 table.

BAUER, A. G., 1957. Considerações sôbre a raiva bovina e sua transmissão por morcegos no Rio Grande do Sul. *Arq. Inst. Pesquisas veterinárias Desidério Finamor.* (1956/57), ano 2: 20-22, 2 pls., 1 table.

CABRERA, A., 1958. Catálogo de los mamíferos de América del sur. I (Metatheria-Unguiculata-Carnivora). *Revista del Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" Instituto Nacional de Investigación de las Ciencias Naturales, Ciencias Zoológicas 4* (1): i-iv, 1-307.

CARTER, D. C., 1968. A new species of *Anoura* (Mammalia: Chiroptera: Phyllostomidae) from South America. *Proc. Biol. Soc. Wash., 81*: 427-430.

CONSTANTINE, D. C., 1966. New bat records from Oaxaca, Arizona and Colorado. *J. Mamm., 47* (1): 125-126.

DAVIS, W. B., 1966. Review of South American bats of the genus Eptesicus. *Southwest. Nat., 11* (2): 245-274, 5 figs., 4 tables.

——, 1970. The large fruit bats (genus *Artibeus*) of Middle America, with a review of the *Artibeus jamaicensis complex*. *J. Mamm.*, 105-122, 5 figs., 3 tables.

DOBSON, G. E., 1878. *Catalogue of the Chiroptera in the collection of the British Museum.* London: i-xlii, 1-567, 30 pls.

——, 1880a. On some new or rare species of Chiroptera in the collection of the Göttingen Museum. *Proc. Zool. Soc. London*: 461-465, 1 pl.

——, 1880b. Report on accessions to our knowledge of the Chiroptera during the past two years (1878-80). *Rep. Brit. Assoc.*: 169-197.

FORMAN, G. L., 1972. Comparative morphological and histochemical studies of stomachs of selected American bats. *Univ. Kansas Sci. Bull., 49* (10): 591-729, 53 figs., 2 tables.

GEOFFROY SAINT-HILAIRE, É., 1818. Sur de nou-

velles chauve-souris, sous le nom de glossophages. *Mém. Mus. Hist. Nat., Paris, 4*: 411-418, 2 pls.

GOODWIN, G. G., 1959. Bats of the subgenus *Natalus*. *Amer. Mus. Novit.* 1977: 1-21, 2 figs., 1 table.

———, 1960. The status of *Vespertilio auripendulus* Shaw, 1800, and *Molossus ater* Geoffroy, 1805. *Amer. Mus. Novit.* 1994: 1-6, 1 fig.

GRAY, J. E., 1838. A revision of the genera of bats (Vespertilionidae), and the description of some new genera and species. *Mag. of Zool. and Bot.*, 2: 483-505.

HALL, E. R. y K. R. KELSON, 1959. *The mammals of North America*. Vol. I. Ronald Press Co., New York: i-xxx, 1-546, *1-79*, 312 figs., 320 maps.

HANDLEY, C. O., Jr., 1956. Bat versus ant. *J. Mamm., 37* (2): 279.

———, 1960. Descriptions of new bats from Panama. *Proc. U. S. Nat. Mus., 112* (3442): 459-479, 4 tables.

———, 1966. Checklist of the mammals of Panama. *In* R. L. Wenzel and V. J. Tipton (eds.) *et al. Ectoparasites of Panama*. Field Museum of Natural History, Chicago: 753-795.

HARRIS, A. H., 1971. *Pipistrellus hesperus* (Chiroptera) versus ant. *Southwest. Nat., 15* (3): 396-397.

HAUPT, H. y H. REHAAG, 1921. Durch Fledermäuse verbreitete Seuchenhafte Tollwut unter Viehbeständen in Santa Catharina (Süd-Brasilien). *Zeitschr. f. Infektionskrankheiten und Hygiene der Haustiere, 22* (1): 76-88, 22 (2): 104-127.

HERSHKOVITZ, P., 1949. Mammals of northern Colombia, preliminary report no. 5. Bats (Chiroptera). *Proc. U. S. Nat. Mus., 99*: 429-454, 1 fig.

HUSSON, A. M., 1962. The bats of Suriname. *Zool. Verhandelingen Rijksmu. Nat. Hist. Leiden, 58*: 1-282, 39 figs., 30 pls. 31 tables.

LAVAL, R. K., 1973. A revision of the Neotropical bats of the genus *Myotis*. *Nat. Hist. Mus. Los Angeles Co., Sci. Bull. 15*: 1-54, 23 figs., 14 tables.

LIMA, J. L., 1926. Os morcegos da coleção do Museu Paulista. *Revista do Museu Paulista*, São Paulo, *14*: 43-127.

LINARES, O. J., 1971. A new subspecies of funnel-eared bat (*Natalus stramineus*) from western Venezuela. *Bull. So. Calif. Acad. Sci., 70* (2): 81-84, 2 figs., 1 table.

LÖNNBERG, E., 1921. A second contribution to the mammalogy of Ecuador with some remarks on Caenolestes. *Arkiv för Zoologi, 14* (4): 1-104, 8 figs., 1 pl.

MARTIN, R. L., 1971. The cover. *Bat Research News, 12* (1): 1 + cover.

MILLER, G. S., Jr., 1907. The families and genera of bats. *Bull. U. S. Nat. Mus., 57*: i-xvii, 1-282, 49 figs., 14 pls.

———, 1924. List of North American Recent mammals, 1923. *Bull. U. S. Nat. Mus.*, 128: i-xvi, 1-673.

———, y R. KELLOGS, 1955. List of North American Recent mammals. *Bull. U. S. Nat. Mus., 205*: i-xii, 1-954.

PAWAN, J. L., 1936. The transmission of paralytic rabies in Trinidad by the vampire bat (*Desmodus rotundus murinus* Wagner, 1840). *Ann. Trop. Med. Parasit., 30* (1): 101-130 + 1 pl.

———, 1948. Fruit-eating bats and paralytic rabies in Trinidad. *Ann. Trop. Med. Parasit., 42* (2): 173-177.

PETERS, W., 1869. Über die zu den Glossophagae gehörigen Flederthiere und über eine neue Art der Gattung *Colëura*. *Monatsber. Kön. Preuss. Akad. Wiss. Berlin* (for 1868): 361-368, 1 pl.

———, 1870. Bemerkungen über neue oder weniger bekannte Flederthiere besonders des Pariser Museums. *Monatsber. Kön. Preuss. Akad. Wiss. Berlin* (for 1869): 391-406.

PINE, R. H., 1969. Stomach contents of a free-tailed bat, *Molossus ater*. *J. Mamm., 50* (1): 162.

———, 1972. The bats of the genus *Carollia*. *Tech. Monog. Texas Agric. Exper. Sta.* No. 8. Texas A & M Univ., College Station: 1-125, 3 figs., 7 maps., 8 tables.

PODTIAGUIN, B., 1944. Contribuciones al conocimiento de los murciélagos del Paraguay. Entrega 1. Familias: Phyllostomidae y Desmodontidae. [Reprint of] *Rev. Soc. Cient. Paraguay, Asunción, 6* (4): 25-62.

RENGGER, J. R., 1830. *Naturgeschichte der Saeugethiere von Paraguay*. Schweighauserschen Buchhandlung, Basel: i-xvi, 1-394.

RODE, P., 1941. Catalogue des types de mammifères du Muséum d'Histoire Naturelle. Ordre des chiroptères. *Bull. Mus. Nat. Hist. Nat., Paris, 13*: 227-252.

ROSS, A., 1961. Notes on food habits of bats. *J. Mamm., 42* (1): 66-71, 1 table.

———, 1967. Ecological aspects of the food habits of insectivorous bats. *Proc. Western Found. Vert. Zool., 1* (4): 205-264, 15 figs., 1 frontispiece.

RUSCHI, A., 1951a. Morcegos do estado do Espí-

rito Santo [.] Introdução e considerações gerais. *Bol. Mus. Biol. Prof. Mello Leitão Zool.*, Santa Teresa, Espíritu Santo, no. *1*: 1-16, 2 figs.

———, 1951b. Morcegos do estado do Espírito Santo [.] Família *Desmodontidae*, chave analytica para os Gêneros e espécies representadas no E. E. Santo. Descrição de *Desmodus rotundus rotundus* e algumas observações a seu respeito. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo, no. *2*: 1-7 + 4 unnumbered pages, 3 figs.

———, 1951c. Morcegos do estado do Espírito Santo [.] Descrição de *Diphylla ecaudata* Spix e algumas observações a seu respeito. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo, no. *3*: 1-3 + 4 unnumbered pages, 3 figs.

———, 1951d. Morcegos do estado do Espírito Santo [.] Família *Vespertilionidae*, chave analítica para os Gêneros e espécies representadas no E. Santo. Descrição de *Myotis nigricans nigricans* e *Myotis espiritosantensis* n. sp. e algumas observações a seu respeito. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo, no. *4*: 1-11 + 4 unnumbered pages, 4 figs.

———, 1951e. Morcegos do estado do Espírito Santo [.] Família *Vespertilionidae*. Descrição das espécies: *Lasiurus borealis mexicanus* e *Dasypterus intermedius*, com algumas observações biológicas a respeito. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo, no. *5*: 1-11 + 4 unnumbered pages, 4 figs.

———, 1951f. Morcegos do estado do Espírito Santo. Família *Molossidae*. Chave analítica para os Gêneros e espécies representadas o E. E. Santo. Descrição de *Molossus rufus rufus, Molossops planirostris espiritosantensis* n. sub. sp, e *Tadarida espiritosantensis* n. sp. e dados biológicos a respeito. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo, no. *6*: 1-19 + 4 unnumbered pages, 7 figs.

———, 1951g. Morcegos do estado do Espirito Santo [.] Família *Noctilionidae*, Chave analítica para os Gêneros representados no Brasil, com a descrição da unica espécie representada no Espírito Santo: *Noctilio leporinus leporinus* (Linnaeus). *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo, no. *7*: 1-7 + 4 unnumbered pages, 2 figs.

———, 1951h. Morcegos do Estado do Espírito Santo [.] Família *Emballonuridae*, chave analítica para os Gêneros, espécies e sub-espécies representadas no Estado do Espírito Santo. Descrição de *Peropteryx macrotis* e *Peropteryx kappleri*. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo, no. *8*: 1-10 + 3 unnumbered pages, 3 figs.

———, 1952a. Morcegos do estado do Espírito Santo IX[.] Os morcegos das grutas do *Limoeiro* em *Castelo, Monte Libano* em *Cachoeiro do Itapemirim* e de *Itaúnas*, em *Morro d'Anta*, em *Conceição da Barra*. Grutas de Inverno, Verão e Acidentais. Cohabitação. O banho. Morcegário e criação em cativeiro. Pesquisas sôbre Corpusculos de Negri. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo, no. *9A*: 1-91 + 4 unnumbered pages, 37 figs.

———, 1952b. Morcegos do estado do Espírito Santo IXA[.] Família *Emballonuridae*. Chave analítica para os Gêneros espécies e subespecies representadas no E. Santo. Descrição das espécies: *Saccopteryx leptura* e *Centronycteris maximiliani maximiliani*. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espirito Santo, nr. *10*: 1-16.

———, 1953a. Importância médico-veterinária dos morcegos. *Vida Capichaba*, Ano 31, no. *635*: 56-58.

———, 1953h. Morcegos do estado do Espírito Santo * X[.] Família *Emballonuridae*. Descrição das espécies: *Rhynchiscus naso* e *Diclidurus albus albus*, com algumas observações a respeito. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo, no. *12*: 1-9 + 4 unnumbered pages, 3 figs.

———, 1953c. Morcegos do estado do Espírito Santo * XI[.] Família *Phyllostomidae*, Chaves Analíticas para Sub-famílias, Gêneros e espécies, representadas no Estado do E. Santo. Descrição das espécies: *Trachops cirrhosus* e *Tonatia brasiliense*, com algumas observações a respeito. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espirito Santo, no. *13*: 1-13 + 5 unnumbered pages, 4 figs.

———, 1953d. Dois casos de sanguivorismo de *Desmodus rotundus rotundus* (E. Geoffroy) e *Diphylla ecaudata* Spix, no homem, e outras observações sobre os quirópteros hematófagos e acidentalmente hematófagos. *Bol. Mus. Biol. Prof. Mello-Leitão* Biol., Santa Teresa, Espirito Santo, n. *13*: 1-8, 1 plate.

———, 1953e. Algumas observações sobre Alimentação dos Quiropteros. *Phyllostomus hastatus hastatus* (Pallas; *Molossus rufus* E. Geoffroy, *Chrotopterus auritus australis* (Thomas) e *Noctilio leporinus leporinus* (Linnaeus). *Bol. Mus. Biol. Prof. Mello-Leitão Biol.*, Santa Teresa, Espirito Santo, n. *14*: 1-5.

———, 1953f. Morcegos do estado do Espírito Santo *XII[.] Família *Phyllostomidae*: Descrição das espécies: *Micronycteris megalotis*

megalotis e *Phyllostomus hastatus hastatus*, com algumas observações biológicas a respeito. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo, no. *14*: 1-14 + 4 unnumbered pages, 5 figs.

——, 1953g. Morcegos do estado do Espírito Santo *XIII[.] Família *Phyllostomidae*. Descrição das espécies *Mimon bennettii* e *Lonchorhina aurita*, com algumas observações. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo, no. *15*: 1-11 + 5 unnumbered pages, 4 figs.

——, 1953h. Morcegos do estado do Espírito Santo *XIV[.] Família *Phyllostomidae*. Descrição das espécies: *Dolichophillum macrophyllum* (Wied) e *Chrotopterus auritus australis* (Thomas). *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espirito Santo, no. *16*: 1-7 + 5 unnumbered pages, 2 figs.

——, 1953i. Morcegos do estado do Espírito Santo *XV[.] Família *Phyllostomidae*. Descrição das espécies: *Glossophaga soricina soricina* e *Anoura geoffroyi*, com observações a respeito. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo, no. *17*: 1-12 + 4 unnumbered pages, 4 figs.

——, 1953j. Morcegos do estado do Espírito Santo *XVI[.] Família *Phyllostomidae*. Descrição das espécies: *Lonchoglossa caudifera* e *Lonchoglossa ecaudata*, com algumas observações biológicas a respeito. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo, no. *18*: 1-7 + 5 unnumbered pages, 2 figs.

——, 1953k. Morcegos do estado do Espírito Santo * XVII[.] Família *Phyllostomidae*. Descrição das espécies: *Lonchophylla mordax* e *Hemiderma perspicillatum*, com algumas observações biológicas a respeito. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo, no. *19*: 1-7 + 5 unnumbered pages, 2 figs.

——, 1953 "1". Morcegos do estado do Espírito Santo *XVIII[.] Família *Phyllostomidae*. Descrição das espécies *Artibeus jamaicensis lituratus* e *Vampyrops lineatus*, com algumas observações. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo, no. *20*: 1-11 + 5 unnumbered pages, 4 figs.

——, 1953m. Morcegos do estado do Espírito Santo * XIX[.] Família *Phyllostomidae*, descrição de *Tonatia bidens* e *Sturnira lilium lilium*. Família *Vespertilionidae*, descrição de *Eptesicus hilarii* e *Eptesicus brasiliensis*. Família *Molossidae*, descrição de *Eumops abrasus abrasus*. Com algumas observações a respeito. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo, no. *21*: 1-5 + 5 unnumbered pages.

——, 1953n. Primeira palestra sobre morcegos do estado do Espírito Santo. *Bol. Rotary Club de Vitória*, no. *35*: 141-142, no. *36*: 146, no. *37*: 145, 149, no. *38*: 153.

——, 1954. Morcegos do estado do Espírito Santo XX[.] Chaves analíticas e artificiais para a determinação das famílias géneros, espécies e sub-espécies dos morcegos representados no Estado do Espírito Santo, e a lista atualizada das mesmas. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo no. *22A*: 1-17 + 5 unnumbered pages.

——, 1964. Macacos do estado do Espírito Santo. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo, nr. *23-A*: 1-23.

——, 1965. Lista dos mamíferos do estado do Espírito Santo. *Bol. Mus. Biol. Prof. Mello-Leitão Zool.*, Santa Teresa, Espírito Santo, no. *24A*: 1-40.

——, 1970. Morcegos do estado do Espírito Santo[.] Chaves analíticas e artificiais para a determinação das Famílias, Géneros, espécies e subespecies dos morcegos representados no E. E. Santo, com a descrição de uma nova espécie da Família *Natalidae* Miller, 1899 da região do Rio Itaunas, em Conceição da Barra e Rio Mucurí ao Sul da Bahia: *Natalus espiritosantensis* n. sp. *Bol. Mus. Biol. Prof. "Mello-Leitão" Zool.*, Santa Teresa, Espírito Santo. no. *43*: 1-11, 2 unnumbered pls.

——, 1971. Morcegos do estado do Espírito Santo (Reedição). [reprinted ed. of] *Boletim do Museu de Biologia Mello Leitão* (N.os 2, 3 e 9-A). Ministério da Agricultura, Escritório de Produção Animal Equipe Técnica de Defesa Sanitária Animal. Coordenadoria do Plano de Combate á Raiva dos Herbívoros. "Impresso no Setor de Artes Gráficas da Escola Técnica Federal 'Celso Suckow da Fonseca'": 1-24, 32 unnumbered pls.

RUSCHI, A. y A. G. BAUER, 1957. Classificação de quirópteros do Rio Grande do Sul. *Arq. Inst. Pesquisas Veterinárias Desidério Finamor.* (1956/57), año 2: 38-41, 1 pl., 1 table.

SANBORN, C. C., 1933. Bats of the genera *Anoura* and *Lonchoglossa*. *Zool. Ser. Field Mus. Nat. Hist.*, *20*: 23-28.

——, 1949. Mammals from the Rio Ucayali, Peru. *J. Mamm.*, *30*: 277-288.

TAMSITT, J. R. y D. VALDIVIESO, 1966. Taxonomic comments on *Anoura caudifer*, *Artibeus lituratus* and *Molossus molossus*. *J. Mamm.*, *47* (2): 230-238.

THOMAS, O., 1898. On the small mammals collected by Dr. Borelli in Bolivia and northern

Argentina. *Boll. Mus. Zool. ed Anat. Comp. Universitá Torino, 13* (315) : 1-4.

———, 1900. List of the mammals obtained by Dr. G. Franco Grillo in the province of Parana, Brazil. *Ann. Mus. Civico Storia Nat. Genova*, ser. 2, *20* (40) : 546-549.

———, 1920. *On Neotropical bats of the genus* Eptesicus. *Ann. Mag. Nat. Hist.*, ser 9, *5*: 360-367.

TUTTLE, M. D., 1967. Predation by *Chrotopterus auritus* on geckos. *J. Mamm., 48* (2) : 319.

———, 1968. Feeding habits of *Artibeus jamaicensis. J. Mamm., 49* (4) : 787.

VIEIRA, C. O. da C., 1942. Ensaio monográfico sobre os quirópteros do Brasil. *Arquivos de Zoologia, Estado São Paulo, 3*: 219-471, 42 figs., 4 pls.

———, 1955. Lista remissiva dos mamíferos do Brasil. *Arquivos de Zoologia, Estado São Paulo, 8*: 341-474.,

VILLA-R., B. y M. VILLA-CORNEJO, 1971. Observaciones acerca de algunos murciélagos del norte de Argentina, especialmente de la biología del vampiro *Desmodus r. rotundus. An. Inst. Nat. Autón. México 42,* ser Zool. (1) : 107-148, 5 figs., 2 maps.

WETZEL, R. M. y J. W. LOVETT, 1974. A collection of mammals from the Chaco of Paraguay. *Univ. Connecticut Occas. Papers Biol. Sci. Ser., 2* (13) : 203-216.

WIED-NEUWIED, Maximilian Prinz zu, 1826. *Beiträge zur Naturgeschichte von Brasilien. Verzeichniss der Amphibien, Säugethiere und Vögel, welche auf einer Reise zwischen dem 13ten und dem 23sten Grade südlicher Breite im östlichen Brasilien beobachtet wurden. II. Abtheilung. Mammalia. Säugethiere.* Gr. H. S. priv. Landes-Industrie-Comptoirs, Weimar, *2*: 1-620, 5 pls.

WILSON, D. E., 1973. Bat faunas: a trophic comparison. *Syst. Zool., 22* (1) : 14-29, 12 tables.

WILSON, N., 1958. Another instance of bat *versus ant. J. Mamm., 39* (3) : 438.