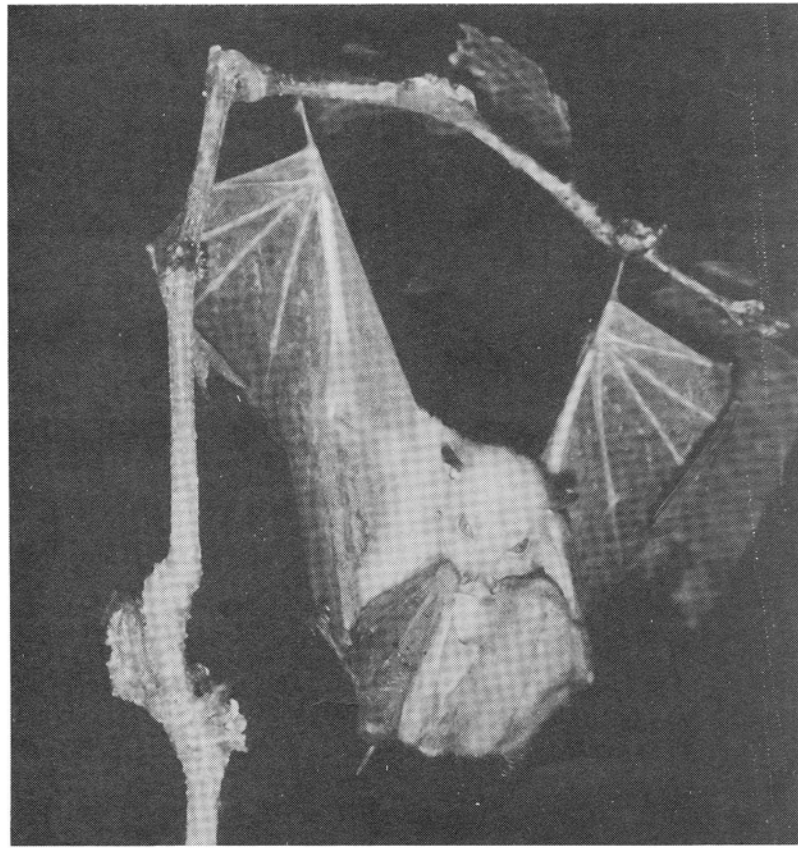
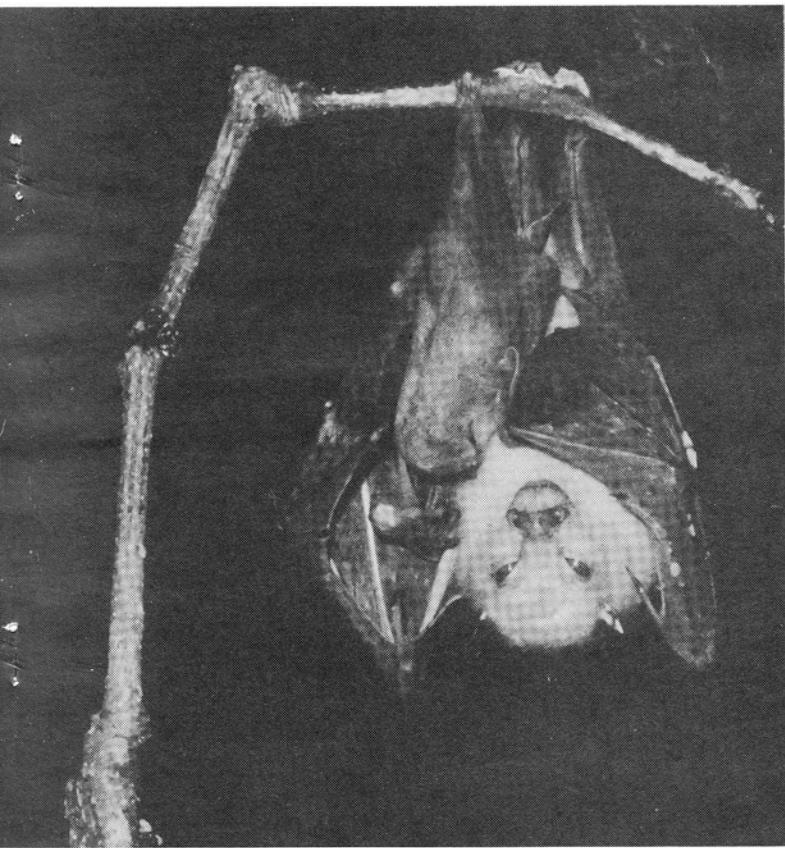


BAT RESEARCH NEWS

Vol. 10, No. 1

January, 1969



New Guinea Tube-nosed Bat, Nyctimene albiventer

BAT RESEARCH NEWS

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THE COVER

Reading your recent note about females carrying young while feeding (?) reminded me of an unusual experience on our 1964 trip to New Guinea. We were camped on May

5 in a big rain forest at 2000 feet at Masba Creek in the heart of the Huon Peninsula on the northeast coast of New Guinea. Stan Grierson and I were out early in the evening "jacking", when Stan picked up the eyes of a Nyctimene at rest on a low branch (6'). He was so close that he aimed (we were using .410 # 12 shot) well to one side of the bat. It fell to the ground uninjured (later, we could not find even one shot wound), and we took her back to camp intending to keep her alive for a day or so and take some pictures. The next evening we went out again, and while walking by the spot where we had collected the Nyctimene, we heard a faint squeaking, and after poking around in the branches for a while we found a young, uninjured Nyctimene. When this young bat was put with the female back at camp, he immediately went to the left teat and began feeding. Even while Grierson was photographing, the female made no attempt to take flight, and the young paid him no attention.

In the pictures note the spotting of the ears and of the skin of the wings. Note the clawed tip of the second digit in the picture on the left; also the mid dorsal streak on the young male which is characteristic of this species. The tube-nose shows up well in the other picture.

	AMNH # 194848 ad	194849 imm
FA	60	43
TL	117	75
TV	22	13
WS	453	287
Wgt.	about 31 g	about 9 g

At the time the female fell to the ground she had either finished nursing or had returned to her young to nurse. Certainly if she had had the young attached to a teat both would have dropped to the ground. Nyctimene albiventer is a solitary bat roosting in vegetation (in my experience). It is primarily a rain forest species, but I have netted it in oak forest occasionally at 4000-5000 feet.

Hobart M. Van Deusen, Amer. Museum of Natural History, New York, 10024.

RESOLUTION ON VAMPIRE BATS

RECOGNIZING that vampire bats, Desmodontidae, constitute a serious economic, veterinary and public health problem in Latin America, not only because vampire bats can transmit rabies and other diseases to domestic animals and man, but also because their sole food is the blood of birds and mammals, including man,

Bat Research News appears quarterly: January, April, July and October. Subscription rate is \$1.00 for two years. All back issues are available for \$5.00. Wayne H. Davis, Department of Zoology, University of Kentucky, Lexington, Ky. 40506, U. S. A.

CONSIDERING further that the eradication of vampire bats, whether desirable or not, is impractical due to their wide distribution, abundance and inaccessible roosts, and,

CONSIDERING that many other species of bats, commonly found roosting with or liable to be misidentified as vampires, play an important role in nature, for example in the control of insect pests of economic importance,

the I.U.C.N. Latin American Regional Conference on Conservation of Renewable Natural Resources, meeting at San Carlos de Bariloche, Argentina, on 2 April, 1968,

RECOMMENDS TO ALL Governments concerned that necessary control of vampire bats in problem areas be based on sound biological, ecological and immunological studies, aiming at selective reduction of local vampire populations only,

and RECOMMENDS FURTHER that personnel charged with the application of control measures be properly trained, and that special care be taken to avoid indiscriminate and mass destruction, particularly by dynamiting and fumigation of caves and other roosting places which may shelter large numbers of bats and other animal and plant species beneficial to man or of great scientific interest.

The above resolution was sent to me by Arthur Greenhall, who was involved in drafting it.

BAT RESEARCH OPPORTUNITIES AT THE OZARK UNDERGROUND LABORATORY

The Ozark Underground Laboratory, located 60 miles from Springfield, Missouri, in the Ozark Highlands, offers unusual bat research opportunities. The laboratory cave has a spring through fall population of about 100,000 Myotis grisescens. The colonies are found on flat ceilings ranging in height from 5 to 8 feet. They can be easily reached, with much of the route being over cemented trails.

Electricity and remote sensing lines are available near the bat areas, and abundant water is available from the underground stream.

Access to the bat area is via an artificial entrance and a steel gate. The bats enter the colony area from the opposite direction via the natural entrance and an unpleasant 900 foot long passage. As a result, the bats are disturbed only when studies are in progress in their particular area, and care is taken to keep this disturbance to a minimum.

Fees are charged for work conducted at the Laboratory, and charges are based upon the facilities required. Routine observations can be made by a member of the Laboratory staff if the researcher desires.

The Laboratory is particularly well suited for intensive studies under controlled conditions. Workers contemplating studies of this type are invited to consider our facilities. Our quarterly newsletter is available free to interested workers. Thomas Aley, Director, Ozark Underground Laboratory, Route 2, Ozark, Mo. 65721.

CURRENT STUDIES ON MYOTIS GRISESCENS

Last spring I decided to work on Myotis grisescens for my doctoral dissertation. My research will cover life history, ancestry, infraspecific variation, incipient

isolating mechanisms, and distribution. Field studies will be centered in Alabama, Florida, Tennessee, and Virginia.

Paul Robertson and I worked this area extensively during June, July and August of the past summer. We were surprised to find that a large number of the original 4,000 M. grisescens banded from 1960 to 1962 were still alive. We visited 30 colonies of M. grisescens in Alabama, Florida, Tennessee and Virginia and captured about 40,000 bats. Of these, 30,000 were sexed and aged, 10,000 were banded, and about 1,000 were recaptured in other areas. A large number of late summer recoveries indicate that M. grisescens from the very large summer colonies in Alabama migrate mostly to hibernacula in northcentral and northeastern Tennessee for the winter. Some and possibly many of them probably reach wintering caves as far north as Kentucky and Virginia. If anyone in these areas has the opportunity this winter, I would appreciate it if he would make a careful check for band numbers 6-83001 to 6-93000.

If funds can be obtained, I hope to spend two more summers and one winter working with M. grisescens in the Southeast. My work will include a detailed study of growth and development, population turnover during the reproductive period, activity periods, feeding habits, and routes and speed of travel. Paul and I have already accumulated considerable data in these areas. Our success was greatly enhanced by the use of bat traps that I have developed during the past two years.

The latest version of bat trap can be collapsed and reassembled in about 20 minutes, and we estimate its weight as less than 20 pounds. Tom Kunz recently tried it out on Myotis velifer in a mine entrance and reported excellent results. Apparently very few, if any, of the bats detected, bounced off, or passed through the trap. The trap was set in the center of a tunnel entrance with three feet of unblocked space on each side, yet individual bats were recaptured as many as 8 times in a single night. Using a less satisfactory version, Paul Robertson and I caught 4,107 bats of 5 species in front of a cave in our last night in Tennessee. Two traps were briefly tested over streams in Venezuela where they were more than twice as effective as mist nets while taking 40 species of bats. I plan to publish a complete description of the trap as soon as further testing in the tropics and in the southeastern United States has been completed.

Incidentally, M. lucifugus breeds in Tennessee. While working on the distributional status of Tennessee bats, Paul and I found a colony of about 1,000 M. lucifugus in an attic near Dayton. We did not have time to investigate other reports of bats in attics in the same area. Merlin D. Tuttle, Museum of Natural History, University of Kansas, Lawrence 66044.

THE FIRST INTERNATIONAL BAT RESEARCH CONFERENCE

In spite of the present situation in Czechoslovakia, the conference took place as planned. The session was held on 6 September, 1968, in the lecture room of the Ales Art Gallery at Hluboka. After the opening words by Dr. W. Cerny, chairman of the Czechoslovak Zoological Society, the following participants presented their papers: Mr. Braaksma (Vreeswijk), Dr. Daad (Amsterdam), Mr. Dorgelo (Amsterdam), Dr. Gaisler and Dr. Hanak (Brno and Praha), Dr. Neuweiler (Tubingen), Dr. Novotny (Brno), Mr. Racey (London) and Dr. Roer (Bonn). At the end of the session Mr. Racey showed a film on "Parturition in the noctule bat". Then the participants inspected 3 exhibits on the bat research in Czechoslovakia.

An excursion through south Bohemia was made on 7 September. Some of the participants joined a trip to Moravia where they visited the caves in the Moravian Karst as well as south Moravia. During these excursions observations were made at the roosting sites of Myotis myotis, M. daubentoni and Rhinolophus hipposideros, besides observations of hunting individuals of Nyctalus noctula, Myotis daubentoni and Pipistrellus pipistrellus. In accordance with the original schedule, the conference was closed at Lednice on 9 September.

The members of the Organizing Committee express their warm thanks to all who assisted them in their endeavors to organize the international meeting of scientists engaged in bat research. Our particular thanks are due to those colleagues from abroad who took part in the conference in spite of the unfavorable conditions in Czechoslovakia. At the same time we fully understand the reasons that prevented the remaining ones from attending. Due to the present circumstances we intend to publish, above all, the papers read at the conference. The originally announced papers that could not have been read will be published only in case their authors have no other possibility of publishing them. Their manuscripts in a limited extent should be sent to Dr. V. Hanak, Institute of Systematic Zoology, Charles University, Praha, Vinicna 7, Czechoslovakia, before 31 December, 1968. The participants of the conference have approved that an endeavor should be made to organize the second international bat research conference in one of the western European countries (e.g., the Netherlands), in a future year. Dr. V. Hanak & Dr. J. Gaisler, Brno.

THE MYOTIS LUCIFUGUS FROM SIERRA GRANDE, NEW MEXICO

Myotis lucifugus was reported from New Mexico by Miller and Allen (The American bats of the genera Myotis and Pisonyx, Bull. 144, U. S. Natl. Mus., 1928) on the basis of a skull only in the USNM collection from Sierra Grande, Union County. In their listing of specimens examined of Myotis lucifugus carissima, they record this specimen (p 52) with an appended " (determination not positive)". Apparently because of this, they did not record any measurements for this specimen as they did for all others.

Because of the doubt expressed by Miller and Allen, and the failure for so long to turn up any other specimens of this species from New Mexico, students of the Chiroptera have often expressed doubts about the identity of the skull from Sierra Grande. One person who had examined it once told me he thought it is a Myotis yumanensis.

Findley and Jones (J. Mamm. 48: 437, 1967) said that the specimen "may be referable to M. l. lucifugus, the nearest recorded station of which is south central Kansas". In their listing of specimens examined they put it alone under a heading of: Myotis lucifugus ssp.

Recently I borrowed this specimen and examined it. I compared it to all known species of North American Myotis, and am of the opinion that it is Myotis lucifugus. However, it seems different from specimens of this species from north central New Mexico and south central Colorado, and I agree with Findley and Jones that it seems like M. l. lucifugus. It is smaller than those we collected in nearby areas of New Mexico and Colorado last summer. Only a few among our 160 specimens are as small as this one, and most of these are yearlings, whereas the Sierra Grande

specimen was an old animal with well worn teeth.

Although this specimen was apparently taken on 19 August, the wandering season, when bats are often found well beyond their nursery range, it is my guess that the most likely explanation for this specimen is that there may have been a mistake in listing the locality with this particular specimen. The skull label carries the following typewritten information: 131509 *Lasionycteris* alc N. Mex: Sierra Grande Aug. 19, 1903 A. H. Howell. The word *Lasionycteris* is marked out with pencil and replaced in pencil with *Myotis lucifugus*. Penciled across the label is: skull only. A small tag in the skull vial contains two pin holes and has written on it with pencil: N. Mex. Sierra Grande. On the reverse side in different pencil writing is: 131509 ♀ alc.

I took the following measurements on this skull: greatest length 14.8; zyg br 9.0; br. braincase 7.4; height 5.2; max toothrow 5.3.

I think that there may have been a mixup somewhere in past history, and that the bat that Howell collected at Sierra Grande on August 19, 1903, was a silver-hair. I suggest that in the future we disregard this locality when considering the distribution of *Myotis lucifugus*, and we disregard this specimen in considering the taxonomy of this species in New Mexico. There are several precedents for this action (e. g., the *Myotis thysanodes* from St. Louis and the *M. austroriparius* from Canada. If anyone has any additional information on the Sierra Grande specimen, or any comments on my proposal, I would be glad to run his remarks in the next issue. W. H. Davis.

HERE AND THERE

BARBOUR and I have nearly finished our study on the *Myotis lucifugus-occultus* complex. They seem to intergrade in Colorado-New Mexico as Findley and Jones suggested.

Our book on the bats of America has been held up by the need to raise \$5,000. The University of Kentucky Press put up \$5,000 of the estimated cost of \$15,000 beyond estimated receipts. The University Research Fund approved our request for \$ 5,000 provided we raise the last \$5,000 outside the university. We had been counting on the university's unrestricted fund for this if all else failed. Wealthy people with interest in wildlife (birds) who have been approached, look at Barbour's color photographs of these horrible beasts and shudder.

ED SULKIN sent me a letter from KEISAKU HATTORI, of the Hokkaido Institute of Public Health, South 2, West 15, Sapporo, Hokkaido, Japan. Dr. Hattori has become interested in taxonomy of his local bats. He says that he has found two species of myotids which are evidently unrecorded in Japan. They resemble closely *Myotis lucifugus* and *Myotis volans* from morphological characters by description in the literature. He wants to compare his specimens with these species, and has offered to trade Japanese specimens of bats for them. We shall send him some.

Miller and Allen note (p 12) that *Myotis daubentoni* is similar to *M. lucifugus*, and that *M. frater* seems to be the Old World counterpart of *M. volans*. I am not familiar with these species.

DON SMITH is now back at Ottawa. He is working on his African bats and exploring a few mines. He has a student working on the behavior of bats in a temperature gradient.

ALLAN VINEGAR is a new subscriber at Long Beach State College. He is working on various aspects of energetics of migration and hibernation.

ERIC RUNDQUIST is a new subscriber who has been working with STANLEY ROTH studying snakes as predators on bats, especially Elaphe guttata emoryi on Myotis velifer. He asks for information from anyone having knowledge of any snake's eating bats or living in caves with bat populations. His address is Biology Dept., Lawrence High School, Lawrence, Kansas 66044.

There is a considerable literature on snakes eating bats. There are recent papers in J Mamm, Am Midl Nat, Herpetologica. The paper on the Mexican free-tailed bat in Texas in Ecol Monogr had a list of snakes and accounts of their feeding on bats.

GLEN KOEHLER is having difficulty with his captive Myotis losing hair. He feeds them glop and gives them a drop of a multiple vitamin compound. He has tried adding wheat germ, but still gets hair loss. He wonders what he can do to cure this condition. His address is 3275 N 93 St, Milwaukee 53222.

I am surprised that the vitamin drops do not cure the problem. On the other hand Orr says (J. Mamm 39: 342, 1958): "Numerous vitamin mixes were tried but only Stuart Formula has proved completely satisfactory. This contains vitamins A, D, E, B₁, B₂, B₆, niacin, niacinamide, panthenol, iron, iodine and manganese. The addition of this formula to the diet of captive bats kept by the writer has produced some remarkable results. Two pallid bats and a Mexican free-tailed bat that had almost completely lacked hair for over a year assumed normal pelage within a few months."

GUSTAV KIRK wrote that European bats are now legally protected in Sweden, Finland, USSR, Denmark, Poland, Germany, Czechoslovakia (Bohemia & Moravia only), Switzerland, Liechtenstein, Austria, Hungary, Italy, Yugoslavia, and Bulgaria.

BOB STONES at Michigan Tech asked if I would like to help him on a banding project. He has many thousands of bats hibernating in the mine tunnels of the northern peninsula. I would very much like to do this, but it is just too far from here.

J. FRED DENTON of the Medical College of Georgia said that he found a colony of more than 1,000 Tadarida in a store in the center of Forsyth, Monroe County, Georgia. This is the most northern known colony in the state.

MICHAEL L. BONNELL at the University of California at Santa Cruz, is studying the roles of the various physiological and environmental factors in regulating the time of evening emergence from the roost in several different species and populations. He says it seems to be a balance between an endogenous circadian rhythm and an exogenous one with the level of light intensity acting as the most important Zeitgeber. He is interested in the adaptive significance of such a system.

CDC Veterinary Public Health Notes for October, 1968 describes a rabies problem in the northeastern states and neighboring provinces. Through August Maine had reported 58 cases in 1968. Ontario, Quebec and New Brunswick reported 936 cases for the same period.

The same issue reports an outbreak of rabies in raccoons in Manatee County, Florida. Over 35 cases were reported in the county.

ED SULKIN recently returned from congresses in Teheran and Istanbul where he presented the results of his accumulated work on bats as carriers of viruses.

HAROLD HITCHCOCK has retired as Chairman of the Biology Department at Middlebury College and is now at Norwich University in Northfield, Vermont. He is there for one semester, after which he will spend a semester at Hawaii.

JEREMY J. HATCH is still working with radio transmitters for Eptesicus. He has done some homing experiments with the bats carrying dummy transmitters. He made a careful count of bats on 19 October, 1968, at a mine near Kingston, N.Y., where Dan Smiley, Harold Hitchcock and I had banded in 1961 and 1962. He said

there was a minimum of 1200 Myotis in the mine. We had banded 1976 Myotis lucifugus in this mine on 5 November 1961.

The newsletter of the OZARK UNDERGROUND LABORATORY reported that the Myotis grisescens were abundant in the cave on 5 October, but only one was seen the following day. This was an earlier departure than noted in previous years.

HOBART VAN DEUSEN says that reading in Vol 8 # 4 about about bats impaled on various sharp objects reminded him of one he once collected in New Guinea. He found one of the rarest bats in New Guinea caught on a spike of a lawyer cane vine.

The CDC Zoonoses Surveillance issue of September, 1968, contained the quarterly rabies summary for April, May and June. During these three months there were reported 1,030 laboratory-confirmed cases of rabies in the United States. There were 85 cases in bats.

ADAM KRZANOWSKI wrote to correct a statement I made in the cover story of July that the vampire is the only bat successfully bred in captivity. He mentioned the article by Novick on "Successful breeding in captive Artibeus" (J. Mamm 41: 508-509). He says the article mentioned more such examples.

ADAM also has data in reply to the question of JOSEPH WOOD KRUTCH on which way the Tadarida brasiliensis spiral from caves: in 1961 at Bracken Cave, Texas he saw them spiraling out counterclockwise.

TOM ALEY, Director of the Ozark Underground Laboratory wrote: In Vol 9 no. 2 p 18 of Bat Research News I gained the impression that Myotis grisescens had been added to the rare and endangered species list of the Office of Endangered Species. I had occasion to write to Harry A. Goodwin, Chief of the Office of Endangered Species, and got the following reply:

"In response to your inquiry, neither the grey bat (Myotis grisescens) nor the Ozark blind salamander (Typhlotriton spelaeus) is being considered for addition to the list of rare and endangered species at this time."

The above statement, although true, is misleading. The bat is on the list. I saw such a list that was sent to me. Myotis grisescens and Myotis sodalis were listed as endangered species.

Several years ago I got from the American Society of Mammalogists Conservation Committee a tentative list of mammals considered to be in peril. It was subdivided into three categories (vanishing, rare, endangered ? as I remember). An included letter asked if I thought there were any bats that should be included. I replied that Myotis grisescens and Myotis sodalis, although not rare or vanishing, were species that I consider endangered because of their unique requirement of large caves or cave like structures. I said that these caves are becoming ever more popular with spelunkers, and that the bats are apparently becoming more restricted in their range and are drastically decreasing in numbers. I said that I think M. sodalis will survive indefinitely in Mammoth Cave National Park, but that I think it likely that M. grisescens will likely disappear within the next 10-15 years if a program of protection is not devised. Sometime later I received (from the U. S. Fish & Wildlife Service ? I believe) the official list. Unfortunately, I have been unable to find this copy.

Last year this list went to the Supervisors of the National Forests, with a directive that they see if any of the included occurred within their boundary, and if so to see what steps might be taken to insure their survival. At that time I

got a call from the headquarters of the Daniel Boone National Forest in Winchester, Kentucky, asking me if Myotis sodalis or Myotis grisescens occurred there. This resulted in the initiation of a program to acquire certain caves under a Forest Service program to acquire private inholdings for the purpose of preserving rare and endangered species. This also resulted in the story in BRN to which Mr. Aley alludes. If any one knows what is going on here, I would appreciate hearing in time to clear it up in the next issue. Probably Mr. Aley and Chief of the Office of Endangered Species, Mr. Goodwin, would also like to know.

The CDC Veterinary Public Health Notes for December has an article on recently developed animal rabies vaccines. It discusses 6 types of vaccines that have been developed and licensed within the last 5 years.

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From:

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THE COVER

A couple of weeks ago Barbour and I were going through the folders of photos for the bat book, culling the last of the optionals. When we decided not to use this picture of Myotis keenii I mentioned that I thought it would make a nice cover for Bat Research News.

We seldom encounter this species in Kentucky, although it is common in caves to the north of us. This one came from a cave just across the river in Indiana where several can always be found in winter. The long pointed tragus serves to distinguish this species from M. lucifugus. Photo by Roger W. Barbour.

Bat Research News appears quarterly: January, April, July and October. Subscription rate is \$1.00 for two years. All back issues are available (some cover photos are not) for \$5.00. Wayne H. Davis, Department of Zoology, University of Kentucky, Lexington, Ky., 40506, U.S.A.

TRYPANOSOMES OF BATS

By Stephen M. Gittleson and Richard L. Hoover, Department of Zoology, University of Kentucky, Lexington, Kentucky 40506

Cavernicolous protozoa. Approximately 400 species of protozoa (including free-living and parasitic forms) have been described from caves throughout the world since 1845 (Gittleson and Hoover, 1969). Flagellates belonging to the order Kinetoplastida which includes free-living Bodo sp. and the parasitic Trypanosoma sp. comprise one of the largest groups of cave protozoa in terms of species representation.

Occurrence of bat trypanosomes. Apparently the first reports of bat trypanosomes were made at the beginning of the century (Petrie, 1905). Table 1 summarizes the literature in regard to the occurrence of trypanosome species in the blood of bats, their intermediate hosts (where known) and geographic locations. The incidence of trypanosomes in bats is indicated by Marinkelle's (1966) finding that 11% of nearly 2000 bats collected in Colombia harbored trypanosomes.

Life cycle. Berghe et al (1963) studied hundreds of the ectoparasitic bug Stricticimex brevispinosus (associated with the bat Hipposideros caffer in a cave in Tanganyika) in which they found: 1) in the stomach, a few large trypanosomes of the type found in circulating blood of the bat; 2) in the hindgut, many short crithidial forms; 3) in the rectal ampulla, clusters of crithidial forms attached by flagella to the rectal villousities; and 4) small and slender metacyclic trypanosomes always free in the rectal ampulla. The latter is probably the infective form that passes out with the feces and into the bat blood through the skin wound created by the biting bug. Berghe et al (1963) suggest that transmission by this form of contamination, classical for T. lewisi (fleas) and T. cruzi (bugs) is likely the case for all trypanosomes of bats.

Marinkelle (1966) found abundant development of T. rangeli-like trypanosomes (identified from bats, see Table 1) in the bugs Rhodnius prolixus and Cavernicola

Table 1. Trypanosome species, bat host and invertebrate intermediate host, arranged by geographical location in alphabetical order.

PROTOZOAN	BAT HOST	INTERMEDIATE HOST	REFERENCE
BELGIAN CONGO			
<u>Trypanosoma pipistrelli</u>	Vespertilionidae	<u>Cimex lectularius</u>	Leleup (1956)
<u>Trypanosoma leleupi</u>	<u>Hipposideros caffer</u>	<u>Cimex lectularius</u>	
<u>Trypanosoma leleupi</u>	<u>Hipposideros caffer</u>	<u>Ornithodoros moubata</u>	Rodhain (1951)
<u>Trypanosoma heybergi</u>	<u>Nycteris hispida</u>	<u>Leioognathus arcuatus</u>	Rodhain (1923)
<u>Trypanosoma pipistrelli</u>	<u>Vesperugo pipistrelli</u>	<u>Cimex lectularius</u>	Rodhain (1942)
		<u>Ornithodoros moubata</u>	
BRAZIL			
<u>Trypanosoma cruzi</u> -like	<u>Phyllostomus hastatus</u>	<u>Acrocomia sclerocarpa</u>	Deane (1967)
		<u>Scheelea phalerata</u>	Barretto (1967)
COLOMBIA			
<u>Trypanosoma rangeli</u> -like	<u>Glossophaga s. soricina</u>	<u>Rhodinus prolixus</u>	
	<u>Artibeus lituratus</u>	<u>Cavernicola pilosa</u>	
	in addition to above:		
	<u>Peropteryx m. macrootis</u>		
	<u>Phyllostomus hastatus</u>		
	<u>Phyllostomus discolor</u>		
	<u>Carollia p. perspicillata</u>		
	<u>Desmodus r. rotundus</u>		
	<u>Molossus m. major</u>		
	in addition to all above:		
	<u>Noctilio labialis albiventer</u>		
	<u>Uroderma b. bilobatum</u>		
	<u>Artibeus j. jamaicensis</u>		
	<u>Artibeus cinereus</u>		
	<u>Myotis n. nigricans</u>		
<u>Trypanosoma cruzi</u> -like			Marinkelle (1966)

PROTOZOAN	BAT HOST	INTERMEDIATE HOST	REFERENCE
COSTA RICA			
<u>Trypanosoma pessoai</u>	<u>Artibeus jamaicensis</u>		Esquivel, et al (1967)
	<u>Artibeus cinereus</u>		
CUBA			
<u>Trypanosoma phyllostomae</u>	<u>Artibeus perspicillatus</u>		Cartaya (1910)
ENGLAND			
<u>Trypanosoma sp.</u>	<u>Pipistrellus pipistrellus</u>		Petrie (1905)
NORTH AFRICA (Algiers & Tunis)			
<u>Trypanosoma nicollearum</u>	<u>Vespertilio kuhli</u>		Sergent (1905)
	<u>Myotis murinus</u>		
<u>Trypanosoma vespertilionis</u>	<u>Vespertilio kuhli</u>		
PORTUGAL			
<u>Trypanosoma dionisii</u>	<u>Vesperugo pipistrellus</u>		Bettencourt & Franca (1905)
	<u>Vesperugo serotinus</u>		
	<u>Vesperugo nattereri</u>		
SENEGAL			
<u>Trypanosoma morinorum</u>	<u>Hipposideros tridens</u>		Leger & Baurý (1926)
SUDAN			
<u>Trypanosoma megadermae</u>	<u>Megaderma frons</u>		Wenyon (1908)
TANGANYIKA			
<u>Trypanosoma megadermae</u>	<u>Hipposideros caffer</u>		Berghe, et al (1963)
<u>Trypanosoma mpapuensis</u>	<u>Nycteris aethiopica</u>	<u>Stricticimex brevispin-</u> <u>osus</u>	Reichenow (1940)

pilosa. C. pilosa contained T. cruzi-like flagellates also found in bats (Table 1).
Significance of bat trypanosomes. Bats may play a role as a reservoir for the agent of Chaga's disease (Marinkelle, 1966). Marinkelle found bats (11%) and triatomid bugs Rhodinus prolixus (55%) infected with trypanosome species like T. cruzi in or very near human habitation. He estimates that 2 million Colombians harbor T. cruzi and many of these people suffer from some form of cardiopathy.

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BAT BANDING IN OKLAHOMA

Here are the numbers of bats my wife and I have banded in Oklahoma. Tony DeBlase has given us considerable help.

1967		1968
<u>Myotis velifer</u>	2205	8359
<u>Plecotus townsendii</u>	47	118
<u>Eptesicus fuscus</u>	4	7
<u>Pipistrellus subflavus</u>		1

Most of these were in northwestern Oklahoma, but a few were in northeastern Oklahoma and south-central Kansas. In addition to these, of course, Dr. Bryan Glass, George Rogers and Stan Rouk have banded many thousands of Tadarida brasiliensis.

The frequency of caves in the gypsum hills of northwestern Oklahoma is high. In one area of 18 square miles there are 10 caves used by Myotis velifer (one nursery-hibernaculum and nine other hibernacula). Two of these caves also serve as nurseries for Plecotus townsendii and one as a nursery for Tadarida brasiliensis. The largest caves are somewhat over a mile long. Steve Humphrey, Dept. of Zoology, Oklahoma State University, Stillwater.

EARLY ACTIVITY OF A BIG BROWN BAT

On March 23 at 5:10 p.m., I saw a big brown bat flying among the bare trees that border the Red Cedar River at the Kalamazoo Street Bridge in East Lansing, Michigan. The afternoon had been unusually warm with the temperature at about 65°F. Most of the day had been sunny and balmy. At the time of the observation the sun was slightly shrouded in haze. I saw the bat flying over the water and stopped the car and got out to watch it flying about for several minutes before it flew off through the trees. It zig-zagged around as if it were attempting to catch flying insects, although none was seen in the air. It reminded me a lot of the way pipistrelles come out before dark to dart about in the bright light. Previously I have not seen nor read of the big brown bat carrying on so during daylight hours. Rollin H. Baker, The Museum, Michigan State University, East Lansing, 48823.

HERE AND THERE

I was mistaken when I said that Myotis grisescens is on the list of rare and endangered fish and wildlife. Larry Brown sent me a copy of the list. Myotis sodalis is there but M. grisescens is not. Perhaps the latter was dropped from the tentative lists because it is still an abundant bat, even though its position is precarious. I would guess that it will probably become extinct before M. sodalis does. No cave that is regularly inhabited by this species is protected, and I know of no movement to save any of them.

Merlin Tuttle called a couple of weeks ago to inquire about the status of M. grisescens in Kentucky. He had left the University of Kansas for spring vacation and was checking on the gray bats in Tennessee. As far as I know the species is essentially gone from Kentucky. We have not found them at any of the caves where they used to form nurseries since the Coach-James cave system was commercialized a few years ago. The gray bats from all the known colonies in Kentucky wintered there. These bats are so sensitive to disturbance that they may have simply gone elsewhere and now reside in unknown retreats in Kentucky. Perhaps the colonies were simply not at home when I visited the caves; they are unpredictable. I know of no one who has checked Coach-James cave in winter since it was commercialized. The bats might still live there. It takes a rugged vertical caving expedition to get to where the bats were.

Merlin Tuttle is studying the survival of the young of M. grisescens in small vs large colonies. He says preliminary data suggest better survival in the large colonies. Perhaps this is why they generally reside in such huge colonies. Possibly also when a population gets to a critical level they cannot recover. I asked him about the population in Sauta Cave, Alabama. This is the largest population known of this species. He said that there are about 275,000 there in summer. Apparently they are still holding their own. This cave should be bought by the state or the Nature Conservancy and the bats assured of protection.

A movement is underway once again to try to get protection for the bats in Bat Cave in Carter Caves State Park, Kentucky. The great colony of M. sodalis hibernates within easy reach of the hundreds of people who go through this cave every winter. Several years ago Ralph Ewers and others from Cincinnati built a gate at the entrance to the cave. It rusted so quickly that the automatic opening device designed to open the gate during flooding, worked only for the first few months. Vandals beat down the top bar so that they could crawl over. The naturalist for Kentucky State Parks called me yesterday to talk about protecting the bats. He wants to know what should be built and about how much it would cost. He seems to think there would be no trouble getting funds to build whatever is needed.

Frank Graves was up here last month. He is finishing an MS at Memphis State under Michael Harvey. His thesis is on the bats of western Tennessee. Last summer was spent netting bats throughout the region. He was quite successful; has some interesting finds and nice data on the relative abundance of species.

A new subscriber is Dr. Viktor Masing, Botany Dept., Tartu University, Tartu, Estonian S. S. R. His wife is working on a very active bat banding program.

Josefine Rauch is a graduate student at the University of Alberta in Edmonton. She wants to work on thermogenesis of the brown fat during arousal in Eptesicus fuscus. Unfortunately the species is rather scarce up there, and she would like to find a place where they are common summer residents. The closest place I know where they are common is in western South Dakota. I would not be surprised if they are common in southern Alberta, but I just do not know.

F. H. Wessman, 1-A St. Thomas Walk, Singapore 9, is a geophysicist who is interested in bats. He is doing some collecting for the University of Kansas.

Ed Gould, at the Laboratory of Comparative Behavior, Johns Hopkins University, Baltimore, wants to work on the vocalization of infant bats. He plans to

compare several genera that have contrasting echolocation signals, and would like to start with Myotis and Plecotus.

Don E. Wilson, Smithsonian Tropical Research Institute, box 2072, Balboa, Canal Zone, is studying the life history of Myotis grisescens on Barro Colorado Island. He is working on reproduction, population dynamics, and general ecology.

Bruce Richardson is a senior in zoology at San Diego State who is interested in bats. He hopes to do some netting in southern California this summer. He is finding bats scarce in the San Diego region, even at the collecting sites where Krutzsch found them common 25 years ago.

J. Frederick Bell commented on Glen Koehler's difficulty with Myotis losing hair. Dr. Bell said he had that trouble several years ago with bats eating moist food from an open dish. The food got into the hair which would mat and finally come out. He went to a narrow trough for feeding and had no more trouble.

Leslie H. Hall, an Australian bat bander, is now at Western Washington State College working on the rabbits of San Juan Island. He plans to make it to the mammal meetings in New York in June to meet the bat people of the U. S.

I hope to do some work on the Tadarida brasiliensis of Georgia this summer, with the idea of eventually working out their post season travel pattern. I want to see if they can be located in sufficient numbers to warrant a banding study. I also plan to get to the mammal meetings in New York.

Newsletter number 1 of the Biological Survey of Alabama Caves came out in February. It is produced by John and Martha Cooper of the Institute of Speleology at the University of Kentucky. It is 6 pages of notes on who is working with what in all aspects of cave biology in Alabama. If you are interested in Alabama cave life, write to the Coopers for a copy.

The rabies surveillance for the third quarter (July, August, September) of 1968 is out. There were 832 laboratory confirmed cases of rabies in the U. S. during that period, 338 fewer than for the same period of 1967. Eighty percent were from wildlife. There were 156 cases in bats.

Major Paul C. Smith, Chief, Rabies Diagnostic Laboratory, U. S. Army Medical Component, SEATO, APO San Francisco, 96346, has begun a study of the ecology and population dynamics of the bats in a cave in Thailand. He is interested in migration patterns and the etiology of disease associated with die-offs. The cave contains an estimated 2 to 3 million bats, mostly Tadarida and Taphozous.

Alan B. Rodney, Biology Dept., New Mexico State University, Las Cruces, plans to start banding bats. He has located a cave in Lincoln County, N. M., where about 500 Plecotus townsendii hibernate.

Luther Little writes that he plans to visit some mines in southern California this spring to check on the bat populations. He asks if Barbour and I would autograph a copy of our book for him. We would be pleased to.

James Dale Smith, Museum of Natural History, University of Kansas, asks for information concerning the NATO Advanced Study Institute Symposium on Animal Sonar Systems, Volume 1, for which I had several references in the last issue. Our Library has been unable to locate this thing also. I got my references from Biological Abstracts.

Merle Kuns is studying Desmodus in the northern provinces of Argentina.

Wayne Davis?

?

The CDC Veterinary Public Health Notes for January has a note entitled "Vampire bats move northward into Texas". It concerns the Diphylla ecaudata that was found in the railroad tunnel 12 miles west of Comstock.

Sidney L. McGuire is back at LSU finishing his dissertation on the Trematoda of bats of Costa Rica. He has data on other parasites which he plans to put together into a paper on the ecology of parasitism of the bats of Costa Rica. He is interested in bats, parasites, environment and zoonoses.

Stuart Ellins is a graduate student in psychology at the University of Delaware working on sleep in bats. He says that he has had opportunity to meet several people who are doing physiological work with bats, and that they are truly concerned with bat conservation.

William A. Wimsatt is spending 5 months in Tucson. I do not know the status of his book on the biology of bats. Keep expecting to hear something about it any day.

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BAT RESEARCH NEWS

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MORMOOPS MEGALOPHYLLA

THE COVER

This photo of a Mormoops is one that we culled in selecting the black and white pictures for our book. We have shots of this wierd face from several angles and picked the best one to publish. Our color plate will show the whole animal. This is the bat we got at Alamos, Sonora, a couple of years ago when Robert Baker took us there in quest of the species. Photo by Roger W. Barbour.

Bat Research News appears quarterly: January, April, July and October. Subscription rate is \$1.00 for two years. All back issues are available (some cover photos are not) for \$5.00. Wayne H. Davis, Department of Zoology, University of Kentucky, Lexington, Ky., 40506, U. S. A.

HERE AND THERE

My plans to do some work in the Deep South this summer fell through. An unexpected operation promises to keep me off the ladders and out of the attics for the rest of this year. I am getting around all right now and may get a little field work done during August.

where [The manual on Bats and Bat Banding by Arthur M. Greenhall and John L. Paradiso is out and now available. Write the bat banding office for your copy. It is an excellent summary of information available on finding, catching, handling and banding bats.

The University Press of Kentucky has told us that our book will be out October 13, 1969. I think they may be telling the truth this time. We have finished correcting the third set of galley proofs, and work is now progressing on the color plates.

Stephen Humphrey asks where he can obtain a good dip net about 18" in diameter. The type he likes is no longer stocked and he has been unable to get one from the manufacturer.

Stephen Humphrey sent me a photo from the Stillwater News-Press of 9 June showing Old Main at Southern Illinois University burning. This is the building where Cagle and Cockrum did their classic study on Myotis lucifugus and estimated the colony size at 30,000. The bats have been gone in recent years as a result of the exterminators.

In the last issue I listed the interesting paper by Bradley and O'Farrell on temperature relationships of the western pipistrelle and noted that my reprint did not indicate its source. I wrote to Glen Bradley and asked about it; his reply came just too late to get into the last issue. The paper is pp 85-96 in *Physiological Systems in Semiarid Environments*, C. C. Hoff & M. L. Riedesel, Eds., University of New Mexico Press, 1969.

Larry Brown is trying to obtain a specimen of Plecotus rafinesquii. Perhaps someone has one he would trade.

Concerning the direction of spiral as bats leave the cave, Harold E. Stark wrote that near Saraburi, Thailand where the million or so Taphozous and Tadarida plicata live, they leave the cave spiraling somewhat to the left but mostly going straight.

The 50th Anniversary meeting of the American Society of Mammalogists was held June 15-21 at the American Museum of Natural History in New York. The 16 bat papers on the program were grouped in a single day.

Samuel Linhart sent me a copy of the progress report for the vampire bat mammal damage control research project of the Fish & Wildlife Service in Denver and Palo Alto, Mexico. They have done load lifting studies in getting ready for radio transmitter work. They have also been working on aging techniques and population dynamics.

Michael J. O'Farrell is now in graduate school at New Mexico Highlands University working under Dr. Eugene Studier.

Larry Kerr is a new subscriber who is working on a masters degree at Western Illinois University. He plans to be doing some bat banding.

Wilson Baker has been working in the caves about Marianna, Florida, with Pipistrellus, M. grisescens and M. austroriparius. He is also checking Waterfall Cave, Grady Co., Georgia, once a month, and shooting some yellow bats.

Robert Stones has quite a program going now at Michigan Tech. He has an NSF grant for his temperature work with bats, and many undergraduate and graduate students participating in field work. They have a PhD program and he has several candidates working with him.

The Society of the Sigma Xi has announced that it has made a grant-in-aid to Stephen R. Humphrey to assist him in his study of the population ecology of the cave bat (Myotis velifer) in northwestern Oklahoma. The society is a good source of small grants for graduate student research. Last year they made grants totaling \$ 89,375.

The Communicable Disease Center Zoonoses Surveillance annual rabies summary for 1968 is out. There were 3613 laboratory-confirmed cases of rabies reported. This is down by 22 % from 1967. Kentucky reported the largest number of cases with 413. Rabies was reported from 291 bats, down from 414 the previous year, and the lowest since 1962.

I wrote to Fritz Bell about populations of bats in Montana. He says that he finds M. volans rather scarce, but M. lucifugus very common. He banded hundreds of the latter under a railroad bridge a few years ago. Then the bridge was torn down and replaced with a structure not nearly so attractive to the bats. He put some experimental roosts under it but has not yet checked to see if they use them.

Harold Hitchcock has been teaching at the University of Hawaii this past year. He had a visit with Donald R. Griffin who was on his way to Fiji and New Guinea. Hitchcock came back to Vermont in June.

KENTUCKY PROTECTS ITS BATS

In Kentucky bats are now protected and can be killed legally only with a scientific collectors permit or if damaging property. Shrews, moles, mice and rats are not protected. All other wild animals are protected except during open season and as specified by regulation. This is by act of the Department of Fish and Wildlife Resources Commission meeting 7 June, 1968.

HOARY BATS IN KENTUCKY

When Barbour (J. Mamm. 44: 122-123, 1963) summarized the known status of the hoary bat, Lasiurus cinereus, in Kentucky, there were but three records. Adult females with their young had been found in Lexington in 1929 and 1961, and Barbour shot a female in Hickman County, in western Kentucky on 9 April, 1955.

On 17 September, 1965, M. D. Hassell found a dead hoary bat in the Bat Cave in Carter Caves State Park. The skeleton was saved. This bat was a male.

On November 4, 1968, my neighbor at 126 Jesselin Dr., Lexington, told me of a bat in her back yard. I found an injured female hoary bat hanging on the trunk of a tree. This specimen was preserved.

On 26 June, 1969, I watched a hoary bat feeding over the tobacco field behind my house. The bat appeared at 9:25 EDST and flew a repeating path about 100 yards long and 50 yards wide high (70- 100feet) above the trees for ten minutes and then disappeared. Lasiurus borealis and Eptesicus fuscus were also seen feeding over the field that evening.

Many evenings during the last seven years I have sat in my yard and watched the bats fly; never before had I seen a hoary bat. W. H. Davis.

SECOND INTERNATIONAL BAT RESEARCH CONFERENCE

The second international bat research conference is being planned for March 18-22, 1970. It will be held at the Zoological Laboratory at the University of Amsterdam. It is hoped that contributors will present papers on most of the varied fields of current research on bats. Papers will be presented in five tandem sessions. An excursion to the limestone quarries of South Limburg, where so much bat research has been done, is planned. Accomodations in Amsterdam run about \$ 5-10 per night.

Those who are interested in attending the conference should contact the organizing committee Prof. Dr. A. Punt, Dr. J. Dorgelo, Dr. S. Daan, University of Amsterdam, Laboratory of Animal Physiology, Kruislaan 320, Amsterdam, the Netherlands.

BAT NOTES FROM LEE COUNTY, KENTUCKY

On 9 June, 1969, I visited the cave in the remote wilderness of northwestern Lee County, Kentucky, where Rippey and Harvey (J. Mamm. 46: 499, 1965) reported Plecotus townsendii. Several small clusters of these bats were seen, some torpid and some active. Several wore bands that had been applied there by Harvey on 28 March, 1964. All showed evidence of band injury by swelling distal to the band. The sore regions were moist.

Within a torpid cluster of 8 Plecotus was a single male Myotis grisescens, also torpid. He was so much a part of the cluster, with big-eared bats packed tightly about him, that he was nearly overlooked. I had never before encountered this species in the caves of this region.

I then visited a small unnamed cave a few hundred yards from the main cave and found there 6 species of bats. There was one of each of Eptesicus fuscus, Pipistrellus subflavus, Plecotus townsendii (wearing Harvey's band), Myotis grisescens, and Myotis keenii. All of these were torpid. There was a group of about 20

Myotis sodalis, half of which were active. They were on a low ceiling above an old pile of guano 3 feet deep and 6 feet across. There were bat bones under all the rocks on the floor, but none in the open. The rocks were too flat, with the spaces between them too small, for a small mammal to have dragged them under. They had probably been there for many years.

On previous visits to this small cave I had found it nearly devoid of Chiroptera (a pipistrelle and a big brown bat in winter; no bats in summer), and no bats over the guano. I had thought the pile represented the site of an old nursery of Plecotus townsendii, but now there seem reasonable alternatives: it might have been Myotis grisescens or a band of wandering male M. sodalis. Summer netting at the cave should be interesting. W. H. Davis.

ENERGY UTILIZATION IN A CAPTIVE SILVER-HAIRED BAT

A previous study by Brisbin (J. Mamm., 47: 719-720, 1966) has indicated the lack of available information concerning the energetic parameters of Chiroptera. It is the purpose of this study to provide such data for a captive male silver-haired bat, Lasionycteris noctivagans.

The bat used in this study was maintained in a small wire cage at a room temperature of approximately 21° C for 76 days following its capture on 18 January in Athens, Georgia. Feeding procedures, food items and the caloric analyses of food and feces were the same as those used in the study of the hoary bat (Brisbin, 1966). Briefly, the food items used and their caloric values were as follows: mealworm (Tenebrio sp.) beetle larvae (2.33 Kcal/g live weight), pupae (2.21 Kcal/g live weight) and adults (1.96 Kcal/g live weight). The caloric value determined for the larvae agrees closely with that of 2.31 Kcal/g live weight reported by Licht and Jones (Gen. & Comp. Endocr., 8: 228-244, 1967) for Tenebrio larvae. Seven replicates of a random sample of the total feces produced by the silver-haired bat throughout the feeding experiment gave an average caloric value of 4.66 ± 0.02 (SD) Kcal/g dry weight.

The bat's weight ranged from 8.1 to 11.5 g during the period of captivity, with a mean value of 9.7 ± 0.7 (SD) g. The bat weighed 11.5 g at capture and 9.0g at death, 76 days later. The weights of the bat during a 20 day experimental period did not differ significantly from those of the other periods of captivity, as revealed by t-test ($P > 0.01$, $df = 13$). All of these weights are within the range given by Walker (Mammals of the World, Vol. 1, p. 339, 1964) for adult weights of this species.

Caloric intake during the 20 day period averaged 4.86 ± 1.45 (SD) Kcal/ day, with a range of 1.77 to 7.51 Kcal/ day. The daily caloric intake of the silver-haired bat was significantly smaller than that of the hoary bat ($P \leq 0.01$, $df = 38$). Calories egested through the feces averaged 0.47 ± 0.20 (SD) Kcal/ day, with a range from 0.09 to 0.89 Kcal/ day. This mean value was also significantly smaller than the corresponding mean value for egestion by the hoary bat ($P \leq 0.05$, $df = 38$).

Daily assimilation efficiencies were calculated by subtracting calories egested in the feces from calories ingested in the food, and dividing by total calories of food eaten. Calories lost in the urine were considered to have been assimilated but not utilized. Eighteen such daily efficiency calculations averaged 88.60 ± 6.85 (SD) %, with a range from 73.50 to 98.22 %. A t-test again revealed that the assimilation efficiency of the silver-haired bat was significantly smaller than

that of the hoary bat ($P = 0.05$, $df = 36$).

Differences in body size between the silver-haired and larger hoary bat probably account for the lower caloric intake, egestion and assimilation efficiency of the former. Using the mean values for body weight and caloric intake, a daily food intake requirement of 0.50 Kcal/g body weight was calculated for the silver-haired bat. It is interesting to note that while this value is greater than that of the larger hoary bat (0.30 Kcal/g body weight), it is still smaller than the daily food intake requirements of slightly larger passerine birds which range from 0.75 to 1.00 Kcal/g body weight (Gifford and Odum, Condor, 67: 383-403, 1965). This study thus indicates that the energetic parameters of the silver-haired bat follow the same general pattern as those of the hoary bat and that any discrepancies between the two are probably due to the differences in body size between the two species.

Grateful acknowledgment is made to Mrs. Shirley G. Marshall for assistance with the caloric determinations. Financial assistance for the preparation of this manuscript was provided by a contract AT (38-1)-310 between the University of Georgia and the U. S. Atomic Energy Commission. Hans N. Neuhauser and I. Lehr Brisbin, Jr., Institute of Ecology, University of Georgia, Athens 30601.

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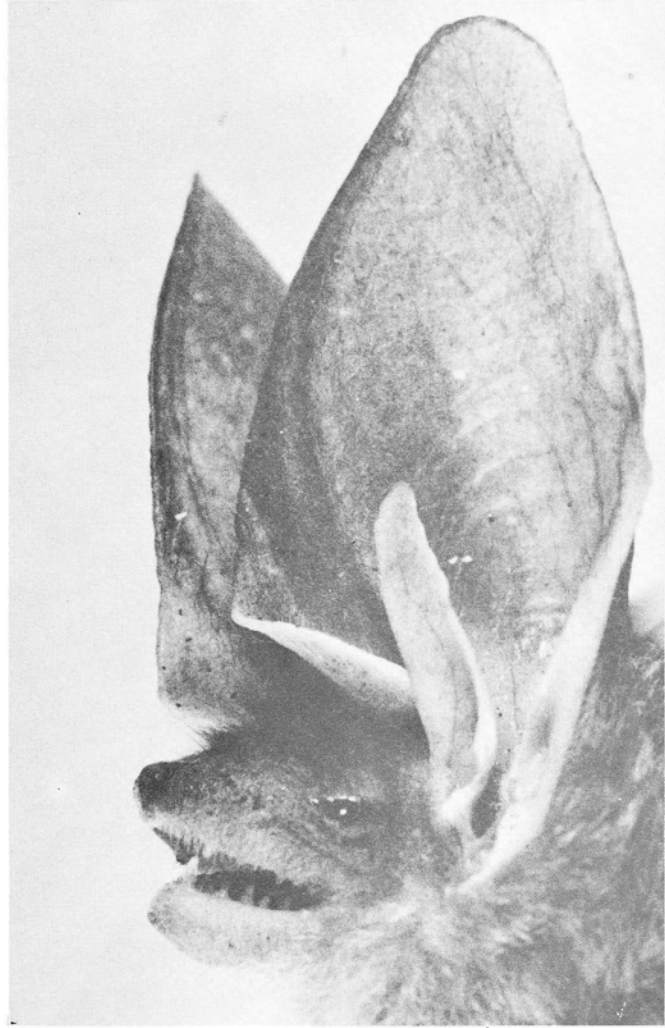
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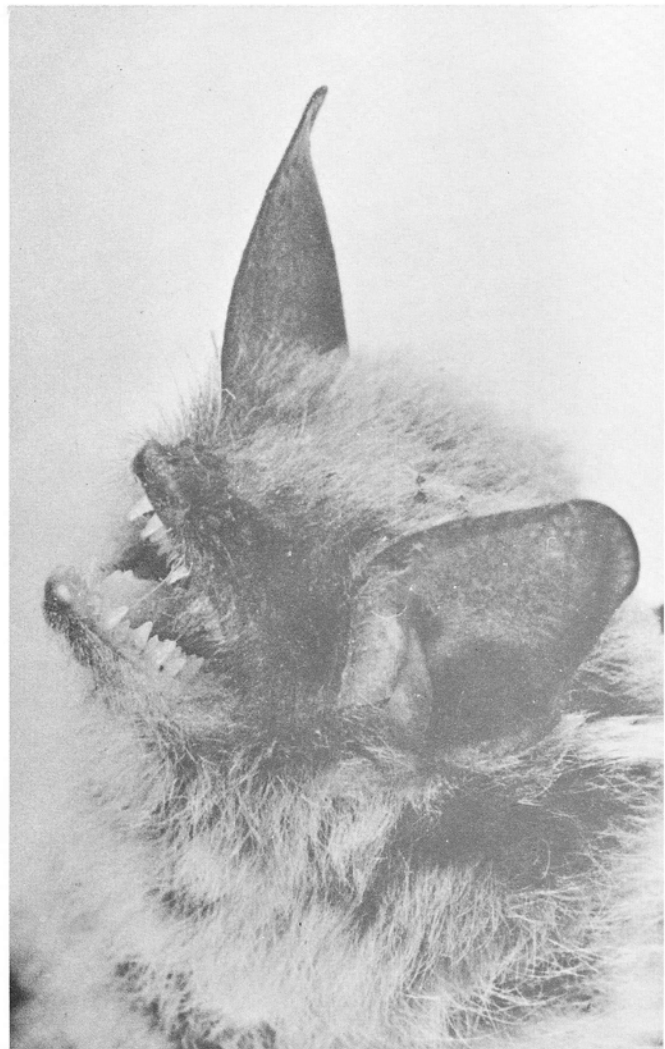


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THE COVER

Abel Fornes, Pueyrredon 1072, Salta, Argentina, works with bats and takes some pictures. He sent me these and said I could use them on the cover. Included are a couple of species I had never seen in photographs before. The species on the cover are: top, Desmodus rotundus rotundus, Histiotus montanus; bottom, Tadarida brasiliensis, Myotis chiloensis alter.

Bat Research News appears quarterly: January, April, July and October. Subscription rate is \$ 1.00 for two years. All back issues are available (some cover photos are not) for \$ 5.00. Wayne H. Davis, Department of Zoology, University of Kentucky, Lexington, Ky., 40506. U.S.A.

HERE AND THERE

Part of my file of material for the last issue fell out and was not seen until too late. It is included here. Two people have replied to the plea of a reader for information on how to obtain Les Systems Sonar Animaux - Biologie et Bionique, R. G. Busnel, Editor. DONALD R. GRIFFIN sent me an order blank which indicates that it can be obtained for 35 francs from Laboratoire d'Acoustique Animale, Domaine de Vilvert, 78, Jouy-en-Josas, France. GEOFF E. TURNER wrote that it can be obtained for 44.95 francs (\$ 9.74 Canadian) from L'Association Naturalia et Biologia, College de France, Place Marcelin-Berthelot, Paris 5, France.

The Newsletter of the OZARK UNDERGROUND LABORATORY says that RICHARD MYERS had a faculty grant to study color changes in Myotis grisescens last summer. Among other things he studied ceiling temperature changes where the bats were. The newsletter also says that the Mark Twain National Forest cancelled an aerial insecticide spray project 15 miles north of the Laboratory because of the possible effects on Myotis sodalis, an endangered species.

JOHN PARADISO wrote in response to my query that the soft lipped bands are all that are available for bat banding. He says that he hopes to be able to produce the type of band agreed upon by banders at the North Carolina meetings as soon as this last shipment of lipped bands is used.

CLYDE SENGER wrote that he had a good winter banding Plecotus townsendii in Washington. He had a lot of recaptures of bats banded in 1964 and 1965. A recovery of one banded 15 miles south of Bellingham was on the south tip of San Juan Island in January. This was 30 miles away and across at least two miles of water. At his cave on Mt. St. Helens on 22 February he found 7 feet of snow. There was ice on the ceiling where the bats stay and only 20 were found where over 200 usually winter. Fifteen of the bats carried his bands. In August he did some netting at the cave and got good catches of Myotis of several species.

M. BROCK FENTON finished his PhD at Toronto and is now at Carleton University in Ottawa. On 5 October, 1968, he and Geoff Turner were in the Coach-James cave system in Kentucky. He says there were large numbers of bats (M. grisescens and M. sodalis) flying about in and out of the cave in the evening, and that there were some torpid bats in the cave.

DON E. WILSON says I had him listed in the April issue as working on Myotis grisescens in Panama. It should have read Myotis nigricans.

PATRICIA KIRTLAND is a new subscriber at the Center for Neural Sciences at the University of Indiana. She is working on the neuroanatomy of the visual systems of various species. Last summer she went to Australia to study the flying foxes and others.

ANTHONY LEWIS is a new subscriber who is working on ecology, taxonomy and distribution of bats in Arizona. He is at Arizona State, Tempe.

STEVE HUMPHREY has invented a bat cage for handling large numbers of bats. It is made of hardware cloth on 4 sturdy corner posts. The top is a plywood square with a 4" long piece of cylindrical tin flashing in the center. The cages hold 600 active M. velifer.

JOHN HALL has made 3 trips to Trinidad in the past year and banded over 2000 bats of 18 species. He is testing regular bird bands, rounded end and lip-ped bands. He is also working on the ecology of Carrolia perspicillata.

DR. H. ROER wrote last spring that he was working on the water balance of vampires. He also asked about the use of bird boxes by bats in America.

In July a bat flew down and attacked a little girl in Lexington. There were several witnesses. The girl's mother opposed shots for religious reasons; 11 days later child welfare authorities were notified and went to court. They called the UK Med Center and then me wanting to know the likelihood that the bat was rabid. I favor freedom of religion, but that wasn't what they asked me about. I think chances are high the bat was rabid.

The CDC Veterinary Public Health Notes for June has a story saying that vampires cost Mexican cattle raisers \$128,000,000 through death by rabies.

DAVID EASTERLA spent the summer working on Euderma in the Big Bend. He caught a pregnant one that gave birth in captivity. He banded several and netted a juvenile. One night he netted 6 within 50 minutes. By photographing released ones he found that they fly with the ears erect.

DICK MILLS is one of Copes students who is working on bats in western Ohio. Last summer he banded over 2000, mostly big brown bats. He was surprised at the scarcity of little brown bats in SW Ohio. He once took a hundred big brown bats from a house and banded and released them at Dayton, about 10 miles away. Many of the bats took up residence in a hollow tree on the grounds of the Dayton Museum of Natural History where they were released. Twenty-five were counted in the tree a week later.

BERNARDO VILLA wrote that the price of his book "Los Murcielagos de Mexico" is now \$ 17.70 U.S. It can be obtained from the Libreria Universitaria, Avenue Insurgentes Sur No. 229, Mexico, D. F., Mexico.

JIM HARDIN, who took an MS at Kentucky and taught at Memphis State, is now working on a PhD at Southern Illinois. He sent me a clipping from the Southern Illinoisan after Old Main burned. A safety officer had inspected the attic on 6 June. He found about 50 bats then.

The CDC Zoonoses surveillance rabies report listed 978 cases for the first 3 months of 1969. Wildlife accounted for 74%. Virginia had the most cases, 189. Kentucky, which led the nation last year, was 2nd with 103. Rabies is a common disease.

HAROLD HITCHCOCK has been getting around since he retired after a distinguished career at Middlebury College. He spent a year teaching at Norwich University in Vermont, then a year at the University of Hawaii. He now is spending a year as Chairman of the Department of Biology at Bates College, Lewiston, Maine 04240.

JAMES FINDLEY has several things going at New Mexico. He has been taking slow motion pictures of Myotis in flight and doing comparative food habit work on the genus. He found identical milk proteins in Myotis lucifugus occultus and M. l. lucifugus from Minnesota. JENESS is doing the milk studies for him at Minnesota. In July Findley and his students karyotyped a female Euderma. This is something that ROBERT BAKER had been trying to do for years.

Findley has an NSF grant to do a biosystematic revision of the genus Myotis. He is comparing the various species on the basis of behavior, reproduction, annual thermal and migratory cycles, serology, energy sources, aerodynamics, etc. This is a long term project of course. So far he has reviewed the morphology of the described species and run these data through the NTSYST program at KU. The clusters of species he got seem to coincide with forage feeding types. He now plans to study a species from each group in detail, in part by having graduate students working on them. Thus Don Wilson is working on M. nigricans in Panama. Hal Black is comparing food habits of New Mexican species; Jay Druecker has been doing histological studies of the gonads in M. volans as well as in Lasionycteris and Lasiurus cinereus. Mike Bogan has nearly finished studying the systematics of M. californicus. His former student, Art Harris, now at the University of Texas, El Paso, is continuing work on M. yumanensis, for which he has NSF support.

A press release of 11 June, 1969, from the Dept of Public Information, Commonwealth of Kentucky, says that effective this fall when the hibernation season begins, Bat Cave in Carter Caves State Park will be open only to biologists, naturalists and others with legitimate reasons to visit the cave. A chain link fence will be erected by the Dept of Parks to enclose the entrances to Bat Cave, and anyone desiring access to the cave during the bat hibernating season, usually October through April, will have to apply at the park office. Bat Cave will be open to the public, as usual, in the summertime.

ALTON ELECTRONICS CO., box 13978, University Station, Gainesville, Florida, 32601, produces a bat detector for \$ 42.00 without headphones and battery. Write for their catalogue if interested. They claim it is excellent for monitoring on the wing sonar of bats feeding outdoors about lights, etc.

WILBUR GUNIER found Myotis lucifugus living in cypress trees housing wood ducks in Bollinger County, Missouri. He sent me a specimen to examine and I was surprised to see that it was this species. Just across the river in Tennessee FRANK GRAVES found M. austroriparius to be abundant, but no M. lucifugus.

JAMES HEDGES, who did the last index for us, is working up the last five years now. He says he will send me final copy a month after this issue is out. The index will be sent to all subscribers.

It is the policy to include endangered subspecies on the U. S. Fish & Wildlife Service official list of Endangered species of U. S. vertebrates. Therefore I filled out and submitted forms suggesting Plecotus townsendii ingens and P. t. virginianus. These eastern relicts of a western species may face a natural extinction, but the process is being hastened by man. I know of no place where either of these spectacular big-eared bats receives protection. We urgently need

a Nature Conservancy or state park project in West Virginia on this. Those colonies cannot hold out much longer; perhaps it is already too late. Getting the bats on the endangered list will help stir some interest.

WILBUR GUNIER is doing a masters thesis on M. grisescens. He has been studying the distribution, age and sex ratio of a large winter colony in Missouri. He has banded about 9000 and has been getting some good returns.

CLYDE SENGER has been netting at Ape Cave in Washington again this fall with success. He has found other areas that he plans to work next summer also. He has been working with his banding records on the computer. He has a program that will print out a copy for the records in D. C. and will list captures by dates, location, species, recaptures. He says he thinks the program will be a real timesaver and that if anyone is interested in assistance to let him know. He is at Western Washington State College, Bellingham.

TOM MEADOR sent me clippings from the San Angelo Standard Times and the West Texas Livestock Weekly. The latter said "As yet unsolved is a problem with Mexican free-tailed bats which emerge in large numbers from Bracken Cave on the flight path to Randolph Air Force Base. This happens for only about 45 minutes each evening, but the Air Force does not like to suspend operations that long because of bats."

In the Standard Times was a feature story with picture about TONY MOLLHAGEN at Texas Tech, a graduate student studying bat activity in west Texas. He was netting to determine what times each species is most active. It also said that in the Chinati Mountains he captured a Mormoops and a Leptonycteris. Another story on the same page concerned the work of DAVID EASTERLA in netting Euderma in Big Bend National Park.

GLEN KOEHLER visited the Black Hills last summer to net some bats. On 10 August at 12:20 MDST he saw a bat which he thought to be a Myotis flying across Center Lake, near Custer. Perhaps the bat had been disturbed in its day roost. Glen has also been trying to catch red bats that feed over a street near his home in Milwaukee. They avoided his net. He then tried a pressure sprayer used for spraying weed killer. With this he soaked bats enough that they would land in a tree to dry off. However they went for the tree tops where he could not catch them. He suggests that the method might work over ponds where the bats can be knocked into the water and retrieved as they swim to shore.

RICHARD LAVAL was collecting bats in Honduras when the war broke out, Bombs fell within 100 yards of his truck. He encountered difficulties crossing the two warring countries on his way home.

In a cave in Honduras LaVal found only Myotis and giant ticks. He said the ticks were not bothering the bats and didnt seem interested in him. He wonders what they fed upon.

The University Press of Kentucky is going into conservation, ecology and natural history. They are offering a \$5000 award for the best manuscript in ecology or conservation received by October, 1970.

CEIL HERMAN is working on a PhD with JACK TWENTE at Missouri. She will be studying Antrozous pallidus.

The CDC Veterinary Public Health Notes for August reports that in Oregon 14-20% of the bats examined by the state public health laboratory since 1960 have been positive for rabies. In the same issue is an article on a new diagnostic

test for rabies developed in Germany.

DICK MILLS writes that on 5 August he and TOM POWELL were netting an unlikely looking section of the White Oak River in Brown County, Ohio. Four nets were set from 8:45 until 1:00, during which time they caught 28 Lasiurus borealis and 2 M. lucifugus. The red bats included one adult of each sex and 17 female and 9 male immatures. They found that by placing their cages holding bats beneath the nets they attracted other red bats. Others have also noted this effect with this species.

I have a letter of October 1 from WILLIAM WIMSATT concerning his book on the biology of bats. He is in the final editing of all manuscripts for Vol. 1. These will be submitted to the publisher not later than 15 November.

Our book here is wriggling through the final stages. Barbour and I have caused the latest delay of a couple of weeks. We were not satisfied with the layout or the quality of reproduction of the black and whites. We howled persistently enough that both jobs were done over, the photography work by a different company. We are now pleased with the results of both.

SHELTA CAVE FUND OVER THE TOP

John E. Cooper, Chairman of the Shelta Cave Project Fund Raising Committee of the National Speleological Society, has announced that the campaign to purchase the biologically unique Shelta Cave in Huntsville, Alabama, has been a success. The Society's goal was to raise \$10,000 to buy land containing the cave entrances. Contributions were in excess of \$12,000. Shelta Cave is now a nature preserve and natural underground laboratory, owned by the NSS and protected by a sturdy gate which does not interfere with movements of the Myotis grisescens colony. Although no general collecting of the fauna is allowed, and no facilities are available, research projects in the cave are being encouraged by the Society. An intensive long-term ecological study of the aquatic community is in progress, and interest in the bat population has been expressed. Information concerning research possibilities may be obtained from Dr. William B. White, Chairman, Research Advisory Committee, National Speleological Society, 201 Engineering Science Building, University Park, Pa., 16802.

The National Speleological Society wishes to thank all readers of Bat Research News who have contributed to the fund.

A RECOVERY OF A BANDED HOARY BAT

During the summer of 1966 we banded about 300 hoary bats in Arizona; a recovery of one of these has just been received. On 2 July we banded male hoary bat BAT 5-37131 at Upper Martyr Pond, a small pool near the head of Cave Creek, 6 mi SW Portal, Arizona. This bat was found dead in Tucson, about 90 miles west of the banding site, on 13 September, 1969, by Kathleen O'Dowd, 140 Avenida de Palmas, Tucson 85716. So far as I know this is the only recovery of a banded hoary bat ever reported. Perhaps other banders have something on them in their files? W. H. Davis.

AN EXAMPLE OF UNUSUAL BEHAVIOR AND TEMPERATURE DEPRESSION
IN ARTIBEUS LITURATUS (PHYLLOSTOMIDAE)

In August 1968 a number of phyllostomid bats, including 4 Artibeus lituratus, were mist-netted in the tropical wet forest of the Osa Peninsula, Province of Puntarenas, Costa Rica, and placed in a flight cage (4 x 8 x 2m) set in an open area about 30 m from the forest where the bats were caught. The cage was partially shaded with palm fronds, and a bunch of bananas was hung inside for food. Initially the bats attempted to escape, but seemed to become adjusted to their new surroundings within a few hours.

After keeping the bats caged for 4 days, I decided to release the 4 A. lituratus. At 0615, after an overnight low ambient temperature of about 20°C, the 4 bats felt cool to the touch and were unable to fly. I placed them outside the cage in the sun, which had just risen. They immediately increased their rate of breathing and had succeeded in reaching flying temperature after 20 minutes. The first bat to fly went directly into the forest. However, the next 2 bats flew repeatedly around the cage, periodically landing and attempting to gain entrance. Finally, both landed on the cage and showed no inclination to take flight again. After 13 minutes I prodded the 2 with my finger, at which time they took off for the forest. The fourth bat, after several flights around the cage, landed on the cage but refused to fly again when prodded. About 45 minutes later he flew into the forest.

Behavior of 3 of the 4 bats released might be ascribed to their normal reluctance to leave their roost during daylight. However, I find it rather surprising that the cage in which they were imprisoned for 4 days was apparently identified by them as their home roost, even though the edge of the forest where they were captured was but a few meters away.

The apparent torpor of the 4 bats is also surprising, in view of laboratory findings by Morrison & McNab (Comp. Biochem. Physiol. 21: 207-221, 1967) that indicate this species normally maintains a body temperature above 35°C even when ambient drops as low as 5°C. However, in their experiments, the T_B of 2 individuals dropped to within 2 to 3°C of ambient. They suggested that these low temperatures might be indicative of true torpor and represent a basic capability of these animals. If torpor is indeed a basic capability of A. lituratus, its continued presence may be a result of selective forces which would be operative should these bats be subjected to occasional food shortages. On the other hand, it is possible that this species evolved from a heterothermic ancestral form and has retained this characteristic as vestigial.

These observations were made possible by the Program of Tropical Studies and Research of the Organization of Tropical Studies. -- Richard K. LaVal, Dept. of Wildlife Sciences, Texas A & M University, College Station 77843.

ON THE DISTRIBUTION OF MYOTIS LEIBII IN NEBRASKA

Jones (Univ. Kansas Publ., Mus. Nat. Hist. 16: 84, 1964) shows the distribution of Myotis subulatus (= M. leibii) across the western half of the state, based upon specimens examined. He also shows it as ranging across the north-

ern part of the state into the northeast. This is based upon a specimen not seen but listed in the literature from Crystal Lake, Dakota County. This record is that of T. C. Stephens (J. Mamm., 26: 92, 1945). In this paper Stephens says: " By running through the key in Cory's The Mammals of Illinois and Wisconsin, I concluded that the specimen was Say's bat, Myotis subulatus (Say)."

But at the time of Cory's book (1912) the name Myotis subulatus was applied to the bat which we now know as M. keenii septentrionalis, and it was clearly Stephens' intention to identify his bat as such. Cory's key separates M. subulatus from M. lucifugus by: "---ears when laid forward extending well beyond end of the nose; tragus slender - M. subulatus . ---ears when laid forward not extending beyond end of the nose; tragus short and broad - M. lucifugus . Using this key with a single bat in hand, I suspect that either species would come out as M. subulatus . Apparently the specimen in question at the University of Nebraska has been lost, else Jones would have examined it.

Since the specimen of M. subulatus listed in the literature from Iowa has recently been examined and found to be a M. lucifugus (Kunz & Schmitter, Trans. Kansas Acad. Sci. 71: 168, 1968), this rolls back the known distribution of M. leibii ciliolabrum to Cherry County in northcentral Nebraska. W. H. Davis.

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IN HONOR OF E. RAYMOND HALL

Contributions in Mammalogy, a volume honoring Professor E. Raymond Hall, appeared in July 1969 as number 51 in the Museum of Natural History, University of Kansas Miscellaneous Publication series. This contains papers by 17 of his former doctoral students. Dr. Hall has retired as Director of the Museum after a long and especially distinguished career.