



FEET OF MYOTIS LUCIFUGUS (LEFT) AND M. SODALIS

BAT RESEARCH NEWS

Volume 6: Numbers 1–4

1965

Original Issues Compiled by Dr. Wayne H. Davis, Editor, of *Bat Research News*

Copyright *Bat Research News*. All rights reserved. This material is protected by copyright and may not be reproduced, transmitted, posted on a Web site or a listserve, or disseminated in any form or by any means without prior written permission from the Publisher. The article is for individual use only.

Bat Research News is ISSN # 0005-6227.

BAT RESEARCH NEWS

Table of Contents for Volume 6, 1965

Volume 6: Number 1, January 1965

| | |
|--|---|
| The Cover Story | 1 |
| News from Here and There | 2 |
| Preparation of Blood-engorged Mosquitoes | 4 |
| Bats Banded at University of Kentucky in 1963 | 4 |
| Correspondence | 4 |
| Summary of Outbreak of Bat Rabies in Mississippi | 8 |
| New Bat Research at Kentucky | 8 |
| Literature | 9 |

Volume 6: Number 2, April 1965

| | |
|----------------------------------|----|
| The Cover | 11 |
| News from Here and There | 11 |
| Bat Banding during 1964 | 12 |
| Tips on Techniques | 13 |
| Endangered Species of Bats | 14 |
| Insecticides in Bats | 15 |
| Correspondence | 15 |
| Literature | 21 |

BAT RESEARCH NEWS

Table of Contents for Volume 6, 1965 (cont.)

Volume 6: Number 3, July 1965

| | |
|--|----|
| The Cover | 23 |
| Photographing North American Bats | 23 |
| More on Rabies | 23 |
| Cavers Rabies Risk Is Greater by Robert J. Hosley | 24 |
| Correspondence | 25 |
| Here and There | 27 |
| Literature | 27 |

Volume 6: Number 4, October 1965

| | |
|--|----|
| The Cover | 29 |
| Here and There | 29 |
| Shipping Live Bats | 29 |
| Netting Bats in Florida | 30 |
| Fly-by Night | 31 |
| Banding Awards | 32 |
| Notes on Bats in Virginia by John R. Holsinger | 32 |
| Ideas on Useful Introductions of Bats as Insect Destroyers by Adam Krzanowski | 33 |
| Rabies | 34 |
| Bats Dying in Missouri Caves | 36 |
| British Bat Bands | 36 |
| Correspondence | 36 |
| Literature | 39 |

THE COVER STORY

The keeled calcar and the length of the hair on the toes are characteristics useful in separating Myotis lucifugus and Myotis sodalis in the field. Although the latter characteristic is one that we use for field hands who are not thoroughly familiar

with the two species, we find we have difficulty in explaining it. Often I have had a student ask if this bat was not M. lucifugus, and when I would say that it was sodalis he would say "---but it has hair on its toes." This photograph by Roger W. Barbour points out the difference better than could many words. Like any characteristic of any living thing, these show variation. Some keels are larger than others on sodalis. On some individuals they are almost non-existent. John Hall even found a Myotis lucifugus once which had a keel. As to hair on the toes, some M. l. are really shaggy. We have one photograph in which the difference is very striking. However, we chose to use this picture which shows differences to look for when they are not so striking. This is the type of photograph that we will use in our book on the Bats of North America which will appear in about a year and a half. We plan to use whatever photographs are needed to allow a reader who is not familiar with bats to identify any normal adult bat found in the U. S. Although we will have photographs of three views of the skull, we hope that a person will be able to identify the bats without reference to the skull. For each species there will be a color plate of the whole animal and a close-up profile plus anything distinguishing from our file of pictures of ears, feet, wings, tails, etc.

There are 38 species of bats in the U. S. We plan to get as many as possible photographed at Lexington this year, and then spend summer after next in the field picking up the rest. We have the Kentucky bats done and have been trying to get some of the rest. Ed. Sulkin and Stanley Taylor sent us T. brasiliensis. We are now trying to get everything else. Could I interest anybody in sending us some live bats? We would be glad to send you shipping containers, pay the cost of shipment and give you local mammal specimens in exchange.

I have been asked how we get the fine color photos of the bats. Everyone knows that bats are very poor about posing for a photo when they are active. It goes something like this. First, Roger Barbour is the finest photographer I have ever known, and this is an important factor. If possible we get three bats for subjects instead of one. A bat gets tired and nasty after a few minutes of our trying to get him to pose, and a rest in the cage helps. Also bats have individual personalities and, while one may give us fits, the next may be cooperative. When we set up to get a color picture we spend a whole day and about two rolls of color film. The secret to getting anything is patience. We really spend the time on it. Then next day Barbour develops the films while I try to feed the bats and get them used to being handled. Then we examine the films and if not completely satisfied we spend another day with the camera. If we are still not pleased we try to get one of our bats adapted to captivity, and then take some more of the tame one. After we are fully satisfied we chloroform a bat and take a couple of rolls of black and whites of various features. For each species we end up with a dozen or so fine photos over which we spend a pleasant hour or

Bat Research News appears quarterly: January, April, July and October. Subscription rate is \$1.00 for 2 years. All back issues (Vol. 1-5) \$2.00. Single copy \$.25. Wayne H. Davis, Dept. of Zoology, University of Kentucky, Lexington, Kentucky, U. S. A.

so deciding which one to publish.

I have completed a first draft of a distribution map for each species and will be glad to send copies to anyone who would like to see them and might be willing to offer constructive criticism. I am trying to avoid showing a bat as occurring in any large area from which no specimens are known, and am planning to check personally all specimen records that I consider doubtful. For instance my tentative map for M. lucifugus does not show it occurring in much of Kansas or Nebraska. I will not show it in New Mexico on the basis of the skull only listed by Miller and Allen as their own questionable identification. If they were not very sure of it I doubt if anyone else would be. I do not show the species as occurring in the coastal areas of the Carolinas. I doubt if it occurs there, but will reserve judgment until I examine these alcoholics and compare them to alcoholic M. austroriparius. My distribution maps look quite different from any that have ever been published before. I would be glad to have you look at them and give your opinion as to their accuracy in your state or region. By the way could someone tell me why Davis, Herreid and Short show T. brasiliensis extending up across central Oregon? Perhaps I have missed a paper on this. I would not be surprised if Monroe Holmes and his colleagues were finding them up there, but if they have been I am unaware of it.

NEWS FROM HERE AND THERE

Very little news has come in this time, so most of this issue will have to be about goings on at Kentucky. If you will send me a summary of the bat banding you have done during 1964 I would be glad to run it in the next issue. Or how about a summary of all your banding over the last several years, such as that interesting one Cockrum sent me last year.

It has become necessary to charge something for back issues. I have decided to put a photo on each issue from now on and we will need the money.

DAN SMILEY sent me a couple of clippings from the New York Times. One was about the article by Dorothy Dunning and Kenneth Roeder that appeared in Science Jan. 8 where they showed that beaming the ultrasonic noise made by a certain kind of moth at a bat when he was about to catch a mealworm caused the bat to dodge the mealworm. The mealworms were lofted into the air with a mealworm gun of course, and the bats had been trained to catch them. MRS. DUNNING was a student at Middlebury College several years ago where she did some bat work with HAROLD HITCHCOCK. The other clipping was about my work with M. M. LUCKENS which appeared in Science for November 13 in which we showed that big brown bats are far more sensitive to DDT than any other mammal yet tested. Incidentally in the same issue of Science is a fascinating article about homing in birds. They took white-crowned and white-throated sparrows from a winter feeding station in San Diego, California, and shipped them to Baton Rouge, La., and Laurel, Md. In following years some returned from each place. As exciting as this is, it still isn't adequate evidence to prove to me that there is any such thing as homing instinct. Because these birds had a whole year to wander around and no one knows where they were during that time. No experiment has yet demonstrated adequately that any animal can find its way home without either a great deal of wandering or previous familiarity with the territory. I don't doubt that the sparrows had never been to Maryland, but I wonder how they found their way home and we have no answer. I decided that it is time

someone set up an experiment to get some data on this, so I wrote to Cockrum and Glass suggesting that some homing work be done with Tadarida. In colonies where several million of these bats occur I thought perhaps 10,000 could be spared for a homing experiment. I suggested that that many be shipped alive to Lexington soon after they return to their summer homes from their winter residences in Mexico. With that many banded and turned loose so far from home (I think it would be a reasonable assumption that Arizona Tadarida had never been in Kentucky) we should get at least 100 recoveries. I would expect that would get back home, but that the pattern of recoveries plotted on a map would show whether they were wandering or knew where they were going. Cockrum replied that he and Russ Davis got the same idea at the same time and are definitely interested in such a project. They were thinking in terms of carting them to Georgia in a refrigerated truck. A question that occurred to Cockrum and which we discussed over the phone the other day was what the local people would think of having 10,000 lost bats, some of which were rabid, wandering around.

I have heard rumors to the effect that the Journal of Mammalogy has folded up and died. I do not think this is so. I expect that this thought arose because the November, 1964, issue is not yet out, but I know that the new editor, Dr. M. Raymond Lee, is hard at work getting this year's volume underway.

LUTHER FREDERICKSON is having his troubles in Tennessee. They are plagued with a very bad outbreak of rabies in foxes. I called him the other day to talk about bats and rabies. I had heard that the State was considering an anti-bat campaign. Dr. Frederickson said that this is not so.

RICHARD K. LAVAL (box 16211, LSU, Baton Rouge, La.) is a new subscriber. He is interested in Tadarida in Louisiana. He has a report of a large colony nearby. He plans to investigate it any check for others this spring and do some banding.

DON SMITH says bat work is slow because of teaching duties, but that a big Craigmont mine expedition was planned for December.

HAROLD HITCHCOCK says he just got his rabies booster shot and when the deer season is over will start poking into caves again.

ALFRED E. PERRY writes that the Oklahoma State bat workers banded another 20,000 neonatal Tadarida b. mexicana in the caves in western Oklahoma this past summer and have already been receiving a few recoveries. He says they are using no. 2 bands and seem to be having little trouble with band injury and the return situation is greatly improved.

Now that volume 5 of this newsletter has been completed I have been thinking that there is a need for a cumulative index. Many people keep them all, and if they want to look something up it is hopeless. I have found this out several times myself. However, it would be a big job which I do not want to perform. If someone would like to do it, I would run off the stencils and mail it out. Two readers have asked for larger margins so that they can bind their issues. So it is done.

Last fall ED SULKIN asked me to help him get evidence that mosquitos feed on bats. He needs this in his encephalitis work. Although he expects to find that mosquitos do feed on bats, there is no evidence for it, and someone has raised that question in criticism of one of his theories. Therefore there is need for data. So far we have been unable to find engorged mosquitos in the caves, so I am mentioning the problem here in hopes that some reader knows

of caves inhabited by both bats and mosquitos, and would be willing to check into the problem. Dr. Sulkin sent me the following information:

PREPARATION OF BLOOD-ENGORGED MOSQUITOES

The following procedure is to be followed for the preparation of blood meal smears from engorged mosquitoes so that the blood meal can later be identified. The collection of blood meals should be done with scrupulous attention to prevent the contamination of one blood meal with another.

1. Engorged mosquitoes may be killed in either chloroform tube or ether tube, or the mosquitoes may be placed directly in a freezing compartment for temporary storage before the next step.

2. The dead intact mosquito is removed and placed on a piece of filter paper of good quality on the site where it is intended to make a smear. The abdomen is separated from the thorax with a pair of needles. Caution should be taken not to damage the remaining carcass, which should be saved for species identification and kept with the blood smear.

3. The abdomen contents are squeezed onto the filter paper with a pair of needles. The smear should be allowed to dry thoroughly. With freshly fed mosquitoes there is not difficulty obtaining a good smear on filter paper, but with poorly fed ones it may be necessary to squeeze out all the stomach contents with a needle.

To avoid carrying over small amounts of serum from one smear to another, it is most important that needles and other instruments used for the dissection be cleaned in normal saline before reuse.

4. Filter paper with blood spot and the remaining carcass of mosquito are kept in a test tube. The tube is frozen until processing or mailing.

RECORDS: A useful way is to divide the filter paper into several pieces, each bearing a number. The following details are set out on key sheets carrying the same number.

- A. Locality: State, County, name of cave, etc,
- B. Description of locality
- C. Date and hour of collection
- D. Name of collector

BATS Banded AT UNIVERSITY OF KENTUCKY IN 1963

We did little bat banding this year and that mainly during August swarming season in the Mammoth Cave area.

| | | | |
|------------------------|------|----------------------|------|
| Myotis lucifugus | 1798 | | |
| Myotis sodalis | 3711 | Lasiurus borealis | 65 |
| Myotis keenii | 4 | Nycticeius humeralis | 1 |
| Myotis subulatus | 3 | Plecotus townsendii | 780 |
| Myotis grisescens | 84 | Plecotus rafinesquii | 8 |
| Eptesicus fuscus | 190 | | |
| Pipistrellus subflavus | 971 | Total | 7615 |

CORRESPONDENCE

KRAKOW, POLAND. In the last issue Mr. R. C. Stones asks about papers on growth rates. Such papers are not rare. The newest one I know of is: Relatives Wachstum und intraspezifische Allometrie der Grossmaus-ohr (*Myotis myotis* Borkh.) Acta Universitatis Carolinae, Biologica, Praha, vol. 1964 pp 235-303, 1964 The authors address is: Sigmund,

Leo, Katedra systematicke zoologie UK
 Vinična 7
 Praha II, Czechoslovakia

Please pass my hearty greetings to Mr. Stones; I remember him from the American Society of Mammalogists meeting in 1961. Adam Krzanowski.

NOTTINGHAM ENGLAND (Hugh Stewart Hall, Nottingham University). I was interested to read the reply in this issue on the use of celluloid rings, and have since tried them. I was able to purchase a quantity from The Greenrigg Works, Woodford Green, Essex. They have a variety of colors and also striped rings. There is no doubt that they are easier to apply, and I shall be interested to see how long they will last. - I have obtained permission to carry out a project on bat movement at a location within a convenient distance about the University. We are also hoping to build or borrow a bat detector and carry out a series of recordings on bats of known character, preferably under natural conditions. If you have access to any publications that deal with construction of bat detectors and modifications produced, and their use in identification of bats in the field I would be very pleased to know of them. Duncan Harrington. *Ed. note- So far as I know the only bat detectors are built by the workers at the Electrical Engineering Dept. of M. I. T. I do not know that anything has been published on them.

SACKVILLE; N. B. From the 9 years of banding that we have carried on at the mine in Dorchester we should be able to provide some supplementary evidence on survival of M. lucifugus and M. keenii in this area. Unfortunately the mine is now too dangerous to go into, and we shall have to end our banding. This means that my proposal to carry out a summer survey will be somewhat pointless and probably indicates the end of banding at this university. I will try to get some publication done on the data we have at hand as soon as possible. W. B. Stallworthy.

SANDWICH, ILLINOIS. How is your flashlight technology developing? I am anxious to get some of these miniature devices for my studies on Eptesicus. Would appreciate information regarding cost of making this equipment and supply houses from which materials could be obtained. - The new color bands would be ideal for tracing winter movements within the mines at Utica. I plan to buy some. - Have located two different mines in LaSalle and will visit these this weekend. Both were located by contacting individuals who had reported recoveries to the Fish & Wildlife Service. Also located two more Eptesicus colonies in the Peoria area. - We talked about summer distribution of lucifugus from the Utica colonies when you were in Sandwich, and we both agreed on a southward movement, especially in the central part of the state. Neither of us had recoveries from the northwestern part of the state. In August Mr. Gerald Storm of the Ill. Natural History Survey reported one of my lucifugus from a farm about 12 miles N Mt. Carroll, Jo Daviess County, Ill. I am certain far more extensive work in this area would turn up additional summer recoveries. Are there any active banders in the Dubuque, Iowa, area? *(later letter)* I received bulbs and batteries and got a catalogue from Pinlites, Inc., today and will write Aristo-Craft tonight about bulbs. Dr. William Southern, Northern Illinois University, has a large supply of bulbs and batteries I can experiment with. - Bob Satterfield was up last weekend, and we banded about 1000 M. lucifugus and Eptesicus. I have not located the sodalis yet this year, but will continue looking. *(later

letter)*. An electrical engineer, Dr. Otis Ivie, a pioneer in the radio crystal (radio telemetry) field, is a very close friend of mine. I called him and explained our problems with the three volt system, and he is almost certain we can iron out this problem with little difficulty. He has offered to start working on the problem immediately, and will charge nothing. Our only expense will be parts. Harlan Walley.

KANSAS CITY, KANSAS. Since several subscribers are interested in catching live red bats, I might mention an incident that happened to me on the Current River, Shannon Co., Mo., August 31, 1963. While setting up a net after dark I was surprised by three red bats striking the net before I could get it up. One other red bat and a M. sodalis immediately hit the net, and others seemed to be attracted to the area. It was then that I realized that 5 live red bats in a cage hanging from my car nearby had attracted them by their alarm notes (I assume). I observed several red bats land momentarily on the cage. However it didn't take long for the bats to learn where the net was and I didn't capture anymore despite their presence. If one could secure several live red bats (mine were captured earlier in a cave "bat graveyard" see Myers 1960 J. Mamm. 41: 114-117) and use them as decoys at a net, perhaps success could be increased. David Easterla.

KINGSTON, ONTARIO (60 Clergy St. W.). Last Christmas I had the good fortune to accompany Dr. R. E. Beschel on a bat banding trip in the vicinity of Kingston. We visited several of the caves and mines which Dr. Hitchcock had studied. Since that time I have been doing quite a bit of bat banding in this area. I intend to go to the University of Toronto next year and work with Dr. R. L. Peterson on a problem concerning populations, movements and distribution of bats in southern Ontario. Since last Christmas I have banded over 500 bats, most of which were M. lucifugus, plus some M. keenii, M. subulatus, Pipistrellus subflavus obscurus, and Eptesicus fuscus. Several new hibernation sites have been located, mostly caves and a few mines. I continued banding in summer. All summer colonies located were M. lucifugus. Pipistrellus inhabited the caves during the summer. One interesting fact turned up last winter. The bats do not seem to spend the entire winter in one cave, but seem to move around. Evidence is negative, since I recorded only the absence of bats from a certain site after they had been banded, but I hope in the next few years to do more work along this line. M. Brock Fenton.

READING, PA. The gray bat colony in James cave was down in Fort Pit. When we were there in 1957, you and I were atanding at the top of Fort Pit. You need about 50 feet of ladder or rope. The drop is in three parts, but you can climb the first and third. - I taught mammalogy at Penn State this summer and did net Aitken Cave on 8 nights in July and August. We caught from 50 to 200 each night. This is far more than what hibernate in the cave. I hope we find some of them this winter. - I have never netted Hellhole. I have been in there 3 times during the summer, and the most bats seen roosting in the daytime was 112 little brown bats. I am continuing to band M. lucifugus and M. sodalis this winter in New Jersey, Pennsylvania and West Virginia. I am applying for a grant to track down the summer colonies of M. lucifugus that are associated with the winter colonies, and to continue studies of the population ecology of M. lucifugus for the next 3 years in this area. Regards to everyone at Kentucky. John S. Hall.

KANSAS CITY, MISSOURI. I jokingly wrote a letter to Swamp Schwab last spring following a letter written up in the correspondence section of BRN. As it turned out he did not receive his copy and through a misunderstanding he and/or Cockrum were upset. I hope the matter was cleared up with no hard feelings. It was written as a joke. - I have been having some luck collecting bats along the western edge of Missouri and found that short requests for information on caves, etc., published in the classified section of some small-town newspapers brought excellent results. Henry A. Mitchell.

JACKSON, MISSISSIPPI (State Board of Health). I have received the back issues of Bat Research News and have found them most interesting and informative, for I am new in the bat field. Enclosed is a summary of the outbreak of rabies which is occurring in Miss. You will note that only two species seem to be involved (possibly only one species, since specimens were received and discarded by the Public Health Lab without being properly identified). This summary will no doubt be of interest to some of the people you have mentioned in your newsletter, especially those working with L. borealis. You may use this information any way you desire. Anyone wishing a map or other data may have same for the asking. - My interest at present lies in determining what species are in Mississippi and how they are related to the rabies problem. - Colonies of bats which I have observed through the summer and early fall have mysteriously disappeared. There are few ideal places for hibernation in Mississippi. Research has revealed only two caves and one abandoned mine in the state I expect to go to these places in the near future to collect some specimens if any are there. - I would like very much to obtain specimens of each species which may be found in Mississippi. This collection would be used primarily to identify specimens examined by the Public Health Laboratory and then by any other interested individuals or groups who might request these specimens for lectures or exhibitions. If you have any ideas as to the most practical way to obtain at least one specimen for mounting and one skin, as well as two skulls, please advise me. *(later letter)* No one has ever done a survey of the bat population of Mississippi as to species, where they are located, and how they live. - We have experienced (August-December, 1964) 67 cases of rabies in bats. This is the first time that bats have been brought to the attention of the public. I had tried to get official sanction for a survey three years ago, but it was not approved due to lack of personnel and finances. It will take many years to obtain the information which I am seeking for the work is being done mostly on my own time, as I have opportunity, when I am in different sections of the state. I am collaborating with Dr. White, who is interested in external parasites. As I collect samples, I place them in separate plastic bags (NASCO whirl-pak, Scientific Products) which are heavy enough so that the bat cannot penetrate it with his teeth. Dr. White checks these for parasites, harvests the brains for rabies examination, and records the collection data. He is keeping the records. - We will average 10 to 20 bats a month for rabies examination in our Laboratory now that attention has been brought to the public with the recent outbreak. Prior to this it was at the rate of two to five a month. When the outbreak began, farmers and the like who knew where there were colonies, harvested 10 or so for examination; that is the reason why we ran a 20% positive (of those submitted) instead of a higher percentage. Some of the bats which were sick but not rabid are being checked for encephalitis. I have learned a great deal about bats during and since this outbreak. - One thing I have not learned is this: why

would they move their place of abode, since, it seemed to me, it was ideal for hibernation? I know of no place they could go that would be any better. We have only three caves that I can find mentioned in the literature and one silica mine. Where are the bats now? In hollow trees? If they are I cannot find them. I have a pack of beagles and am out several times each week. I look for signs in trees but cannot locate any. I may stumble onto the answer. Mississippi soil is not conducive to caves or places of hibernation such as other states may have. Highest point is 860 feet. The bats have moved from barns, highway bridges, and houses (twilight and big brown bats). In one instance this occurrence was overnight. We had a cold snap (down to 20°) two nights and then 40° the next two nights; the fifth night the bats did not return. I do not understand this. Pete A. Fussell.

SUMMARY OF OUTBREAK OF BAT RABIES IN MISSISSIPPI

August 17, 1964 was the date Mississippi became the 44th state to diagnose rabies in a bat. Since that date 66 other cases have been diagnosed by the fluorescent antibody technique in the Public Health Laboratory.

The bat which constituted the bulk of the reactors has been the red bat (Lasiurus borealis) with two cases being in the twilight bat (Nycticeius humeralis). These bats were found principally around houses in well populated areas. All were brought in by individuals for examination. Colonies which were located and sampled were negative.

It is interesting that of the specimens submitted prior to November 1, 1964, only 20% were positive for rabies. This is being pursued further, as time permits, in the light of viral testing with representative samples of those submitted that were negative for rabies.

Mississippi had a case of canine rabies in 1961 and 7 cases in 1960. No other cases in animals have resulted from the bat outbreak.

*Note added. Dec. 31, 1964. Lasiurus cinereus diagnosed. Pete Fussell.

NEW BAT RESEARCH AT KENTUCKY

M. D. Hassell is ^{studying} intracave movement of all species of bats in Carter Cave this winter and determining rate of weight loss in Myotis sodalis.

Roger Barbour and I have just completed a study on the use of the eyes by bats in flight and submitted a paper for publication, and we are now working on eyesight and homing.

Mark Luckens and I have a small grant to analyze tissues of bats for pesticides. We are examining small samples of 3 common species and are measuring the rate of disappearance of stored pesticides during the hibernation season. We have also given bats highly lethal doses of DDT and refrigerated them. They are surviving nicely. What will happen when we bring them out?

A young fellow at the med school is taking samples of membranes from each hibernation season collection that we make and doing a study on the mast cell population as hibernation progresses.

We are putting in for a grant to study mobilization of fat and pesticides in hibernating bats and the rates of detoxification and/or excretion of stored pesticides.

LITERATURE

HITCHCOCK, H. B. 1965. Bat Rabies in New England. A paper presented at the Northeast Wildlife Conference, Harrisburg, Pa., Jan. 18, 1965. Mimeographed by H. B. H. Bats collected throughout Mass. and to a lesser extent in adjoining areas of Conn., N. H. and Vt. between July, 1962, and December, 1963, were examined for rabies virus at the Institute of Laboratories, Mass. Dept. of Public Health. M. lucifugus showed 0.76% infection and Eptesicus fuscus 4.1%.

SIGMUND, LEO. 1964. Relatives Wachstum und Intraspezifisches Allometrie der Grossmausohr (Myotis myotis Borkh). Acta Univ. Carolinae- Biologica Vol 1964:235-303. A remarkably thorough piece of work, this paper is based upon measurements and analyses of data from 31 embryos, 175 postnatals, and 103 adults. Numerous graphs show relative growth rates of various bones.

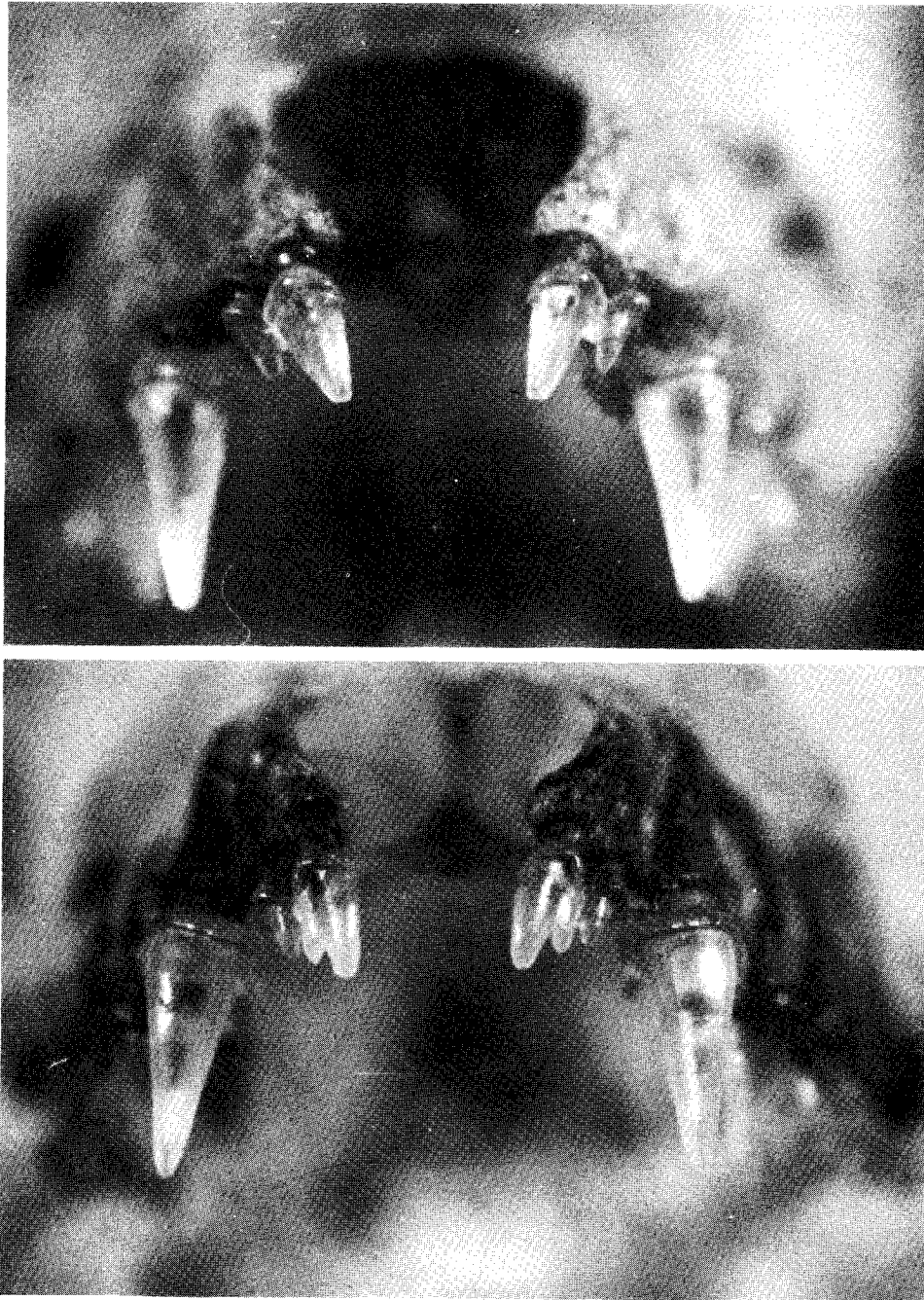
LUCKENS, M. M. & W. H. DAVIS. 1964. Bats: Sensitivity to DDT. Science 146: 948, Nov. 13, Big brown bats were shown to be roughly 10 times as sensitive to DDT as most other mammals that have been tested. Total mortality was obtained with doses of 40mg/kg and some deaths occurred with doses as low as 20 mg/kg.

HOROWITZ, BARBARA A. 1964. Temperature effects on oxygen uptake of liver and kidney tissues of a hibernating and non-hibernating mammal. Phys. Zool. 37: 231-239. Myotis austroriparius from a cave near Gainesville, Fla., were used. Kidney respiration was consistently higher and relatively less affected by temperature than that of liver. Unfortunately, she does not give the date of collection of the bats. We do not know whether they are physiologically summer bats or winter bats, so her comparisons of "hibernating and non-hibernating" bats seem relatively meaningless.

MENAKER, M. 1964. Frequency of spontaneous arousal from hibernation in bats. Nature. 203: 540-541. August 1. Thermocouples were sewn under the skin of M. lucifugus put in a dark room at 3° to 5°C., and continuous recordings made. A graph shows intervals between arousals in 13 bats. Two bats went 80 and 90 days between arousals, much longer periods than have been reported for any other mammal.

ALLEN, R., R. A. SIMS, & S. E. SULKIN. 1964. Studies with cultured brown adipose tissue. Amer. J. Hygiene. 80: 11-32. Effects of low temperature on rabies virus in the brown fat of M. lucifugus were studied. Cultures retained infection more than 4 months at 8°C, which covers the hibernation period nearly. Transfer to 37.5°C resulted in rapid virus multiplication. Brown fat maintains metabolic activity at low temperatures better than other cell cultures studied. This is likely an important factor in the persistence of rabies virus in these cells during hibernation.

TWENTE, J. W. & J. A. TWENTE, 1964. An hypothesis concerning the evolution of heterothermy in bats. Annales Acad. Scientiarum Fennicae. Series A IV. Biologica 71/32 Helsinki. pp.436- 442. Presents the hypothesis that bats evolved a pattern of heterothermy as a mechanism for survival in tropical climates and that from this heterothermy, hibernation became possible when climatic changes warranted. They also suggest that echolocation is a secondary adaptation for cavern-dwelling. But tell me, Jack, how did the bats get around in the caverns before developing echolocation?



FIRST UPPER INCISORS IN PLECOTUS TOWNSENDII (ABOVE) AND
P. RAFINESQUII.

THE COVER

The big-eared bats Plecotus townsendii and Plecotus rafinesquii have undergone a painful history of misidentification in the literature in spite of the fact that they are rather strikingly different animals with well-marked characteristics.

Handley's revision has corrected the mistakes of careless observers in all cases where specimens are available for study.

We have some excellent color slides showing the differences in fur color of these two species; these will be made into color plates for our book. For this month's cover I asked Dr. Barbour for a picture showing the differences in the first upper incisors of the two species. The skulls shown are from specimens taken from one of the several caves in Lee County, Kentucky, where the two species occur together. The University Press didn't do nearly as good a job in reproducing this photo as they have done with covers for us in the past. When this figure appears in our book it should be more clear.

Bat Research News appears quarterly: January, April, July and October. Subscription rate is \$1.00 for 2 years. All back issues (Vol. 1-5) \$2.00. Single copy \$.25.
Wayne H. Davis, Dept. of Zoology,
University of Kentucky, Lexington,
Kentucky, 40506, U. S. A.

NEWS FROM HERE AND THERE

RICHARD LAVAL says that he is talking about working on the physiology of bat migration at LSU.

DAN SMILEY writes that DICK MANVILLE was a guest last summer. Dan runs the Lake Mohonk Mt. House in the Catskills. The picture on the letterhead looks like quite a place to spend the summer.

ADAM KRZANOWSKI answers David Easterla's question which appeared in the last issue by suggesting he look up the article by H. von Boettcher in Zeit. Saugetierk. 15: 325-326 (1940) 1943. He also lists six references for bats feeding on mosquitos for Sulkin. Adam is the authority on bat literature. He came over to this country to work in the libraries to compile a bibliography of the bat literature of the world. He spent a year at Kansas and one in Washington. When is this to be published?

MARY WIEDEMAN was a recent visitor at Kentucky. She showed a movie on circulation in the bat wing which was a truly spectacular piece of work. One could watch the workings of tiny pocket valves, the pulsing and changing directions in the vessels, the constriction and relaxation of microscopic vessels, and the changes in shape of the erythrocytes as they squish through the smallest capillaries.

ARTHUR GREENHALL sent me a copy of a technical release of the National Pest Control Assn on DDT toxicity to bats which was based on my recent note in Science on this. This makes five popular type reports of news services of various sorts on this little paper that I have seen. This release ends with the statement "At present there is no registration for the use of DDT in bat control. Liberal applications of 6% DDT in household pest control is acceptable, however, and it appears that the lack of registration is because no one has applied for it. An effort is being made to correct this situation."

M. J. MCHUGH shot a Lasionycteris in Alaska last summer and wants to know if it is a range extension or if something has come out later than Hall & Kelson. So far as I know it is. But since I don't have access to Canadian Field Naturalist and it is not covered in Biol.

Abstracts I may miss something from up there.

DENNY CONSTANTINE is working on a Master of Public Health degree at the University of California at Berkeley. He has a degree in Veterinary medicine.

J. S. BLEAKNEY has been finding pipistrelles in Nova Scotia. He sent me a copy of a paper on this; the details should appear in press soon. He says they have a good many caves which have never been visited by bat collectors, and he is wondering about the possibility that they might turn up Myotis sodalis sometime.

I owe an apology to DUNCAN HARRINGTON for neglecting to get his name onto the letter he wrote asking about bat detectors and which I put in the last issue.

WALT HALLAND has kindly volunteered to work up an index to the first five volumes. I hope to send them out with the next issue.

A spelunkers' newsletter from Missouri describes a homing experiment which DICK MYERS did last fall. He took about 2000 bats from Rocheport Cave, banded them and dabbed each with fluorescent paint, and released them from four different directions.

Myers says he has heard rumors about a student at S.I.U. "banding thousands of bats at Pilot Knob Mine, Mo." and asks if I know anything about it. It is news to me.

I have at hand the second issue of Myotis, a newsletter put out by Dr. H. ROER and Dr. R. FELDMANN in Bonn. It is concerned primarily with European bat work.

NIXON WILSON is interested in obtaining specimens of streblids. He asks if we find any on the Plecotus in Kentucky. I cannot answer for sure because I don't remember specifically, but I think I have found them by the numbers on all Plecotus populations I have ever handled. We are going to make some observations on colonies of both species this summer, and we will try to collect a few specimens for him. How about a trade for a live healthy Lasiurus semotus that we can photograph? If our book is to be on the bats of the U. S. we would need one.

PHIL KRUTZSCH says that he would still very much like to have reproductive tracts of lasiurine bats fixed in 10% formalin.

SWAMPY SCHWAB is now in the Animal Physiology Dept. at the University of California at Davis. Apparently the ammonia in the Arizona bat cave chased him out.

GEORGE BAER sent us a couple of live Antrozous last month.

BAT BANDING DURING 1964

Harlan Walley reports his banding in northern Illinois:

| | ♂ | ♀ | | ♂ | ♀ |
|------------------|------|-----|------------------------|------|------|
| Myotis lucifugus | 1882 | 982 | Pipistrellus subflavus | 13 | 16 |
| Myotis sodalis | 114 | 84 | Eptesicus fuscus | 329 | 301 |
| Myotis keenii | 16 | 10 | | | |
| | | | Totals: | 2354 | 1393 |

M. J. Wilcox reports that the following were banded by the Ontario Bird Banders Association at their Operation Recovery stations at Long Point and Point Pelee:

| | |
|-------------------|----|
| Myotis lucifugus | 18 |
| Lasiurus cinereus | 1 |
| Lasiurus borealis | 2 |

Steve Humphrey reported the following bats banded by the group at Earlham College:

| | | | |
|-------------------|--------|------------------------|--------|
| Myotis lucifugus | 10,554 | Nycticeius humeralis | 435 |
| Myotis sodalis | 870 | Lasiurus borealis | 14 |
| Myotis keenii | 39 | Lasiurus cinereus | 1 |
| Myotis subulatus | 6 | Pipistrellus subflavus | 1338 |
| Myotis grisescens | 1 | | |
| Eptesicus fuscus | 209 | Total | 13,467 |

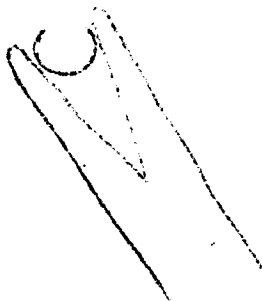
Don Smith sent the following list of all his bat banding in Ontario and Quebec:

| | <u>1962</u> | <u>1963</u> | <u>1964</u> | <u>Total</u> |
|------------------------|-------------|-------------|-------------|--------------|
| Myotis lucifugus | 583 | 160 | 863 | 1606 |
| Myotis keenii | 28 | 19 | 39 | 86 |
| Myotis subulatus | 6 | 0 | 1 | 7 |
| Eptesicus fuscus | 9 | 2 | 4 | 15 |
| Pipistrellus subflavus | 3 | 4 | 2 | 9 |
| Totals | 629 | 185 | 909 | 1723 |

TIPS ON TECHNIQUES

Number 2 bands are too large for eastern pipistrelles - they sometimes slide off over the wrist. Pipistrelles carry number 1 bands well with no injury or chewing. This is the best size for these bats. However the recovery rate on these bats is almost nothing(I have had 2 recoveries among over 12,000 pipistrelles banded over the last 15 years), and in an attempt to get some data about movements of these bats we have been experimenting with ways of applying the number 2 bands. We have now come up with a method which seems to be entirely satisfactory. We put the band through the wing membrane and then close it off-center as indicated:

gripped
with pliers



closed band

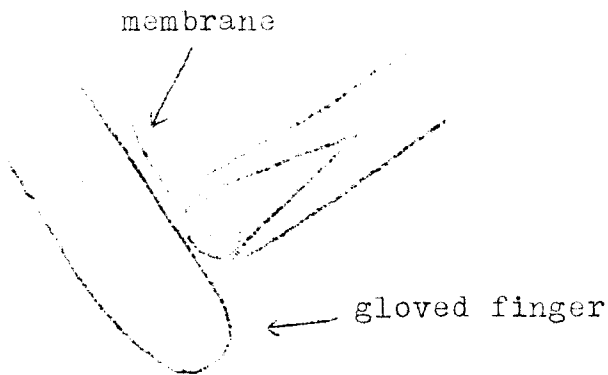


Pipistrelles banded this way have been returning in numbers with no indication of injury or chewing. The number is easily legible. You might wonder why not just put the band through the membrane and close it up snug with the ends even. The problem here is to get the ends to remain so firmly together that the membrane cannot get between them and the band slip off. This requires extra work with the pliers and the end result seems no better than the off-center closure.

Since the advent of the too-hard-to-squeeze-shut-with-the-fingers-type band we have been trying different kinds of banding pliers.

I ordered some banding pliers from Roger McDonald who makes them for bird banding. They have the gripping surface drilled out to fit the band and he has added a band opener. The workmanship is excellent. I have not tried them. Hassell did and said they are no good for banding bats. He says the ground out area is just a nuisance. It is much easier to close a band by gripping it with pliers than to try to fit it into the rounded surface. We have decided that the best band closers we have found are long-nosed pliers which are bent. These are Craftsman curved diagonal pliers, and are available from Sears, Roebuck & Co. @ \$3.68. With these a person can band bats at a rate on one every 8 seconds. The best procedure we have found is:

Hold bat in gloved hand with your palm upward and the forearm to be banded lying across your fingers. Pick up band with your other hand which also holds pliers. Place band on in such a way that the open edges are upward, one edge covered by the wing membrane. The back side of the band rests firmly on a finger. The pliers then go over the open edges of the band.



ENDANGERED SPECIES OF BATS

Last week I received a copy of a tentative list of rare and endangered fish and wildlife of the United States as compiled by Dr. John Gottschalk of the Fish & Wildlife Service. The only bat mentioned is Euderma maculatum. At the same time I also received copies of correspondence between Dr. Hoffmeister, President of the American Society of Mammalogists, and Dr. Barkalow, Chairman of the Committee on Conservation of Land Mammals concerning the possible addition of Myotis sodalis to the list. Attached was a note from Dr. Barkalow suggesting that I comment. So I wrote Dr. Gottschalk my opinion as follows:

"---Perhaps two additional species of bats need be included somewhere in your list. These are Myotis sodalis and Myotis grisescens. Although neither is rare and they do not fit well into any of your listed categories, I think both should be considered as endangered species because of their highly specific habitat requirements and the rapidly increasing vulnerability of these habitats. Both species require large caves or cave-like structures to complete their life cycles. These caves are under ever increasing use by humans in recreation and as air raid shelters. Bat colonies are ever more frequently being raided for laboratory experimental animals. This

trend will continue to accelerate. Museum collectors and biological supply houses may be taking more bats than previously. Rabies and insecticide poisoning may be new threats.

"The populations of these two species have been decreasing steadily in recent years. Many caves are being abandoned and the geographical ranges of these species are shrinking.

"Although the present populations of these bats are about 500,000 (M. sodalis) and a million or two (M. grisescens), I think it is likely that both may become nearly extinct within the next 10 or 20 years. Myotis sodalis will probably persist in Mammoth Cave National Park, but there is at present no sanctuary suitable for Myotis grisescens."

INSECTICIDES IN BATS

Our Eptesicus that we had fed big doses of DDT (80mg/kg) were taken out of the refrigerator after a couple of months and remained in good health. No signs of poisoning. I wonder if they metabolized it, excreted it, or stored it. Next fall we will find out.

Last summer our first analyses for pesticides in bats were run at the University of Kentucky Institute of Toxicology. Four common insecticides were present in Myotis sodalis from Carter Cave, but the levels were so high that it seemed that the technician must have been doing something wrong. Each bat contained far more than enough pesticide to kill a bat. Dr. Luckens said the results were ridiculous—that all the bats would be dead if they had that much. We fired our technician and Dr. Luckens began running the analyses himself. He has now run samples from each winter month and every bat seems to have unbelievable levels. We calculate that if every insect were carrying a lethal dose, if each bat were active half a year and ate a third his weight each night, lived for ten years, stored permanently every bit of insecticide he ingested, he still could not have the levels we are finding. Obviously something is very fishy. No doubt the stuff is there. It shows on both thin layer and gas chromatography. But the quantities could not possibly be right.

If our grants go through there will be several assistantships available for work with us on pesticides and bats. This would be an opportunity for someone to get started in the very active new field of pesticides and wildlife. I expect that interesting and frightening results will be turning up in our laboratory in the next few years.

CORRESPONDENCE

HOUGHTON, MICH. (Biol. Dept., Mich. Tech. Univ.). Banding is going well. Many M. lucifugus and M. keenii. Located a number of Eptesicus. Finding time to band is a problem during the school year. Reports still come in that there are mine shafts that house bats during the summer. We have some of these shafts located and plan to check them. I plan to do some netting on Isle Royal this summer. Robert Stones.

BETHESDA, MD. (NIH, Natl. Inst. of Allergy & Infectious Diseases). This June I am going to the Canal Zone for a year to work on histoplasmosis in bats. My main interest will be in the ecology and dissemination of Histoplasma capsulatum and, since many species of bats are known to be infected, I want to study some of these animals

in their own environment. We have selected for this study a harborage of Chilonycteris rubiginosa fusca in which about 20% of the bats are infected. There are about 2000 animals in this roost. Since I want to capture, release, and recapture a representative number of bats at weekly or biweekly intervals, some means of individual identification will be necessary. Permanent banding would be advantageous since, if it appears to be profitable, the study may be continued for several years.

I am a microbiologist by training and a complete novice with respect to bats. It is to my benefit that I can utilize some of the experience of Dr. Paul Alite, who has just spent a year and a half in the Canal Zone working on similar projects and has pointed out the harborage that I want to work on extensively. The bat appears to be a fascinating animal and I am looking forward to this project with enthusiasm. H. F. Hasenclever.

SAN FRANCISCO (Biol. Dept., S. F. State College). I will be going to the Orizaba area of Veracruz again this summer and will be visiting several extensive caves there. I would appreciate getting any information concerning safety precautions regarding the air-carried guano-fungus. Chris Wemmer.

Ed. note. I expect the best source of this information would be Dr. Hasenclever.

WOLFVILLE, NOVA SCOTIA (Biol. Dept., Acadia Univ.). Your mention in the January issue of BRN of a forthcoming book on the bats of North America is welcomed by this reader. It would be wonderful to have a pictorial guide that the amateur could use with assurance. It would certainly stimulate more critical observations and reports of range extensions.

Your request for information on mosquitos feeding on bats in caves interests me. You say you found no engorged mosquitos in caves. I am wondering if you found any mosquitos in caves? In the one cave (Frenchman's, Hants County) which we worked in last summer it was very evident that the mosquitos would not enter the cave- when eating our lunches outside the cave in the warmer air we were voraciously attacked by mosquitos, but if we moved into the entrance, where the temperature was near 46° F the mosquitos seemed to be stopped by some invisible barrier. Various flies inhabit the cave both summer and winter, but we have never seen any mosquitos at any season. J. S. Bleakney.

Ed. note. No, we did not find any mosquitos in the caves last October. They do occur in caves down here, but so far as I know mostly to spend the winter. The most I ever saw were in a cave in SW Virginia in autumn, when Tom Barr and I found hundreds of Anopheles.

KUALA LUMPUR, MALAYA (Migratory Animal Pathology Survey, A.P.O. 323 San Francisco). Our ringing teams in eastern Asia have not been doing much with bats recently. There is enough confusion in taxonomy that most of the workers are collecting instead of banding. Our experiences in Malaya led to the abandonment of rings because of damage to the bats' wings. Now I am wondering what experience your correspondents have had with ear tags. We may try them.

Dr. Beran at Silliman University, Dumaguete, Philippines, is testing bats for rabies. Rabies is very prevalent in Philippine dogs but he has not found it in bats yet. However we are recommending that our people take rabies shots.

The Earl of Cranbrook, who has done much bat banding in England,

recently visited his son, Lord Medway, in Malaya, and they went on a bat hunting trip into Borneo. Some interesting insectivorous species showed up. H. Elliott McClure.

WARRENSBURG, MO. (Biol. Dept. Central State College). Myotis grisescens and young move when disturbed; I have tried to study them as inconspicuously as possible, but lights and slight movement bother them. I have not tried infrared.

Last Saturday my students and I examined a colony of Myotis sodalis I have been studying since 1954. Of band-styles used we found:

No wing-clip type; this is the third year with no returns on this type. Not surprising!

The number 0 which have been on the bats for up to 10 years are in good shape - bats too.

Ninety per cent of the flanged bands (European type) were badly mashed and scarred from chewing. I still feel this would be a satisfactory band if it were heavier, thus making it more difficult for the bat to mash it around the radius.

I found a comparable percentage of # 2 bands on bats in the cave; a percentage similar to those recorded for the # 0 bands after being on bats 2 years. But all 28 bands showed some degree of chewing; two had to be replaced with new bands and 77% were lodged in tissue at the distal end of the radius. They are too large for this species.

I found little damage to band or bat from the 1B bands. However these bands will slip off the distal end of the wing if they are not put on exactly. Dick Myers.

Ed. Note. I do much wonder what caused this last statement. The 1B bands are so small they could not possibly slip off the distal end of the wing. Perhaps they were not closed tightly and they slipped off the radius as any band would. Hitchcock and I found this difficulty when we had a couple of students along who did not close bands enough.

Our results with # 2 bands on Myotis sodalis do not agree at all. We have banded about 20,000 of these in Carter Cave during the last three winters. We have found no band injury at all. We have some chewing just as we get with any band we have ever tried. However we have never had an illegible # 2 like we so frequently used to get with the # 0 and # 1. The reason is that there is so much to chew before the bat gets to the number on the # 2 bands. Our return rate is such that we believe these bands cause the bats no difficulty. The Carter Cave population is one of the few bat colonies I know that seems to be holding its own. The population remains at 100,000, just as it was when I first estimated it in 1957.

NASHVILLE, TENN. (2112 Woodlawn Dr.). I read with interest the plan for a new bat book. Surely there is a lot more to learn than has been published and a world of information available since Hamilton's book was published on the Mammals of Eastern U. S.

On warm winter evenings when the temperature is in the 50s I sometimes see small bats flying about in the edges of woodlands where no known caves are nearby. What species do you think they might be? I haven't been lucky enough to bring one down with my .410.

Such bats are supposed to winter in tree cavities or under bark. When they return to high body temperatures on these warm nights what happens when maybe within 24 hours the temperature drops to zero? Can they stand such a freezing and survive? I hope the forthcoming book will give us the answer. Albert F. Ganier.

Editor's answer: Red bats are very commonly seen on warm winter

evenings throughout this area. See the paper on winter range of the red bat by Lidicker and Davis in J. Mamm. several years ago. One day in January John Hall and I counted 24 red bats flying over the roads in Mammoth Cave National Park. I have often wondered too how they withstand the very low temperatures. I would guess that they get well insulated in a small crevice in a hollow tree and maintain temperature near freezing by expending a little extra energy for the duration. Next August Barbour and I are going to do some experiments with red bats at low temperatures. This is possible now that they are available in quantity. By the way, bats do not have to maintain temperatures above freezing. A student at Middlebury took Eptesicus down to rectal temperature of -2°C and the animals showed no ill effects. That was as low as we could get the cooler to go. Lidicker and I once took an Eptesicus wing down to 0°C with ice bath and recorded conductions of nerve impulses on an oscilloscope at that temperature. I have always wanted to do more along this line; now I am set up with a neuro-physiologist at the UK Med School to do it. We are going to study nerve conduction at low temperatures in Eptesicus taken in summer and winter. Perhaps we should also try red bats.

ELDORADO, TEX. (route 1). I surely do enjoy reading the Bat Research News, though I am not a bat bander myself. Your coming book on bats will be welcomed. Any way I can help, just let me know.

I was wondering if you know where I might obtain a copy of the report of Dr. Lyle S. Adams on the Project X-ray. I am conducting a historical survey of Texas Caves, and would like to obtain anything on the bat incendiary bomb project of World War II that I can.

I can obtain copies of Charles A. R. Campbell's book "Bats, Mosquitos, and Dollars" for anyone who is interested. I only have copies of the portion dealing with bats, and can have additional copies made for about 7¢ a page. J. T. Meador.

Ed. note. Can anybody help with his request?

MAGNOLIA, ARK. (box 1347 Southern State College). For the last 2 years I have been conducting a small banding project under the supervision of Dr. J. A. Sealander of the University of Arkansas. This involves several large summer colonies of Nycticeius humeralis in Crossett, Ark. I am very interested in the study of bats and plan to continue the project.

The Nycticeius leave in winter. Also of possible interest two of my colonies apparently merged last summer.

I would like to add to my small collection of material on bats. I have most of the books that have been published recently on the subject, but find that most of the information on bats is in back numbers of scientific journals and museum publications. It is difficult for me to obtain these, but I have been able to get a few reprints from companies such as Quivira that deal in used material of this sort. Could you give me any information as to where I might obtain reprints? Harry E. Stephens.

ARLINGTON, V.I. (2629 S Walter Reed Dr.). I am sending a photo that I took of the bats in Sauta Cave, Alabama, in June 1963. I thought there must have been over 200,000. I would estimate that the photo was taken from 70 to 100 feet away. This may be helpful in future determinations of population size. Concerning this population: What is the future of the cave? Are they going to commercialize it more thoroughly, make it into a civil defense shelter by exterminating the bats, or what? No one seems to know.

I have a photo of a colony of bats about 100 feet in from the entrance of Mitkin Cave, Pa., in 1956. They were a fairly tight-packed cluster of about 200 bats on the ceiling. Does John Hall or anyone know if Myotis sodalis was still there at that time? I think that is probably what they were.

Also I remember a note by John Hall on the P. townsendii in Hoffman School Cave, W. Va., about a year ago in the News. I had become aware of the summer colony in the cave because I had banded 49 males and 9 females on 2 June 1963. However I have not seen a winter population there for several years. Lyle Conrad.

LUND, SWEDEN. Thank you for the bat skeletons you sent me a few years ago. Do you think there are any possibilities to get more American bat species from anybody? Sven-Olle Olsson.

BONN, GERMANY (Zoologisches Forschungsinstitut u. Museum Alexander Koenig, Koblenzer Strasse 150-164). Besten Dank fur Ihr Schreiben vom 8.1.65. Ich danke Ihnen schon jetzt vielmals fur die Zusenden von Vol 5 der "Bat Research News". Unserer Rundbrief Myotis II/1964 haben Sie sicher inzwischen erhalten. Ich habe auch einigen anderen Herrn bzw. Instituten in Ihrem Lande Myotis II zugeschickt. Sollten Sie noch ein Exemplar benötigen, so lassen Sie mich das bitte wissen; es stehen noch einige wenige Exemplare von Myotis II zur Verfuigung. Ihre Bat Research News wurde ich in Zukunft sehr gern im Tausch gegen Myotis beziehen. H. Roer.

CLARKSVILLE, TENN. (Biol. Dept., Austin Peay State College). We are doing some bat banding in the caves here in Montgomery and adjacent counties. On January 30 David Snyder and I banded 1433 bats in a cave in Stewart County, and February 13 we banded 816 in Bellamy Cave. We have banded and color-marked with celluloid bands about 50 bats in various smaller caves.

For closing bands I have taken a pair of hemostats and wrapped copper wire around them in such a way as to prevent the jaws from closing too far; it closes the band so that it fits just right. In collecting bats we use onion sacks with the five quart oil cans at the neck and also a collapsible fish net. I have made two short graspers from old curtain rods and one from a piece of electrical conduit 11 feet long, equipped with a trigger handle. We take a card table into the cave and place a Coleman lantern on it to band. James R. Heltsley.

BELLINGHAM, WASH. (Biol. Dept., Western Wash. State College). Bat banding near Bellingham has been slow but rewarding this year. The original colony of Plecotus townsendii (about 20) was collected by some students last spring, and no bats were present in two later visits. We located a series of small openings under some large blocks of sandstone at the base of a cliff. Some are large enough to stand up in. We found one Plecotus townsendii here in October. On our next visit we found 3 including the banded one. It was about two blocks from the original site. We have since banded 8 bats in the area. All bats moved between visits, several within a week. I now feel that the bats in this area are active all winter. The body temperature of two of the bats was 4.2°C which was also the air temperature. One other bat, presumably at this temperature when photographed in place was gone about two hours later. I hope to spend a night or two at a cave in southern Washington to see if I can get a better picture of the situation. I haven't checked all of the Biological Abstracts yet, but so far have almost nothing on the biology of P. townsendii. Do you know offhand of anything on them? Clyde M. Senger

Ed. note. Offhand, yes, I do. Pearson's paper in the 1952 J. of Mammalogy contains a wealth of information on the species. The title is misleading, because reproduction is only a part of this fine study. Also Handley's 1959 revision of the genus seems to contain a thorough going over of all the information in the literature and puts to use all data available on specimen labels. This excellent study is far more than just the taxonomic treatment.

OTTAWA, ONT. (Biol. Dept., Carleton University). Have just browsed through the latest BRM which just arrived- most interesting and informative as usual. Was very pleased to hear about your forthcoming book - really looking forward to getting a copy. If you need any bats from this species-poor area for photography let me know.

Five of us visited Craigmont 6 December and in 10 hours underground handled 539 banded bats and banded 879 more. We estimated the population at 6000-7000, well below that of one and two years ago. This has been my only successful trip. All other trips checking out possible caves and mines in our area have been very disappointing. Don Smith.

BALBOA, CANAL ZONE (Drawer C, Smithsonian Institution). In April I will be down in the low lands where perhaps I can get a Eumops glaucinus for you to photograph. Not much luck on bats in the high mountains of western Panama. Edwin L. Tyson.

ITHACA, N. Y. (Zoology Dept., Cornell Univ.). I read with interest on page 5 of the recent Bat Research News the item concerning Duncan Harrington of Nottingham University who desires to avail himself of a "bat detector". You may be interested to know (and pass on to him) that a description of the detector developed at MIT with recently-developed refinements has been published, and in sufficient detail that one can be built by any competent electronics technician. I have had two built here at Cornell and both work very well - Phil Krutzsch now has one of them. The reference citation is: J. J. G. McCue & L. Bertolini. A portable receiver for ultrasonic waves in air. IEEE Transactions on Sonics and Ultrasonics, Vol. SU-11, No. 1, June 1964. My reprint was sent me by Dr. McCue upon request.

On the other hand while in England last November I was privileged to see demonstrated a detector developed there by an engineer which in terms of sensitivity, performance, and convenience of operation is, I think, far superior to the MIT model, and costs only about 3/5 as much. Several prototypes are currently being used by a well-informed amateur (who stimulated an engineer friend to develop the detector) who is using it in the field in precisely the way and for the reasons Mr. Harrington wants one. He may wish to correspond with the principals involved: The man using the detector is Andrew Watson, 35 Richmond Rd., Basingstoke, Hants, England. The engineer who designs and builds them is Mr. E. S. L. Brownjohn, Esq., A.M.I.E.R.E., Managing Director, Holgates & Totton, Hants, England. Brownjohn is willing to supply them on a commercial basis (I have talked to him about it personally), and they will cost about £300. each (the ones I had built cost over \$500. each)

There may well be others in this country who might be interested in this fine British "bat detector". I am going to get one as soon as I can scrape up sufficient pennies. Bill Wimsatt.

LITERATURE

STONE, R.C. & J.E. WIEBERS. 1965. Body Temperature cycling of winter little brown bats in the cold following heat exposure. *Experimentia* 21: 1-6. Bats taken from caves in winter and kept in the lab at 33°C for various times were refrigerated at 10°C and their arousal times compared to controls put directly into the cold room. Maximum heat acclimation was attained at 20-28 days. Such bats required 3.5 hours to warm themselves; controls warmed in ½ hour.

JAEGER, R. 1963. Serologisch-hamatologische und immunologische Untersuchungen an winterschlafenden Fledermausen (Myotis myotis S.) Hibernating bats have drastic reduction in antibody activity. Gamma-globulin content of serum is half normal. Percentage of neutrophils increase and eosinophils and lymphocytes decrease.

O'MELRA, D.C. 1963. How to cope with bats. *Maine Farm Research*. October, p 21-23. Says banding returns indicate the majority of bats may move from Maine to Massachusetts and New York for the winter. Claims bats living in an attic can crawl through very small crevices and can enlarge the opening by gnawing.

_____, 1964. Rabies studies in bats from central Maine. *Maine Farm Research*, October p. 1-5. No indication of rabies virus was found in over 200 bats tested. Most were Myotis lucifugus; a few were Eptesicus. He reports Pipistrellus subflavus, but in response to my inquiry indicates that it was an error in identification.

STARRETT, A. 1962. The bats of Puerto Rico and the Virgin Islands, with a check list and keys for identification. *The Caribbean J. Sci.* 2: 1-7.

DAVIS, W.H., M.D. HASSELL & M.J. HARVEY. 1965. Maternity colonies of the bat Myotis l. lucifugus in Kentucky. *Amer. Midl. Nat.* 73: 161-165. Observations on 6 colonies: parturition dates, sex ratios, banding recoveries. Colonies contain 20-34% adult males when nursing young are present. The species is scarce but widely distributed as a summer resident in Kentucky.

FELTEN, H. 1964. Flughunde der Gattung Pteropus von Neukaledonien und den Loyalty-Inseln. *Senck. Biol.* 45: 671-683. A taxonomic review of the materials in the museums and a key to the species.

BEZEM, JJ, J.W. SLUITER & P.F. VAN HEERDT. 1964. Some characteristics of the hibernating locations of various species of bats in south Limburg. *Koninkl. Nederl. Akademie Van Wetenschappen - Amsterdam. Proceedings, Series C*, 67: 325-350. Statistical treatment of data on distance from entrance, height from ceiling, and positions chosen by 7 species hibernating in the cave. They conclude that choice of hibernating location in the caves is a continuation of the habits in choosing a summer roost.

SLUITER, J.W. & P.F. VAN HEERDT. Distribution and abundance of bats in S. Limburg from 1958 till 1962. *Natuurhistorisch Maandblad* 53e Jrg. No. 11-12 p. 164-173. Although populations had decreased from 1946-1957 no decrease was evident since then. This change is attributed to lack of disturbance.

Dunaway, P.B. & L.L. Lewis. 1965. Taxonomic relation of erythrocyte count, mean corpuscular volume, and body weight in mammals. *Nature* 205: 481-484. Three species of bats are included: Eptesicus fuscus, Pipistrellus subflavus, and Lasiurus borealis. The latter had the very high count of $19.61 \pm .43 (x10^6)$ for 5 animals. They suggest the explanation of an adaptation to meet the metabolic demands of exposure during cold weather.

Just today I received a stack of reprints from Dr. Erwin Kulzer of the Zoophysiologicalen Institut der Universität Tübingen in Germany. I have not had opportunity to read them yet, but I see a couple of major papers on temperature regulation. Since so many readers are interested in this I will list these references without commenting on content.

Fledermausen aus Tanganyika. Zeit. Säugetierk. 27: 165-181, 1962.

Über die Jugendentwicklung der Angola-Bulldogfledermaus Tadarida condylura. Säugetierk. Mitteilungen 3:116-124, 1962.

Über die Biologie der Nil-Flughunde (Rousettus aegyptiacus). Natur und Volk 91: 219-228.

Temperaturregulation bei Flughunden der Gattung Rousettus Gray. Zeit. f. vergleichende Physiol. 46: 595-618, 1963.

Ostafrikanische Fledermause. Natur und Museum 92:115-126, 1962.

Die Regelung der Körpertemperatur beim Indischen Riesenflughund. Natur und Museum 93: 1-11, 1963

From: Dr. Wayne H. Davis
 Department of Zoology
 University of Kentucky
 Lexington, Kentucky, 40506
 U. S. A.

BAT RESEARCH NEWS

Vol. 6, No. 3

July, 1965



BIG BROWN BAT CARRYING FLASHLIGHT

THE COVER

This big brown bat is carrying an Eveready No. E675 1.4 volt mercury battery and a pinlite bulb No. L 12-12 from the Pinlite Division of Kay Electric Co., 1275 Bloomfield Ave., Fairfield, N. J. 07007. The batteries are readily available at about \$1.80 per half dozen. The bulbs we order from the manufacturer at \$5.00 each, with discount for quantity of 10 or more. The battery lasts over 6 hours.

We were sitting in my office last month trying to design a better envelope to carry the battery more firmly on the bat's back when Hassell came up with the idea of using the plastic container in which the batteries are packaged. This worked fine. One lead of the bulb is fastened to the back of the battery with silver electrical conducting tape, and the other lead taped to the other side through a hole cut in the plastic container. Then a tiny piece of cloth is glued to the back side covering the battery, and finally the whole thing is glued to the bat with a mixture of acetone and cellulose acetate. The bats do not try to scratch it off. The device is so light that it seems to have no effect on behavior. Unfortunately, though, we have not had success in tracing feeding ranges of our bats after we finally perfected the light. Our study area has too many lights, both stationary and moving. It is near an intersection of two major highways, and a bat carrying a light is very quickly lost to view. We finally gave up on it for this project. However, it should work in some areas. We plan to use our bulbs in homing studies with mice if the mice will tolerate the apparatus. The photo is by Roger W. Barbour.

PHOTOGRAPHING NORTH AMERICAN BATS

Bryan Glass sent us some Myotis velifer in May, bringing to 15 the number of species of bats we have photographed for our book. We have obtained about all the species of bats that are available in the eastern U.S., and will have to be able to take to the road to get much more done. We are trying to get funds for an expedition next summer. In the meantime we would be very grateful to anyone who would be willing to send us some live healthy bats. They can be sent Air Express Collect. The species we need are : Mormoops megalophylla, Macrotus waterhousei (californicus), Choeronycteris mexicana, Leptonycteris nivalis, L. sanborni, Myotis yumanensis, M. austroriparius, M. occultus, M. evotis, M. thysanodes, M. volans, M. californicus, Pipistrellus hesperus, Lasiurus seminolus, L. cinereus, L. intermedius, L. ega, Euderma maculatum, Plecotus phyllotis, Tadarida femorosacca, T. molossa, Eumops perotis, E. underwoodi, and E. glaucinus.

MORE ON RABIES

The following is lifted word for word from the D. C. Speleograph of May, 1965 (p.52):

Bat Research News appears quarterly: January, April, July and October. Subscription rate is \$1.00 for 2 years. All back issues (Vol. 1-5) \$ 2.00. Single copy \$0.25. Wayne H. Davis, Dept. of Zoology, University of Kentucky, Lexington, Kentucky, 40506, U.S.A.

"CAVERS RABIES RISK IS GREATER by Dr. Robert J. Hosley

"Although it has been suspected for some time, the first evidence for the presence of rabies virus in bat urine was reported in the January, 1965 issue of the New England Journal of Medicine. The report comes from a collaborative study by workers at the Harvard School of Public Health. It has been known for some time that the virus was apparently present at times in some caves in an aerosol form, since it was possible to infect caged animals, protected from the bite of bats, by placing them inside a Texas cave. The purpose of the Massachusetts study was to determine the incidence of rabies in bats in that area. Rabies was detected in a number of bats, and the workers concluded that the situation calls for the closest scrutiny by public health officials and medical and veterinary practitioners. It was also mentioned that the various field and laboratory workers had received pre-exposure protection against rabies using duck embryo rabies vaccine.

"Locally there is some misunderstanding about pre-exposure immunization for persons whose risk of exposure to rabies is generally higher than that of the population in general. This comes about first because few physicians in the course of their practice find it necessary to give rabies vaccine to anyone, and, consequently they are less well informed about rabies vaccine than they are vaccines for polio, diphtheria, or tetanus. Secondly, even fewer physicians are asked about the possibilities of pre-exposure protection. There exists a good body of medical literature on the subject, but, for the general public which is not at risk of exposure, it has not been considered of sufficient importance to make its way into the Physicians Desk Reference—that ingenious book of handy instructions for practicing doctors which tells them what to do, how to begin, and where to go next.

"There are 2 kinds of rabies vaccines on the market. One is made from rabbit brain, is sometimes painful, and results occasionally in severe consequences including paralysis and death. This vaccine is never recommended for use except in cases of known exposure to a rabid animal. The other kind, which is equally effective, is made from duck embryo tissue, is not painful, and has not resulted in undesirable consequences in the hundreds of thousands of doses given since it was first marketed in February, 1957. The product is not new. Its use for pre-exposure immunization began to appear in the medical literature in 1959. The currently recommended course is three 1cc subcutaneous injections one week apart, followed by a single 1cc injection 6 to 10 months later. This completes it; there are no yearly booster shots required to maintain immunity.

"Editor's comment: Dr. Harry Meyer, Jr., recommends a booster every few years and the series again if bitten or exposed to a possible rabid animal."

The above article brings to mind several points that I would like to have comments on from qualified medical personnel. First there seems considerable difference in recommendations for booster shots. I got my first duck embryo vaccine at Illinois in the spring of 1956, and physicians in the various states where I have lived since have all had me get a shot once a year. All personnel involved with my bat projects get yearly rabies shots. For our personnel who are

bitten by rabid bats the physicians at UK give a series of 14 shots of duck embryo vaccine in the abdomen. Second is the attitude of some physicians that rabies is uncommon as where the above article says "---the general population which is not at risk of exposure---". It seems to me that the general population is at considerable risk of exposure. Rabies is a very common disease in the U.S. For example the weekly Morbidity and Mortality report of the Communicable Disease Center of the U.S. Public Health Service for May 15, 1965, reports a cumulative total up to that time for the year 1965 of 1,946 cases of rabies in animals. I suspect that there are few communities in the U.S. where, given a couple of days, I could not pick up an animal that would test positive for rabies.

The comment that physicians are not well informed about rabies vaccine seems true even today. Several people have told me about going to a physician for the vaccine and finding that he was unaware of its existence or how to get it. It seems very strange to me that people all get vaccine for such presently exotic diseases as smallpox and diphtheria but not for rabies. Is there good reason for this or is medical practice simply that far behind the times? Possible reasons that come to mind are that people are usually aware of rabies exposure and post-exposure treatment is often successful; and that high antibody titre might not help against rabies.

The only groups that I know of who take rabies vaccine as a matter of course today are veterinarians and bat handlers. Although I wonder if it might not be a good idea for anyone to take the vaccine, I question the idea that cavers risk is greater. Perhaps those who go into a certain cave in Texas (Frio) where two people died of rabies and where Constantine's famous airborne rabies experiments were performed, may have greater risk. Perhaps other Southwest caves might be dangerous. But I suspect that cavers in the rest of the country have a greater likelihood of getting rabies whenever they are above ground than during an equal amount of time in a cave. During the past 10 years there have been 3 human deaths from rabies after having been bitten by a rabid bat in the U. S. None was associated with a cave. During the same time there have been over 90 other human deaths from rabies; most from dogs and cats. I suspect that dogs and cats, which can be found running loose most anywhere in the country except in caves, are far more dangerous to man than are bats.

Perhaps some of our medical subscribers will tear apart my comments and give us some authoritative information on this subject for the next issue.

CORRESPONDENCE

LAWRENCE, KRS. (Science Dept., Lawrence High School). I haven't forgotten your request for live bats, but due to several circumstances this spring we haven't been able to do the field work we usually do. This past weekend I went to a cave where I always have found M. vellifer, but we didn't find a one this time. Stanley Roth.

BETHESDA, MD. (Medical Mycology Section, Natl. Inst. of Allergy & Infectious Diseases). For the past two years we have been studying the frequency and spectrum of natural infection with Histoplasma capsulatum among Panama bats. It is apparent that several species (Molossus major, Carollia perspicillata, Micronycteris megalotis, Chilonycteris rubiginosa fusca and Artibeus jamaicensis) are capable of shedding the fungus from intestinal lesions and contaminating

soil via feces. In Panama as many as 25% of some species are naturally infected.

I have been impressed by misinformation in your newsletter concerning the fungus infection caused by H. capsulatum. The illness is usually benign; less than 1% of the 30 million or so persons in the United States that have been infected are symptomatic. A small percentage of these may succumb, but complete recovery is the rule. Primary exposure to the fungus confers some immunity to re-infection. Severity of illness is probably related to the size of the inhaled inoculum, hence the risk to bat collectors. I might suggest that you contact Dr. Michael L. Furcolow, an authority on this subject, who is now Professor of Pediatrics at the University of Kentucky Medical School. A review of this illness would appear to be appropriate in your publication. Paul K. Klite.

BAGDAD, IRAQ (Dept. of Biology, College of Education, Univ. of Bagdad). Congratulations on the fine photograph of the feet of M. lucifugus and M. sodalis which appeared on the cover of the January issue of BRN. Your book on bats of North America is most needed and certainly will be of great use to bat students.

Unfortunately readjustment and heavy teaching load did not allow me to do much research since I came back to Iraq last summer. Last August I visited a small cave at Rawa, about 365 km W Bagdad, looking for bats. Traveling in a land rover on a rough road for most of the way was not easy. The cave was inhabited by a small colony of bats. A few specimens were collected and they proved to be the trident leaf-nosed bat Asellia tridens.

Two weeks ago and also last week, Dr. K. Al Rubae, who had worked with some Iraqi bats before, and I visited an old building at Mahmudiyah, about 30 km SW Bagdad, where we observed a large colony of Asellia tridens. We estimated the number of bats in this colony at about 4,000. In a nearby building we located a small maternity colony of Eptesicus sp. This is an interesting colony and we are watching it closely. In a small town S of Mahmudiyah we located a colony of the Tomb bat Tappehous nudiventris (about 1,000 bats), and Dr. Al Rubae had located another colony of this bat at Amarah, about 200km SE Bagdad.

I am planning to initiate a bat banding project soon. I am trying to acquaint myself with the local fauna. I haven't any bands yet. I don't know which is best, the British bands (colored plastic) or the German bands. I would appreciate any suggestions. Iyad Nader.

BATON ROUGE, LA. (Box 16211, LSU). A student at the LSU Med School has asked me to collect bat guano for analysis in a histoplasmosis study now being conducted under a Public Health grant. This I can do in La., but her work would be more significant if she had guano from a wider geographical area. I wonder if your readers in various parts of the country would scoop up a few grams of guano in a small plastic bag, drop it into an envelope with locality and species of bat and mail it to: Miss Kathy Pittman, Pathology Dept., LSU Medical School, 1542 Tulane Ave., New Orleans, La.

You might be interested to learn that the histoplasmosis study consists primarily of tissue analysis by electron microscopy. Currently they are working with about 30 Tadarida mexicana I brought them from Texas. With a few of these bats Henry J. Werner and one of his students here at LSU are making a histological study of the sebaceous glands of the face.

Speaking of Tadarida and Texas I got the impression from past correspondence that perhaps you had not read Dillard Carter's (Texas A & M) dissertation on the taxonomic status of the mainland forms of Tadarida. I talked to him at length and find that he has some new ideas on this problem since his thesis

You will remember that I wanted to do some work on the physiology of migration in bats. According to Krutzsch and Sulkin (J. Mamm. 39:262-265) T. mexicana can be kept successfully in captivity. Davis and Carter at A & M told me they could be transported for a couple of days in a burlap bag. My experience was as follows. On 1 June I collected about 100 Tadarida and 12 M. velifer at Bracken Bat Cave. The bats were kept shaded in the back seat. We returned with them to Baton Rouge the following day; 40 of the Tadarida were dead. Thirty of the survivors went to the med school and 30 into a large wire cage in a nice warm attic (temperature range 30-35). Procedures recommended by Krutzsch and Sulkin were followed. The bats took glop readily, but during the next 2 weeks one or more bats died each day. Two adults and a newborn young survived. I handfed the young bat (whose mother had died) with baby formula for a week during which he seemed quite healthy, but suddenly he died. No one in the zoology or veterinary departments here could come up with an explanation. Who might be able to suggest a cause? I can't risk getting more bats until I can have assurance that they too will not die.

Are you doing anything with the races in your book? I am hoping to find some specimens of Myotis austroriparius gatesi which may be a good species. We have only 8 specimens.

Banding has been slow but I am planning a big day of activity next weekend. Hope to see if our colonies of Tadarida are really sedentary like Carter says they should be. Richard K. LaVal.

HERE AND THERE

The meetings of the American Society of Mammalogists at Winnepeg were very interesting with 15 papers on bats and much discussion among bat workers.

A new subscriber, JAMES MACAULAY, is working in the educational films section of the National Film Board of Canada, preparing the script for a film on the Life of the Bat. He says BRN has been most interesting and helpful.

We started our late summer netting this year at Carter Cave on July 17, and encountered the heaviest bat traffic we have ever had there. It was equally good on July 23. Most seemed to be wandering male M. sodalis.

ADAM KRZANOWSKI says he has been sidetracked by other duties but hopes to get back to work on his world bibliography of bats and get it published in about 2 years.

The weekly Morbidity & Mortality Report for June 12, 1965, has a most interesting account of a human rabies death. A man was bitten by a rabid dog in West Virginia on June 13, 1963. He took 14 doses of rabies vaccine following this exposure. He became ill on May 14, 1965, and died of rabies on May 21.

LITERATURE

JONES, J.K. 1964. Bats new to the fauna of Nicaragua. Trans. Kansas Acad. Sci. 67: 506-508. Lists 8 species new to Nicaragua.

JONES, J.K. 1964. Bats from western and southern Mexico. Trans. Kansas Acad. Sci. 67: 509-516. Another long list of new distributional records. Since the wide usage of mist nets was just beginning when Hall and Kelson's Mammals of North America appeared in 1958, there has been a remarkable increase in our knowledge of distribution of bats in central America. At least three new species have been described, and numerous papers on distribution have appeared. It is quite a job just to keep up with this literature.

_____. 1963. Additional records of mammals from Durango, Mexico. Trans. Kansas Acad. Sci. 66: 750-753. Includes 6 species of bats new for the state.

Kulzer, Erwin. 1965. Temperaturregulation bei Fledermausen (Chiroptera) aus verschiedenen Klimazonen. Zeit. für vergl. Physiol. 50: 1-34. Data on 28 species of bats from different climatic regions.

MARKOS, H. 1962. Fledermausbeobachtungen in der Hermannshöhle bei Kirchberg am Wechsel/Niederösterreich. Bonner Zool. Beiträge 13:274-283. The cave is an old known place for the lesser horseshoe (Rhinolophus hipposideros) to congregate for the winter. They were studied by banding since 1942. Sex ratios showed 70.8% males. The oldest bat was 14 years; average life expectancy was 3 years, and approximately the same for both sexes. No English summary.

KALLEN, F. C. 1964. Some aspects of water balance in the hibernating bat. Annales Acad. Sci. Fennicae. Series A, IV Biologica 71/19, pp. 257-267. Bats in hibernation need both high humidity and free water. In hibernation bats in dry air lost water 3 times as fast as those in high humidity; the latter lost water at 1/20 the rate of bats at room temperature. Circulating air accelerated water loss. Arousal from hibernation results in loss of water equivalent to 10 days of hibernation.

FERRY, A. E. 1965. Population analysis of the guano bat Tadarida brasiliensis mexicana (Saussure) using the lens-weight method of age determination. PhD Thesis, Oklahoma State Univ. 60pp. Lens-weight was used to separate the population into age groups up through 5 years, with accuracy found to be 80%. The oldest group is designated as over five years. The author believes that population turnover is probably complete in 7 or 8 years, and points out that this is drastically different from the findings of R. B. Davis, et. al (Ecol. Monog. 32:511, 1962), who suggest that about 75% of the female population they studied live to 10 years of age.

MUNFORD, R.E. & J. B. COPE, 1964. Distribution and status of the Chiroptera of Indiana. Amer. Midl. Nat. 62:473-489. A key to the species plus an account of each, including a map showing the localities from which specimens have been taken and are preserved in collections.

FROM: W. H. DAVIS
 Dept. of Zoology
 University of Kentucky
 Lexington, Ky. 40506
 U. S. A.

BAT RESEARCH NEWS

Vol. 6 No. 4

October, 1965



THE COVER

This common freetail, Tadarida brasiliensis was sent to us by Dr. Stanley K. Taylor, who took it from a colony in the attic of a house in Houston, Texas. Roger Barbour used several rolls of color film on this bat, which

was one of the most cooperative bats we have photographed. Barbour pulled out this slide and made the black and white print by photographing it. We now have good pictures of all species found east of the Mississippi except Lasiurus cinereus, L. intermedius, and Eumops glaucinus, but very few of the western species.

Bat Research News appears quarterly: January, April, July and October. Subscription rate is \$1.00 for 2 years. All back issues (Vol. 1-5) \$2.00. Single copy \$0.25. Wayne H. Davis, Dept. of Zoology, University of Kentucky, Lexington, Kentucky, 40506, U. S. A.

HERE AND THERE

At the meetings in Winnepeg last June Al Beck told me that he had encountered difficulty with number 2 bands on crevice-dwelling bats. He uses smaller bands for some species. He also mentioned again that he feeds his bats in the laboratory entirely on canned dog food. I asked what brand he uses, and he said he buys Pooch because it is the cheapest. We don't have that brand in Lexington. My bats will eat a little dog food since I started buying Streak, the cheapest brand we have, but they much prefer glop. I make glop now by putting a gallon of insects taken from the light traps into a food chopper with enough water so that it will chop them. I then drain this through cheese cloth and mix with a couple cans of dog food, two pounds of dry curd cottage cheese, and two pounds of bananas, all of which have gone through a meat grinder. The variety of insects seems to improve the vitamin problem (or more likely the dog food which is substituted for egg yolk), for I do not need to add vitamins to this mixture.

Richard LaVal got by for a visit during August and went netting with us at Short Cave.

Marion D. Hassell and several other students have been doing some netting at Carter Cave this fall. They have been finding traffic of bats very heavy this year. I was with them one night when they took 2400 in a single 18' net. All were banded and released with no casualties, but it kept 6 of us busy all night.

Tom Barr reported that he found a cluster of active bats at a spot deep in Ray's Cave, Indiana, on August 9. There were about 1000, and were active.

SHIPPING LIVE BATS

Live bats can be shipped across the country and delivered in good health with little difficulty. However, certain handling care is needed before they are sent. A bat's most urgent problem in shipping is moisture loss. Give bats a drink before packing. Enclose a moist cloth in the container. Bats can be shipped in a wooden box, a sealed metal bucket punched with a few holes, or even a cigar box. They can be shipped Air Express. As to whether they can be shipped Air Mail or not there seems to be considerable disagreement. It seems to depend on the local postmaster as to whether or not they are acceptable. In an attempt to clarify this I wrote to the Post Office Department and asked about it. I got the following reply from Roy L.

Sheridan, Director, Mail Classification Branch: Aug. 27, 1965

"Only a comparatively few live creatures are classed as mailable in the domestic mails. With the exception of honey bees and day old fowl, the mailable creatures are cold-blooded and can be dispatched inside of sacks except during the warm summer months.

"Most warm-blooded animals if they are acceptable in the mails would require special attention in handling, storage and transportation. Packages containing them would be required to be kept right side up and handled and stacked separately to assure proper ventilation and protection from temperature extremes. The Postal Service is not equipped to provide this treatment. Therefore live bats are not acceptable for mailing."

So this is the official word. Actually bats would require no special treatment. They need little oxygen and could be stored in sacks. They have a wider range of temperature toleration than any other vertebrates that I know of.

NETTING BATS IN FLORIDA

In August Barbour and I decided to go to Florida to see if we could catch and photograph Lasiurus seminolus, L. intermedius and Myotis austroriparius. A few days before time to leave Barbour's well went dry and he had to stay home. The Barborosa Ranch is a big operation to leave to his wife for a week, and to have to haul water for a herd of hogs was too much. So Hassell and I went, with plans to ship bats back.

We went first to my brother's house at Freeport, in northwestern Florida, where several seminole bats can be seen each evening feeding over the house and over the bayou. My brother's wife told us about a single yellow bat which makes a pass over the house at treetop level about once an evening. We set up several nets, but caught nothing. Same luck next night. We saw the yellow bat go over once the second night and saw several seminole bats both nights. We spent the third night with nets up beside a pond about 50 miles west of Gainesville, and did not even see a bat. When we went into Gainesville next day to see Bryan McNab we were rather discouraged. We had expected no difficulty in netting a seminole bat. McNab told us that he had been trying to get some live Lasiurus, and that William Jennings (who knows far more about Florida bats than anyone else) had written him that in many hundreds of net hours in all parts of Florida he had never taken a tree bat. They fly too high. In fact he had never netted any bats except where they were coming out of roosts. We decided then that perhaps our best chance was to hope for swarming behavior at a cave entrance. So we set up a nets outside the entrance to Warrens Cave. We put them high on long cane poles. We had been there for three discouraging hours without seeing bats since a few pipistrels at dusk when I decided to try swishing an extra cane pole which we had. I had remembered that in 1947 in Berkeley County, W. Va., Leonard Llewellyn had told me that the best way to collect red bats was to hold a cane pole into the air and vigorously vibrate the tip of it. He said they would fly into the pole. I did not believe the tale, so he demonstrated for me and did not succeed in catching or even attracting any bats. Anyway we had nothing better to do at Warrens Cave, so I started waving the pole. Almost at once a Nycticeius humeralis flew into the net. After we retrieved him Hassell tried the pole. A seminole bat came down, was touched by the pole, flew into the net, bounced off, and flew away. Later we caught a pipistrel and saw another seminole bat

pass above the nets several times. The pole and our moderate success may have been coincidence, but we took turns shaking the thing for a couple of hours. About midnight McNab arrived and after an hour or so we all went back to the sewage ponds at the University of Florida campus where McNab had caught a half a dozen Myotis austroriparius for us with a dip net. This is a remarkable place. Insects are thick coming out of the grass around the ponds and the little bats are abundant. As many as a dozen or 20 could be seen at a time feeding over the ponds. They occur there both summer and winter. It is not known where they come from, but I suspect that they inhabit the concrete pipes that carry the water from one pond to the next.

Next day we went back to Freeport and tried my brother's suggestion of putting a net on top of the house. With the cane poles we got the net up another ten feet or so. After we had removed the last chimney swift of the evening from the net and put him in the chimney, we went down to watch the bats and I picked up a cane pole. I had no more than begun to swish it than the yellow bat came in at full speed and went straight into the net. It looked as if he dropped into a good pocket, but by the time I got to the top of the ladder he was gone. We tried the pole quite a bit then beside the house and over the bayou where we had another net, but had no luck. After retiring to the house for a couple of hours we came out to find a seminole bat in the net on the roof. In the morning there was a hole where another bat had been caught and chewed out. So it appears as if one needs to get the nets up high to catch tree bats in Florida. Barbour is designing a net raiser that will take the nets up to whatever height we need wherever we want to put them, and we will return to Florida next year.

FLY-BY NIGHT

The following story is condensed from the Inland Bird Banding Assn. News of July-August, 1965. They got it from the June, 1965, Illinois Natural History Survey Reports.

Could a transmitter be designed small enough that it would not bother the flight of a small bird? Survey wildlife expert and electronics engineer W. W. Cochran, designer of portable transmitters for deer, ducks, etc., decided to try ----small enough to be carried by a bird, strong enough to emit a receivable signal, and with enough battery power to last several days. The final model weighed 1/10 ounce and was glued to the bird's back just behind the head.

Early trials were discouraging. Birds were released and followed by directional receivers mounted in the Survey Building, in the home of Survey ornithologist R. R. Graber, and one mounted in a truck. A charter plane with a special receiver was ready to take off at a moment's notice. The birds could be followed around Urbana by radio fixes from these stations. Some birds refused to migrate before the batteries ran down. Others, watched continuously for hours, slipped away and were lost to the radio receiver.

Finally on 6 May a newly tagged Swainson's thrush took to the air in Urbana at 7:50 PM CST. Strong signals told watchers Cochran and G. W. Swenson III in the building and Jean Graber at her station that the bird was in the air. The two stations obtained successful fixes on the bird and determined that it was heading northwest. They phoned Dr. Graber at the airport. He and the pilot jumped in the plane, were off the ground immediately, and soon had located the bird. The bird flew at about 40 mph, the plane had a stalling speed of 60 mph; thus the pursuers occasionally had to circle back to get behind the bird,

but were able to follow it and plot its course accurately. About midnight, approaching Moline, came a ticklish decision: Would the bird fly much longer? If not, the plane had plenty of gas; but there were no airports with gas pumps open after midnight ahead on the projected flight of the bird. They decided to refuel at Moline and fretted 40 minutes on the ground waiting for someone with a key to the gas pump, etc.; finally they were on their way again. Following a projection of the course the bird had flown, they located it again within an hour, only a fraction off its earlier course. At 4 AM CST the bird landed north of Rochester, Minnesota. It had flown for 8 hours and 10 minutes at 43 mph. The straight-line distance between Urbana and the landing spot is 350 miles; the bird had flown in a very slight arc so that it had actually covered 353. The pilot said he couldn't navigate that well himself.

With the tracking method proven workable the researchers feel that we can finally get definite answers to some of the long-asked questions on songbird migration.

It appears as if they have developed something which would be useful in bat research. Barbour and I looked into the possibility of radio for our feeding range work. Remarkably small instruments are available, but the limiting factor is a power source. I wonder how they got so light an apparatus to transmit so far. They must have been picking up the signals from several miles away.

BANDING AWARDS

I have received a letter from Albert Schnitzer, Chairman of the Memorial Award Committee of the Eastern Birdbanding Association concerning their annual award of \$100. to a student who uses bird banding as a part of an ornithological study. Mr. Schnitzer writes that, although the award concerns bird banding rather than bat banding directly, some of our students might be interested in applying for it. He mentions that he has often wondered whether there is any similarity in the migration paths of birds and bats, whether the migration urge is triggered by similar stimuli, and whether the origin of migration might be linked to the same geological developments which probably initiated avian migrations. He suggests a paper, supported by banding data from both bats and birds, would be fascinating and would be well received by EBB members. For information concerning the award write to Mr. Schnitzer, at Wild Hedge Lane, Mountainside, New Jersey.

The boys have been getting evidence this fall suggesting some relationships of bat to bird migration. The great flight at Carter Caves in late September was on a very cold night (temp went to 3°C), which was two nights following the first cold night of the season. They have also been getting evidence to suggest that bats fly in groups.

NOTES ON BATS IN VIRGINIA

by John R. Holsinger

A small colony of Myotis grisescens was sighted in Litton Cave, Lee County, Va., on 17 August 1965. A rough estimate is about 50 to 100 bats. When first discovered they flew away and later were found clustered in another part of the cave. They flew again when approached. This is the second record of a Virginia cave colony of

this species. The species was first discovered in Virginia at Grigsby Cave, Scott Co., in August 1961 (J. Mamm. 45: 151-152). Litton Cave is about 5 miles SE of Pennington Gap, Va., just off Rt. 58.

What appears to be a very old bat roost (perhaps late Pleistocene) was located in Morrell Cave, Lee Co., Va., in August, 1960. The cave is 5 miles SW of Jonesville on the south side of the Powell River, high on a bluff. The cave is extremely dry, and some passages have dust several inches deep. Geologically the cave appears to be very old and probably belongs to an earlier erosion cycle than that responsible for most of the caves in the area. It might be profitable to study the contents of this old guano deposit. I will gladly direct anyone to the cave who is interested in studying this deposit. I think something interesting might turn up there.

Evidence of a large bat colony was found in Gibson-Frazier Cave, Lee Co., Va., on 16 August 1965. In a maze section of the cave near the top of a canyon passage a large guano deposit was seen. It was fresh enough to have been deposited in recent years. One local resident referred to this area as the bat roost. The evidence suggests a recent large colony of Myotis grisescens.

On 18 July 1965 Charles Rippey and I visited Grigsby Cave, Scott Co., Va., to get a Myotis grisescens to photograph. The colony was absent. A few weeks before our visit a dead cow had been burned just inside the cave entrance and the odor was extremely rank. We do not know whether or not the smoke from the burning (which could have been drawn into the cave judging by the direction of the air currents near the entrance) caused the bats to leave. Dept. of Zoology, University of Kentucky, Lexington 40506.

IDEAS ON USEFUL INTRODUCTIONS OF BATS AS INSECT DESTROYERS

by Adam Krzanowski

1/ Introduction of lasiurid bats in the Old World temperate forests: These forests suffer, especially in Europe, from insufficient numbers of bats. This is caused by a relative lack of tree holes. Construction of special bat boxes as substitutes is too expensive. Some remedy could be the introduction of the red bat and hoary bat because they take shelter among the leaves.

2/ The pallid bat as a possible locust destroyer: It is well known that the locust is limited in its distribution during the years of population depression. The centers of survival are in deserts. Erection of bat towers in such deserts and introduction of the North American pallid bat, which is the renowned hunter of insects sitting on the ground, Orthoptera among them, could contribute to locust control. In the artificial roosts some native species would probably join the American species.

3/ Erection of bat towers in the arid zone: As these regions occupy a high percentage of the earth's surface, they are potentially very important in crop production. However, the vast numbers of plant eating insects lower the net production tremendously: according to calculations, grasshoppers, etc., eat more green plants than the cattle grazing on the same pasture! The introduction of the pallid bat and other species having similar habits into these almost batless regions would significantly increase the crops. Then these regions could support more cattle, sheep and wildlife. Of course bat towers would have to be erected simultaneously with the introduction of bats. Institute of Systematic Zoology, Polish Academy of Sciences, Slawkowska 17, Krakow, Poland.

RABIES

There were several responses to my request in the last issue for recommendations concerning rabies vaccine. Thanks to those who wrote. I will present here the information they supplied.

Luther Fredrickson, D.V.M., of the Tennessee Department of Public Health sent the recommendations of the World Health Organization Expert Committee on Rabies as found in their 4th Report (Technical Report Series No. 201, 1960, p. 14):

"1. If the individual continues to work at risk, he should be re-vaccinated with a similar booster dose every 2 to 3 years.

2. It is therefore recommended that in case of mild exposure of an individual who has demonstrated an antibody response to antirabies vaccination received in the past, a single booster dose be given. In case of a severe exposure the committee feels that the usual post-exposure treatment ---should be given."

The evaluation of the exposure should be made by a physician. Factors that he would consider could be the location and extent of the bites and whether or not the bite was through the protective clothing or on exposed skin.

Most of the rabies problems in this country at present involve various species of wild animals. Since caves are usually located in the areas that are near likely wild animal haunts, the cave explorer may be at risk in travelling to and from the cave in many parts of the country. The amount of risk in the cave would depend upon the bat populations, the amount of time he spends in the cave, and the protective clothing that he wears.

World Health Organization publications are available from Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N. Y. The cost of Technical Report Series 201 is 30¢.

H. R. Whitney, M. D., Western Dakota Medical Clinic, 615 Kansas City, Rapid City, S. D., writes:

Your remarks on rabies in the last issue of Bat Research News are most interesting. As a physician, I want to comment on some of the issues you raised.

Although the duck embryo vaccine has been on the market for nearly 10 years, it is still relatively new by comparison with many therapeutic measures, and thus physicians are not familiar with its use unless they have some reason to familiarize themselves with it. No one physician can possibly keep up with all the developments in medicine, and to most physicians rabies is an uncommon disease. Therefore, only physicians who are particularly interested in the disease, as I am, try to keep up on rabies.

The need for booster shots is still in the evaluation stage and any published schedule is certainly arbitrary. The remarks of Dr. Hously as you have published them are exactly the same as those listed in the 1964 edition of the "Report of the Committee on the Control of Infectious Diseases" of the American Academy of Pediatrics. Certainly, in my opinion, anyone who handles bats frequently, as you do, should have yearly boosters. Furthermore, I know I have heard the recommendation that any bite of a rabid animal should be followed by a course of 14 shots of duck embryo vaccine, no matter how much vaccine has previously been given.

Incidentally, while I agree with you that rabies is a much more common disease than most people and even most physicians realize, I think that smallpox and diphtheria are also very much with us. I would guess that just as you could easily find bat rabies anywhere in the

U. S., anyone who took a large number, perhaps two or three hundred, throat cultures in any big city in the U. S. would probably find a fair number positive for diphtheria. Smallpox has been eliminated from the U. S. by widespread immunization and strict standards for vaccination for admission to the country, but in other parts of the world it is still a major problem.

You may be interested in 3 articles on rabies which appeared in the J. of the Amer. Med. Assn. Vol. 193 No. 5 Aug 2, 1965. Possibly the most interesting one is entitled Unusual Reaction to Rabies Vaccine, on page 369.

George M. Baer, D.V.M., Acting Chief, Southwest Rabies Investigation Station, University Park, N. M., wrote:

The current recommendation for pre-exposure rabies immunization is 2 doses of duck embryo vaccine one week apart, followed by a booster 6 months later. Anyone working with rabid animals, in a laboratory with the virus, or working in an area where rabies is a distinct possibility (i.e., bat caves) should get periodic boosters, preferably annually. At our laboratory we all get annual boosters, usually about a month before we start our summer work.

Some of your statements on rabies in general could be misinterpreted. Rabies is not so common in all U.S. communities; in 1963 very few cases were reported from Connecticut (0), Wyoming(0), Idaho (3), Maine (2), Mass. (6), Mont. (1), Nevada (11) and Utah (4). Rabies has recently been at a very low level in the mountain states (it was not so earlier this century), and in New England.

In the last 10 years the great majority of human rabies deaths (39, not 90) have indeed been from dog bites, but the picture is fast changing, both in regard to reduced numbers and the greater percentage of human cases from rabid wildlife as follows:

| Year | #rabid animals | dogs & cats | bats | rabid wildlife | human deaths | biting animal |
|------|----------------|-------------|------|----------------|--------------|---------------|
| 1955 | 5844 | 3000 | 14 | 1915 | 4 | |
| 1956 | 5846 | 2963 | 41 | 2079 | 10 | |
| 1957 | 4802 | 2140 | 31 | 1942 | 5 | |
| 1958 | 4814 | 1996 | 68 | 2075 | 5 | |
| 1959 | 4083 | 1411 | 80 | 1915 | 6 | bat(2) dog(4) |
| 1960 | 3457 | 974 | 88 | 1836 | 2 | dogs |
| 1961 | 3470 | 811 | 186 | 2174 | 3 | fox(2) dog(1) |
| 1962 | 3727 | 797 | 157 | 2314 | 2 | bat(1) dog(1) |
| 1963 | 3933 | 790 | 303 | 2611 | 1 | dog |

As you can see our problem has been especially in wildlife recently, with more cases in wildlife than in domestic animals since 1957.

If physicians wish to acquaint themselves with facts on rabies immunization their local, county, or state health departments will be able to give them this information. Diseases such as smallpox and diphtheria may on the surface appear to you as "presently exotic", but through large-scale preventive immunization of millions of people these have been brought under control. This is the whole purpose of preventive immunization. In contrast only 20-30,000 or so people are vaccinated annually for rabies.

We now have 1964 data to add to Dr. Baer's table. The 7 August issue of the Morbidity & Mortality Report lists 409 dogs, 220 cats, 594 farm animals, 1061 foxes, 1909 skunks, 352 bats, 1 man, and 238 other animals for a total 4,784 cases of rabies diagnosed in the United States during 1964. An increase over the last several years, but substantially lower than in 1953 when there were 8,837 cases reported including 14 people.

The CDC Veterinary Public Health Notes for August 1965 report that North Dakota has become the 46th state to report bat rabies.

BATS DYING IN MISSOURI CAVES

On several trips into Missouri caves last spring Earl Neller noticed dozens of bats dead and dying. Many were on the ground, still breathing but too weak to fly. Although the bats were on the banks of the stream in Carroll Cave, he reports that they were not wet and obviously were not dying of drowning. He noticed the same thing in nearby Coffin Cave where there was no water. He says vandalism was not the cause, because he knows his group was the only ones in Carroll Cave in May and June. He sent me about a hundred dead bats which he had picked up in Carroll Cave on May 8. They were mostly Myotis grisescens, but included a few M. lucifugus and a Pipistrellus subflavus. We ran pesticide analysis on two gray bats and found they were loaded with DDT, but the quantities were no greater than what we have been finding in apparently normal Kentucky bats taken from caves in winter. That is, the levels seem to be such that they would easily kill a bat if fed to them in single doses in our laboratory. However, we find that bats can tolerate much greater dosages (at least 4 times the LD₅₀) if they are put into hibernation for a month or so after feeding. We still have a lot to learn about the metabolism of pesticides in hibernating bats. All our work is done on Eptesicus, and I do not know how much pesticide it takes to kill a Myotis grisescens.

BRITISH BAT BANDS

I have a copy of a letter from Mr. T. J. Pickvance of the University of Birmingham to Dr. Harold Hitchcock concerning the bat bands they are using in England. They are 4mm inside diameter, which is the same as our number 2 bands. They are made of a special alloy which is very much harder than aluminum and resistant to chewing. He says they have had no trouble with band injury. They are available from Lsmbourne Bros., 170-174 Great Hampton Row, Birmingham 13, England.

Dr. Hitchcock sent the band to Arthur Greenhall. Hitchcock comments that the harder alloy is a strong advantage, because it would solve the chewing problem. He says the longer a band is on a bat the more likely it is to get chewed, which results in the loss of some of our most interesting records, when the numbers cannot be read. I have noticed, however, that our own bands, beginning with the 642 series, are so hard that they have solved the chewing problem for us.

CORRESPONDENCE

PORTLAND, ORE. (State Board of Health). To return to our mutual interest in bats and bat rabies. Finally having caught up with some of your recent issues of Bat Research News, I must say that the photography is unique and very interesting for your cover page.

I noticed in the April 1965 issue, Albert Ganier, Tennessee, was referring to the body temperature in bats and your reply regarding Eptesicus. About 2 years ago in looking for bats we were in an old headquarters building on an Indian Reservation. This is a 3 story wooden structure and we found Eptesicus and Myotis both under the center ridge beam. This was during the day in summer, and the temperature was recorded at 120°; our thermometer would go no higher. These bats apparently remained in this spot all year, and ambient winter temperatures have gone as low as -20°. I don't believe I have added anything to bat ecology, but it was of interest to us that these animals survive such temperature ranges.

No banding has been done for several years due to lack of time and staff. However, we hope others will continue such work. Bat rabies still exists in Oregon, and several dozen persons are bitten each year despite all warnings. Monroe A. Holmes

HOT SPRINGS, S. D. (Wind Cave National Park). In the August 1965 NSS News you requested information on caves where bats swarm near the entrance on summer nights. This has been noted to some extent at Jewel Cave.

Many of our rangers go on cave crawls during the evenings, and an increase in number of bats was noticed as the summer progressed. There were almost none present during the day. Bats don't start showing up until about 9 PM, and numbers increase from then on. Bats seem to mill around just outside the entrance, and there is constant exchange in and out. I have no idea of the number of bats passing in and out; 20 a minute is a rough guess. They travel up to $\frac{1}{4}$ mile into the cave.

The entrance is about 6' x 6' and is barred by a gate made of steel bars. The spaces are about 6" x 12". We think the gate might cause the milling around.

About 1 September several bats were captured with mist net at the entrance. They included Myotis subulatus, M. thysanodes, and Eptesicus fuscus. There were no Plecotus townsendii which is the bat we have banded in the cave during hibernation. Dr. Larry Brown, Dept. of Zoology, University of Wyoming, will be collecting some bats this winter in Jewel Cave. He has recommended the Lincoln index for determining the summer population of Jewel Cave bats, which is apparently quite different from the winter population. Any comments or recommendations you might care to make would be appreciated. James B. Thompson, Management Assistant.

Ed. comment: The Lincoln index would not work if the bats are transients, or if individuals become net shy after capture. We have never tried to estimate numbers at our swarming caves, and I know of no way to do it.

TORONTO, ONT. (Royal Ontario Museum). I am currently working under Dr. R. B. Peterson on a master's degree, the topic of our research being bat movement, ecology and development. During the summer I have banded some 1500 bats in the area around Kingston, Ont. Almost all were M. lucifugus, but we got some P. subflavus, Eptesicus fuscus, M. keenii and M. subulatus. We also got some information on movement of bats between summer colonies and an amazing 45% return on a homing study over 30 miles with 20 female M. lucifugus. This was done in May 1964. Within a week one bat is known to have returned, followed by 6 more before the end of the summer. This summer 2 more have been recaptured.

Last week I received word of an interesting recovery. A bat banded

at Dane, Ont., and released at Chaffey's Lock, was recovered at Lovern Falls, 160 miles west of the point of release.

I noticed in the August NSS News that you are interested in summer bat flights around cave entrances. I have noticed this around Kingston, but never involving too great a number of bats. The caves are Tyendinaga and a series of caves just north of Tyendinaga. M. Brock Fenton.

BATON ROUGE, La. (box 16211 L.S.U.). I went to New Orleans to talk with Dr. Roger D. Baker about histoplasmosis in bats. He does not seem to think bats are an important vector.

We tried some netting here in southern La. this fall and have caught Plecotus, L. seminolus, and M. austroriparius, among other things. The two M. austroriparius we caught really look strange. Both are gray, almost the color of M. grisescens. One has a yellow belly, the other a gray belly. One had lactated this year, so we know she was an adult. The three gray M. a. mumfordi specimens from La. I mentioned to you had been identified by Doug Lay at the Chicago Museum. Unlike all our gatesi, they have black membranes. I fear that further collecting will be required before we can really be sure of what kind of Myotis we have down here. For example, no one has ever collected a single specimen in Mississippi. Yet it must be here that intergradation (hybridization?) must be occurring.

I wrote to Roland C. Clement, staff biologist of the National Audubon Society, about the declining bat populations and asked if we could get some publicity on this problem in Audubon Magazine. He indicated an interest in working up an article on bats and bat preservation for the magazine. It seems to me it would be great to have an organization of their influence behind the effort to achieve some protection for bats. He wanted to know some details on current threats to bat populations. I told him the best place to start would be with the back issues of Bat Research News. I indicated that you might be willing to donate a set for such a worthwhile purpose. Do you think it would be worthwhile for an article of this sort to be published? Richard K. LaVal.

Ed. reply. Yes, it would certainly be helpful to get an article in Audubon Magazine. I think the National Audubon Society is the most effective force for conservation in this country, and I have been a member since 1947 when I was in junior high school. I will send Roland Clement a complete set of the News. To get data for his article he should contact Hitchcock, John Hall, Myers, Glass, Cockrum, and Seck. He might want to reprint in his article the picture in Allens book Bats showing the large winter colony of M. sodalis in a Vermont Cave. This colony is long since gone.

Re the Myotis from La. I would certainly be surprised if the identification of these as M. a. mumfordi were correct. More likely you have discovered a second color phase, such as occurs in the population in Florida. The gray phase is rather common there. I have one from there in which the belly is yellow and the back gray with a brown patch going across it. I have one in captivity which is gray on the back and yellow on the belly.

One of our undergraduate students, Russell Norton, sent me an alcoholic M. austroriparius from a cave in southern Mississippi. I gave it to the American Museum. I have also seen several of this species (misidentified as M. lucifugus) from a cave at nearby Brooklyn Alabama in the collection at Auburn University.

LITERATURE

There is too much literature to review all papers I get, so a policy must be formulated. I have been trying to include all papers from obscure sources which I think readers may not see, and have been excluding papers from the Journal of Mammalogy, which probably contains more bat papers than any other journal, because I think most readers probably subscribe to it. If you do not subscribe to the J. M., and are interested in the bat literature, you should subscribe now. It is the best bargain available in scientific journals. The \$4.00/ year membership dues is not nearly enough to cover the cost to the Society of supplying you with your journal. This is possible because of wise investments of life membership funds many years ago, and the Society passes on the benefits to the current membership. Send your \$4.00 to Dr. Bryan P. Glass, Dept. of Zoology, Oklahoma State University, Stillwater, Oklahoma, and become a member of the American Society of Mammalogists.

- Girard, K. F., H. B. Hitchcock, G. Edsall, & R. A. MacCreedy, 1965. Rabies in bats in southern New England. New England J. of Med. 272: 75-80.
- Gaisler, J., & M. Klima, 1965. Letni nalezky nekterych mene znamych netopyru na Morave a na Slovensku v obdobi 1961-1964. Lynx 5: 19-29. The title translates something like this: Summerfindings of a few seldom-seen kinds of bats in Mahren and in Slovakia during 1961-1964. The paper concerns the status of seven species in these regions, including some ecological observations. But don't trust my translations on this one; everyone should read it for himself.
- Hurka, L., 1965. Faunisticky vyzkum netopyru v zapadnich Cechach. Lynx, 5: 42-47. Faunistic investigation of bats in West-bohemia. Four years of systematic searching for bats in the region turned up 13 species. A table gives the numbers of each kind found.
- Gardner, A. L., 1965. New bat records from the Mexican state of Durango. Proc. Western Found. Vert. Zool. 1: 101-106.
- Luckens, M. M. & W. H. Davis, 1965. Toxicity of dieldrin and endrin to bats. Nature. 207: 879-880.
- Wells, H. J., M. Makita, W. W. Wells, & P. H. Krutzsch, 1965. A comparison of the lipid composition of brown adipose tissue from male and female bats (Myotis lucifugus) during hibernating and non-hibernating seasons. Biochem. et Biophysica Acta. 98: 269-277. One of my colleagues, who is much interested in the adipose tissues of bats, pointed out that this is a most strange paper. Nowhere do the authors say how many bats were used. The tables contain only absolute figures, giving no range of variation, so that the reader cannot tell whether the differences are real or are simply within the range of individual variation.
- Glass, B. P. & R. J. Baker, 1965. Vespertilio subulatus Say, 1823: proposed suppression under the plenary powers (Mammalia, Chiroptera). Bull. Zool Nomencl. 22: 204-205. The thing described by Say was probably the bat we now know by the name of Myotis yumanensis. The authors propose to keep this latter name for the species and to suppress the name subulatus, as in Myotis subulatus. The species we now

know by the name Myotis subulatus would take the name Myotis leibii.

Stones, R. C. & J. E. Wiebers, 1965. A review of temperature regulation in bats (Chiroptera). Amer. Midl. Nat. 74: 155-167.

Malaysian Cave Issue of the Malayan Nature Journal Vol 19, no. 1, May 1965. 112pp. A collection of 12 articles on the caves of Malaysia, including some interesting information on bats by Lord Medway, H. E. McClure and others. This copy of the Journal is available for \$1.75 from the Malayan Nature Society, box 750, Kuala Lumpur, Malaysia.

Greenhall, L. M., 1962. Aspects of ecology in vampire bat control in Trinidad. Anais do Segundo Congresso Latino-Americano de Zoologia. Sao Paulo, Brasil. p. 321-325.

Greenhall, L. M. 1965. La Importancia de los Murcielagos y de su Control en la Salud Publica, con especial Referencia a Trinidad. Boletin Oficina Sanitaria Panamerica LVIII:294-302. The importance of bats and their control in public health, with special reference to Trinidad.

Greenhall, L. M., 1965. Trinidad and bat research. Natural History, 74: 14-21. A popular article with some fine pictures.

Anderson, S. & C. E. Nelson, 1965. A systematic revision of Macrotus (Chiroptera). Our bat Macrotus californicus becomes Macrotus waterhousii californicus. This is the finest most thorough taxonomic paper I have ever seen.

Hitchcock, H. B., 1965. Twenty-three years of bat banding in Ontario and Quebec. Canadian Field-Nat. 79: 4-14.

DO I HAVE YOUR CORRECT ZIP CODE BELOW? I WILL NEED IT FOR THE NEXT ISSUE.

From: Dr. Wayne H. Davis
 Department of Zoology
 University of Kentucky
 Lexington, Kentucky 40506
 U. S. A.