

BAT RESEARCH NEWS

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# BAT BANDING NEWS

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## THE COVER

The cover photograph, provided by Richard S. Mills of the Dayton Museum of Natural History, shows an ant head firmly attached to the head of an Eptesicus fuscus male taken in a maternity colony in a barn in Xenia, Greene County, Ohio. Handley (Jour. Mamm., 37: 279, 1956) and Wilson (Jour. Mamm., 39: 438, 1958)

have reported carpenter ant head attachment to the face of Eptesicus fuscus, the ant genus being Camponotus.

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## HERE AND THERE

ADAM KRZANOWSKI has sent a rather extensive bibliography on the bat central nervous system for use by MARK DULIN at Kansas State University in response to Mark's request in Vol. 11, No. 3 of BRN, a good example of how BRN can be useful in furthering communication among bat workers. At Adam's request, I have sent a pre-publication copy of his niche and species diversity paper to STEPHEN HUMPHREY, who is interested in the same type of study.

RICHARD S. MILLS is currently engaged on research on Myotis keenii and is interested in knowing of others who are currently or who have in the past worked with sizeable populations of this species. Most studies, to our knowledge, have dealt with numbers less than one hundred. His address is 2629 Ridge Avenue, Dayton, Ohio 45414. As soon as work is stabilized for me, I intend to run off a complete name and address list of subscribers to BRN for ease of communication.

ROBERT K. STROSNIDER, the Acting Forest Supervisor at Blanchard Springs Caverns near Russellville, Arkansas, is interested in the bat fauna of the area, as the Caverns will be open to the public in 1973. He is a new subscriber to BRN. Anyone interested in the possibility of helping in this effort can write him at P. O. Box 1000, Russellville, Arkansas 72801.

CLYDE JONES of the Mammal Section of the Bird and Mammal Laboratories at the U. S. National Museum will be supplying a note of bat banding policy at a later date. Modernization of the bat banding program is in order, within the limitations of finances and resources, and suggestions can be sent to him or to BARBARA HARVEY, who is in charge of the bat banding program and is eager to computerize the band records. I had the pleasure of meeting her last week at the USNM, and was much impressed with her enthusiasm; it will be an excellent system if she has her way. Whatever the shortcomings of our current bat band set-up, and I know of relatively few, we have been spoiled a bit by all the advantages of a national office; my feelings in this are reinforced by a note from IYAD NADER in Iraq indicating that his bat banding program is bogged down due to the unavailability of bands.

IYAD NADER is working on a review of Iraqi bats, including records of all the bats in the collection of the Biological Research Centre in addition

to those previously recorded, and with a key to identification of the bats of Iraq. He is currently trying to encourage one of his graduate students to work on the life history of Pipistrellus kuhli.

BERND MARTENS, a 4th year zoology student at the University of Calgary, is a new subscriber interested especially in bat behavior.

SCOTT KEEFER is currently working on temperature regulation, measurement, and behavior of Plecotus townsendii, P. refinesquii, and several Myotis. He has suggested the value of a listing of professors and addresses for those interested and willing to take on graduate students in bat research, and I think it a very good suggestion. This could easily be done in conjunction with the listing of subscribers to BRN. REQUEST: Would those who are interested and willing to take on students in bat research please so indicate to me within the next few months, and I will so note on the listing of the subscribers. This would provide students with some idea of where they might go, and specializations (taxonomy, physiology, behavior, etc.) could be listed easily.

HAROLD HITCHCOCK has a course set up for the Bates College Short Term, April 26-June 10 which sounds good. The catalogue description is: "A FIELD STUDY OF THE BATS OF MAINE. An investigation of the distribution and migration of the cave bats of Maine. A field course covering as large an area as practical; capturing, banding and releasing bats in summer colonies. Enrollment limited, and only by permission of the instructor."

FRANCIS GRAMLICH, the State Supervisor of Wildlife Services for Maine, notes that he has tried the non-lethal bat repellent, "Rotran" which in two experimental attempts appeared to give excellent control of Myotis, although the control may have been due to bat departure for hibernation as it was late in the season. He intends to test it again this spring.

LARRY WATKINS writes that he is planning to continue his studies for the 6th year on Nycticeius humeralis this summer, especially with regard to food consumption and activity. He also hopes to do some experiments on water loss similar to those done by EUGENE STUDIER.

A nice set of recent reprints arrived from JAMES A. SIMMONS, at the Auditory Research Laboratories, Princeton University. He supplied the cover photograph for the January 15 issue of Science, a good shot of a spear-nosed bat, Phyllostomus hastatus.

ALVIN NOVICK has a forthcoming paper on some aspects of pulse design in bat echolocation in the American Scientist.

KARL KOOPMAN has an American Museum Novitates coming out on the Glauconycteris-Chalinolobus problem, and he and HOBART VAN DEUSEN have another to appear on the Chalinolobus rogersi - C. nigrogriseus - C. picatus complex.

FRED J. BRENNER is currently banding several populations of little and big brown bats in western Pennsylvania, being especially interested in their migratory behavior.

There have been few band returns lately of bats banded with JOHN PAWLUK and THOMAS CLANCY in northern New York in 1963-1964; I attribute this to the current lack of public information about bats and bat banding in that area, as returns were numerous when the newspapers in that area carried stories on

bat work. HAROLD HITCHCOCK had a good newspaper write-up on bats in the larger Maine newspapers this last spring, and many notices in the papers on his new course, asking for bat locations. WILLIAM KEITH has just had a newspaper write-up in the Houston papers which may help him get more bat contacts there. The New York Times had a short column on EDWIN GOULD's recent bat interests, so bats have been getting in the news. In spite of bits of misinformation, witty cliches, and garbled coverage, the newspapers are a good medium for dissemination of bat information, especially to stimulate band returns and to help overcome the traditionally poor image bats have had in the public eye.

The Ozark Underground Laboratory, at Ozark, Missouri, is interested in possible studies on the breakdown of bat wastes from the large seasonal gray bat (Myotis grisescens) colony which customarily hangs directly over the lower portions of the cave stream. Anyone interested in the effect of the wastes on aquatic life forms, etc., should contact them, writing to the OUL., Route 2, Ozark, Missouri 65721.

A recent Ripley's Believe It or Not item was that bats often come to rest on the backs of bullfrogs which seem to offer no objection. The only relationship I can think of between bats and bullfrogs is that mentioned by HELMUT MUELLER in his 1969 note on finding a red bat in a bullfrog stomach, in a case in which I assume that the bullfrog did mind!

Dr. MUELLER has sent a letter from B. D. SHARMA, Department of Zoology, Government Degree College, Poonch (J&K), India, in which he requests papers on bat research and names and addresses of others who might be able to provide additional information, reprints, etc. I am sending BRN to him, and hope that others will also respond by sending reprints. He is currently at work on the general survey, functional anatomy, and identification of bats of Kashmir Province.

RALPH A. RASCHIG is interested in obtaining a copy of Charles Campbell's 1925 book, Bats, Mosquitoes, and Dollars. Anyone having an available copy can contact him c/o NATO, P. O. Box 1418, Sarasota, Florida 33578, giving price, etc. He notes that 6 bat towers built in Italy were destroyed in W.W. II, according to the Italian consulate.

The January issue of BioScience has a cover photograph of a pallid bat, Antrozous pallidus, supplied by STEPHEN HUMPHREY.

STEPHEN HUMPHREY and his wife have banded in the various parts of Oklahoma in the past two years the following bats; 1969 figure, then 1970 figure:

<u>Myotis velifer</u>	1039	705
<u>Plecotus townsendii</u>	112	89
<u>Antrozous pallidus</u>	-	16
<u>Myotis yumanensis</u>	-	11
<u>Eptesicus fuscus</u>	4	8
<u>Myotis lucifugus</u>	7	-
<u>Pipistrellus subflavus</u>	3	3
<u>Nycticeius humeralis</u>	1	-
<u>Myotis leibii</u>	-	1

Incidentally, the record of Cimex adjunctus, the eastern bat bedbug, biting human beings was established for the first time in the case noted in the October BRN by LOUIS J. LIPOVSKY. He notes that CLAUDE H. SCHMIDT, Chief

of Insects Affecting Man and Animal Research Branch, U.S.D.A., has stated that this is the first bite record associated with human beings for this bedbug.

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N O T E S

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STRESS INDUCED ABORTION IN BATS

On 23 May 1968, I entered Bear Cave, now called Tumbling Creek Cave by its owner, Tom Aley, who operates the cave as the Ozark Underground Laboratory at Forsyth, Taney County, Missouri. This cave is open to scientific investigators by membership only and is claimed to contain a large summer nursery colony of gray bats, Myotis grisescens, numbering nearly 150,000.

My purpose was to band several thousand bats as part of an extensive study of the population dynamics of M. grisescens in Missouri begun by Dr. Richard Myers several years earlier. A group of about 10,000 was soon found and 200-300 bats were placed in each of five collecting cages.

By the time we had been banding for an hour, I noticed blood on the sides of the collecting cages and blood on several bats, but no evidence of fighting or chewing. It was then that I saw several aborted fetuses on the cave floor beneath the colony, and found about a dozen in the bottom of each collecting cage. Blood around the vaginal openings of females made it clear that the stress of my disturbing and handling the bats was inducing mass abortion. I ceased immediately and turned the remainder loose.

The fetuses were very uniform in size, approximately 3/4 inch long and hairless. Obviously they were not near term and no young were present anywhere in the colony.

Guthrie (J.Mamm., 14:1-19, 1933) found first young at Rocheport Cave on 20 June in two successive years and Black (J. Mamm., 15:67-68, 1934) found newborn young in Arkansas 11 June. Guthrie mentions, "Only a few pregnant females have been collected, and in every case parturition occurred within a few hours." This was nearly a month later than my experience, and the young she found were apparently full term.

Spontaneous abortion among bats has been reported by Novick (J. Mamm., 41:508, 1960) in captive Artibeus and Macrotus mexicanus held confined for several months but Gates (J.Mamm., 22:53-56, 1941) found that the Nycticeius he kept in confinement died while resorbing "decomposing" fetuses without aborting.

My experience points up the need for bat banders working with gray bats to leave colonies strictly undisturbed from early May in Florida (Rice, J. Mamm., 36:289-290, 1955) throughout June in the more northerly parts of the range of this species--WILBUR J. GUNIER, Missouri Cooperative Wildlife Research Unit, University of Missouri, Columbia, 65201.



LONG-DISTANCE RECORD FOR MOVEMENT OF A GRAY BAT

In July and August 1967 I banded 551 gray bats, Myotis grisescens, from a large nursery colony in a barn in central Missouri. This was part of a homing study reported elsewhere (Gunter and Elder, in press) and resulted in 115 returns, mostly at the original colony site. However, eight males were subsequently found in Missouri caves and one male, banded BAT 6-02491, was killed near Savoy, Black Hills, Lawrence County, South Dakota, by Tim Joseph, of Menden, Missouri, 21 August 1968. While vacationing in South Dakota, he crawled into a small cave and saw three banded bats. He was successful in catching but one and sent the band to me. Savoy is exactly 637 air line miles from the point where I released the bat at Higginsville, Missouri, 1 year and 35 days previously.

Long distance flight records for European cave bats of three species have been recorded by Krzanowski (J. Mamm., 45:152, 1964) as 1061, 1219, and 1467 miles, all from interior USSR to Bulgaria. In North America, Fenton (Canadian J. Zool., 47:597-602, 1969) banded M. lucifugus that moved 500 miles between hibernacula, Hall (Reading Public Mus. and Art Gallery Sci. Publ. 12:1-68, 1962) reported M. sodalis that moved up to 320 miles, and Smith and Goodpaster (Science, 127:644, 1958) got experimental homing of Eptesicus from 450 miles. With the exception of flights of 790 and 800 miles by banded Tadarida brasiliensis recorded by Villa and Cockrum (J. Mamm. 43:43-64, 1962), this flight of 637 miles by a displaced M. grisescens seems the longest yet recorded in North America for a banded bat--  
WILBUR J. GUNTER, Missouri Cooperative Wildlife Research Unit, University of Missouri, Columbia, 65201.

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On October 10, 1970, 6 year old Matthew Winkler was bitten on his left thumb while asleep in his bed in Lima, Ohio. His recovery from symptoms attributable to rabies constitutes the first documented such case, although I recall in my studies of bat rabies in Kansas having read of wolf attacks in Siberia where the wolves were found to be rabid, but mortality was not always the result. Newspapers and magazines have given thorough coverage, so I will add little here except to note that the hysteria promoted by some newspaper writers died rather quickly; one article was entitled, "Bat Bite, Scream in Dark Began Family's Nightmare", and included such emotion charged writing as: "a child's scream tore through the house", "fastened by frenzied teeth", "he saw the tiny rodent, wings limp, its teeth in his son's flesh", "The vet sent the rodent by bus", "suspicion gnawed at his mind", etc. The general attitude of the public was that all bats must be rabid, as I found in conversation with laymen friends, from janitors to teachers, and I could only wish that young Matthew had been bitten by a dog instead of a bat. It is unlikely that the public would demand the killing of all dogs, but there is a ready acceptance of extreme control of wildlife suspected of harboring rabies. The excitement seems to have died down, but the presence of bats in human habitation may produce extreme reactions not formerly engendered by bats' presence, now that the public is informed of the danger. Details of this case may be found in the CDC Morbidity and Mortality, Vol. 19, No. 50, for week ending December 19, 1970, or in the CDC Veterinary Public Health Notes for December 1970. If you wish copies, I will be happy to provide same on request.

The October 1970 CDC Zoonoses Surveillance on Rabies reports 74 cases of

rabies in bats from 26 states. There were 30 bat rabies cases from 17 states reported for October 1970, with six cases from five states reported for November. Euderma maculatum has been added to the list of bat species reported with rabies, a specimen collected at Friant, California having been found rabid. The specimen is being held as a frozen specimen at Fresno State College for use in laboratory instruction by KEITH STANDING, head of the Biology Department there. The Sargent-Welch Biology and General Science Digest, 18 (2), has printed a digest of DAVID and PATRICIA EASTERLA's National Wildlife article of 1969, and Dave is noted as the source of much of the basic information on Euderma in the January 1971 CDC Veterinary Public Health Notes write-up on the rabid Euderma.

With the increased possibilities for exposure to rabies, all those who plan on handling bats in any numbers should certainly get the protection of the pre-exposure vaccine. Contacting your local veterinarian should get you information as to how you can have this taken care of. There is a new one-shot vaccine which may replace the pre- and postexposure vaccines now used, being tested by Dr. T. J. Wiktor, Wistar Institute, Philadelphia.

SAMUEL B. LINHART, research biologist, formerly at Palo Alto, Mexico, and now at Denver, Colorado, plans to have a bibliography of the vampire bats (Desmodus, Diphylla, Diaemus) consisting of about 600 titles ready sometime this coming summer. Those not familiar with his work who are seriously interested may contact him at the F&WS, Bureau of Sport Fisheries and Wildlife, Building 16, Denver Federal Center, Denver, Colorado 80225.

On going over the bat papers included in the 1970 compilation by J. Knox Jones, Jr. and Sydney Anderson, Readings in Mammalogy, a KU Museum of Natural History publication, a paper I consider a bat classic came to mind. While finding the six bat papers included in the work to be excellent choices, I wished that the 1914 paper by James E. Ackert, "The innervation of the integument of Chiroptera", Journal of Morphology, 25(2): 301-343, could be included in such a work. This paper is a classic of its time, being written at the time when obstacle avoidance in bats was still an unanswered question, before echolocation was accepted. Since I assume that almost every mammalogist has certain special papers he would like to see in such a compendium, it is no surprise to see one's favorites passed over, and is certainly no reflection on the choices of the editors of such works. I do suggest that the Ackert paper is one worth looking at in one's spare time as an example of the meticulous work that went into providing supporting information for a hypothesis no longer acceptable.

WAYNE DAVIS writes that a pipistrelle he banded in Greenville Saltpeter Cave, Greenville, Monroe County, West Virginia on 15 March 1965 has just been reported from a cave in the Eagle Rock Section of Roanoke, Virginia.

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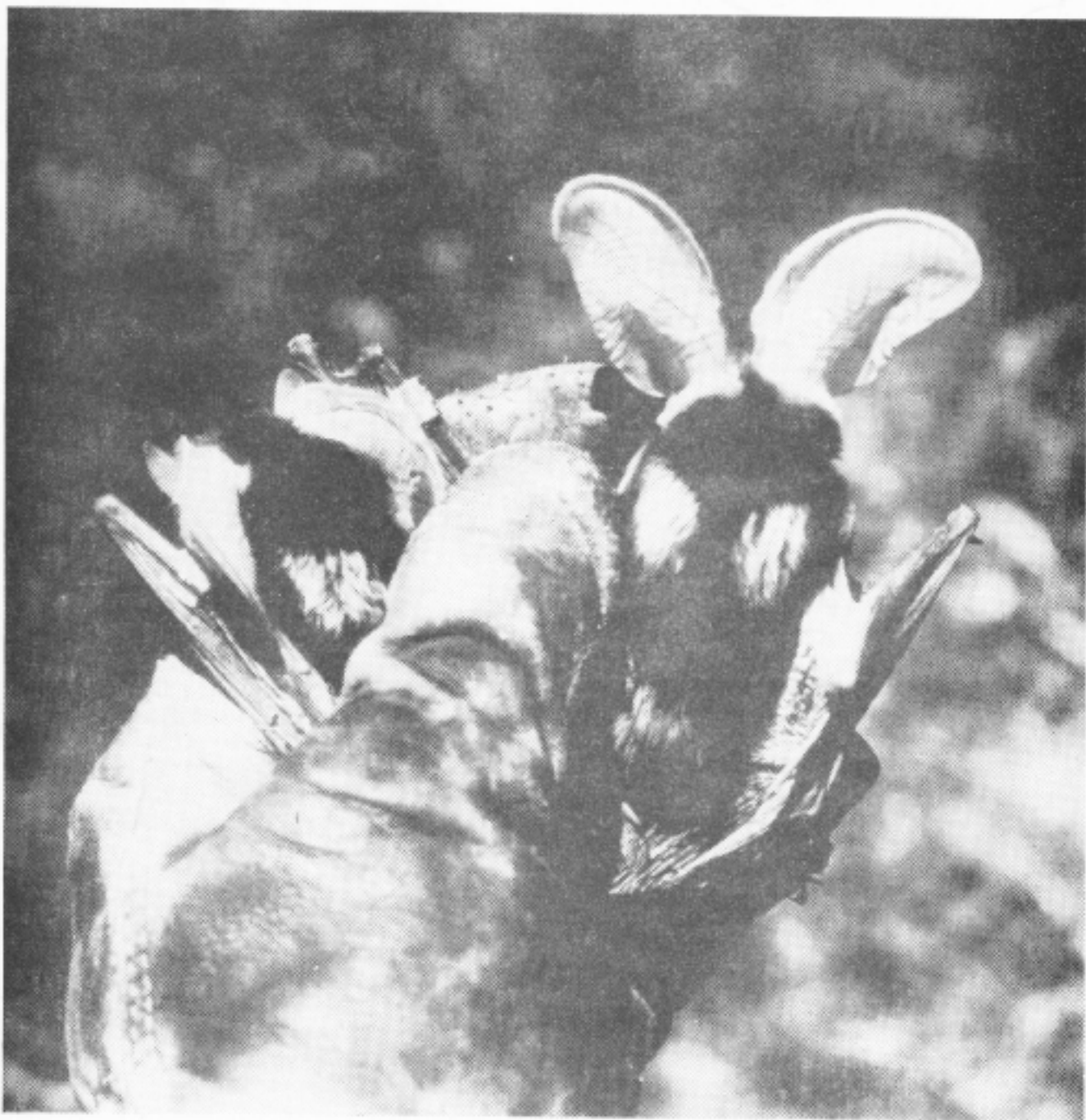
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(to be continued in next issue....)

BAT RESEARCH NEWS

Volume 12, No. 2

April 1971



## THE COVER

The cover photograph, made from a slide provided by David Easterla, is a unique shot of two Euderma maculatum in hand. Dave banded and released them at Big Bend National Park, Brewster County, Texas on 7 August 1969. Dave sent me color slides of Euderma in flight, but blown-up black and white photos are not clear enough to make them cover material.

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Bat Research News appears quarterly: January, April, July, and October. Subscriptions are \$1.00 for two years. Address all correspondence to Robert L. Martin, Department of Biology, Preble Hall, University of Maine, Farmington, Maine 04938.

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## HERE AND THERE

THOMAS Aley notes that Tumbling Creek Cave, with its seasonal colony of Myotis grisescens, may possibly come under the National Landmark System of the National Park Service. The ownership of the cave would remain with the Ozark Underground Laboratory, but recognition of the cave might be helpful in long-term protection of its fauna.

ROBERT A. MARTIN's paper on Late Pliocene and Pleistocene bats of North America and the Antilles is now in press in the *American Midland Naturalist*. ]

STEPHEN HUMPHREY, now at the Florida State Museum, notes that the CDC's pictorial key to genera of U.S. bats which is probably the primary and even possibly the only source reference for identification of bats by state health departments in rabies cases may be misleading. The drawing of the head of Pipistrellus is larger, for example than that drawn of Antrozous, and Steve thinks that the designation "fur brown or red" as it is given in the key may "silver-tipped" possibly lead non-mammalogical workers to stop at this point on noting brown fur, thus including any brown furred bat as a Lasiurus, the correct genus for silver-tipped brown or red fur. He has examined bats tested for rabies and identified by two state health departments and found numbers of Myotis and Nycticeius (and occasionally immature Eptesicus) identified as Lasiurus. He makes the suggestion that many of us have made for years to state health departments, namely that they freeze the bodies and have the identification made by a qualified mammalogist. I personally know of a state health department which listed a Blarina as a mole even after I had identified it; as it was not rabid, the mistake was carried no further, but if it had been rabid, the misidentification would have been carried on into the permanent records. Since this may not always be done even in the best of situations, Steve would like to know if any subscriber of BRN able to draw bat features would be willing to try to construct a more accurate pictorial key for the Public Health Service. Many of us have copies of this key for reference, and will be happy to provide same to anyone interested in such an endeavor.

For those of you who may wish to use Bat Research News as an outlet for short papers, it may be of interest to note that Academic Media has listed BRN in their "Directory of Scholarly and Research Publishing Opportunities". My feeling is still that the decision rests on the author as to whether he wants to call a note in BRN a publication or not. It seems quite acceptable to most.



HOBART H. VAN DEUSEN has an original DBN Volume 4, No. 4 which he'll send to the first person to write for it. I hope to pick up whatever back issues are available from WAYNE DAVIS the end of this year when visiting Kentucky, so will not be able to provide issues earlier than October 1970 until after that time.

The long-distance record noted by WILBUR GUNIER for a Myotis grisescens (BRN, January 1971) is indeed unusual, but such data should be recorded, and the following comment by LARRY N. BROWN is interesting: "A Myotis lucifugus which I banded in Laramie, Albany County, Wyoming, in August 1965, turned up less than two months later in the Seattle, Washington, area where it was collected in the basement of a home on a small island in Puget Sound. The route that the bat travelled is problematical, but the air miles distance is about 1000 miles. Since a straight line would take a bat over some of the highest and roughest terrain in the country, the animal must have flown a much lower circuitous path."

CHARLES E. MOHR has been named to the newly created post of Chief Naturalist for the State of Delaware. He will be in charge of interpretation of the environment and coordination of recreation and education.

DANA P. SNYDER writes that on going through their freezer at the University of Massachusetts, they found an Eptesicus fuscus female which had been donated by a collector in early 1968. It was taken February 9, 1968 in a mine at Chester, Massachusetts, and has a band on the right forearm with the number 1 EFS 1060. The band is not a standard bird or bat band, but is a flat fingerling type tag. If the bander is a subscriber to ERN, this information may be useful, and any information on it would be appreciated.

JOHN W. SOWLES, a new subscriber, is working on behavior of Myotis lucifugus at Washington and Jefferson College, Washington, Pennsylvania.

KENNETH WEIDE and ROBERT A. MARTIN are involved in a long-term study of the incidence of rabies in South Dakota bats; their results so far have been negative.

MARY ANN HOGUS notes that due to lack of funds, planned neuroanatomical studies on bats are being eliminated until some possible future time.

RALPH A. RASCHIG writes that in February of 1971 and all through the winter he has been studying the bat towers built in Florida according to the same design and construction as Dr. Campbell's bat towers in Texas. He notes that in the mid-twenties when these towers were built, the approximate cost was \$5000.00 apiece.

IYAD NADER is at Riyadh, Saudi Arabia, under a UNESCO project. His current address, differing from the one on the subscriber list, is: c/o UNDP, P.O. Box 550, Riyadh, Saudi Arabia. He may return to Iraq in August or stay another year.

The up-dated subscriber list should help to identify and locate those workers mentioned in this news section for those not familiar with the names, and I plan to list papers given at meetings and their authors with the idea that those interested in the subjects noted will then be able to write the authors for further information. Communication from some areas is still poor, and for graduate students and part-time workers who may not get to the various meetings this may help to bridge the information gap.

DR. THOMAS B. STILL, Associate Research Scientist, New York Department of Health, New Scotland Avenue, Albany, New York 12201, writes: "We are currently interested in New York State bat virus isolation studies, examining those bats that are rabies negative. All these specimens we test are dead and in various stages of decay. Hopefully, through Bat Research News, we may contact investigators in New York State who can provide us with live bat collections."

JOHN HALL is still working with bat populations in New Jersey, Virginia, West Virginia, and Pennsylvania, and during the last three years has taken four trips up to one month in length to Trinidad. The main objectives of the latter are to band a variety of tropical species to see how they take to banding and also to do a detailed study of the ecology of Carollia perspicillata, a colony of which he has maintained for two years at Albright College.

TEJ KUMARI KOUL, a research scholar in the post-graduate Department of Zoology at the University of Kashmir, is working on the bats of Kashmir, and has already done some work on the anatomy and histology of some of the pipistrelles. He is a new subscriber to BRN.

Some excerpts from an article by I. L. RAUTENBACH, Curator of Mammals at the Transvaal Museum, summarize bat work in South Africa: "Since bat banding was first undertaken in Southern Africa, the number of banded bats has grown rapidly, whereas the number of active banders has unfortunately declined. To date some 31,000 bats have been ringed, thanks mainly to recently introduced improvements in technique. Approximately 2,500 bats have been recaptured, revealing some interesting facts of the life history of the more common species. ...."Bat migration has been studied intensively in the Transvaal. Miniopterus banded in caves near Pretoria during hibernation, migrate north during early summer, covering a distance of about 160 miles. Young are born in these summer quarters and during a recent summer visit to bat caves in the Potgietersrus district, a calculated half-a-million active bats were seen in a single cave. The longest distance covered by a bat, according to our records, is about 400 miles. This animal was caught in Kimberly, banded and released in Pretoria, and was soon afterwards recaptured in Kimberly."

In response to the request that those professors willing to take on graduate students in various phases of bat work make their willingness known, the following: LARRY N. BROWN is willing to take on students for M.A. & Ph.D., his general areas of interest being population ecology, behavior, and reproduction of bats. RICHARD K. LAVAL is interested in graduate students in systematics, ecology, and behavior, with his special interest being Neotropical Nyotis, although he would welcome studies on other Neotropical bats (or even domestic species, he adds). PHILIP H. KRUTZSCH writes: "Our laboratory devotes its energies to anatomical and physiological studies of the chiroptera, and at the moment we have vacancies in our Ph.D. program. This program is in the Department of Anatomy in the medical school and is a broadly oriented experience with minor fields possible in biology, biochemistry, physiology, microbiology, anthropology, pharmacology, mathematics, and bioengineering." EUGENE STUDIER notes that New Mexico Highlands University offers a Master's in Biology, and his major bat research interest deals with environmental physiology. STEPHEN HUMPHREY is also interested in taking on students who wish to do research on bat ecology. I hope that other professors willing to take on graduate students in bat research will also make themselves known through the medium of Bat Research News. Since the up-dated subscriber list will in all probability be sent out at the same time as this issue, there is no need to give greater identification to the above names.

JOHN W. TWENTE indicates a willingness to take on graduate students in bat research, his specialty being hibernation physiology.

NIXON WILSON writes that this past winter he visited a cave in Jones Co., Iowa, which according to JAMES HEDGES has the largest numbers of bats in winter of any he has explored in Iowa. Jim suggested that Nixon send his findings to BRN as proof that Iowa caves do have bats, so here are the results:

<u>Eptesicus fuscus</u>	230
<u>Pipistrellus subflavus</u>	0
<u>Myotis lucifugus</u>	50
<u>Myotis keenii</u>	2

Nixon writes: "There were more bats present, but I ran out of bands and some bats were inaccessible. There was one clump of 188 E. fuscus. I have never seen this many E. fuscus together before and would be curious if any BRN readers have found clumps of this species in such numbers in caves."

A listing of the papers given at the Second International Bat Research Conference, held at Amsterdam, 17-22 March 1970, may be of interest. They were published as the Proceedings of the Second International Bat Research Conference in BIJDRAGEN TOT DE DIERKUNDE, 40(1). The listing:

- A. PUNT. Round table discussion on bat-conservation.
- V. HANÁK & J. GAISLER. Comments on the protection of bats in Czechoslovakia and some suggestions on the research on bat populations.
- V. AELLEN. Le baculum de Tadarida teniotis.
- S. BRAAKSMA. The distribution of bats in The Netherlands.
- S. DAAN. Photographic recording of natural activity in hibernating bats.
- B. DULIĆ & N. TVRTKOVIĆ. The distribution of bats on the Adriatic islands.
- M. EISENTRAUT. Ein kurzer Ueberblick ueber die Geschichte der Fledermausforschung.
- J. S. FINDLEY. Phenetic relationships in the genus Myotis.
- W. FIRBAS. The innervation of the bat cochlea.
- J. GAISLER. Remarks on the thermopreferendum of palearctic bats in their natural habitats.
- A. H. GREENHALL. The use of a precipitin test to determine host preferences of the vampire bats, Desmodus rotundus and Diaemus youngi.
- V. HANÁK. Notes on the distribution and systematics of Myotis mystacinus Kuhl, 1819.
- G. HELDMAIER. Variations of body temperatures and metabolism during entrance into cold lethargy in the bat Myotis myotis.
- B. KUIPERS & S. DAAN. "Internal migration" of hibernating bats: response to seasonal variation in cave microclimate.
- F. A. MUTERE. The breeding biology of equatorial vertebrates: reproduction in the insectivorous bat, Hipposideros caffer, living at 0°27'N.
- G. NEUWEILER. Neurophysiological investigations in the colliculus inferior of Rhinolophus ferrumequinum.
- U. H. NORBERG. Hovering flight of Plecotus auritus Linnaeus.
- A. FYE. The aural anatomy of bats.
- H. ROER. Zur Wasserversorgung der Microchiropteren Eptesicus zuluensis vansoni (Vespertilionidae) und Sauromys petrophilus erongensis (Molossidae) in der Namibwueste.
- U. SCHMIDT, A. H. GREENHALL & W. LOPEZ-FERMENT. Vampire bat control in Mexico.
- H. U. SCHNITZLER. Comparison of the echolocation behavior in Rhinolophus ferrumequinum and Chilonycteris rubignosa.

- L. SIGMUND & A. ZAJICOVA. Quantitative Zusammensetzung des Gehirns der Mitteleuropaeischen Fledermaeuse (Rhinolophidae und Vespertilionidae).
- J.A. SIMMONS. Distance perception by echolocation; the nature of echo signal-processing in the bat.
- R. E. STEBBINGS. A comparative study of Plecotus auritus and P. austriacus (Chiroptera, Vespertilionidae) inhabiting one roost.
- H. STEPHAN & P. PIRLOT. Volumetric comparisons of the brain structures in bats (an attempt at a phylogenetic interpretation).
- A. WATSON. Electronic aids to the identification of bats in flight and to their study under natural conditions.

The Third International Bat Research Conference is planned for National Park Plitvice, Yugoslavia, from September 5-10, 1972. For information, write Inz. Nikola Tvrtković, Croatian Society for Natural Sciences, Llica 16/111, P.O. Box 258, 41001 Zagreb, Yugoslavia. I have been wondering if there is a possibility that those of us planning to attend might get together in making a request for a grant (NSF?) for the trip. Those interested, please contact me, and we'll see what can be arranged.

On November 27 and 28, 1970, a conference entitled, "Bat Research in the Southwest" was held in Tucson, Arizona, hosted by the University of Arizona and the Arizona-Sonora Desert Museum. The meeting was organized by Roy Horst, assisted by James Findley, Eugene Studier, and Terry Vaughan. With 120 bat workers in attendance, 26 papers were given, and an abstract of the papers is available by writing Roy Horst. The titles are as follows:

- R. M. WEBSTER. Sex-related enzyme activity in the kidney of the free-tailed bat (Tadarida brasiliensis cynocephala) and the albino mouse (ICR strain).
- E. J. BRAUN. The renal anatomy of the fish-eating bat, Pizonyx vivesi.
- R. HORST & T. YOUNGKIN. Respiratory water loss in the vampire bat Desmodus rotundus.
- R. E. CARPENTER. Sodium chloride excretion in Australian bats.
- C. S. ROUK. Comparative gastro-intestinal histology of selected American bats.
- E. H. STUDIER & H. J. O'FARRELL. Seasonal temperature relationships in Myotis lucifugus and Myotis thysanodes.
- R. JENNESS, R. L. GLASS & E. H. STUDIER. The composition and properties of bats' milk.
- W. J. BLEIER & R. J. BAKER. Species distribution of a toxic protein in the seminal vesicle of bats.
- H. J. O'FARRELL & E. H. STUDIER. Growth and development in two species of bats, Myotis lucifugus and Myotis thysanodes.
- B. L. DAVIS & R. J. BAKER. Chromosomal variation in Rhogeessa.
- J. M. BURNS, R. J. BAKER & W. J. BLEIER. Hormonal control of "delayed development" in Macrotus waterhousii, I. Role of the thyroid.
- V. R. MCDANIEL, B. L. DAVIS & R. J. BAKER. Chromosomal races in Uroderma bilobatum.
- P. LEITNER & A. J. BECK. The Tadarida brasiliensis populations of California.
- A. H. HARRIS. Taxonomy of Myotis yumanensis and Myotis lucifugus in the interior southwest.
- R. DAVIS. A tentative demographic analysis of a maternity colony of pallid bats.
- D. A. EASTERLA. Status of Leptonycteris nivalis in Big Bend National Park, Texas.
- P. H. KRUTESCH. The role of the uterus in the reproductive biology of hibernating bats.

- J. S. FINDLEY. Phenetic relationships in the genus Myotis.
- D. J. HOWELL. Mutualistic adaptations of bat pollinators and their hosts.
- R. K. LAVAL. The Myotis nizzricans complex in South America.
- T. H. KUNZ. Reproductive patterns and development of Myotis velifer in Kansas.
- B. VILLA-R. A study of the stomach contents in the vampire bats Desmodus rotundus and Diphylla ecaudata.
- J. A. SIMMONS. Narrow-band and broad-band bat sonar systems.
- L. C. WATKINS. A photoelectric cell system for recording nocturnal activity of bats.
- E. MCKINLEY. Parameters relating to the onset of foraging in the cave bat Myotis velifer.
- G. C. MITCHELL. USAID-BSFW vampire bat control program in Latin America.

The December issue of the Newsletter of the Mammal Society of the British Isles notes that Britain is one of 12 countries where bats are not protected, using GUSTAV KIRK's 1970 Oryx paper as a source of information. The same issue of Oryx has a paper by R. E. STEBBINGS entitled, "Bats in Danger". In the Newsletter of the Mammal Society of the British Isles, same issue, Stebbings asks for information on bats. The questions are short enough to reproduce here as a possible example to be followed in the U.S. They are as follows:

1. What roosts are known to you and for how long (what species, where is the roost, numbers present).
2. Have any of these roosts been threatened in any way? If so, how and what was the result?
3. What methods do you think could feasibly be used to protect the roosts (e.g., fitting grilles over cave entrances, moving offensive colonies elsewhere, obtaining tree conservation orders).
4. Have the numbers of bats in colonies known to you increased or declined?
5. Have you ever seen dead bats anywhere? If so, how many, when and where? Do you know the cause of death?

GUSTAV KIRK is editor of Saeugetierschutz, a journal published by the Europaeische Gesellschaft fuer Saeugetierschutz. The first edition has six papers of interest to bat workers; full citations are as follows:

- ALMEIDA, F. F. de. 1970. Der Schutz der heimischen Tierarten. Saeugetierschutz (Hohenbuechen), 1: 37-38. in German
- CURRY-LINDAHL, K. 1970. Conservation of mammals in Sweden. Saeugetierschutz (Hohenbuechen), 1: 39-41.
- KIRK, G. 1970. Einige Probleme des Saeugetierschutzes in Europa. Saeugetierschutz (Hohenbuechen), 1: 13-14. in German
- KRZANOWSKI, A. 1970. The protection of bats. Saeugetierschutz (Hohenbuechen), 1: 23-25.
- KURSKOW, A. 1970. Erfahrungen mit kuenstlichen Fledermausquartieren in der Sowjetunion. Saeugetierschutz (Hohenbuechen), 1: 21-22. in German
- ROER, H. 1970. Massnahmen zur Erhaltung und Hebung des Fledermausbestandes. Saeugetierschutz (Hohenbuechen), 1: 27-32. in German

CLYDE M. SENGER is interested in working with students on master's degree at Western Washington State College, with interests listed as taxonomy, physiology, survival, and movement. He is actively working on the biology of Plecotus townsendi. His sabbatical leave presented him with the worst winter in the seven years he has been there, and snow tunnels were necessary when he was able to get to the caves at all. The snowshoes bit reminded me of the "good old days" of banding in northern New York State.

The March 5 issue of Science has a good cover of a Phyllostomus hastatus head, to go with JAMES SIMMONS' paper in that issue. Excellent photography!

The American Scientist paper by ALVIN NOVICK has color plates of bats by ROGER BARBOUR. They are of the quality one finds in Endeavour, but seldom in publications financed by scientific societies.

My thanks to HARLAN WALLEY and WAYNE DAVIS for keeping up the supply of citations of papers I might overlook. I hereby solicit reprints and even Xerox copies of recent papers of subscribers; this will enable me to get them listed faster and more efficiently than through my usual literature search. There may be duplication of listings in the literature section of BRN, as I find that a great deal of time is spent in just checking citations with my files of those already cited in BRN.

#### N O T E S

#### LONGEVITY RECORD FOR PIPISTRELLUS SUBFLAVUS

by Harlan D. Walley and William L. Jarvis, Department of Biology, Northern Illinois University, DeKalb, Illinois 60115.

Abstract: Recorded longevity for Pipistrellus subflavus is extended from 11.2 years to 14.8 years. Ageing by tooth wear appears unreliable for this species.

The longevity of American bats has recently been reviewed by Paradiso and Greenhall (1967) from data compiled from U.S. Fish & Wildlife Service banding returns. Fourteen species, representing six genera, are cited. The oldest presently known longevity record for a North American bat is that of a Myotis lucifugus recovered 24 years after banding (Griffin and Hitchcock, 1965), while Hall, et al. (1957) has recorded 18.5 years for Myotis keenii. Paradiso and Greenhall (1967) record ages of 19 years for Eptesicus fuscus and 16.5 years for Plecotus townsendii.

On 14 February 1971 and again on 25 February 1971, while recording recoveries of Pipistrellus subflavus in South Blackball Mine, 1.75 miles west of Utica, LaSalle County, Illinois, a male P. subflavus was found carrying the U.S. Fish & Wildlife Service band number 57-04984, which was banded on 16 February 1957 at South Blackball Mine by Wayne H. Davis. This would indicate a minimum age of 14.8 years for this bat, since the young of this species are born in June or early July. Paradiso and Greenhall (1967) gave 11.2 years as the greatest recorded age for P. subflavus, while Davis (1966), using multiple regression analysis, showed that P. subflavus could live up to 13 years.

It is interesting to note that some species having exceedingly long life spans (e.g., M. lucifugus, M. keenii, Plecotus townsendii) bear only one young. Pipistrellus subflavus, which is smaller than these species, has two young, and possibly this could be a factor in its shorter life span.

In examining the canine teeth of the above specimen, only slight wear was found, comparable to what Twente (1955) described for five year old bats. Hall, et al. (1957) have shown that tooth wear in M. lucifugus and M. keenii, as used by Twente (1955) and Stegeman (1956) for other species, is a highly unreliable criterion for age determination. Degree of tooth wear is apparently an unreliable criterion for age determination in P. subflavus also.

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This issue will be late due to my desire to have the subscriber list with it.



RESEARCH CANADA



## THE COVER

The cover photograph of the tree-dwelling bat, Lasiurus, was provided by Wayne Davis. The attitude of the bat appears to be typical defensive posture. Future covers on vampire bat locomotion and three-dimensional photography of bat dentition are now being planned.

Bat Research News appears quarterly: January, April, July, and October. The subscription rate is \$1.00 for 2 years. Address all correspondence to Robert L. Martin, Department of Biology, Preble Hall, University of Maine, Farmington, Maine 04938. U.S.A.

## EDITORIAL COMMENTS

The major part of this issue is the up-dated subscriber list. Since the major function of a newsletter is to provide better means of information exchange among the readers, such a list can be most useful when fully accurate. Some bat workers have not retained their subscriptions and some never have become subscribers; since the utility of BRN is limited by the absence of information on and from these workers, I have taken the liberty of adding their names with a request for information from them as to how BRN could be of more use to them. Although the number of such additions is small, I would like to see BRN reach maximum effectiveness, and it can only do this when it is available to every bat research worker. For this reason, I request those who have graduate students conducting research with bats to point out its availability (at 12.5¢ per issue, even a struggling graduate student should be able to afford it), and gift subscriptions for colleagues in foreign countries would increase its utility. The Australian Bat Research News has been, of necessity, irregular in publication, and Myotis, while of the highest quality, is much restricted in distribution. While each is more or less regional, greater informal communication is desirable throughout the world. Even if we should be fortunate enough to set up an international journal of bat research, there is still need for the informal newsletter type, open to general comments and short notes, and it would be good to have BRN, ABRN, and Myotis all available in libraries and research laboratories. Since libraries usually are dependent upon subscription services to handle their periodical orders, and these subscription services require a profit in order to operate, I am constantly being besieged to provide special discounts for their services; at the low price of BRN, with the same work involved for me whether or not the subscription service handles the order, I would prefer to have some subscriber give a subscription to their library or even provide me with the name and address of the library and I will provide it free. When the cost of bookkeeping outweighs the price of the subscription, this is a result, and I am happy to see BRN in libraries. With the above comments in mind, I have two requests to make of subscribers:

1. Please check your name and address on the listing in this issue. If it is incorrect or incomplete in any way, let me know immediately. If you wish titles, as Dr., Prof., etc. added or deleted, let me know. I will make up-to-date changes in each issue of BRN.
2. With the increase, actual and potential, in foreign coverage, I would like to acquire the services of an editor for Spanish and German editions at this time. The work would involve translating the main body of BRN into the appropriate language, and the printing, mailing, etc. would still be up to me. Your suggestions, offers of help, and such are solicited. Gift subscriptions to colleagues in foreign countries can be helpful, too, as a reiteration of my comments above.

## HERE AND THERE

PHILIP J. SPEAR, Research Director of the National Pest Control Association, The Buettner Building, 250 West Jersey Street, Elizabeth, New Jersey 07207, notes that a number of so-called ultrasonic devices are being sold with claims for providing repellent action against bats, and would like to know what evidence there is from research or practical experience that such devices have a useful role in repelling bats from structures. Since this would be a far better method than extermination, which leaves the habitat unoccupied and still favorable for bat use when entrances are not sealed up, such sealing being a major problem in itself in large storage buildings, more information is desirable. Those having information on this subject are requested to write Dr. Spear, with a copy to me for note in ENR. The only paper on the subject known to me is that of HILL, E. P. III. 1970. Bat control with high frequency sound. Pest Control Mag., 38(9): 18.

HANS NEUHAUSER has found Myotis leibii in the Great Smoky Mountains National Park.

CARLOS MARTINEZ is working on the genus Syconycteris as a Ph.D. student under WILLIAM LIDICKER at the MVZ, Berkeley.

SIGURD SZERLIP writes: "For the past eight years I have been exploring caves, mostly in New Mexico, and I have taken notes on some of the bats I have encountered. I have also taken pictures of several species. I was interested in one population of about 10,000 Plecotus townsendii which were living in Dry Cave, Eddy County, New Mexico, until the installation of a cave gate by BLM. After the installation the bats had a hard time getting in and out and the population dropped drastically. It is gradually being repopulated; however, many bats have moved to other nearby caves which did not get gated." He will be working on his Ph.D. in entomology at Berkeley.

B. V. PETERSON of the Diptera Section, Entomology Research Institute, Central Experimental Farm, Ottawa, Ontario, Canada, is involved in taxonomic studies of the ectoparasitic bat flies of the families Nycteribiidae and Streblidae and would like to keep reasonably up to date on bat work in general. Gifts of specimens of these bat fly families for use in revisionary studies would be greatly appreciated.

STUART ELLINS has completed a Masters' thesis entitled, "A visual discrimination by the echolocating bat, Myotis lucifugus"; an abstract of this has been published in Amer. Zool., 10: 474, under the same title. He has recently completed a dissertation entitled, "Brightness discrimination thresholds in the bat, Eptesicus fuscus" and would be happy to furnish abstracts of either paper to anyone who might be interested.

ARTHUR HARRIS writes: "We have at least seven species of fossil bat from the more recent (prob. 12-15 thousand years old) deposits. A couple of the Myotis probably are linear descendents of the species described by Choate and Hall in 1957, but a lot more work is necessary before I can say much definitely. My main trouble is an over-abundance of remains. As a very rough estimate, there are probably over 10,000 bat elements in the material already excavated, with the National Geographic Society and the University of Texas at El Paso supporting another four weeks in the field next summer. Needless to say, the curatorial problems are great." A later note adds that the four weeks were extremely successful, too.

On the following listing of bat research workers, an asterisk is placed to the left of the names of those who have bands in active use, according to the list provided me by CLYDE JONES of the Bat Banding Office of the Bird & Mammal Laboratories of the USFWS. My thanks to him and BARBARA HARVEY for providing me with useful information.

For ease in mailing use, I have broken down the list into U.S.A., library coverage in U.S.A., and then foreign listings.

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#### NOTE HERE AND THERE

The British Museum (Natural History) has just issued in late April "Bats  
of Ethiopia collected by the Great Abbad Expedition, 1968" by J. E. Hill  
and J. Morris, as Bull. Zool., 21(2): 25-49. It is for sale at 1 pound 15,  
or about \$4.50 U.S.A. Readers in the U.S.A. may not be aware that they can  
obtain such items through the Sales Section, British Information Services,  
845 3rd Avenue, New York, New York 10022.

"The Second Annual Symposium of Bat Research", successor to the Tucson meet-  
ing of 1970, will be held at Albuquerque, New Mexico, on November 26-27,  
1971.

CLYDE JONES has sent out a questionnaire on the current status of U.S. bat  
populations. The information should be exceptionally useful if those who  
got the forms fill them in fully.





## THE COVER

The cover photograph is provided through the courtesy of the Division of Photography, Field Museum of Natural History, and is Figure 1 of the paper by ANTHONY F. DEBLASE, "Pairing of Myotis blythi in west-central Iran." Shown is a roosting pair of Myotis blythi in Gara Tarik, a cave about 20 miles north of Divandarreh, Kurdistan Province, Iran. This is one of many torpid pairs seen hanging in the cave. In all cases the pair included one male and one female, with the male positioned with his ventrum to the female's dorsum. All such pairs were in torpor and no copulation was observed.

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## HERE AND THERE

The up-dated subscriber list for Bat Research News has already been put to good use, ROBERT HENSHAW of Pennsylvania State University called me for such a list and it was thus used as the basis for the call for papers for the AAAS meeting in Philadelphia for December 1971. CHARLES MOHR was kind enough to send a tentative program, abstracted here:

"Bats and man: distributions and habitats" by Robert Henshaw

A paper on bat ecology by Roy Horst

"Clustering behavior and ambient temperature as factors in core, wing, and ear temperatures in Myotis sodalis" by Scott Keefer.

A paper on ecological physiology and survival potential by William Wimsatt

A paper on behavior, learning, and adaptability by Edwin Gould

"The status of threatened species of cave dwelling bats" by Charles Mohr

Discussion, evolution, ecosystems, etc. by Tom Poulson

A panel discussion on "Adaptability of bats, past and future"

"Man and bats: responsibilities of biologists, speleologists, spelunkers, and laymen" by Robert Henshaw.

I assume that the number of papers is low due to the more limited scope of coverage (stressing the "cave" aspects) and the proximity to the Albuquerque bat research meeting in November. I presume that the abstracts will be in the National Speleological Society Bulletin.

By sending the last three issues of Bat Research News out first class, few copies of those issues have been lost, although I replaced a number on being notified of their absence. The following former subscribers are listed now as "unknown at address given", so if you know of them and think they may still be interested in ERN, let them know they're among the missing persons: David Bridge; Cusumano (requested ERN but never paid); James Heltsley; William Mahan; Larry Turner (who has bands in use under his name, so Bat Banding Office could use his new address). Joe Held is not working with bats any more, and John New

has other non-bat duties.

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Charles V. Trimarchi, Senior Bacteriologist, Veterinary Science Laboratories, State of New York Department of Health, New Scotland Avenue, Albany, New York 12201 (currently investigating pathogenicity of rabies in insectivorous bats, maintaining a small colony of Eptesicus fuscus)  
 George Schaeffer III, 112 Cortelyou Avenue, Montrose Manor, Reading, Pennsylvania 19607 (former student of John Hall now in U.S. Navy)  
 Birger Jensen, Game Biology Station, Kalø, Rønne, Denmark (management scientist at the station)  
 James Wm. Neacham, 2327 2nd Avenue - #2, Pueblo, Colorado 81003 (geology/biology major at Southern Colorado State College)  
 Edwin J. Spicka, 2207 Cleveland Boulevard, Granite City, Illinois 62040  
 Michel Anciaux de Faveaux, Résidence Osborne, Rue des Capucins 35, B-8400 Ostende, Belgium (probably well known to many of you through his bat work, his letter head is worth noting here:



Paul Bradshaw, 1608 Old Stage Road, Alexandria, Virginia 22308  
 Dr. Roger E. Carpenter, Department of Zoology, San Diego State College, San Diego, California 92115  
 Earl McKinley, Department of Natural Science, Castleton State College, Castleton, Vermont 05735  
 Dean R. Abbott, 1322 East 6th Avenue - Apartment 12, Flagstaff, Arizona 86001 (graduate research at Northern Arizona University)  
 Dr. George R. Mount, Department of Psychology, East Central State College, Ada, Oklahoma 74820 (interested in operant conditioning in bats)  
 Steven Zirl, 504 Haven Lane, Clarks Summit, Pennsylvania 18411  
 John and Lynda Leffler, Department of Zoology, University of Georgia, Athens, Georgia 30601 (graduate students at U. Georgia, former students of John Hall)  
 Linzer Tortazo, 735 26th Avenue, San Mateo, California 94403  
 Mark R. Mowatt, Wildlife Resources, 240 Forest Resources Building, University of Maine, Orono, Maine 04473  
 Donald Chorzempa, P.O. Box 713, Newhall, California 91321  
 David W. Belitsky, 406 East Winthrop Avenue, Warrington, Florida 32507  
 Dr. Hans-Ulrich Schnitzler, Arbeitsgruppe Elektrophysiologie, Zoophysiologisches Institut, 74 Tübingen, Köllestr. 23, West Germany  
 Dr. Alan Grinnell, Department of Zoology, University of California, Los Angeles, California 90024

Those bat research workers in this country who tried to obtain a copy of Hall and Morris' "Bats from Ethiopia collected by the Great Abbaï Expedition, 1968", a British Museum (Natural History) publication through the British Information Services as I suggested in an earlier number of BRN may have been disappointed. Although the British Information Service still lists the publications of the British Museum as available through their office in their monthly publications list, they have notified me by letter and other writers by post card that they have discontinued the distribution and sale of these, which now may be obtained through Pendragon House Inc., 899 Broadway Avenue, Redwood City, California 94063. They cancelled my order and refunded my money, but forwarded other orders. Their monthly publications listing is still blithely ignoring their change in policy, perhaps until they stop its being printed.

BRENT ROWELL, interested in bats of northeast Tennessee, is the regional editor of the Tennessee Ornithological Society's journal, The Migrant.

JIM HEDGES sent a page from Organic Gardening and Farming, November 1971 issue, with a short article entitled, "When Bats Controlled Mosquitoes", a review of the Texas bat roosts in the early part of this century.

The journal, Studies in Speleology, published by William Pengelly Cave Studies Trust Limited in England, may be obtained by contacting Dr. Antony J. Sutcliffe, Hon. Editor, c/o Department of Paleontology, British Museum (Nat. History), Cromwell Road, London SW7 5BD, England. Bat papers included in past issues are as follows: Hooper, J.H.D., Bats and the Amateur Naturalist [Vol. 1 (1), 1964]; Watson, A., Observing the Natural Behaviour of Bats in Flight [Vol. 1 (2-3), 1965]; Stebbings, R.E., Bats under Stress [Vol. 1 (4), 1966] Mutere, F.A., Bat Studies in Uganda [Vol. 2 (2), 1970]; Stebbings, R.E., Bat Protection and the Establishment of a New Cave Reserve in the Netherlands [Vol. 2 (3), 1971].

JAMES MEACHAM writes, "I discovered a population of Tadarida brasiliensis at some 8,500 ft. in the Sangre de Cristos in a mine/cave in August 1968. I estimated some 9,000 on the basis of their observed flight rate. I'm rather confident that if I'm wrong, the error is conservative. I would like to do some work there next summer." Colorado can be interesting!

J. MEESTER, writing about his change from the University of Pretoria to the University of Natal, notes: "...I will no longer be able to administer the Transvaal Museum Bat Banding Project, which will revert to the control of the Transvaal Museum. However, I will remain active in bat research, and in fact one of my students, Mr. L. R. Wingate, who is working on D.D.T. and Dieldrin residues in cave bats, will be going with me to Natal. Another of my students, Mr. M. v.d. Merwe, of this department, will remain here but I shall probably be external supervisor for his project on reproductive physiology in Miniopterus schreibersi."

NOEL M. BURKHEAD, who spent two months this last summer as a volunteer for the Division of Mammals at the National Museum of Natural History, spent one month working with a field crew collecting on the Delmarva Peninsula for the Delaware State Museum (with about 30% of the collected specimens being bats).

DON WILSON, back from Costa Rica, is now a zoologist with the Division of Mammals in the Bird and Mammal Laboratories, working with endangered species.

BRYAN GLASS writes: "the information on our recoveries of Mexican free-tailed bats is as follows: A female banded 29 June 1964 at Conner's Cave was recovered alive 12 April 1971 at Laredo Air Force Base, Laredo, Texas. One male banded 9 July 1966 recovered 2 March 1971 at Pedras Negras Airport was released at the International Bridge at Eagle Pass, Texas. One female banded 1 July 1964 at Selman's cave in Woodward County, Oklahoma, was recovered dead and dehydrated on 28 June 1971 in a grain elevator at Sterling, Kansas. I presume that this bat had not been in this situation for longer than six months. I doubt that a dead bat would have been hanging around a grain elevator for years without being discovered. A female banded 9 July 1963 at Conner's Cave in Major County, Oklahoma, was captured alive in the Seiling school house only about 15 miles from Conner's Cave on 21 March 1971 and was released the following day. There are one or two other records covering spans of approximately five years but in one case an unattached band was found and in another case the date of capture was not recorded at all and I have not included these."

I note that BRN is listed in Ulrich's International Periodicals Directory, published by the R. R. Bowker Co. of New York.

PAUL PARMALEE writes from Illinois: "I have been banding a hibernating colony of big brown bats near Galena, Illinois, for over 10 years, but the last two or three years I am simply checking for returns." He's still working on archeological and cave bone whenever possible.

STEPHEN CROSS notes that during the summer his group has mist netted and banded at several different locations in southern Oregon to get acquainted with the area and its bats, capturing nine species with 66 individuals banded.

CARLETON PHILLIPS writes that for his studies of mammalian dentitions he is in need of fresh specimens of Choeronycteris mexicana. Individuals of all ages, from neo-nates through old adults, can be used. They either can be sent live or stored in 70% alcohol, having been preserved with either 10% buffered formalin or Carnoy's.

DAVID BRUCE writes from Washington, where some of his students have joined with those of CLYDE SENGER in cave surveys of bats in southern Washington: "... I have never seen anyone comment upon a behavioral trait I noticed with Lasiurus borealis at Purdue. During my stay there we probably had a total of ten red bats come through the lab. Most we picked up from local people who called in response to an ad we placed in the newspapers asking for help in locating bat colonies. People would find the mother with young attached lying in their yards after a rain or wind storm and would call us asking for assistance in removing them from the premises. We took them to the lab where we put them in stainless steel cages, fed them mealworms and provided water. We noticed a distinct difference in the temperaments of the males and females. Male red bats, especially adults seemed very aggressive, alert, and would bite at every opportunity (editor's note: see cover photo of volume 12, no. 3 BRN). One male adult drew blood from my finger, died two days later, and forced me to submit to the 14-shot Pasteur series while its brain was examined for rabies. It wasn't rabid. Several other male red bats displayed this same tendency to bite and resist handling. The females were, by contrast, very docile, much less restless, and could be held easily in the hand. I wonder if others have noticed this difference in Lasiurus or other bats? (editor's note: I have noticed such a tendency in Eptesicus females with young as opposed to Eptesicus males and females without young, so it may be due to the modifying influence of the young, although my observations were not so distinctly clear-cut, having been soundly chewed upon by Eptesicus with and without young present.)

IVAN HORACEK writes from Czechoslovakia ~~██████~~ that he is carrying out ecological observations of bats in their transient roosts, and this summer made a collecting expedition in Bulgaria, collecting Myotis nattereri and Myotis brandti, not previously collected in Bulgaria, Myotis bechsteini, Myotis mystacinus, Myotis daubentoni, Barbastella barbastellus, and Plecotus auritus, as well as other species not commonly found there. A good collection of Myotis mystacinus and its sibling species was taken for use in systematic studies.

R. A. YOUNG, on sending some excellent photos for possible use as BRN cover material, writes: "At the present time I am working on the reproductive biology of Rhinolophus megaphyllus in S.E. Queensland. If any subscribers to BRN have any reprints of references pertaining to the biology of the Rhinolophidae and Hipposideridae which have not been listed in BRN or the Jour. of Mammalogy Supplement, I would appreciate hearing from them. Any unpublished information relating to the reproductive biology of these families would also be appreciated."

SIGURD SZERLIP corrects his earlier note to me on the Plecotus townsendi,

which he has seen in Fort Stanton Cave, Lincoln Co., New Mexico and in Torgacs Cave, New Mexico. The 10,000 bats he noted as formerly occupying Dry Cave were Myotis velifer, the number reaching that amount in 1965, but dropping off subsequently. When unusual reports, such as the large number of Plecotus reported from one cave, are sent to me, I will print them as direct quotations, as I did this one. Then the report can be checked out for usefulness by the workers interested in it.

#### SHORT NOTES

##### PAIRING OF MYOTIS BLYTHI IN WEST-CENTRAL IRAN

On the morning of 14 August 1968 I visited a cave known locally as "Cara Tarik (Dark Cave), located about 20 miles north of Divandarrah, Kurdistan Province, Iran. This cave contained the largest concentration of bats observed during six months of collecting in the Zagros Mountains of western Iran (with the 1968 W.S. and J.K. Street Expedition sponsored by the Field Museum of Natural History and the Iran Department of Game and Fish). The total number of Myotis blythi one of the three species in the cave, was estimated at 12,000. A sample of 292 M. blythi yielded 215 females and 77 males, a ratio of about 3 to 1. Most of these bats hung in clusters which carpeted large areas of the ceiling of the cave, However, numerous bats hung singly and several were observed to hang in pairs.

I examined six of the hanging pairs of M. blythi (see cover photo). Each of these pairs included one male and one female and they always hung with the male's ventrum in contact with the female's dorsum. All of the M. blythi observed appeared to be quite torpid and there was no evidence of copulation. One of these specimens, plucked from its roost and allowed to lie on my opened, gloved hand, took five minutes to become alert enough to fly away. A second specimen responded in the same way.

On 16 August, I visited a cave known locally as "Karaftu" and located several miles north of Gara Tarik. Only about 30 M. blythi were observed in this complex cave. Many of these hung singly but seven pairs of roosting bats were observed. Again each of these pairs included one bat of each sex with the male positioned dorsal to the female. These bats were also in torpor and there was no evidence of copulation.

On August 23 I visited a large cave about 15 miles northwest of Ravansar, Kurdistan Province, Iran. This cave contained approximately 5,000 M. blythi, most of which hung in large clusters. Numerous isolated pairs were observed and all such pairs examined had the sexual composition and arrangement of those described above. Most of the pairs were in torpor but a few appeared to be copulating.

On 28 August 1968, I visited a small cave about 20 miles southeast of Ilam, Ilam Province, Iran. This cave contained 14 female and 15 male M. blythi. One male hung singly. All others hung in bi-sexual pairs arranged as described above. All of these bats were in torpor and no copulation was observed.

Between 28 July and 12 August, M. blythi were collected at four other locations in Northwest Iran and on 6 and 11 September, this species was collected from two locations near Khurramabad, Lurestan Province, Iran. On these occasions bats hung singly or in large clusters, but no hanging pairs were seen.

I have found no reference to roosting or copulating behavior of M. blythi in the literature on Asian bats. From the above observations it appears that in west-central Iran this species forms pairs and copulates during mid to late August. Copulation probably occurs during the bat's normal hours of activity and many pairs remain together, in torpor, through the day.

Neuhauser (1969., p. 26, The Bats of Afghanistan, Masters Thesis, University of Georgia, 111 pages) observed that M. blythi mistnetted at the entrance to Zarmast Cave, 16 km SE of Maimana, Afghanistan, on September 13, 1965, seemed to leave the cave in twos and threes. Banding studies during the copulating period might indicate that pairing in this species is something more than completely promiscuous.

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#### CHOERONYCTERIS MEXICANA FROM TEXAS

A bat captured, photographed, and released on 11 December 1970 in a garage in the Santa Ana National Wildlife Refuge, Hidalgo County, Texas, constitutes the first record of Choeronycteris mexicana for the state. The refuge is mostly subtropical riparian forest, and numerous flowers were in bloom at the time. Photographs were compared with specimens at Texas A & M University, and with plates in Barbour and Davis (Bats of America, Univ. Press of Kentucky, Lexington, 286 pp., 1969). The identification was confirmed independently by Al Gardner (personal communication) who is quite familiar with Choeronycteris (and the similar Musonycteris from the West Coast of Mexico) from his own extensive field work in Mexico.

Elsewhere in the United States, the species is known only from the mountain canyons in the desert Southwest, primarily in southern Arizona (Barbour and Davis, op. cit.) In northeastern Mexico Choeronycteris is known from three localities in southern Tamaulipas (Alvarez, Univ. Kansas Publ. Mus. Nat. Hist., 14:363-473; 1963) and eight localities in southern Coahuila (Baker, Univ. Kansas Publ., Mus. Nat. Hist. 9:125-335, 1956, and Axtell, Southwestern Nat., 7:76, 1962). The Texas record is a range extension of about 210 miles west-northwest of a cave near Hermanos Coahuila, the nearest of the eleven localities mentioned above.

In addition to being an interesting distributional record, this occurrence was unexpected because the literature suggests that Choeronycteris is a cave bat (nearest known caves in range of the species: 150 miles west in Nuevo Leon) and a mountain bat (lowest previous capture site, 1800 feet; Texas site, less than 100 feet.) These facts suggest that the individual was a straggler, and that Choeronycteris is not normally resident in the lowlands of southern Texas.

Copies of the photographs (35mm color slides) have been deposited in the Texas Cooperative Wildlife Collection, Texas A & M University, College Station, Texas.

Richard K. LaVal, Museum of Natural History, University of Kansas, Lawrence, and Wayne A. Shifflett, Bureau of Sports Fisheries and Wildlife, Santa Ana National Wildlife Refuge, Alamo, Texas.

## A RANGE EXTENSION OF RAFINESQUE'S BIG-EARED BAT IN KENTUCKY

The range of Rafinesque's big-eared bat, Plecotus rafinesquii (Lesson), in the Commonwealth of Kentucky is not totally known or fully understood. Hall and Kelson (The Mammals of North America, 1959, p. 200) gives the range of P. rafinesquii as occurring throughout the entire state. More recently, however, Barbour and Davis (Bats of America, 1969, p. 179) state that apparently an isolated population occurs in the eastern mountains and is separated geographically from the main portion of the population in the western part of Kentucky.

On 6 March 1971, a colony of approximately 50 P. rafinesquii was found in Sloan's Valley Cave, Pulaski County, Kentucky. On 8 March 1971, two students at Somerset Community College found a specimen of P. rafinesquii in a cave 1/4 mile east of Ruth, Pulaski County, Kentucky. Again on 30 August 1971, a colony of about 100 P. rafinesquii was found. This colony was seen in a vacant house 2 miles WSW of Ingle, Pulaski County, Kentucky. The house was well shaded with oak and maple trees and according to the owner, had been unoccupied for over five years.

The finding of these bats narrows the geographical distance which separates the western population and its isolated eastern segment. These records are the first for P. rafinesquii from south-central Kentucky.

Drs. Roger Barbour and Wayne Davis made positive identification of the specimens collected from the above sites.

David J. Fassler, Somerset Community College, University of Kentucky, Somerset, Kentucky, 42501.

HEMATOCRIT OF MYOTIS LUCIFUGUS DURING HIBERNATION AND FORCED IMMOBILITY

## SUMMARY

Hematocrits of natural winter hibernating and summer active bats as well as of winter and summer animals which had been kept for a chronic period in a free-flight chamber or confining cages were determined in this study. The trend observed was: increased hematocrit during successive stages of hibernation, with a return to lower levels in summer bats. Restricted bats in both seasons had distinctly higher hematocrits than free-flight bats. Results are briefly discussed as they relate to the physiology of hibernation and to the literature.

There is controversy concerning the hematocrit of hibernating mammals. Eliassen (1961) recorded a decrease in both red cell number and hematocrit in pre-hibernating hedgehogs, whereas Hock (1964) observed an increase in hematocrit in hibernating Arctic ground squirrels and Lyman (1961) an increase in blood viscosity at low body temperatures in thirteen-lined ground squirrels.

In the present investigation little brown bats were captured from winter hibernacula at three periods of the hibernating season (early-Nov., deep-Feb., late-Apr.), and summer bats were likewise obtained from an attic colony in June. These were immediately sacrificed by decapitation and their hematocrits determined utilizing microhematocrit capillary tubes (Guest and Siler, 1934) and a microcapillary reader (McGovern et al., 1955). In addition, winter bats were divided



into two groups and placed into a warm (35°C. room to prevent them from hibernating. One group was allowed to fly freely (450 ft.<sup>3</sup> of flying space), whereas the other was severely restricted in movement by placing each bat in a small compartment (100 in.<sup>3</sup> of space). Summer bats were divided into like groups and treated identically. All bats were fed larval mealworms (*Tenebrio molitor*) daily and were provided with water ad libitum. A complete description of experimental conditions is found elsewhere (Bruce and Wiebers, 1970). After a chronic period, the winter and summer free-flight and restricted bats were sacrificed and their hematocrits determined as for bats taken directly from their natural environments. Table 1 presents hematocrit data from the various groups.

Hematocrit changes follow this trend: (1) progressive increase at successive periods of hibernation, and a return to lower packed-cell volume in summer bats; distinctly higher hematocrits in restricted laboratory bats than in free-flight chamber animals. The latter observation is made in both summer and winter laboratory bats, the difference being statistically significant by student's t-test ( $\alpha = 0.01$ ) in the summer free-flight versus restricted bats (Table 1).

Although statistical significance is not demonstrated for some of these data, the trends observed may be of physiologic importance. They cause one to question the implied relationship between increased hematocrits and hibernation per se., as reported in some papers. Instead, there may be an unknown factor operating in an animal restricted in movement - either enforced immobility, as in a portion of this study, or natural immobility, as in the torpor of hibernation - which precipitates the rise in hemo-concentration.

TABLE I. Hematocrits of Little Brown Bats

	<u>N</u>	<u>X</u>	<u>S.D.</u>	<u>Range</u>	<u>t-value</u>
Early Hibernation	12	53.7	4.84	45.4-62.5	0.989
Deep Hibernation	10	56.0	6.09	45.4-67.0	
Late Hibernation	10	57.7	4.19	50.5-65.8	
Summer	10	54.8	4.68	46.5-62.3	
Winter Free-Flight	10	55.6	3.76	50.4-60.5	1.245
Winter Restricted	10	58.1	5.12	52.2-67.0	
Summer Free-Flight	10	56.5	3.57	50.0-61.0	4.325*
Summer Restricted	10	64.8	4.91	57.5-73.0	

\*Significant at the .01 level:  $t_{0.01} (18) = 2.878$ .

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