

Name Frederick Schenck Barkalow, Jr. Field: Biology -  
Z oology

Project Leader, Inventory of Wildlife Resources  
Alabama Department of Conservation, Auburn  
Box #469, Auburn, Alabama

## Plan of Work

The completion of all major requirements for the Ph.D. degree in Zoology. The doctorate dissertation to be "A Life History Study of The Cotton Rat, Signodon hispidus hispidus Say and Ord.

Wishes to attend University of Michigan, working under Dr. W. H. Burt. Has been admitted. Probable duration of study twelve months, beginning June, 1941. Will return to present position.

Personal Data Born Marietta, Georgia, February, 1914. Married. Age: 27

Undergraduate Work Georgia School of Technology, B. S. in Chemistry, 1936.

Graduate Work Alabama Polytechnic Institute, 1936-37.  
University of Michigan, M. S. in Zoology, 1939.

Experience Instructor in zoology-mammalogy, Alabama Polytechnic Institute, 1936-39, \$1500; project leader, Inventory of Wildlife Resources of Alabama, Alabama Department of Conservation, 1939 - , \$2100.

Accomplishments See attached.

Fellowships: University of Michigan, 1938-39, \$600.

## References

Walter A. Gresh, U. S. Fish and Wildlife Service, Atlanta  
Dr. Charles N. Leach, Rabies Research Laboratory, Alabama Dept. of Health  
Ben C. Morgan, Department of Conservation, Montgomery, Alabama  
Dr. Allen M. Pearson, Alabama Wildlife Research Unit, Auburn  
J. M. Robinson, Alabama Polytechnic Institute  
Dr. W. H. Burt, University of Michigan

## Budget Summary

Total Amount Needed	\$ 1,700
From Applicant	500
From Fund	\$ 1,400

AMOUNT GRANTED

Frederick S. Barkalow, Jr.

PLEASE RETURN  
TO  
JULIUS ROSENWALD FUND

STATEMENT OF PLAN OF WORK



STATEMENT OF PLAN OF WORK

1. FULL DESCRIPTION OF PROJECT

a. Character

The completion of all major requirements for the PhD degree in Zoology.

b. Scope

The project will be divided into two phases as follows:

a. The completion of the French language requirement and the preliminary examination.

b. Completion of the thesis "A Life History Study of the Cotton Rat, Sigmodon h. hispidus, Say and Ord".

c. Significance

The discovery by Dr. Charles Armstrong<sup>1</sup>, Senior Surgeon, United States Public Health Service, that poliomyelitis could be induced in the eastern cotton rat (Sigmodon hispidus hispidus) created an additional incentive to study this characteristically southern rodent. Prior to Dr. Armstrong's discovery the only other mammals known to be susceptible to this disease were man, monkeys, and anthropoid apes. Since the cost of both monkeys and apes makes their use as laboratory animals almost prohibitive, it was highly desirable to secure some animal that would be relatively inexpensive, easily handled in the laboratory, and supplied in large numbers. The cotton rat meets all these requirements as is indicated in the following paragraphs quoted from Dr. Armstrong's paper:

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<sup>1</sup> Armstrong, C.: The experimental transmission of poliomyelitis to the eastern cotton rat, Sigmodon hispidus hispidus. Pub. Health Rep. 54:1719 (1939).

"A number of other rodents have been inoculated with the virus utilized in the course of this study, including——, but no positive results have been secured in animals other than cotton rats.

"The eastern cotton rat is not vicious and it multiplies readily in captivity. It is hoped, therefore, that when a sufficient supply becomes available and the most susceptible age is determined the cotton rat may prove to be a cheap, convenient, and useful laboratory animal for the study of poliomyelitis."

The cotton rat is of especial academic interest since it is one of the few southern rodents whose population is subject to sharply defined cycles. It has long been considered by game managers as one of the major enemies of the bobwhite quail since it preys upon quail eggs and competes with the adult birds for food. Its damage to small grains, fruits, and vegetables make it economically important to the farmer.

Although the cotton rat is an extremely abundant rodent and is known to be an economically important animal, little research work has been done on it. Almost nothing is known of its breeding habits, gestation period, or ecological relationships.

This project will attempt to bring together all of the more important literature pertaining to the cotton rat and will undertake an extensive life-history study of this animal.

2. THE PRESENT STATE OF THE PROJECT

a. Time of commencement

The cotton rat has been of interest to me since 1934 and life history notes on this species have been kept since that time. Work toward the PhD degree was begun at the University of Michigan in 1937. Breeding experiments in the laboratory would begin as soon as the project was approved.

b. Progress to date

The following progress toward the degree of Doctor of Philosophy in Zoology has been made:

1. German reading examination passed.
2. Residence requirements completed.
3. All formal course work completed.
4. Passed upon by the qualifying committee.
5. Doctorate committee appointed.

The following requirements have not been met:

1. French reading examination.
2. Preliminary examination.
3. Final examination.
4. Thesis. (Rather complete field observations and life history notes have been kept on this animal since 1934 so that a large part of the field work required by such a problem has been completed).

c. The amount of work to be completed during the period of fellowship.

1. Bibliography completed.
2. French and preliminary examination requirements could be met.
3. All laboratory breeding experiments such as the determination of gestation, litter sizes in captivity, etc. could be finished.
4. The majority, if not all, of the field work could be completed.

d. The amount of work which could not be finished during the year's work.

1. Final examination. (The final examination cannot be taken within one year of the successful completion of the preliminary examination).

2. Some additional field work may be required to complete the life history study. This would depend entirely upon the problems presenting themselves during the progress of the work.

3. THE PROPOSED UNIVERSITY AND AUTHORITIES SUPERVISING THE WORK

- a. University: University of Michigan.
- b. Dr. W. H. Burt, Curator, Division of Mammals would supervise the work as committee chairman, and Dr. Lee R. Dice, Director, Laboratory of Vertebrate Genetics would direct the breeding experiments.
- c. Field work: All field work will, of necessity, be carried out in the South since the cotton rat is found principally in the Southern States.

4. EXPECTATION AS TO PUBLICATION OR USE OF THE RESULTS OF YOUR STUDY.

- a. Publications: The results of the study will be published as a museum bulletin of the University of Michigan or will be broken down into smaller papers and published in such scientific magazines as the "Journal of Mammalogy", "The Wildlife Journal", etc.
- b. Use of the results of this study: The publication of a life history study of this animal would be of utmost value to the research physician, game managers, and biologists in general. The compilation of a bibliography would in itself be a contribution to science.

5. SUBSEQUENT PLANS FOR MY CAREER.

On completion of my doctorate work, I plan to continue in the field of game research in the South and, in all probability, in Alabama. It is my desire to be connected with either a state conservation department or with a college.

It is my belief that the South offers the most promising future for the scientist especially in the field of game research. Having been born and reared in Georgia, I am well acquainted with game problems in the Southeast and, therefore, it is my desire to continue my work in this section.



Fig. 1 - The cotton rat Sigmodon hispidus hispidus is the only mammal other than the primates, so far discovered, that is susceptible to poliomyelitis. Photograph taken near Auburn, Alabama by Frederick S. Barkalow, Jr.

Frederick S. Barkalow, Jr.



Fig. 2 - The winter burrow of the cotton rat  
Sigmodon hispidus hispidus. Auburn, Lee County,  
Alabama. (Frederick S. Barkalow, Jr.)



Fig. 3 - Johnson grass cut and stored in an abandoned field by cotton rats. During the fall these animals cut and store large quantities of small grains.

Taken near Auburn, Lee County, Alabama by Frederick S. Barkalow, Jr.

TRANSCRIPT

O. K. corres. Zool.  
6-19-37.

Fred Schenck Barkalow

GEORGIA SCHOOL OF TECHNOLOGY  
Atlanta, Georgia

Permanent File  
Graduate School Office  
Please return

Registrar's Office

January 5th, 1937

To whom it may concern:

This is to certify that MR. FRED SCHENCK BARKALOW, JR. was admitted to the Freshman class of the Georgia School of Technology, September 1931 by certificate from the Marietta High School with the following admission units:

English 4 Algebra 2 Pl. & So. Geometry 1½ Physics 1 History 2 Civics 1 Latin 2  
Spanish 2 Chemistry 1 Biology 1 General Science 1 Trigonometry ½

Mr. Barkalow was a student at the Georgia School of Technology from September 1931 to June 1936. He was graduated with the Degree of Bachelor of Science in Chemistry, June 8th, 1936. His record is as follows:

PASSING GRADE D TO A

CAT NO	SUBJECT	NO WKS	HRS Rec	PR WK Lab	GRADE	SEM HRS
Chem 1,2,5,6	inorg. Chemistry & Lab.	36	3	3	C,A,B,B	8
Chem 15	Qualitative Analysis	18	3	9	C	6
Chem 21	Organic Chemistry	18	3	x	C	3
Chem 25	Organic Chemistry	18	3	x	C	3
Chem 61	Metallurgy	18	2	x	A	2
Chem 17	Quant. Analysis	18	2	9	C	4
Chem 18	Quant. Analysis	18	1	12	B	3.3
Chem 29	Organic Chemistry	18	3	6	C	5
Chem 101	Adv. General Chemistry	18	2	x	E R B	2
Chem 147	Physical Chemistry	18	4	4	C	4.6
Chem 221	Organic Chemistry	18	3	x	C	3
Chem 120	Technical Analysis	18	1	6	C	3
Chem 148	Physical Chemistry	18	4	4	D	5.6
Biol 45	General Biology	18	3	4	A	4.3
Biol 46	Zoology	18	3	4	A	4.3
Biol 38	Bacteriology	18	2	4	A	3
Biol 42	Public Health & Preventive Medicine	18	2	x	A	2
Biol 51	Physiology	18	3	x	A	3
Econ 22	Economics	18	3	x	B	3
Dr 15,16	Appl. Technical Drawing	36	x	6	B,D	4
Eng 11,12	Composition & Rhetoric	36	3	x	C,B	6
Eng 31,32	English Literature	36	3	x	A,A	6
Eng 24,45	Economics, Public Speaking	36	3	x	B,B	6
Geol 51	Mineralogy	18	1	3	B	2
Geol 41,42	General Geology	36	3	x	A,A	6
Math 17,18	Alg. & Trig; Analytic Geometry	36	5	x	D,C	10
Math 23,24	Calculus	36	5	x	D,B	10
M L 13,14	Spanish, Elementary	36	3	x	C,C	0
M L 1,2,3	German	54	3	x	C,C,C	9
Phys 9,10	Physics	36	4	x	D,C	8
Phys 16	Physics Lab.	18	x	3	B	1.3
Phys 25	Physics & Lab.	18	3	3	C	4
Mil 1,2,3,4	Fresh. & Soph. ROTC	72	x	5	B,A,C,C	8
Mil 5,6,7,8	Jr. & Sr. Military	72	3	x	B,R,R,B	12

Respectfully,  
(signed)  
Associate Registrar

UNIVERSITY

ALABAMA POLYTECHNIC INSTITUTE  
Auburn, Alabama

June 14, 1937

To Whom It May Concern:

This is to certify that FRED SCHENCK BARKALOW, JR. was admitted to the Alabama Polytechnic Institute on the basis of credits earned at the Georgia School of Technology from which he received the degree Bachelor of Science in Chemistry, June 8, 1936. Below is his record at this institution.

<u>Courses</u>	1936-37	<u>Grade</u>	<u>Semester Hours</u>
Bot 201-2 General Botany		96 95	6
Zool 305 General Entomology		95	3
Zool 410 Economic Ornithology		95	3 (Graduate Credit)

Very sincerely yours,

(signed)

Chas W. Edwards

Associate Registrar

CWE:SM

FISK  
UNIVERSITY

NAME Barkalow, Fred Schenck, Jr.

HOME ADDRESS Marietta, Georgia

DEGREES RECEIVED B.S. Chem. Georgia School  
of Technology, June 1936

DEGREES CONFERRED M.S. June 16, 1939

GRADUATE SCHOOL OF THE UNIVERSITY OF MICHIGAN

DATE ADMITTED S.S. 1937 DEGREE SOUGHT M.S.

UNQUALIFIED ADMISSION S.S. 1937 QUALIFIED ADMISSION

DEPARTMENT Zoology SPECIALIZATION Zoology

YEAR	S.S.	SUBJECT	COURSE	CREDIT	GRADE	INSTRUCTOR	RECORD BOOK
	1937	Comparative Anatomy of Vertebrates	51	4	A	Okkelberg	DATE OF BIRTH
		Investigations in Mammalogy	295	4	A	Dice	POSITIONS HELD IN UNIVERSITY
1st.	1938-39	Ecology (Proseminar)	2510	1	A		RESULT OF LANGUAGE EXAMINATIONS
		Zoogeography	241	2	A-		<u>11 - 16 - 38 Passed</u> <u>German, A. G. Lee</u>
		Invertebrate Zoology	41	4	A		RESULT OF PRELIMINARY EXAMINATIONS
		Parasitology	141	4	A-		ADVANCED CREDIT
2nd	1938-39	Embryology of Vertebrates	56	4	A		
		Mammalogy (Proseminar)	252A	1	A-		
		Investigations in Mammalogy	296	2	A		
		Investigations in Fisheries Biology	258	2	B		
		Herpetology	222D	2	B		

ACCOMPLISHMENTS

2. RESEARCH AND CREATIVE WORK DONE

ACCOMPLISHMENTS

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RESEARCH

Mourning Dove Life History Project

I spent the summer of 1936 as a temporary assistant with the Alabama Cooperative Wildlife Research Unit and assisted on the "Life History Study of the Mourning Dove Project". This work included nesting observations, trapping and banding of adult birds, banding of young birds, studies of their nesting habits, making examinations for both ecto- and endoparasites, and submission of written reports on these observations.

Fox Food Study

In order to get experience in practical game research, the summer of 1938 was spent in the Food Habits Section of the United States Fish and Wildlife Service as an employee of the Alabama Cooperative Wildlife Research Unit. The problem was the determination of the feeding habits of the Red and Gray Fox in Alabama. Stomachs, droppings, and den collections were made by various cooperators throughout the State and the material was sent to the Alabama Cooperative Wildlife Research Unit. My part in this project was the examination of materials sent in by the cooperators. Since a problem of this type requires an extensive collection of comparative materials, the work was done in the laboratories of the Food Habits Section, United States Fish and Wildlife Service, Washington, D. C. The work was carried on

under the supervision of leading food habits specialists. Since this is a long term project, requiring the examination of hundreds of stomachs, etc., only the preliminary findings of this project have been published.

#### Inventory of Wildlife Resources Project

On October 1, 1939, I accepted the leadership of the Pittman-Robertson Project, "Inventory of Wildlife Resources of Alabama". The project, (the Alabama Department of Conservation and the United States Fish and Wildlife Service Cooperating), has the following objectives:

1. To determine the present distribution and approximate populations of the more important game and fur-bearing animals in Alabama.
2. To catalog and evaluate the environmental influences for each species in order that a program of long range planning for wildlife restoration and management can be initiated.

The staff consists of a project leader, three research assistants, a secretary, and two laborers. The project receives an appropriation of approximately \$15,000.00/year and is expected to be completed in five years.

Findings are published from time to time either as scientific notes or as semitechnical articles in the magazine "Alabama Conservation". Progress reports are made to the Department of Conservation and the United States Fish and Wildlife Service at monthly and quarterly intervals respectively.

#### CREATIVE WORK

##### Student Laboratory Technician

During my Junior year at the Georgia School of Technology, I was



employed as a Student Laboratory Technician; the duties consisted of collecting and preserving biological specimens for study. The preparation of microscope slides, insect collections, vertebrate skeletons (both articulate and inarticulate), and a series of mounted birds were included in the year's accomplishments.

A. P. I. Mammal and Bird Skin Research Collection

While an instructor at the Alabama Polytechnic Institute the establishment of a scientific bird and mammal skin reference collection to provide teaching and research materials was begun. I prepared all mammal specimens and assisted in the preparation of the bird skin research collection. Approximately five hundred bird and mammal specimens were personally prepared during my two years as a member of the Department of Zoology-Entomology.

Assistant, Division of Mammals, University of Michigan

As an assistant in the Division of Mammals, University of Michigan, I was in charge of the mammal preparation room. The duties included the preparation of scientific mammal skins and skeletons for the research collection, caring for the "bug" room, and accessioning new material. Several thousand specimens were handled during the year's tenure of the assistantship.

Frederick S. Barkalow, Jr.

ACCOMPLISHMENTS

3. PUBLICATIONS

PUBLICATIONS

Scientific Notes:

"Unusual Nesting Records of the Mourning Dove from Cobb County Georgia", Barkalow, Jr., F. S. The Oriole, July 1936. p. 26. (Official Organ of "The Georgia Ornithological Society").

"Records of the Sooty Tern and Swallow-tailed Kite in Alabama", Barkalow, Jr., F. S. The Wilson Bulletin, June 1939. Vol. 51, No. 2, p. 121.

"The Leconte Free-tailed Bat in Alabama", Barkalow, Jr., F. S. Journal of Mammalogy, August 14, 1939. Vol. 20, No. 3, p. 370.

"Black Vulture and Red Fox Found in an Unusual Association", Barkalow, Jr., F. S. Wilson Bulletin. (In press).

"Additional Notes on Nesting Extremes for Birds Breeding in the Atlanta Region", Barkalow, Jr., F. S. The Oriole. (In press).

Scientific Papers Read:

"Preparation and Care of Raw Pelts in Alabama (10 Min.) (Lantern)", Barkalow, Jr., F. S. Journal Alabama Academy of Sciences, 1938. Paper presented before the Alabama Academy of Sciences, Spring 1938, p. 27.

"Alabama's Wildlife Restoration Program Under the Pittman-Robertson Act of 1937", Barkalow, Jr., F. S. Alabama Academy of Science, March 29, 1940. vol. 12, Part 11. p. 67.

Semi-technical Magazine Articles:

"Hunting With Camera Good Hobby for Spring Months", Barkalow, Jr., F. S. Alabama Game and Fish News, May 1937. pp. 5 & 13.

"Preparation of Pelts From Fur-Bearing Animals", Barkalow, Jr., F. S. Alabama Game and Fish News, November 1938. Reprinted as: "Preparation of Pelts of Fur-Bearing Animals". The Ohio Conservation Bulletin, February, 1939.

"Game Heads--Care and Preservation in The Field", Barkalow, Jr. F. S. Alabama Game and Fish News, December 1939. pp. 3, 4, & 14.

PUBLICATIONS (Cont.)

Semi-technical Magazine Articles:

"Industrious beaver is returning to This State", Barkalow, Jr.,  
F. S. Alabama Game and Fish News, September 1940. pp. 5, 6, & 14.

"Reasons for Bobwhite Scarcity in Alabama", Webb, J. W. and  
Barkalow, Jr., F. S. Alabama Game and Fish News, October 1940.

"Black Warrior Deer Food", Wheeler, Jr., H. J. and Barkalow, Jr.,  
F. S. Alabama Conservation, November 1940. pp. 3, 4, and 8.

ACCOMPLISHMENTS

3. PUBLICATIONS  
( examples of )

**Unusual Nesting Records of the Mourning Dove from Cobb County, Georgia.**—The Mourning Dove (*Zenaidura macroura carolinensis*), although a common resident throughout most of the eastern United States, has never been studied in any detail; thus, little is known about many phases of its life history. The following records may not be actually unusual—only further study will determine this.

The first note concerns the use of the same nest for five successful broods by Mourning Doves, supposedly the same pair. It was located in a pear tree about three and one-half miles from Marietta, Cobb County, Georgia. Miss Louise Franklin observed the nest during 1935 and states that three broods were raised, the last leaving the nest on September 20th. This year one brood was successfully raised early in May; the second brood hatched about June 20th. No new nesting material was added for the second use of the nest.

The second record is that of the Mourning Dove nesting on the ground. This is not a very unusual occurrence and may take place more commonly than is realized. The nest was located in a cotton field in Cobb County about four miles north of Marietta, Georgia. It was placed in some Johnson Grass in an unplowed corner of the field and contained two eggs on June 22, 1936. The nest was not well hidden and contained only short pieces of grass stems and small twigs. It was very shabbily built and contained only about fifty percent as much material in its construction as their usual nest in a tree.—Fred S. Barkalow, Jr., Marietta, Georgia.

(Reprint from THE ORIOLE, July, 1936.)

GENERAL NOTES

Records of the Sooty Tern and Swallow-tailed Kite in Alabama.—On March 20, 1938, following a hard "blow" from the South, an exhausted tern was picked up on the lawn of the Fairhope Hotel, Fairhope, Baldwin County, Alabama. The bird died soon after and was given to Mr. Duncan McIntosh, of Fairhope, who prepared the skin for his collection. Due to decomposition, the sex could not be determined. Mr. McIntosh kindly allowed me to examine the skin and on comparing it with known skins in the University of Michigan Museum of Zoology, it proved to be a Sooty Tern, *Sterna fuscata fuscata*. I believe this to be the first record of the occurrence of the Sooty Tern in Alabama.

On May 14, 1938, I observed a Swallow-tailed Kite, *Elanoides forficatus*, sailing over a grove of live oaks on the eastern shore of Mobile Bay about one mile north of Daphne, Baldwin County, Alabama. The bird was watched for some time as it wheeled and glided overhead, frequently coming within a hundred yards, and at a rather low altitude. The white head, neck, and underparts, as well as the black back, and deeply forked tail were clearly visible, leaving no doubt as to its identity. Listed below are all published records, to my knowledge, for the occurrence of this species in the State.

- 1858 Dallas County. P. H. Gosse ("Letters from Alabama," 1859: 216-217), "seen nearly every day [in July] associating in little groups." (Gosse, *vide* A. H. Howell, "Birds of Alabama," 1924, pp. 128-9).
- 1889 Autauga County, Autaugaville, about March, 1889, one seen by L. S. Golsan. A. H. Howell (*loc. cit.*).
- 1890 Hale County, near Greensboro along the Warrior River. W. C. Avery (*Amer. Field*, 34, 1890: 584) says "Not common. Once abundant. It may breed along the Warrior River [near Greensboro] where now occasionally seen." A. H. Howell (*loc. cit.*).
- 1909 Montgomery County, Barachias on May 1, 1909, one seen by E. G. Holt (*Auk*, 31, 1914: 220).
- 1911 Baldwin County, Chuckee [not Chuckvee] Bay on May 12, 1911, one seen by A. H. Howell (*loc. cit.*).
- 1921 Geneva County, Hartford on January 26, 1921, one specimen shot. P. A. Brannon (*Auk*, 38, 1921: 464).
- 1932 Baldwin County, Fairhope on April 20, 1932, one seen by Duncan McIntosh. Helen M. Edwards (*Auk*, 50, 1933: 234).
- 1938 Baldwin County, near Daphne on May 14, 1938, one seen by Fred S. Barkalow, Jr.
- FRED S. BARKALOW, JR., *Alabama Polytechnic Institute, Auburn, Alabama.*

Reprinted from JOURNAL OF MAMMALOGY  
Vol. 20, No. 3, August 14, 1939, p. 370

THE LECONTE FREE-TAILED BAT IN ALABAMA

A. H. Howell (North Amer. Fauna no. 45, 1921 pp. 28-29) gives only two locality records in Alabama for the occurrence of the free-tailed bat, *Tadarida cynocephala* (Le Conte). Dr. W. C. Avery took about four hundred specimens from an old house in Greensboro, Hale County, on July 31 and August 1, 1890; and two specimens were shot by hunters at Orange Beach, Baldwin County on January 24 and 28, 1912. I believe that no specimens of this species have been reported from Alabama since the latter date. On May 20, 1938, Duncan McIntosh and I collected an adult male *Tadarida cynocephala*, together with 10 *Eptesicus fuscus fuscus* (Beauvois), hanging in a crevice between the walls of a brick building on the Alabama Polytechnic Institute campus, Auburn, Lee County, Alabama. The *Tadarida* had a large fistula, similar to those caused by bot fly larvae, on the midventral portion of its neck. Of the ten *Eptesicus*, seven were young unable to fly, two were adult females suckling young, and a third adult escaped before its sex could be determined.—FRED S. BARKALOW, JR., *Department of Zoology-Entomology, Alabama Polytechnic Institute, Auburn, Alabama.*

Abstract of a paper presented before Section IV, Alabama Academy of Science, March 29, 1940. Reprinted from the *Journal of the Academy*. Vol. 12, Part II, page 67.

"ALABAMA'S WILDLIFE RESTORATION PROGRAM UNDER  
THE PITTMAN-ROBERTSON ACT OF 1937"

—F. S. Barkalow, Jr., State Department of Conservation, Auburn

Under the provisions of the Pittman-Robertson Act of September 2, 1937, a research project entitled "Inventory of Wildlife Resources of Alabama" has been initiated. This project, embracing all game species in the State, is being conducted for a period of twelve months with the expectation that it will be renewed from year to year. Work is directed toward determining the distribution of game, and approximate game populations. Species given primary consideration are the bobwhite quail, wild turkey, deer, squirrel, and rabbit.

Quail are being censused by actual covey counts on representative farms throughout the State. Deer and turkey populations are being estimated by drive counts, while rabbits are censused by means of pellet frequency or flushing counts. Squirrel populations are estimated by means of nest and time interval counts.

Limiting factors, restoration possibilities, and the most pressing research needs are being evaluated, and projects to solve such problems are being submitted. Information is secured in several different ways, including direct field observations made by members of the research staff, and indirect information such as that obtained by means of questionnaires and interviews with interested parties. A study of the literature on censusing is being made to obtain a background for the work of the project.

Full-time assistants have been assigned to the quail, turkey, and deer, as well as to the squirrel and rabbit phases of the project.

# Hunting With Camera Good Hobby for Spring Months

By F. S. BARKALOW, JR.

Department of Zoology-Entomology Alabama Polytechnic Institute

**H**OW many times while hunting have you remarked to yourself "I wish I could get a picture of that last point of Bob's;" or "What a beautiful lagoon! I wish I had a picture of it!" All of you at one time or another have had such inspirations which faded to the tune of "Well, I don't have a good camera and probably wouldn't have gotten a good picture anyway."

Technical nature photography, it is true, is one of the most difficult of all the phases of photography, but interesting pictures can be taken without expensive equipment. Many nature pictures that were taken with a cheap box camera have been prize winners. Photography is not as expensive as it would at first appear to be, and the pleasure and the recreation that it affords well outweigh the expense.

All the equipment that is necessary to take most nature pictures is a small inexpensive box or folding kodak, a seventy-five cent lens, some reliable films, a ball of twine, a manila rope 50'- $\frac{1}{4}$ " long, a measuring tape, and the determination to get a good picture. Any commercial photographer will be glad to demonstrate the use of the kodak and help you with your difficulties, which at first will be many.

Now that the hunting season is closed, why give up the woods and the fields entirely? This is one of the most fascinating seasons of the year from the nature lover and sportman's standpoint for this is the time of the year really to get acquainted with wildlife. Nature at this period is trying to replace her losses of the past Winter and hunting season. The success of the coming hunting season depends on her efforts to replenish game in the Spring. The camera is an invaluable aid in studying game birds and animals, and its use to the sportsman is growing in popularity. Why not dig out the old family kodak, knock off the dust, buy some films, and go out into the field?



"Now that the hunting season is closed, why give up the woods and fields entirely?" says F. S. Barkalow, Jr., of the Department of Zoology-Entomology at Alabama Polytechnic Institute. Mr. Barkalow proceeds to demonstrate the value of a camera at this season of the year. Upper left shows a captive red-tail hawk sitting on a barb-wire fence. Upper right is a mourning dove nest in a pear tree. Below the hawk is a female hummingbird sitting on her nest, while to the right of that is a male flying squirrel just about ready to take off. The lower right picture shows Mr. Barkalow hanging up in a tree 75 feet above the ground photographing a Cooper's hawk's nest. In the accompanying article Mr. Barkalow explains how he made these pictures with inexpensive equipment.



Don't permit yourself the illusion that it will be child's play—it is not. Try swinging over a hawk's nest 70 feet up in a tree with a camera in both hands, a yardstick in your

mouth, and one foot on a swaying branch. Now take the pictures carefully and have them  
(Continued on page 13)

ting you camera. Then, just as you are ready to snap the picture the rope gives suddenly! There you have it—an unexpected thrill. Perhaps you consider yourself patient? You may be, but have you ever tried to photograph a shy mother bird on the nest? Try it this spring. The parent will almost invariably leave the nest on your approach.

Set up your camera and attach a string to the shutter release, retreat to a convenient hiding place, and begin the waiting game. The bird may return immediately, but this is the rare exception. Dull and uninteresting? Perhaps. The unexpected frequently happens. The bird may return to the nest after some absence—you wait breathlessly and just as you prepare to trip the shutter you suddenly become aware of other aspects of nature; you have been sitting in an ant bed and the entire personnel is testing the elasticity of your external integument, or you sit in a blind with the bird only a few feet away and a wood tick most ungraciously starts drilling between your shoulder blades; you mutter to yourself and try to dislodge the intruder—instantly the bird is gone and another two hours is wasted.

But at last you do get the picture and it is successful. There is a feeling that is indescribable—the joy of having made a clean shot at 100 yards is nothing compared to the thrill of securing a good picture of a bird in its natural habitat.

If you are good at stalking, try crawling through a salt marsh on all-fours with mud and slime covering your face, arms, and legs while you vainly try to get a shot of an elusive Marsh Hen on the nest. Try to be quiet, if you can, with 10 or 12 deer flies pumping blood out of your neck or mosquitoes apparently the size of humming birds puncturing your proboscis. But is a good picture not worth all the trouble? You will agree with me if you have ever secured one.

Fishing pictures are always good for diversion (sometimes proof—no trick photography—please). Pictures of yourself

fishing in a rushing trout stream, pictures of a friend untangling his line from a Rhodendron bush, or a picture of the boss resting rather informally neck deep in icy water. All of these make “shots” which you and your friends will enjoy, and will provide unending pleasure.

Hundreds of “shots” of game and wildlife can be taken with inexpensive equipment, and for thrills and sport there are few hobbies that will compare with wildlife photography. A picture of the squirrels on your lawn, your favorite bird dog, birds nesting, a beautiful fishing hole; all of these are within easy reach. Why not take advantage of them during the closed season?

### CAMERA HUNTING

(Continued from page 5)

developed. On examining them closely you wonder what each is supposed to represent. Where did that man's leg come from? What manner of hallucination is this? How did that dove nest get in the middle of that lake? You're quite positive they are not aquatic fowls. Such novelties will greet your first efforts at nature photography, but keep trying—success comes only with experience.

As for thrills, they are plentiful. Roller coasters are a tame experience to lowering yourself on the end of a rope within photographing distance of a nest 50 feet from the ground, measuring the distance carefully, set-

# Preparation Of Pelts From Fur-Bearing Animals

By Fred S. Barkalow, Jr.

Department of Zoology-Entomology, Alabama  
Polytechnic Institute



**T**HIS paper is written to assist the trapper or the farm boy in obtaining more money for his pelts, to increase the value of the annual fur crop, and to secure uniformity of handling fur skins in Alabama.

All fur skins are handled in much the same way. Methods of making the opening cuts and stretching may vary with certain groups. The following general discussion applies to all skins which are to be used for fur purposes. In making the opening cuts, always insert the knife between the skin and body cutting from the flesh side toward the outside (never the reverse). Sever the ears as close to the base of the skull as possible using extreme caution in skinning around the eyes so as not to cut the eyelids. Remove all burrs and other foreign material from the pelt. Wash the whole skin thoroughly being sure to break up and remove all dirt and blood clots with the fingers or an old tooth brush. Washing a skin requires time but the effort and care taken will be well rewarded in receiving more for the pelts. As soon as the dirt and blood have been removed, squeeze the skin out (never twist or wring it), and remove all adhering meat and fat which comes off readily.

Pull the skin away from the meat rather than the meat away from the skin as this reduces the chances of stretching or tearing. Washed skins should be hung up, fur side out, and the fur allowed to dry thoroughly before stretching. After they have been stretched for a few days, and are partially dry, more fat can be removed by carefully scraping it off with the blunt edge of a knife. Never over-stretch a skin. Stretch until the skin is without wrinkles but do not stretch it much beyond this point. Since raw (untanned) furs deteriorate, they should never be kept any length of time but should be sold or sent to a tanner as soon as

possible. Salt or other chemicals should never be used on fur skins.

There are five methods by which the skins of Alabama fur animals are treated. They are named according to the way in which they are stretched and dried:

1. Normal Skin
2. Square Skin
3. Round Skin
4. Cased Skin (flesh side out)
5. Cased Skin (fur side out)

The preceding general directions for stretching and cleaning applies to all five groups. The following discussion takes up specifically the handling of each type.

## 1. Normal Skin (Bear, Deer)

To skin a bear, make a diagonal cut from the left corner of its mouth down the underside of the throat to a point midway between the front legs, thence on the under side along the midline to the tip of the tail. A second cut is made from the middle of one front foot along the inside across the chest and to the middle of the opposite front foot. Another cut is made from the bottom of each rear foot along the back of each hind leg to the base of the tail (Fig. 1). Peel the skin from each leg and cut the claws from the feet leaving them attached to the skin. Remove the skin from the body and allow it to cool for about thirty minutes. In the meantime, scrape off as much adhering meat and fat as possible. Salt the skin heavily, rubbing the salt in well around the claws, lips, and ears. After salting, fold it down the middle of the back, flesh sides together; then roll it up in a loose roll and leave over night. The next morning stretch the skin out and nail it to a flat surface, flesh side out, allowing it to remain until dry (Fig. 2). If excessively fat, ship at once to a fur buyer or tanner. A bear is the **only fur animal** in Alabama whose skin is salted. Handle a deer the same as the bear except the head and feet are cut off (Fig. 3). **Do not salt.**

## 2. Square Skin (Raccoon)

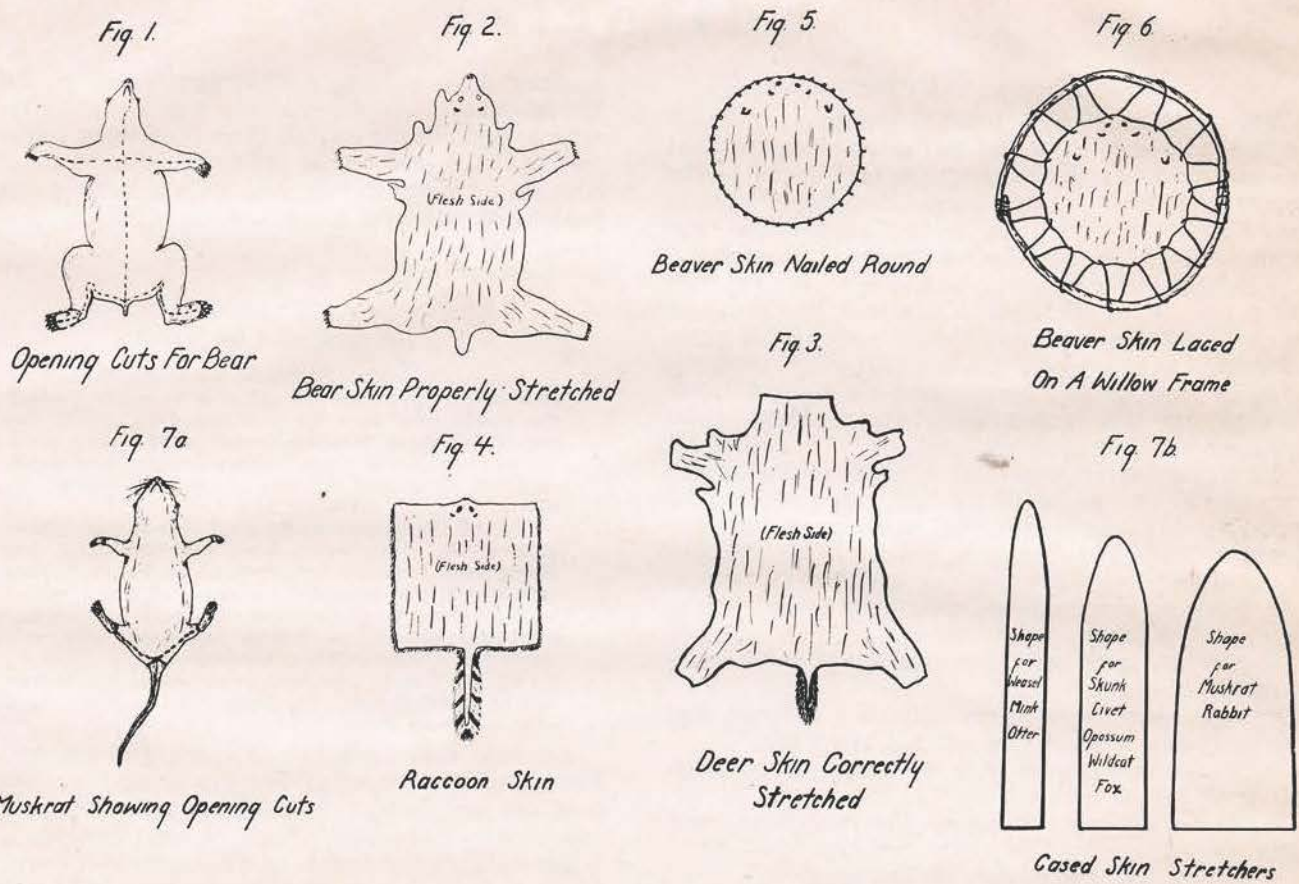
The raccoon skin is the only fur in Alabama which is handled in this manner. Make an incision from the tip of the lower jaw to the tip of the tail on the underside along the mid line. Slit the front and back legs as in the bear, but cut off the skin at the wrists and ankles. Peel it from the carcass, wash, dry and stretch the fur and nail it as nearly square as possible, flesh side out (Fig. 4). Allow it to dry, remove from the board, brush the hair well, and pile it with other skins in a cool airy place.

## 3. Round Skin (Beaver)

Split the beaver skin along the midline on the underside from the tip of lower jaw to end of hair at base of tail, cut down the rear of each hind leg to base of tail and cut around the wrists and ankles. **Do not cut the front legs except around the wrists.** Remove the skin from the carcass, wash it, dry the fur, and nail it in a circular fashion (Fig. 5) on a flat surface, flesh side out, or lace it on a frame (Fig. 6), and allow to dry thoroughly.

## 4. Cased Skin—Flesh Side Out (Skunk, Civet, Weasel, Mink, Otter, Muskrat, Opossum, Rabbit)

To case a skin slit it down the back of each hind leg to the base of the tail, split the tail along the under side from root to tip in all animals except the muskrat and opossum—in these forms cut it completely loose from the tail. Sever the skin from the feet at wrists and ankles (Fig. 7a) and remove it by peeling it loose first from the tail and rump, then forward over the body and head as one would remove a slipover sweater. Clean and wash well, allow the fur to dry, then place it on a stretcher of the correct shape (Fig. 7b). Wooden stretchers may be easily made from poplar or pine boards  $\frac{1}{4}$ " thick for the smaller pelts and  $\frac{3}{4}$ " thick for larger animals. Wire stretchers may be either purchased or made and are equally satisfactory (Fig. 7b). Before trapping season begins a number of stretchers of various types and



The diagrams shown here are explained fully in the accompanying article by F. S. Barkalow, Jr.

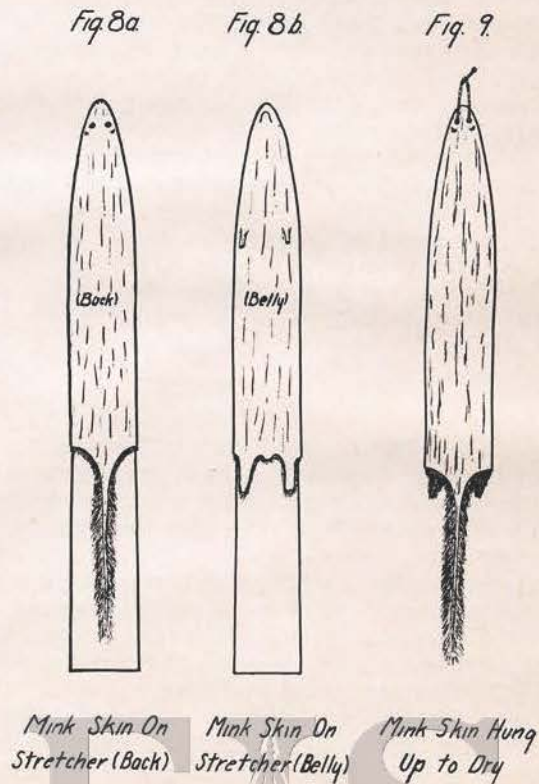
sizes should be made. Never try to use the same board for two pelts unless the animals are of the same size. **Make a board to fit the skin—do not over-stretch the skin to fit the board.** Wire stretchers are adjustable and easily fitted. Be careful to get both front legs as well as both back legs on the same side of the stretcher (Fig. 8b). Use a board that will slide into the skin without being excessively forced, yet will fill the skin without wrinkles. Remove the skins from stretchers as soon as they have dried sufficiently to hold their shape. Never let them dry completely on the stretching board. Hang each one separately by running a string through both eye holes and allow the skin to dry thoroughly before shipping (Fig. 9).

5. Cased Skin—Fur Side Out (Fox, Wildcat, Bobcat or Lynx)

Wildcat and fox skins are prepared exactly as a flesh side out skin **except the feet and claws are left attached.** Place the skin on a stretcher flesh side out until it begins to harden. Then remove it from the board, reverse, and place it back on the stretcher **fur side out** and allow to dry until it can be removed without losing its shape. Hang it up to complete drying.

Important Notice

A new government regulation (U. S. Postal Laws and Regulations, Insert No. 272, April 13, 1936) requires that all skins sent through the mail must be listed on the outside of the bundle. For fur regulations in Alabama, get a copy of the fur



and trapping laws from the State Department of Conservation, Alabama Game Commission, Montgomery, Alabama.



# Game Heads-Care and Preservation in the Field

By Frederick S. Barkalow, Jr.

Inventory Of Wildlife Resources of Alabama Project



WELL mounted game head is one of the most highly prized of all sportsmen's trophies; however, few realize that proper care in the field is necessary to insure a beautiful, life-like specimen. Since a taxidermist is not a magician, he cannot regrow hair which has slipped (come out) because of decomposition; neither is he able to hide a seam across bare skin or skin sparsely covered with hair. It is not the purpose of this paper to give directions for mounting a game head, because the average hunter has neither the time nor equipment for such work. Due to the warm, wet winters which occur in the South the proper care of specimens in the field is a necessity in order that they reach the taxidermist in good condition. I have found through experience that the best results are obtained by using the method described in this paper.

The mounted heads of deer, bear, wildcat, and fox all make beautiful trophies for the den. Since deer heads are most commonly used for this purpose, their preparation will be described in detail. The field care of all game heads is essentially the same, so that the directions given for the deer may be applied to the others with only minor changes. It is better to send the unskinned head and neck to a taxidermist if it will reach him not more than two days after being killed. To ship fresh unskinned heads, sever the neck from the body along line AE (Fig. 1). Rinse off all blood from the hair and wrap the head and neck in several layers of burlap or gunnysacks, tie well, and place the bundle in a shipping crate. (The neck may be removed by making the cuts AE and AB and skinning it out to the base of the skull, severing it at this point, thus leaving the head unskinned for the taxidermist.) Wrap loose newspapers around the head to prevent the antlers from getting broken if the head should shift its position suddenly. Mark the crate "RUSH PERISHABLE" and "FRESH MEAT, KEEP COOL." Be sure to state on the outside what is contained within and also write your hunting

license number on the crate where it can be plainly seen.

If longer than two days are required for shipment, the head must be skinned and salted according to the following directions.

Slitting a deer's throat in order to let it bleed is a mistake most commonly made by the sportsman. This is the worst error which can be made if the head is to be mounted, as it is almost impossible to hide such a

cut. The hair on a deer's throat is quite thin and a seam in this region is sure to show when the head is mounted. If the animal is to be bled, remove the heart by severing all vessels which enter or leave it; this will remove more blood from the carcass than splitting the throat. Before the deer is skinned, measure the distance from the corner of the eye to the tip of the nose. Don't guess at the distance but **measure it accurately to the nearest 1/8"**. If a ruler is not available, cut a small stick the exact length of this distance and measure the stick at a later time. The eye-nose measurement as well as the kind of deer (southeastern white-tail in Alabama) should be written on a label and attached to the scalp when it is sent to the taxidermist. These data are necessary to aid him in properly mounting the head.

To skin out the scalp make an incision as shown in Fig. 1 from a point between the shoulder blades (A) up the back of the neck to a point just in front of the ears (B). Slit the skin from the base of each antler to the end of the first cut (C to B and D to B). Make another cut from the point (A) around the neck on either side to (E). Note that the cut is made well down on the neck and is **never** made just behind the ears! Many fine specimens have been ruined by cutting the neck skin too short. Peel the skin from the neck and cut the ears loose at their bases close to the skull. When the antlers are reached, pry the skin loose from around their bases with a sharpened stick or, better still, a screwdriver. Skin down to the eyes and cut the skin loose close to the skull, being careful **not** to cut the eyelids. By placing the index finger of the left hand under the eyelid and pulling it away from the skull the skin may be severed without danger of damaging the lids. Under no circumstances should the lids be cut, as such a slit will show when the head is mounted. After the eyes are passed, the skin is easily removed from the rest of the head, but care must be exercised in cutting the lips and nose loose close to the skull leaving the fleshy lip flaps attached to the scalp. Leave plenty of nose

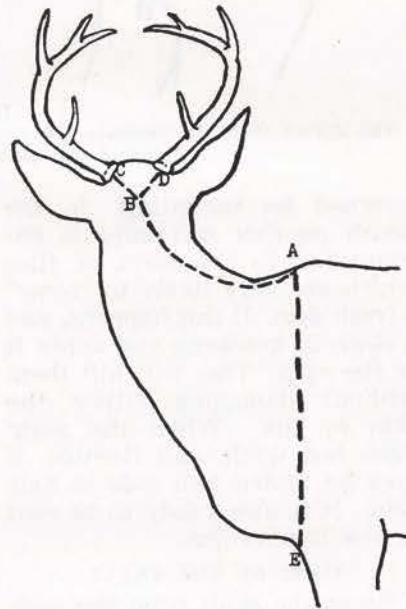


Fig. 1  
The position of the opening cuts for skinning a deer head are indicated by the broken lines.

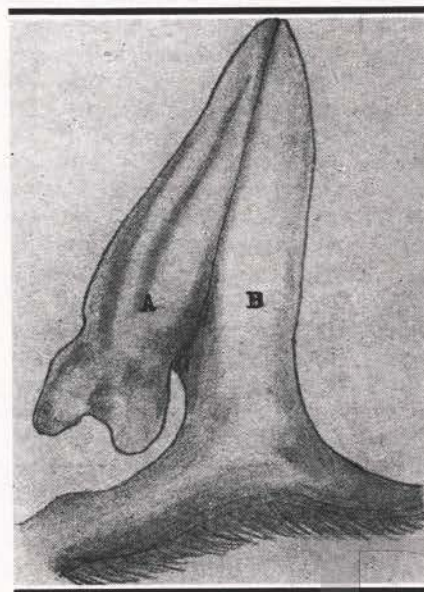


Fig. 2  
Sketch of a deer ear which has been skinned and inverted. A is the ear cartilage (gristle) and B the ear skin (note that the cartilage is left attached to the inside skin of the ear).

cartilage (gristle) attached to the nostrils and bare nose skin, since it can be removed better after the scalp has been separated from the skull.

When the head has been completely skinned out, scrape as much of the adhering flesh as possible from the skin, especially around the neck region and the base of the ears. The ears of all large game animals must be skinned to their tips. Determine the junction of the ear cartilage and skin by feeling along the ear base on the flesh side of the scalp. When the junction has been located, cut carefully along this line on the flesh side, being careful not to cut through the skin. As soon as the cartilage and skin are found to be joined with no meat between them, cease cutting and separate the cartilage from the ear skin along the back of the ear with the fingers or a blunt instrument such as a tooth brush handle or a blunt flat stick. If the skin does not separate readily, cut the adhering membranes in order to facilitate the skinning. Be careful during this operation, as the skin is easily cut and torn. It is better to separate the gristle of the ear from the skin rather than the reverse. Evert the ear as the separation proceeds, being sure to skin it along the back completely to its tip (see Fig. 2).

Slit the upper lips on the inside by making several shallow parallel cuts about  $\frac{1}{4}$ " apart from the nose to just in front of the eye opening. Do not cut through the skin or the base of the "whiskers" (vibrissae).

Wash the scalp thoroughly, being sure to remove all blood clots from the hair; unless this is done, the hair will probably be badly stained. Squeeze (do not wring) out the scalp and salt the flesh side heavily. Pay particular attention to the inside of the lips, the nose, and base of the ears. Fold the flesh sides together, roll up, and allow to remain in a cool place overnight. Be sure to salt all parts of the flesh side thoroughly. If the weather is wet, salt the skin very heavily before rolling it up. Unroll the scalp the next morning and salt again, rubbing the salt into the flesh side with the hand. Turn the scalp wrong side out and hang it in a cool, shady place. Never hang a scalp in the sun or near a fire. Be careful not to let the skin dry in folds, as it is likely to decompose, causing the hair to slip badly when it is

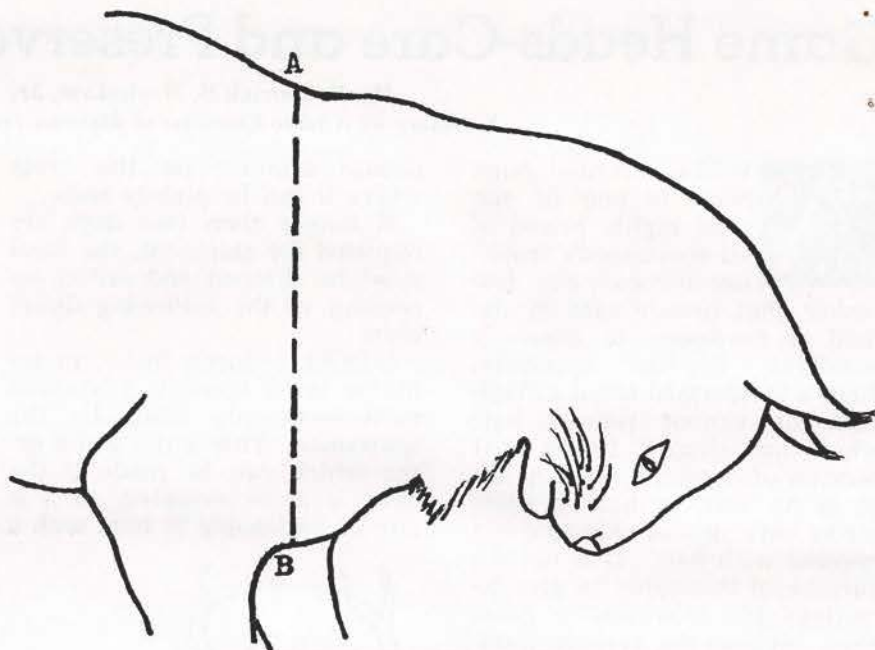


Fig. 3  
The dotted line AB indicates the position of the opening cut for all unantlered game heads (bear, wildcat, fox, etc.).

softened for mounting. In the South another difficulty is encountered in the form of flies which are very likely to "blow" a fresh skin. If this happens, wet a cloth in kerosene and apply it to the eggs. This will kill them without damaging either the skin or fur. When the scalp dries but while still flexible, it may be folded hair side to hair side. It is now ready to be sent to the taxidermist.

#### CARE OF THE SKULL

Sever the skull from the neck and cut out the tongue, eyes, and large cheek muscles. Remove the brain through the hole in the base of the skull (foramen magnum) by means of a crooked wire, a long-handled teaspoon, or a slender stick. Flies may be kept off the skull by spraying or by rubbing kerosene over it. In rainy weather the skull will not dry unless hung in a warm, dry place, but do not hang it in any place in which it becomes too hot to handle, since this will ruin both the skull and antlers. If decomposition has set in and the skull begins to smell, place the skull in boiling water and allow it to remain for a few minutes—never more than five. This will stop decomposition and improve the odor somewhat. It is not necessary to salt the skull.

#### BEAR, WILDCAT, AND FOX

Bear, wildcat, and fox heads should have the scalp removed by making a single cut around the neck immediately in front of the shoulders (see Fig. 3). Pull the skin forward over the head

as you would remove a slip-over sweater. Do not split the back of the neck of these animals. Salt and care for them using the same precautions recommended for deer. **Be sure to skin the ears.** The skulls are treated in the same manner as that of the deer.

If more than one specimen of the same species is taken, both the scalp and skull of each individual should be numbered to prevent mixups.

#### SHIPPING

To ship the head, wrap the scalp and skull separately in burlap or gunnysacks, crate them and ship by express marked "RUSH PERISHABLE." **Place your hunting license number on the outside of the crate** and state clearly what is contained inside, for example, "One Deer Skull and Scalp for Mounting."

#### PRECAUTIONS TO REMEMBER ALWAYS:

1. Measure the head and send the measurement to the taxidermist.
2. Skin the ears.
3. Remove blood from hair.
4. Wrap scalp and skull separately.
5. Leave plenty of neck skin.
6. Be sure all folds are well salted.

#### NEVER:

1. Never split the throat.
2. Never cut the eyelids.
3. Never ship illegally killed animals, for taxidermists assume no responsibility in handling such animals and are required by law in most states to report any such specimens sent to them.

# Industrious Beaver is Returning To This State

By F. S. Barkalow, Jr.

(Editor's note: This progress report is a contribution from the Inventory of Wildlife Resources of Alabama Project sponsored by the State Department of Conservation and the United States Fish and Wildlife Service under the provisions of the Pittman-Robertson Act of 1937. This project has been carried on since October, 1939, under the leadership of F. S. Barkalow, Jr.)



EW wild animals captured the imagination of the early explorers as did the beaver. Nearly every early natural history work contained illustrations of them cutting trees, building dams, or carrying mud on their tails for use in dam building. Large sections of the United States were first explored by beaver trappers and many a bloody encounter took place over the ownership of valuable beaver territories.

In pioneer days beavers were found on every stream system in Alabama, but relentless trapping, hunting, and clearing of swamps and woodland have all but exterminated this valuable fur bearer. A closed season on beaver was declared several years ago in an effort to prevent the complete extirpation of this species in the State.

In order to determine the exact status of the beaver in Alabama an inventory on this animal was begun last February. Colonies reported by the game wardens and interested cooperators have been visited by members of the research staff of the Inventory of Wildlife Resources of Alabama Project, in order to study the habits, determine the present population and the effect of the closed season. Many interesting facts have come to light.

As a result of the protection afforded by the closed season the beavers are rapidly increasing. Eighty-eight distinct colonies or colony groups distributed over 26 counties have been located, and it is estimated that there are at least one thousand beavers in the State. Figure 1 shows the distribution of native and "planted" colonies. One can expect to find beaver along any

stream heading or included in the area between the two lines. The highest concentrations are to be found in Russell, Perry, Sumter and Choctaw counties. Russell County alone has almost 50 per cent of all these rodents in Alabama. It was through the cooperation of several conservation-minded Russell County landowners that permission was given the Department of Conservation to trap beavers for transplanting in the Black Warrior and Talladega National Forests and the Pea River Refuge area. At least one pair of beaver planted last spring in the Talladega National Forest have become the parents of two kits.

Less than one-tenth of the ideal beaver streams in the State are now inhabited. Under proper protection and management a population of twenty thousand head could be maintained. During normal fur years adult beaver pelts bring approximately \$10 each on the open market. Since one-fourth of the total beaver population can be removed annually without depleting the breeding supply, a herd of twenty thousand animals would bring in an income of \$50,000 each year. The financial benefits from the pelts are small, however, when compared with the many other indirect advantages.

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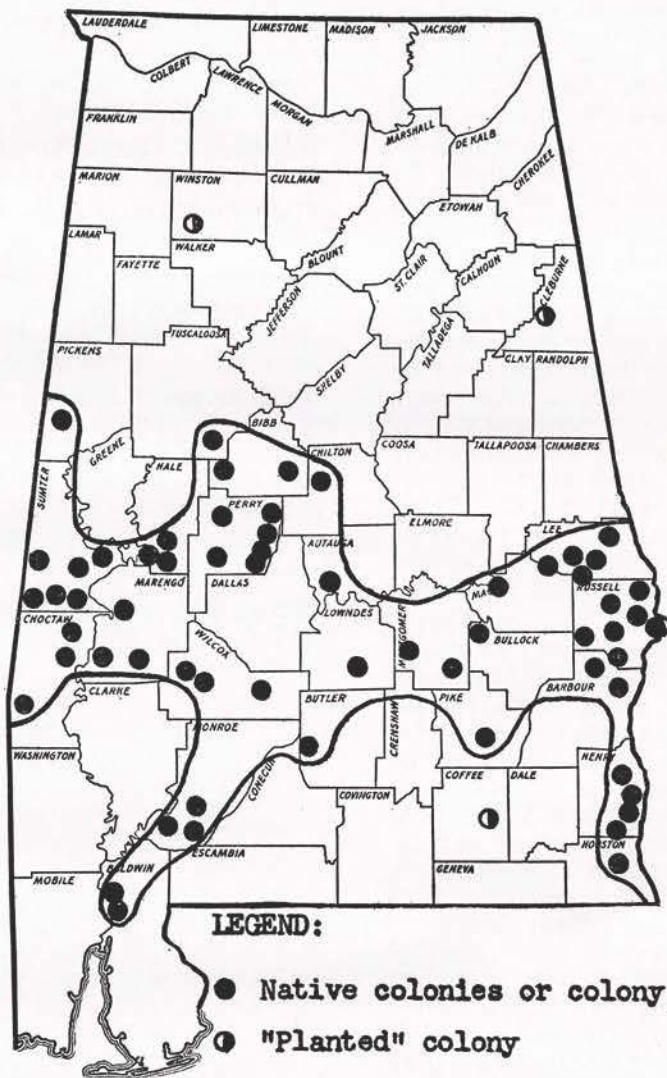
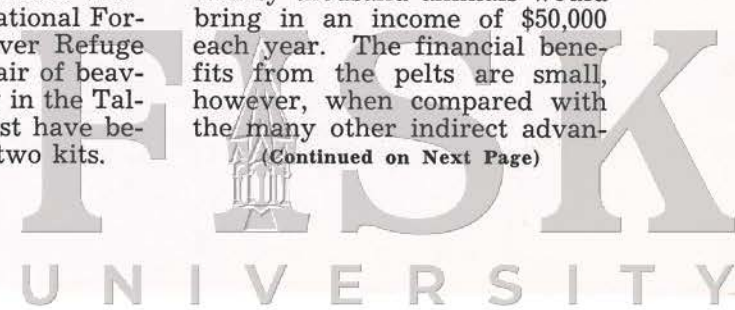


Fig. 1 The area enclosed by the lines is the present known range of the beaver in Alabama.



tages created by these animals. Beaver ponds, especially the new impoundments, furnish excellent fishing lakes. Contrary to the general belief, beavers do not eat fish; in fact, they will not eat flesh at all. Many ducks, especially mallards and wood ducks, are attracted to these inland ponds, and these impoundments provide an excellent habitat for raccoons, mink, muskrats, and otters.

Beaver dams, by slowing down the current, help remove silt and mud from streams. Below such dams fish can spawn without having their nests destroyed by silt. In addition to the main dams, most colonies have a large series of small supplementary and baffle dams above and below the main pond. These dams, in addition to removing silt, aid in preventing severe floods on the smaller streams.

Under certain conditions beavers are a nuisance, as many farmers with bottom-land corn will attest. Corn fields located within twenty-five yards of a beaver creek are likely to be damaged by these animals, since corn-on-the-cob is a delicacy enjoyed by beavers as well as man. However, fields located at a greater distance are seldom if ever invaded. Many landowners plant several extra rows of corn for the beaver to repay them for the fine fishing ponds built nearby. Damage to timber is almost negligible, since they seldom attack trees larger than six inches in diameter, small shrubs and twigs being preferred to large trees. Sweet gum, black gum, willow, and water ash (box elder) are their favorite foods in Alabama. The main damage to timber is caused by the establishment of new colonies with subsequent flooding of areas from which beavers have been absent for many years. Numerous landowners have cut and sold all commercial trees in such areas and left the beavers on the stream, for the returns received for the fur crop in two seasons amounted to more than the timber grown on the area in twenty years. Where beavers are flooding orchards and croplands, it is highly desirable to trap and transplant them to

areas where they are more welcome.

The following list of counties shows the known beaver streams in Alabama and the number of colonies on each:

Total Number of Colonies: 88, located in 26 counties.

Autauga County: Pine Creek, 1 colony.

Baldwin County: Bay Minette Creek, 2 colonies.

Barbour County: Cowikee Creek, 1 colony. Branch emptying into Chattahoochee River, 1 colony.

Bibb County: Branch emptying into Beaver Dam Creek, 1 colony. Lightsey's Pond, 1 colony. Pond in Land Utilization Project, 1 colony.

Bullock County: Panther Creek, 1 colony.

Butler County: Branch emptying into Pine Barren Creek, 1 colony.

Chilton County: Branch emptying into Beaver Dam Creek, 1 colony.

Choctaw County: Okatuppa Creek, 1 colony. Branch emptying into Tuckabum Creek, 1 colony. Branch emptying into Tombigbee River, 1 colony.

Cleburne County: Shoal Creek, 1 colony.

Coffee County: Bowles Creek, 1 colony.

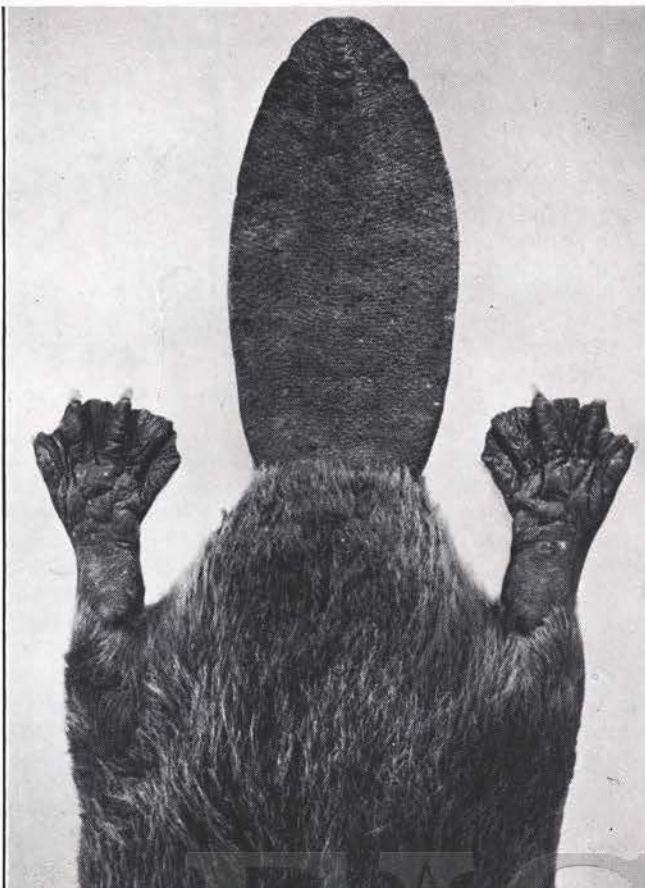
Hale County: Pick's Creek, 1 colony. Little Prairie Creek, 2 colonies.

Henry County: Omusee Creek, 1 colony. Abbie Creek, 2 colonies. Chattahoochee River at point where Abbie Creek empties into it, 1 colony.

Houston County: Cedar Creek, group of colonies.

Lee County: Haawakee Creek, 1 colony. Chelafaula Creek, 2 colonies. Moore's Mill Creek, 1

(Continued on Page 14)



Picture No. 1: The tail and hind feet of an old 47½ pound male beaver. The webbed hind feet supply the locomotive power while swimming and the large flat tail is used in diving, steering, and signalling. The slap of this tail on the water can be heard a quarter of a mile on still winter nights.

colony. Chewacla Creek, 3 colonies. Loblockee Creek, 1 colony.

Lowndes County: Big Swamp Creek, 1 colony.

Macon County: Uphapee Creek, 1 colony.

Marengo County: Horse Mill Creek, 2 colonies. Double Creek, 1 colony. Barton Creek, 1 colony.

Monroe County: Branch emptying into Limestone Creek, 1 colony. Limestone Creek, 1 colony. Mill Creek, 1 colony.

Montgomery County: Branch

emptying into Pinchory Creek, 1 colony. Branch emptying into Olustee Creek, 1 colony.

Perry County: Boxuechitto Creek, 1 colony. Cahaba River, 1 colony. Branch emptying into Oakmulgee Creek, 1 colony. Oakmulgee Creek, 8 colonies.

Pickens County: Tombigbee River, 1 colony.

Pike County: Walnut Creek, 1 colony.

Russell County: Middle Fork Cowikee Creek, 6 colonies. Hat-chechubbee Creek, 1 colony. Watermelon Creek, 2 colonies.

Silver Run Creek, 1 colony. Uchee Creek, 5 colonies. Coch-golachee Creek, 2 colonies. Pond near Brickyard, 1 colony. Chat-tahoochee River lake, 2 colonies.

Sumter County: Toomsoba Creek, 2 colonies. Little Kinter-bish Creek, 1 colony. Big Kinter-bish Creek, 1 colony. Cotahager Creek, 2 colonies. Sucarnoochee Creek, all up and down creek. Namuchee Creek, 1 colony.

Tuscaloosa County: Big Sandy Creek, 1 colony.

Wilcox County: Barren Creek, 1 colony. Red Creek, 1 colony. Dixon Creek, 1 colony.

# Reasons For Bobwhite Scarcity In Alabama

By J. W. Webb and F. S. Barkalow, Jr.

(Editor's Note: This is a contribution from the Pittman-Robertson Project "Inventory of Wildlife Resources of Alabama." This project has been carried on under the leadership of Mr. F. S. Barkalow, Jr., since October, 1939.)

**D**URING the past two decades we have witnessed an almost continuous decrease in our most popular game bird, the bobwhite quail. Growing concern has been manifested by the sportsmen and nature lovers, both of whom have made numerous attempts to restore this species. Unfortunately many of these efforts were not preceded by a scientific study of the birds' needs and resulted in an almost complete failure as far as bringing about a material increase in population was concerned. These efforts did, however, show some of the things that would not work.

Many explanations were advanced to account for this continued decimation, foremost of which was the predation theory. Animals such as the skunk, bobcat, fox, hawks, snakes, stray cats and dogs have all been blamed for this decrease. Undoubtedly many of these animals cause a great deal of damage to quail, but is predation the limiting factor for the quail population? Are there more predators or "varmints" now than there were during the nineteenth century when birds were plentiful? Not necessarily. It is probable that in restricted habitats we may have a few more predators than in former years, but in general these predators, except for dogs, cats, and possibly foxes, have decreased faster than quail. If the relative balance of predator to prey has not materially changed it is obvious that predator control is not the sole solution to the problem.

Overshooting is beyond a doubt one of the major problems to be dealt with in restoring the bobwhite to its former numbers. Hunting pressure continues to increase and better dogs, guns and ammunition make bobwhites easier to secure. Improved roads and automobiles enable one to hunt almost anywhere in the State or adjoining states and as a result more and more people are taking up hunting for sport



Fig. 1—A large field worthless for quail except along the woodland border. Heavy pasturing has destroyed almost all available cover and most of the beneficial quail food plants.

and recreation. This is especially true of the urban dweller.

The bobwhite has been shot completely out in many areas, while on others they have been so nearly extirpated that even with complete protection from hunting the birds have difficulty in maintaining their numbers against their natural enemies. While many areas are obviously shot too heavily, other nearby tracts on which there has been little hunting have in many instances also witnessed a decline in population. Many tracts where hunting has not been permitted for years have only a few more birds than adjoining areas where hunting has been permitted. In view of these observations, we must therefore look still further for a more complete explanation of this decimation.

In an effort to determine the winter environmental conditions preferred by bobwhite quail, observations were made on the location of 91 coveys of birds found in areas selected at random. A number of the environmental factors found to occur most frequently were listed.

Fifty-seven of the 91 coveys were found in fields, 22 in woodland, seven in areas consisting partly of woods and partly of fields, and five in swamps. The

greatest distance of any covey of birds from protective cover was 150 yards, there being only one such case. All other coveys located were less than 100 yards from adequate escape cover, the average distance being 33 yards. Of the 22 coveys found in woodland, the greatest distance of any covey from a field was 100 yards, except for two coveys that were in open woodland not near a field. The average distance of all coveys from fields or open ground was 30 yards. These observations indicate that birds do not like to range very far away from escape cover or very far into it. Thus the area at the center of a large field or dense woodland is likely to be barren for quail use, due in the first instance to lack of protection from predators and in the second to the absence of food.

Food preferences of the coveys of quail observed were, in order, lespedezas (*Lespedeza* spp.) occurring 68 times; beggarlice (*Meibomia* spp.), 31 times; ragweed (*Ambrosia* spp.), 18 times; partridge pea (*Chamaecrista* spp.), 11 times. Seldom was a covey of quail found very far away from one or more of these favorite food plants, even if ideal cover prevailed.

Since no birds were found  
(Continued on Next Page)



Fig. 2—*Lespedeza sericea* planted on a badly eroded hillside provides excellent food and cover for quail. A large covey of bobwhites use this area almost continuously.

ranging very far into woodlands or open fields, it appears that the food they use must be located near the borders of these areas.

Farming practices have greatly changed during the past fifty years. Where our fathers cultivated crude fields of from five to ten acres, we commonly cultivate fields of 100 acres or more. Large crops of cotton with the resulting clean cultivation gives birds no place to find food or cover and as a result they use only the field borders. Many times these borders are cut clean of all brush and weeds, thus leaving a virtual desert for quail. Even the field edges (the only quail range available near food and cover) have frequently become eroded and so infertile that few quail food plants will grow there. Without available food these borders are of little value as quail range. In many instances the woodlands and idle land are so heavily pastured that nearly all quail food plants and ideal ground cover are completely destroyed (Figure 1). The rail fence with its resulting cover and food has been replaced almost completely by wire fences and clean fence rows.

It is apparent that not one but several vital factors have contributed their bit in causing the steady decline in the quail population. While in a certain locality one factor may be called the limiting factor, in another vicin-

ity a different situation may limit the population. When viewed upon a Statewide basis the limiting factors are in order of their importance as follows:

1. The enormous decrease in quail range. This has been caused by the intensive cultivation of large fields which leaves little available food or cover except that along the field borders. Probably the greatest quail need in Alabama is a better distribution of food and cover on the farm lands.

2. Intensive hunting pressure. This is caused by more hunters, better guns, improved ammunition, better dogs, and improvements in travel facilities, all resulting in the over-shooting of coveys and hundreds of complete coveys being wiped out annually. While there is no man-made law preventing the extermination of coveys, this practice violates one of the most fundamental laws of nature. When the seed stock is harvested below the critical point, extermination is the inevitable result.

3. Predator pressure resulting from:
  - a. Diminished quail range.
  - b. Feral dogs and cats.
  - c. Local increases in native predators.

What can be done to improve this situation? While each particular area has a problem peculiar to itself, the following suggestions have proved helpful on many:

1. Establish hedge rows in the large open fields to provide more cover and food. Such plants as privet, plums, and blackberries are helpful in this respect.

2. Plant lespedeza, beggarweed (beggarlice), sesbania, peas, soybeans, German and browntop millet, mungbeans, vetch, and wheat along the borders of fields to supplement the natural food supply.

3. Plant fields in strip crops to furnish a diversification of cover for birds.

4. Leave a border of weeds and low-growing bushes around all field edges. See Figure 3.

5. Do not shoot coveys below 5 or 6 birds.

6. Keep up dogs (especially bird dogs) during the nesting season.

7. Establish predator control only where it has proven necessary.

8. Write the State Department of Conservation for technical information concerning the improvement of lands for quail.

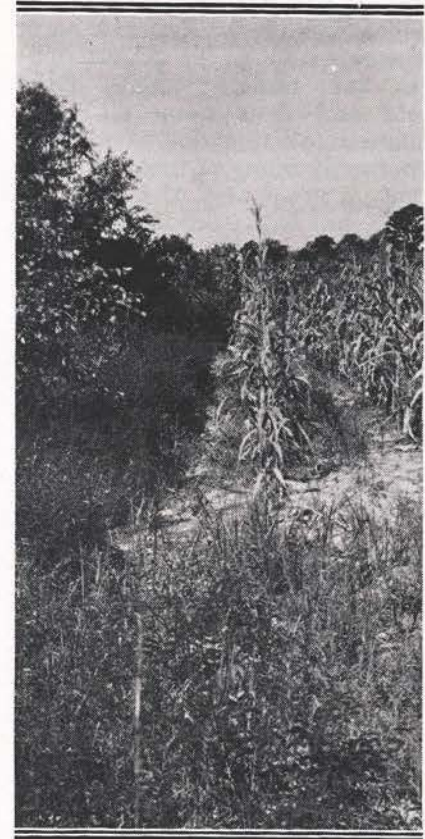


Fig. 3—An excellent field border for quail. Notice the abundant volunteer growth of partridge peas (just to the left of the last corn row), also the bullgrass and partridge peas in the foreground. Available food and cover makes this field corner a haven for bobwhites in the fall. Russell County, near Seale.

# BLACK WARRIOR DEER FOOD

By

R. J. Wheeler, Jr., and F. S. Barkalow, Jr.

(Editor's Note: This article is a contribution from the Inventory of Wildlife Resources of Alabama Project).

**A**N INVESTIGATION to obtain concrete facts relative to the deer food situation in the Black Warrior National Forest was conducted during the latter part of March, 1940. Much of the area now included in the Forest has been acquired recently by the Forest Service. A large portion of this land was cultivated prior to the time of purchase and has since been allowed to return to native vegetation. As a result, the stands on such areas are now fairly uniform in size and age, and competition has not as yet become acute among the plants. Numerous excellent deer food plants now flourish on these areas but in time, they will succumb to shading by the more aggressive plants. The area, therefore, is at the present time at a peak so far as deer food is concerned.

In order that all ecological types be proportionally represented, four areas within the Forest were carefully selected for study. On each of these areas, two belts six feet wide and one-quarter mile long were established by compass and chain. These lines were run perpendicular to the stream systems so as to include all forest types. All woody plants that occurred in alternate paces within the belt along the two miles of line were recorded. The following information was secured in each plot: Species occurring and number of each, size class, availability of each plant as food and the actual number of each species browsed.

Each plant was designated as available or not available for deer browse when the data were taken in the field. Species of the same height and diameter measurement may or may not be available since those plants growing in dense stands tend to shed their lower branches because of natural pruning, and those growing in open stands usually do not lose their lower limbs, which are available to the deer. Some species produce suckers regardless of the stand and this source of food is very important.

Availability of each species as deer browse was considered of primary importance. Of the 10,934 woody plants recorded during the survey, 9,612 or 87.90 per cent were available to the deer as food.

Since late winter and early spring are the times of year when vegetation is at a minimum and therefore the "critical period" for the deer, the amount of available browse at this time and the per cent of surplus over that

consumed is the answer to the question, "What increment to the present population of deer will the Black Warrior National Forest support?" Figure 1 answers this question by showing graphically that only 23.12% of the available browsed was used.

A few of the most important food species during the "critical period" and those during the other portion of the year will be discussed separately. Unless otherwise stated, all vegetation referred to will be available.

## Browse Important During the "Critical Period"

### Greenbriers (*Smilax* spp.)

These evergreen vines composed 17.60 per cent of the available woody growth, being second only to dwarf huckleberry in abundance. The survey revealed that these vines provided 12.19 per cent of the vegetation that was browsed. Greenbriers were shown to be very important as 69.27 per cent of this vegetation was browsed. (Figure 1).

### Dwarf Huckleberry (*Gaylussacia* sp.)

Dwarf huckleberry was the most abundant species on the area as it comprised 31.71 per cent of the available browse. As this plant sheds its leaves early in the winter, only the stems, which remain green throughout the year, are available. Although dwarf huckleberry constituted 8.56 per cent of the material consumed only 27.01 per cent of it was browsed. (Figure 1).

### Strawberry Bush (*Evonymus americanus*)

Strawberry bush, an evergreen, grows along the damp banks of the numerous mountain streams. This



species comprised 1.33 per cent of the total vegetation. Seventy-three plants were observed eaten, which accounted for only 0.76 per cent of the available material browsed. However, 55.72 per cent of these shrubs were browsed indicating a high degree of palatability. (Figure 1).

### Sparkleberry (*Batodendron arboreum*)

Sparkleberry, a shrub that retains a majority of its foliage throughout the winter, constituted 3.78 per cent of the woody vegetation and 0.44 per cent of the woody growth that was browsed. Forty-two of these plants or 11.57 per cent were browsed. (Figure 1).

### Mountain-laurel (*Kalmia latifolia*)

Mountain-laurel grows in profusion along the streams and bluffs. The leaves of this evergreen, although poisonous to cattle, can be eaten successfully by deer. This shrub constituted 4.40 per cent of the plants, 0.34 per cent of the available vegetation browsed by the deer and 7.82 per cent of the mountain-laurel was browsed. (Figure 1).

### Yellow Jasmine (*Gelsemium sempervirens*)

The woody plant survey revealed that yellow jasmine comprised 0.26 per cent of the browse that was consumed and 0.44 per cent of the available vegetation. This vine, an evergreen, was heavily eaten by the deer, as 59.52 per cent of the plants were browsed. (Figure 1).

### Other Species

Many other species that might be  
(Continued on next page)

Greenbrier — browsed 69.27%	surplus 30.73%
Red cedar — browsed 60.00%	surplus 40.00%
Yellow jessamine — browsed 59.52%	surplus 40.48%
Strawberry bush — browsed 55.72%	surplus 44.28%
Dwarf huckleberry — browsed 27.01%	surplus 72.99%
Cherry — browsed 16.67%	surplus 83.33%
Sparkleberry — browsed 11.57%	surplus 88.43%
Sumach — browsed 11.48%	surplus 88.52%
Grape — browsed 9.09%	surplus 90.91%
Mountain-laurel — browsed 7.82%	surplus 92.18%
Hemlock — browsed 5.26%	surplus 94.74%
Sourwood — browsed 5.22%	surplus 94.78%
Dogwood — browsed 4.31%	surplus 95.69%
Pines — browsed 3.28%	surplus 96.72%
Sweet bay — browsed 3.08%	surplus 96.92%
Total plants available — 23.12%	total surplus 76.88%

FIGURE 1. CHART SHOWING UTILIZATION OF AVAILABLE DEER FOODS IN THE BLACK WARRIOR NATIONAL FORESTS DURING THE CRITICAL PERIOD OF 1940.

important as deer food were relatively scarce. These in order of importance are (Figure 1):

- Red cedar (*Juniperus virginiana*)
- Cherry (*Prunus serotina*)
- Sumachs (*Rhus* spp.)
- Grapes (*Vitis* spp.)
- Hemlock (*Tsuga* sp.)
- Sourwood (*Oxydendrum arboreum*)
- Dogwood (*Cornus* sp.)
- Pines (*Pinus* spp.)
- Sweet bay (*Magnolia virginiana*)

#### Browse Important During Late Spring, Summer, Fall and Early Winter

##### Greenbriers

These vines are the best annual foods on the entire area, as they are evergreen and are avidly sought by the deer throughout the year. According to the analysis of 19 deer stomachs secured during December, 1937, and December, 1938, in the Forest, the leaves and fruit of greenbriers accounted for 15.74 per cent of the food ingested.\*

##### Red Maple (*Acer rubrum*)

Leaves of the red maple are utilized as food as long as they are available. This tree represented 5.83 per cent of the available woody vegetation.

##### Hickory (*Hicoria* spp.)

The survey showed that hickory accounted for 4.60 per cent of all the vegetation. The foliage of this tree is

only important as a deer browse during late spring. The mature leaves are apparently distasteful to the deer as very little hickory is consumed after the first of summer.

##### Oak (*Quercus* spp.)

Oaks represented 4.59 per cent of the available browse. However, mention should be made of the 2.52 per cent oaks that offered nothing but mast. The young, tender leaves of the oak are eagerly sought during late spring. It is believed that the high content of tannic acid contained in the mature leaf renders it distasteful to the deer so that following maturity, this foliage becomes unimportant as a food.

The acorn is the deer's "staff of life" during the fall and early winter. Acorns and small quantities of oak leaves composed over 50.00 per cent of the December foods of the deer during 1937 and 1938. Because of the rich nutrients contained in the acorn, these animals attain a physical peak during fall and early winter and are thereby prepared to better withstand the privations of the "critical period." The size of the mast crop is subject to weather conditions and accordingly may or may not be abundant during successive years.

##### Black Gum (*Nyssa sylvatica*)

Black gum composed 3.23 per cent

of the available vegetation. Its foliage is frequently eaten when available. This food is of particular importance in the late spring as the deer are very fond of the tender leaves. Small quantities of black gum fruit were consumed during December of 1937 and 1938. (Ibid).

##### Dogwoods (*Cornus* spp.)

The woody plant survey revealed that 2.41 per cent of all the available woody growth was dogwood. The foliage of this tree is eaten throughout the year when available. The numerous suckers that usually grow from the base of the trunk and the surface roots furnish a large quantity of food. The leaves and fruit composed 0.89 per cent of the early winter deer food in 1937 and 1938. (Ibid).

##### Sumachs (*Rhus* spp.)

The leaves of the sumachs serve as food during late spring, the fruit and terminal portions of the stems during fall and early winter. This plant is known to be a very excellent food. However, due to the heavy understory that prevails on the majority of the area, they compose only 0.63 per cent of the vegetation. Despite the relative scarcity of these species, the fruit and twigs composed 9.48 per cent of the early winter foods during 1937 and 1938. (Ibid).

#### Summary

Seven kinds of plants were revealed by the survey to be of importance as food during the "critical period." These are in order of importance: Greenbriers (*Smilax* spp.), dwarf huckleberry (*Gaylussacia* sp.), strawberry bush (*Evonymus americanus*), sparkleberry (*Batodendron arboreum*), mountain-laurel (*Kalmia latifolia*), yellow jessamine (*Gelsemium sempervirens*), red cedar (*Juniperus virginiana*).

The most important woody plants that produce food for deer during late spring, summer, fall and early winter are: Greenbrier, red maple (*Acer rubrum*), hickory (*Hicoria* spp.), oak (*Quercus* spp.), black gum (*Nyssa sylvatica*), dogwood (*Cornus* sp.), and sumach (*Rhus* spp.)

#### Conclusions

The food supply that is available during the "critical period" will determine the population of deer that the

\*Allen M. Pearson and Carey C. Burnett, "Deer Food in the Black Warrior National Forest." Alabama Game and Fish News, February, 1940, p. 3-4.

(Continued on page 8)

**DEER FOOD**

(Continued from page 4)

area will support. The woody plant frequency survey shows that 23.12 per cent of the available vegetation had been browsed when the investigation was conducted. In view of this fact, it is apparent that the woody growth then present on the Black Warrior National Forest would safely support twice the present deer population.

The area, however, at the time of the survey, was at a peak ecologically insofar as available deer food was concerned, but the food supply will progressively decrease as the vegetation increases in age. It will, therefore, be necessary to keep check on the deer population and the food supply in the future so as to prevent these factors from getting out of balance.

**Recommendations**

Much can be done in the way of forest management to make the area more productive of deer browse. Selective cutting can be advantageously employed in both the sanctuary and game management areas. Care should be exercised to insure leaving an adequate supply of mature oaks, as their mast is very important as an item of food. The canopy should be kept sufficiently open in some areas so as to admit enough light for the growth of the various vines, shrubs and other plants that produce browse for deer.

Frederick S. Barkalow, Jr.

ACCOMPLISHMENTS

4. LIST OF SCHOLARSHIPS OR FELLOWSHIPS HELD.

ACCOMPLISHMENTS

4. List of scholarships or fellowships held.

1. Laboratory Technician (an assistantship) in the Department of Biology, Georgia School of Technology. Dates: November 1, 1934 to June 1, 1935. Studies pursued: The regular curriculum required of a Junior studying for a Bachelor of Science Degree in Chemistry. Stipend: 50¢/hour. The total amount of money received was approximately \$150.00
2. Student Laboratory Assistant in the Department of Biology, Georgia School of Technology. Dates: September 1, 1935 to June 1, 1936. Studies pursued: The regular curriculum required of a Senior studying for a Bachelor of Science in Chemistry. Stipend: 60¢/hour. The total amount of money received was approximately \$300.00.
3. Student Assistant in the Division of Mammals, University of Michigan. Dates: September 1, 1938 to July 1, 1939. Studies pursued: The curriculum leading to a Master of Science Degree in Zoology. Stipend: \$600.00 for the school year.

Frederick S. Barkalow, Jr.

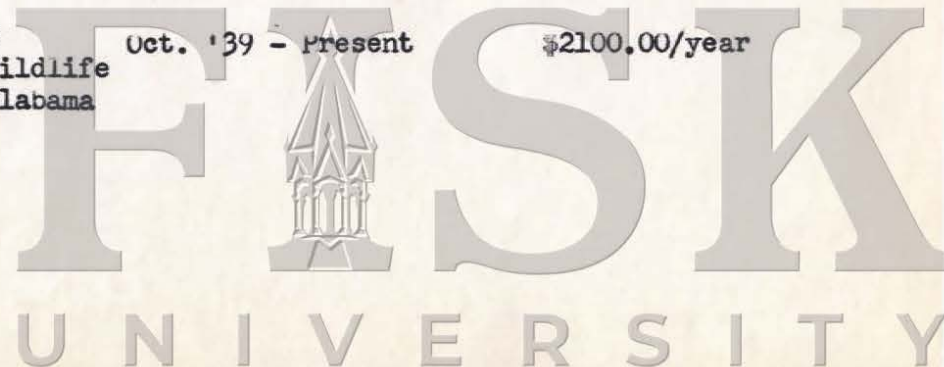
EXPERIENCE

(Record given chronologically)

Frederick S. Barkalow, Jr.

EXPERIENCE  
(Record given chronologically)

Institution or Organization	Address	Position	Inclusive Dates	Annual Salary
Georgia School of Technology	Atlanta, Georgia	Student Laboratory Technician	Nov. '34 - June '35	50¢/hour
Georgia School of Technology	Atlanta, Georgia	Student Assistant in the Department of Biology	Sept. '35 - June '36	60¢/hour
Alabama Cooperative Wildlife Research Unit	Auburn, Alabama	Temporary Summer Assistant	June '36 - Sept. '36	\$60.00/month (equivalent to \$720.00/year)
Alabama Polytechnic Institute	Auburn, Alabama	instructor in Zoology-Mammalogy	Sept. '36 - Oct. '39 (leave of absence from June '38 - June '39 to do graduate work)	\$1500.00/ten months (equivalent to \$1800.00/year)
Alabama Cooperative Wildlife Research Unit	Auburn, Alabama	Student Cooperator	Summer of 1938 (Summer employment)	\$125.00/month (equivalent to \$1500.00/year)
University of Michigan	Ann Arbor, Michigan	Student Assistant Division of Mammals	Sept. '38 - June '39 (on leave from A.P.I. to do graduate work)	\$600.00/ten months (equivalent to \$720.00/year)
Alabama Department of Conservation	Auburn, Alabama	Project Leader Inventory of Wildlife Resources of Alabama	Oct. '39 - Present	\$2100.00/year



LETTERS OF REFERENCE

Frederick S. Barkalow, Jr.

J. M. Robinson, Head Professor, Department of Zoology-Entomology, Alabama Polytechnic Institute, Auburn.

Mr. Barkalow was enthusiastic about the study of mammals when he came to the Institute in 1936. He has sustained such an interest throughout the years and has pursued graduate work at the University of Michigan, working toward the doctorate. He resigned as instructor in this Department in October, 1939, in order to accept an appointment as officer in charge of the Pittman-Robertson Project in Alabama. He continues in this capacity. This position prevents his working on the life history and biology of the cotton rat.

Since Mr. Barkalow is particularly interested in the above project for research and also for the doctorate thesis material, it would be helpful to him if a fellowship could be made available. He is a southerner by birth, has an alert mind, is mentally and physically able to carry on the proposed research project. I feel that he will be able to make a contribution to science as a result of the research outlined. He has repeatedly expressed a desire to continue research and teaching activities here in the South.

-----

Ben C. Morgan, Chief of Game, Fish and Seafoods Division, Montgomery, Alabama.

It gives me great pleasure to recommend Mr. Barkalow for a fellowship with your Fund. I know of no young man who is more worthy of assistance in the line of work which he has set out to make his life's study.

He is intelligent, energetic, thorough in every detail of his duties as director of our State Wildlife Resources Project, which we are conducting in cooperation and through the help of the Federal Government under

Frederick S. Barkalow, Jr.

what is known as the Pittman-Robertson Act. He has furnished us with a detailed report of every county in the State in the same manner that he has set up this plan of work on the cotton rat. He knows what he is doing.

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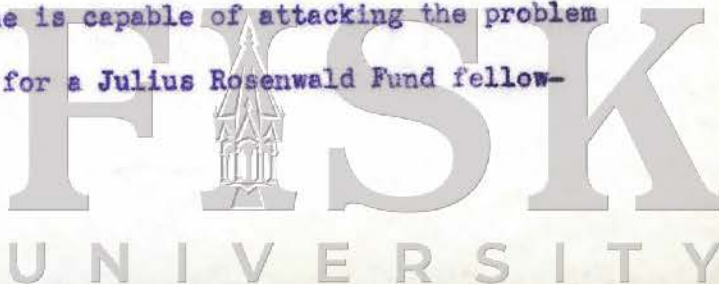
Allen M. Pearson, Leader, Alabama Cooperative Wildlife Research Unit, Auburn.

It is a pleasure to recommend Mr. Barkalow as a candidate for a fellowship. He has been known to me for five years and during part of this time he has worked directly under my supervision. From the standpoint of background and training Mr. Barkalow is well qualified for the problem that he has outlined, and in my opinion merits favorable consideration for a fellowship such as is proposed.

The problem of work is directly related to human welfare and to conservation of desirable wildlife. If carried to completion the proposed work should prove to be of material value from both the scientific and economic viewpoints. A study of the cotton rat in the southern states has been needed for a number of years and it appears that no other established agency is now involved in a comprehensive study of this species. The cotton rat problem is confined largely to the southeastern states but the use of this species as a laboratory animal has already become of international importance. A comprehensive study of the cotton rat as proposed by Mr. Barkalow would be of definite value to conservation interests in the southeastern states and to the study of certain phases of human health throughout the world.

Through his previous experience and personal interest in mammals Mr. Barkalow is now well qualified to proceed with the required work without delay and it is my opinion that he is capable of attacking the problem in an efficient manner. I recommend him for a Julius Rosenwald Fund fellowship without reservation.

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Frederick S. Barkalow, Jr.

Walter A. Gresh, Biologist, Fish and Wildlife Service, U. S. Department of the Interior, Atlanta, Georgia

For the past two years Barkalow has been leader of a project involving the expenditure of approximately \$12,000 annually and entitled "Inventory of Wildlife Resources in Alabama". Under Barkalow's direction are several technically trained assistants, a clerk, and he has also acted as supervisor of a muskrat and beaver restocking program in the State of Alabama. Every three months Barkalow has submitted a quarterly progress report on the activities, scope, plan and accomplishment of the work and has each time presented the report in such a manner that it stood among the best in presentation and accomplishment.

Mr. Barkalow is unquestionably an asset in the field of research and investigation, and should be encouraged to pursue the line of work for which he seems best fitted. Although I regret exceedingly having Mr. Barkalow leave the work he is doing, I know of no individual more entitled to consideration for a fellowship.

I am informed by persons acknowledge as authorities on the cotton rat that the applicant's plan of work offers a splendid contribution to the scientific field.

- - - - -

Charles N. Leach, International Health Division, Rockefeller Foundation.

I have known Mr. Barkalow for two years and have had occasion to work with him during this time. I regard his professional ability very highly and would have no hesitancy in recommending him for a fellowship. He is a diligent worker and has a pleasing personality.

Frederick S. Barkalow, Jr.

The problem Mr. Barkalow has chosen for his thesis is one of timely interest. The cotton rat is very much in demand for scientific purposes and there is very little in the literature regarding its life history and habits.

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W. H. Burt, Curator, Division of Mammals and Instructor in Department of Zoology, University of Michigan.

Mr. Barkalow was my assistant for one year while he was a graduate student at the University of Michigan. Mr. Barkalow's scholastic record at the University is excellent. As a part-time assistant I found him to be very satisfactory. While he was with us he developed some new techniques which we have made a part of our regular curatorial program. He is ingenious, imaginative, and ever alert to new and better ways of doing things - a trait not too prevalent in the ordinary run of students. His interest in and ability to do research has been demonstrated by the several articles which he has had published in various scientific journals.

Mr. Barkalow has a pleasing personality and fits in well in most any kind of group. I am confident that he will make a worth-while contribution in his chosen field of study. I recommend him for a Julius Rosenwald fellowship without reservation.

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JULIUS ROSENWALD FUND

4901 ELLIS AVENUE

CHICAGO

Confidential Report on Candidate for Fellowship

Name of Candidate            Mr. Frederick S. Barkalow, Jr.  
Report Requested of        Mr. J. M. Robinson  
   Alabama Polytechnic Institute, Auburn, Alabama

---

The above-named candidate has applied to this Fund for a fellowship and has given your name as a reference. The candidate's plan of work is attached. Please return it with your statement.

We shall appreciate your frank opinion of this applicant's qualifications, and an appraisal of his plan of work and of his ability to make a noteworthy contribution in his field. *An early reply will be of great assistance in allowing the Fellowship Committee sufficient time for adequate consideration of the large number of candidates.*

We request candid and critical comment. Your reply will be held in strict confidence.

  
Director for Fellowships

---

REPORT

Mr. Barkalow was an instructor in the department of Zoology-Entomology at the Alabama Polytechnic Institute during the school years of 1936-37 and 1937-38. He was on leave for graduate work at Ann Arbor, Michigan during the term of 1938-39.

Mr. Barkalow was enthusiastic about the study of mammals when he came to the department. He has sustained such an interest throughout the years and has pursued graduate work at the University of Michigan, working toward the doctorate. He resigned as instructor in this department October 1, 1939 in order to accept an appointment as officer in charge of the Pittman-Robertson Project in Alabama. He continues in this capacity. This position prevents his working on the life history and biology of the cotton rat. *inst.*

Since Mr. Barkalow is particularly interested in the above project for research and also for the doctorate thesis material, it would be helpful to him if a fellowship could be made available. He is a southerner by birth, has an alert mind, is mentally and physically able to carry on the proposed research project. I feel that he will be able to make a contribution to science as a result of the research outlined. He has repeatedly expressed a desire to continue research and teaching activities here in the South.

OVER

JULIUS ROSENWALD FUND

4901 ELLIS AVENUE

CHICAGO

Confidential Report on Candidate for Fellowship

Name of Candidate

Report Requested of

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We request candid and critical comment. Your reply will be held in strict confidence.

REPORT

Is the candidate free from personality handicaps which would make it difficult to obtain and hold a position giving him opportunity to utilize his abilities?

YES

Signed

*J. M. Robinson*

Position or Title

*Head Professor zoology - Entomology*

Address

*Auburn, Alabama*

Date

*Jan 28, 1941*

Please return to the Director for Fellowships, Julius Rosenwald Fund, 4901 Ellis Avenue, Chicago, Illinois. Addressed, stamped envelope is enclosed.

FISK UNIVERSITY

A

JULIUS ROSENWALD FUND

4901 ELLIS AVENUE

CHICAGO

Confidential Report on Candidate for Fellowship

Name of Candidate      Mr. Frederick S. Barkalow, Jr.  
Report Requested of      Mr. Ben C. Morgan  
   Department of Conservation, Montgomery, Alabama

---

The above-named candidate has applied to this Fund for a fellowship and has given your name as a reference. The candidate's plan of work is attached. Please return it with your statement.

We shall appreciate your frank opinion of this applicant's qualifications, and an appraisal of his plan of work and of his ability to make a noteworthy contribution in his field. *An early reply will be of great assistance in allowing the Fellowship Committee sufficient time for adequate consideration of the large number of candidates.*

We request candid and critical comment. Your reply will be held in strict confidence.

  
Director for Fellowships

---

REPORT

It gives me great pleasure to recommend Mr. Frederick S. Barkalow, Jr. for a fellowship with your Foundation. I know of no young man who is more worthy of assistance in the line of work which he has set out to make his life's study.

He is intelligent, energetic, thorough in every detail of his duties as Director of our State Wildlife Resources Project, which we are conducting in cooperation and through the help of the Federal Government under what is known as the Pittman-Robertson Act. He has furnished us with a detail report of every county in the State in the same manner that he has set up this plan of work on the Cotton Rat. He knows what he is doing.

I certainly trust that you people will be kind enough to name him as one of your members of the Fellowship Fund.

Date      JANUARY 25, 1944

FISK UNIVERSITY

OVER

JULIUS ROSENWALD FUND

4901 ELLIS AVENUE

CHICAGO

Confidential Report on Candidate for Fellowship

Name of Candidate

Report Requested of

The above-named candidate has applied to this Fund for a fellowship and has given your name as reference. The candidate's plan of work is attached. Please return it with your statement.

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We request candid and critical comment. Your reply will be held in strict confidence.

Director for Fellowships

REPORT

It gives me great pleasure to recommend Mr. Frederick S. Barstow for a fellowship with your Foundation. I know of no young man who to make his life's study.

Is the candidate free from personality handicaps which would make it difficult to obtain and hold a position giving him opportunity to utilize his abilities?

This man is strong and able-bodied, and he has no physical defects so far as I know. In fact, he holds a commission in the Officer's Reserve Corps at this time.

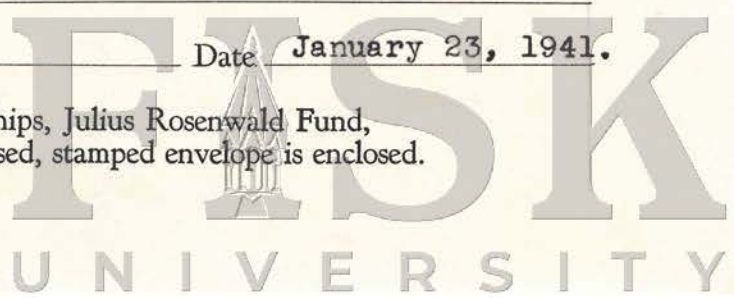
Signed Ben C. Morgan

Position or Title Chief of Game, Fish and Seafoods Division

Address Montgomery, Alabama

Date January 23, 1941.

Please return to the Director for Fellowships, Julius Rosenwald Fund, 4901 Ellis Avenue, Chicago, Illinois. Addressed, stamped envelope is enclosed.



OVER

JULIUS ROSENWALD FUND

4901 ELLIS AVENUE

CHICAGO

A

Confidential Report on Candidate for Fellowship

Name of Candidate Mr. Frederick S. Barkalow, Jr.

Report Requested of Dr. Allen M. Pearson

Box 1031, Auburn, Alabama

The above-named candidate has applied to this Fund for a fellowship and has given your name as a reference. The candidate's plan of work is attached. Please return it with your statement.

We shall appreciate your frank opinion of this applicant's qualifications, and an appraisal of his plan of work and of his ability to make a noteworthy contribution in his field. *An early reply will be of great assistance in allowing the Fellowship Committee sufficient time for adequate consideration of the large number of candidates.*


We request candid and critical comment. Your reply will be held in strict confidence.

  
Director for Fellowships

REPORT

Auburn, Alabama  
January 24, 1941

It is a pleasure to recommend Mr. Frederick S. Barkalow, Jr., as a candidate for a fellowship under the Julius Rosenwald Fund. He has been known to me for five years and during part of this time he has worked directly under my supervision. From the standpoint of background and training Mr. Barkalow is well qualified for the problem that he has outlined, and in my opinion merits favorable consideration for a fellowship such as is proposed.

  
FISK  
UNIVERSITY  
OVER

The problem of work that has been outlined by Mr. Barkalow is directly related to human welfare and to conservation of desirable wildlife. If carried to completion the proposed work should prove to be of material value from both the scientific and economic viewpoints. A study of the cotton rat in the Southern States has been needed for a number of years and it appears that no other established agency is now involved in a comprehensive study of this species. The cotton rat problem is confined largely to the Southeastern States but the use of this species as a laboratory animal has already become of international importance. A comprehensive study of the cotton rat as proposed by Mr. Barkalow would be of definite value to conservation interests in the Southeastern States and to the study of certain phases of human health throughout the world.

Through his previous experience and personal interest in mammals Mr. Barkalow is now well qualified to proceed with the required work without delay and it is my opinion that he is capable of attacking the problem in an efficient manner. I recommend Mr. Barkalow for a Julius Rosenwald Fund fellowship without reservation.

Is the candidate free from personality handicaps which would make it difficult to obtain and hold a position giving him opportunity to utilize his abilities? No personality handicaps.

Signed Allen M. Pearson.

Position or Title Leader, Alabama Cooperative Wildlife Research Unit

Address P. O. Box 1031, Auburn, Alabama

Date January 24, 1941

Please return to the Director for Fellowships, Julius Rosenwald Fund,  
4901 Ellis Avenue, Chicago, Illinois. Addressed, stamped envelope is enclosed.

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JULIUS ROSENWALD FUND

4901 ELLIS AVENUE

CHICAGO

Confidential Report on Candidate for Fellowship

Name of Candidate Mr. Frederick S. Barkalow, Jr.  
Report Requested of Mr. Walter A. Gresh  
U. S. Fish and Wildlife Service, Atlanta, Georgia

The above-named candidate has applied to this Fund for a fellowship and has given your name as a reference. The candidate's plan of work is attached. Please return it with your statement.

We shall appreciate your frank opinion of this applicant's qualifications, and an appraisal of his plan of work and of his ability to make a noteworthy contribution in his field. *An early reply will be of great assistance in allowing the Fellowship Committee sufficient time for adequate consideration of the large number of candidates.*

We request candid and critical comment. Your reply will be held in strict confidence.

  
Director for Fellowships

REPORT

I have known the applicant, viz., Frederick S. Barkalow, Jr., intimately and from a professional standpoint for approximately two years. Prior to that time I had read some of his technical writings and had previously heard most favorable recommendations regarding his work. For the past two years Barkalow has been leader of a project involving the expenditure of approximately \$12,000 annually and entitled "Inventory of Wildlife Resources of Alabama." Under Barkalow's direction are several technically-trained assistants, a clerk, and he has also acted as supervisor of a muskrat and beaver restocking program in the State of Alabama. Every three months Barkalow has submitted a Quarterly Progress Report on the activities, scope, plan and accomplishment of the work and has each time presented the report in such a manner that it stood among the best in presentation and accomplishment.

Mr. Barkalow is unquestionably an asset in the field of research and investigation, and should be encouraged to pursue the line of work for which he seems best fitted. Although I regret exceedingly having Mr. Barkalow leave the work he is doing, I know of no individual more entitled to consideration for a fellowship.

OVER  
UNIVERSITY

JULIUS ROSENWALD FUND

4901 ELLIS AVENUE

CHICAGO

I am informed by persons acknowledged as authorities on the cotton rat that the applicant's plan of work offers a splendid contribution to the scientific field.

Name of Candidate

Report Requested of

The sponsored candidate has applied to this Fund for a fellowship and has given your name as reference. The candidate's plan of work is attached. Please return it with your comment. We shall appreciate your frank opinion of this applicant's qualifications, and an appraisal of his plan of work and of his ability to make a noteworthy contribution in his field. An early reply will be of great assistance in allowing the Fellowship Committee sufficient time for adequate consideration of the large number of candidates. We request candid and critical comment. Your reply will be held in strict confidence.

REPORT

Is the candidate free from personality handicaps which would make it difficult to obtain and hold a position giving him opportunity to utilize his abilities?

Yes.

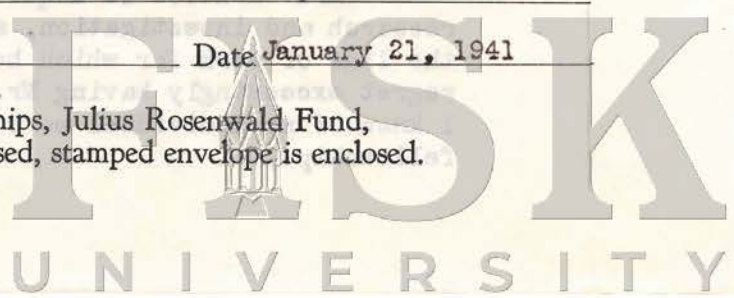
Signed Walter G. Gresh

Position or Title Biologist, Fish and Wildlife Service, U.S. Department of the Interior.

Address 317 Glenn Building, Atlanta, Georgia.

Date January 21, 1941

Please return to the Director for Fellowships, Julius Rosenwald Fund, 4901 Ellis Avenue, Chicago, Illinois. Addressed, stamped envelope is enclosed.



JULIUS ROSENWALD FUND  
4901 ELLIS AVENUE  
CHICAGO

Confidential Report on Candidate for Fellowship

Name of Candidate      Mr. Frederick S. Barkalow, Jr.  
Report Requested of    Dr. Charles N. Leach  
Alabama Department of Health  
Rabies Research Laboratory, Montgomery, Alabama

The above-named candidate has applied to this Fund for a fellowship and has given your name as a reference. The candidate's plan of work is attached. Please return it with your statement.

We shall appreciate your frank opinion of this applicant's qualifications, and an appraisal of his plan of work and of his ability to make a noteworthy contribution in his field. *An early reply will be of great assistance in allowing the Fellowship Committee sufficient time for adequate consideration of the large number of candidates.*

We request candid and critical comment. Your reply will be held in strict confidence.

  
Director for Fellowships

REPORT

is the candidate free from personality handicaps which would make it difficult to obtain and hold a position giving him opportunity to utilize his abilities?

\_\_\_\_\_  
Person or Title

\_\_\_\_\_  
Date

Please return to the Director for Fellowships, Julius Rosenwald Fund, 4901 Ellis Avenue, Chicago, Illinois. Addressed, stamped envelope is enclosed.



JULIUS ROSENWALD FUND  
4901 ELLIS AVENUE  
CHICAGO

Confidential Report on Candidates for Fellowship

Name of Candidate

Report Requested of

Dr. Charles E. Rosen

Illinois Department of Health

Illinois Department of Health, Springfield, Illinois

The above-named candidate has applied to this Fund for a fellowship and has given your name as reference. The candidate's plan of work is attached. Please return it with your statement. We shall appreciate your frank opinion of this applicant's qualifications, and an appraisal of his plan of work and of his ability to make a noteworthy contribution in his field. An early reply will be of great assistance in allowing the Fellowship Committee sufficient time for adequate consideration of the large number of candidates. We request candid and critical comment. Your reply will be held in strict confidence.

REPORT

Is the candidate free from personality handicaps which would make it difficult to obtain and hold a position giving him opportunity to utilize his abilities?

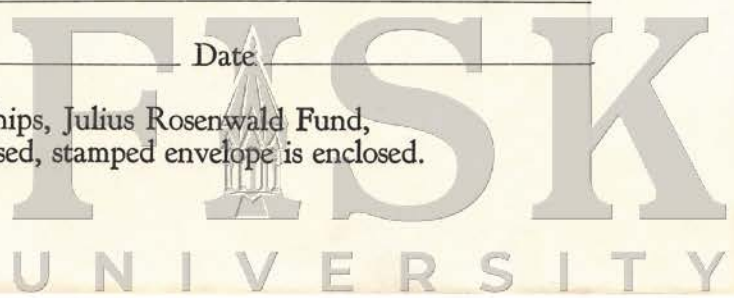
Signed \_\_\_\_\_

Position or Title \_\_\_\_\_

Address \_\_\_\_\_

Date \_\_\_\_\_

Please return to the Director for Fellowships, Julius Rosenwald Fund,  
4901 Ellis Avenue, Chicago, Illinois. Addressed, stamped envelope is enclosed.



OVER

<sup>A</sup>  
FELLOWSHIPS

THE ROCKEFELLER FOUNDATION  
INTERNATIONAL HEALTH DIVISION  
WILBUR A. SAWYER, M.D., DIRECTOR  
NEW YORK

CHARLES N. LEACH, M. D.  
STATE BOARD OF HEALTH  
MONTGOMERY, ALABAMA

January 21, 1941

Dear Sir:

This is in reply to your request for information regarding the professional qualifications of Mr. Frederick S. Barkalow.

I have known Mr. Barkalow for two years and have had occasion to work with him during this time. I regard his professional ability very highly and would have no hesitancy in recommending him for a fellowship. He is a diligent worker and has a pleasing personality.

The problem Mr. Barkalow has chosen for his thesis is one of timely interest. The cotton rat is very much in demand for scientific purposes and there is very little in the literature regarding its life history and habits.

Very truly yours,

  
Chas. N. Leach

Director of Fellowships  
Julius Rosenwald Fund  
4901 Ellis Avenue  
Chicago, Illinois

CNL:MSM

FISK  
UNIVERSITY



JULIUS ROSENWALD FUND  
4901 ELLIS AVENUE  
CHICAGO

Confidential Report on Candidate for Fellowship

Name of Candidate

Mr. Frederick S. McFarlan, Jr.

Report Requested of

Dr. W. E. Hunt

Department of Zoology, University of Michigan, Ann Arbor, Michigan

The above-named candidate has applied to this Fund for a fellowship and has given your name as reference. The candidate's plan of work is attached. Please return it with your statement.  
We shall appreciate your frank opinion of this applicant's qualifications, and an appraisal of his plan of work and of his ability to make a noteworthy contribution in his field. An early reply will be of great assistance in allowing the Fellowship Committee sufficient time for adequate consideration of the large number of candidates.  
We request candid and critical comment. Your reply will be held in strict confidence.

REPORT

Is the candidate free from personality handicaps which would make it difficult to obtain and hold a position giving him opportunity to utilize his abilities?

Yes

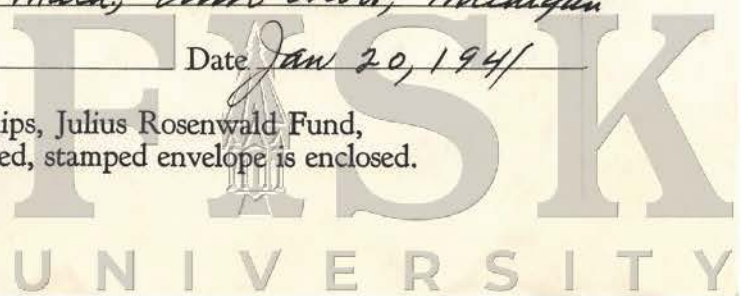
Signed *W. E. Hunt*

Position or Title *Curator, Division of Mammals and Instructor, Dept. of Zoology*

Address *Museum of Zoology, Univ. Mich., Ann Arbor, Michigan*

Date *Jan 20, 1941*

Please return to the Director for Fellowships, Julius Rosenwald Fund,  
4901 Ellis Avenue, Chicago, Illinois. Addressed, stamped envelope is enclosed.



# FELLOWSHIPS

April 12, 1941

Dear Mr. Barkalow: It is a pleasure to inform you that you have been selected by the Committee on Fellowships of the Julius Rosenwald Fund to receive a grant of one thousand four hundred dollars (\$1,400) to assist you in carrying forward your studies in zoology at the University of Michigan for the twelve-month period beginning June 1, 1941.

Will you please let us know at once whether or not you can accept this grant? An announcement of the Committee's selections will be made soon and it can include only those from whom acceptances have been received.

Very truly yours,

GMR:MLU

GEORGE M. REYNOLDS

Mr. Frederick Schenck Barkalow, Jr.  
Box 469  
Auburn, Alabama

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UNIVERSITY



DR. WALTER B. JONES  
DIRECTOR

J. M. WHITE  
ADMINISTRATIVE ASSISTANT

THOS. A. FORD  
DIRECTOR CONSERVATION PLANNING

DR. ALLAN F. ARCHER  
DIRECTOR OF RESEARCH

NEILSEN B. O'REAR  
EDITOR OF PUBLICATIONS



FELLOWSHIPS

BEN C. MORGAN, CHIEF  
GAME, FISH AND SEAFOODS

W. G. LUNSFORD, CHIEF  
PARKS, MONUMENTS AND  
HISTORICAL SITES

J. BROOKS TOLER, STATE FORESTER  
FORESTRY DIVISION

DEPARTMENT OF CONSERVATION

MONTGOMERY, ALABAMA

	GMR	18	BR	0
	DE		DE	4/18

Box 469  
Auburn, Alabama  
April 17, 1941

Mr. George M. Reynolds  
Director of Fellowships  
Julius Rosenwald Fund  
4901 Ellis Avenue  
Chicago, Illinois

Dear Mr. Reynolds:

I wish to accept the grant of fourteen hundred dollars (\$1400) from the Julius Rosenwald Fund. I wish to express my sincere appreciation to you and to the members of the committee for selecting me as a recipient of one of your Fellowships.

I regret my delay in acknowledging receipt of your letter. I attended the Southern Association of Conservation Officials Conference in Atlanta, Georgia from April 14-16 and did not receive your letter until I returned last night.

Thanking you again for your consideration, I am

Sincerely yours,

*Frederick S. Barkalow, Jr.*

Frederick S. Barkalow, Jr., Leader  
Inventory of Wildlife Resources of  
Alabama Project

FSB:R

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# FELLOWSHIPS

April 18, 1941

Dear Mr. Barkalow:      When you are ready to  
begin work under your  
fellowship grant, kindly submit a payment plan  
that will meet your needs. It is customary for  
Fellows to prefer payment either in monthly or  
quarterly installments, but if another plan is  
more agreeable to you do not hesitate to suggest  
it.

Very truly yours,

DOROTHY A. ELVIDGE

DAE:RH

~~Mr. Frederick S. Barkalow, Jr.~~  
Box 403  
Auburn, Alabama

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# FELLOWSHIPS



DR. WALTER B. JONES  
DIRECTOR

J. M. WHITE  
ADMINISTRATIVE ASSISTANT

THOS. A. FORD  
DIRECTOR CONSERVATION PLANNING

DR. ALLAN F. ARCHER  
DIRECTOR OF RESEARCH

NEILSEN B. O'REAR  
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BEN C. MORGAN, CHIEF  
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PARKS, MONUMENTS AND  
HISTORICAL SITES

J. BROOKS TOLER, STATE FORESTER  
FORESTRY DIVISION

DEPARTMENT OF CONSERVATION  
MONTGOMERY, ALABAMA

Box 469  
Auburn, Alabama  
April 23, 1941

DE	4/25	DE	o
MLW		MLW	o

Mrs. Dorothy A. Elvidge  
4901 Ellis Avenue  
Chicago, Illinois

Dear Mrs. Elvidge:

I wish to acknowledge receipt of your letter dated April 18.

As soon as definite arrangements have been made to secure leave from my work here, I will submit a payment plan to you.

Thanking you very much for your letter, I am

Sincerely yours,

*Frederick S. Barkalow, Jr.*  
Frederick S. Barkalow, Jr., Leader  
Inventory of Wildlife Resources of  
Alabama Project

FSB:R

# FELLOWSHIPS

DR. WALTER B. JONES  
DIRECTOR

J. M. WHITE  
ADMINISTRATIVE ASSISTANT

THOS. A. FORD  
DIRECTOR CONSERVATION PLANNING

DR. ALLAN F. ARCHER  
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NEILSEN B. O'REAR  
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PARKS, MONUMENTS AND  
HISTORICAL SITES

J. BROOKS TOLER, STATE FORESTER  
FORESTRY DIVISION

## DEPARTMENT OF CONSERVATION

Auburn, ~~MONTGOMERY~~, ALABAMA

WCH	8	WCH	May 7, 1941
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Frederick S. Barkalow, Jr.  
Box # 469  
Auburn, Alabama

Mr. George M. Reynolds  
Director for Fellowships  
Julius Rosenwald Fund  
4901 Ellis Avenue  
Chicago, Ill.

Dear Mr. Reynolds:

I have been ordered to active duty as a First Lieutenant in the Coast Artillery Corps for the period of one year beginning May 26, 1941. I have received notice that my request for a deferment in order to continue my doctorate studies has been refused.

Since I will be unable to continue my graduate work until I have completed my tour of duty in the army, I respectfully request a deferment of my fellowship for the period of one year.

Sincerely yours,

*Frederick S. Barkalow, Jr.*

Frederick S. Barkalow, Jr.  
Senior Biologist, Inventory of  
Wildlife Resources of Alabama

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128  
FELLOWSHIPS

May 13, 1941

Dear Mr. Barkalow: Mr. Reynolds has resigned his position with the Julius Rosenwald Fund to work with the government, and your letter of May 7 has come to me for answer.

In accordance with your request for deferment of your fellowship, we are hereby reserving your grant to enable you to begin your work during the year 1942 instead of 1941. Best wishes to you for a successful year of army duty.

Sincerely yours,  
WILLIAM C. HAYGOOD

Acting-Director  
for Fellowships

WCH:MLU

Mr. Frederick S. Barkalow, Jr.  
Box 469  
Auburn, Alabama

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DR. WALTER B. JONES  
DIRECTOR

J. M. WHITE  
ADMINISTRATIVE ASSISTANT

THOS. A. FORD  
DIRECTOR CONSERVATION PLANNING

DR. ALLAN F. ARCHER  
DIRECTOR OF RESEARCH

NEILSEN B. O'REAR  
EDITOR OF PUBLICATIONS



# FELLOWSHIPS

BEN C. MORGAN, CHIEF  
GAME, FISH AND SEAFOODS

W. G. LUNSFORD, CHIEF  
PARKS, MONUMENTS AND  
HISTORICAL SITES

J. BROOKS TOLER, STATE FORESTER  
FORESTRY DIVISION

## DEPARTMENT OF CONSERVATION MONTGOMERY, ALABAMA

WCH 19	WCH 0		
SE	SE		

Box 469  
Auburn, Alabama  
May 15, 1941

Mr. William C. Haygood  
Acting Director for Fellowships  
Julius Rosenwald Fund  
4901 Ellis Avenue  
Chicago, Illinois

Dear Mr. Haygood:

I wish to express my sincere appreciation to you and to the members of the Committee for granting me a deferment of the fellowship.

Thank you for your wishes of a successful year of army duty.

Sincerely yours,

*Frederick S. Barkalow, Jr.*

Frederick S. Barkalow, Jr.  
Senior Biologist, Inventory of  
Wildlife Resources of Alabama

FSB:R

FISK  
UNIVERSITY

FELLOWSHIPS

1st. Lt. F. S. Barkalow, Jr.

93d. C.A. (AA)

Camp Davis, N.C.

12/13/41

Mr. William C. Haygood  
Director for Fellowships  
Julius Rosenwald Fund  
Chicago, Ill.

WCH 15	WCH 23
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	wch me 15

Dear Mr. Haygood:

Your letter of November 17 was forwarded to me. I will do my best to place these applications in the hands of deserving individuals.

Can you give me some information concerning my fellowship? As you know, my fellowship was deferred to June 1942 in order that I may complete my year's tour of duty. Since I will be in the army for the duration of the war I would like to know if my fellowship will be held for me?

Please mail all future correspondance to the following address:

1st. Lt. F. S. Barkalow, Jr.  
207 Washington Ave.  
Marietta, GA.

Thanking you for any information concerning my fellowship which you would care to give me, I am

sincerely yours,

Frederick S. Barkalow, Jr.  
1st Lt. 93d. C.A. (AA)



# FELLOWSHIPS

December 16, 1941

Dear Lieutenant Barkalow: Your letter of the  
13th has come in  
Mr. Haygood's absence from the office. He will  
return sometime next week, and will write you  
then regarding your fellowship.

Sincerely yours,

MARGARET L. UTLEY

MLU

Lieutenant Frederick S. Barkalow, Jr.  
207 Washington Avenue  
Marietta, Georgia

FISK  
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# FELLOWSHIPS

December 24, 1941

Dear Lieutenant Barkalow: Your letter of December 13 came while I was on a field trip, and has been held until my return.

Our Committee on Fellowships has voted to reserve all unused fellowship grants for the duration of the war. Therefore, your grant will be held for you until the present emergency is over and you can resume work on your project.

Sincerely yours,

WCH:MLU

Lieutenant Frederick S. Barkalow, Jr.  
93d. C. A. (AA)  
Camp Davis, North Carolina

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# FELLOWSHIPS

Lt Col Frederick S. Barkalow, Jr.  
108 South Ross Street  
Auburn, Alabama  
23 February 1946

Director for Fellowships  
Julius Rosenwald Fund  
4901 Ellis Avenue  
Chicago, Ill.

Dear Sir:

Mr. William C. Haygood informed me in a letter dated December 24, 1941 that the Julius Rosenwald grant awarded me by the Committee on Fellowships in April 1941 would be held for me until the present emergency was over. I will be released from the armed forces effective May 7, 1946. I have made the necessary arrangements to resume the work of completing my doctorate at the University of Michigan this June.

In a conference with Dr. William H. Burt, my doctoral committee chairman, in Ann Arbor last week the suggestion was made that my thesis problem be changed from "The Life History of the Cotton Rat, Sigmodon hispidus" to an "Ecological Study of the Game and Fur Animals of Alabama". Dr. Burt deems this advisable because of my experience in the game research field. For nineteen (19) months prior to entrance into the army I directed the Pittman-Robertson projects "Inventory of Wildlife Resources of Alabama", "Beaver and Muskrat Restocking", a duck food planting and restoration program in Mobile Bay, and started a statewide quail food planting program. My successor and former assistants carried these projects to completion during my tour of duty, consequently, there is a vast amount of information available which has considerable value to the State of Alabama and to the entire game management field. It is believed that, in view of the economic importance of the game and fur resources in the South and the results already obtained from my work with the Pittman-Robertson Program, a shift of problem is desirable.

Would you please inform me what procedure is necessary for obtaining a change of problem?

Thanking you for any instructions or suggestions, I am

Sincerely yours,

*Frederick S. Barkalow, Jr.*  
Frederick S. Barkalow, Jr.  
Lt Col, CAC

# 1400.00

for 12 mos period

  
FISK  
UNIVERSITY

# FELLOWSHIPS

February 27, 1946

Dear Colonel Barkalow: It is good to be resuming our correspondence which was broken off in 1941, and good to know that you plan to take up your work at Michigan this summer.

Our records show that you have a \$1400 grant for a twelve month period. When you enter the University, please write our Comptroller telling how you wish this amount to be paid.

Since your new project is still in the same general field, I think that all that will be necessary is for you to submit a copy of the new plan of work, somewhat along the lines of your previous plans, in respect to length and comprehensiveness. I would like to have this before the end of next month so that I can inform the Committee on Fellowships of this change, at its next meeting.

Sincerely yours,

WILLIAM C. HAYGOOD

WCH:RFL

Lt. Col. Frederick S. Barkalow, Jr.  
108 South Ross Street  
Auburn, Alabama

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Frederick S. Barkalow, Jr.

EXPERIENCE

(Since submission of original application)

**FISK**  
UNIVERSITY

Frederick S. Barkalow, Jr.

EXPERIENCE

(Since submission of original application)

Institution or Organization	Address	Position	Inclusive Dates	Annual Salary
Alabama Department of Conservation	Montgomery, Ala.	Project Leader Beaver & Muskrat Stocking Project 2-D	1 Jan. '40 - 25 May '41	\$2100.00
Alabama Department of Conservation	Montgomery, Ala.	Project Leader Waterfowl Food Planting Project 5-D	1 July '40 - 25 May '41	\$2100.00
Alabama Department of Conservation	Montgomery, Ala.	Project Leader Deer & Turkey Restocking Program Project 13-D	1 July '40 - 25 May '41	\$2100.00
Alabama Department of Conservation	Montgomery, Ala.	Project Leader Farm Game Habitat Restoration Project 6-D	1 May '41 - 25 May '41	\$2100.00

(Note: Projects listed above ran concurrently with Inventory of Wildlife Resources of Alabama, Project 1-R)

U. S. Army - Entered active duty as a 1st Lt CAC, May 26, 1941  
Separated active duty as a Lt Colonel, CAC, May 7, 1946

Positions Held in Army

Supply & Evacuation Staff Officer (4010-1) at Division Level Inf. Repl. Tng. Center,  
Ft. McClellan, Ala.  
Military Personnel Officer (2200-1) at Division Level Inf. Advanced Repl. Tng. Center,  
Camp Maxey, Texas  
Sanitary Engineer (7960), Camp Davis, N. C. & Camp Irwin, Calif.  
Supply Officer & Adjutant of 36th, 119th, & 58th AA Group



ACCOMPLISHMENTS

3. PUBLICATIONS

(Since submission of original application)

PUBLICATIONS

(Since submission of original application)

Scientific Paper:

"A Comparative Study of the Bacula of Wood Rats (Subfamily Neotominae)",  
Burt, William H. and Barkalow, Frederick S. Jr. Journal of Mammalogy,  
August 14, 1942, Vol. 23, No. 3, pp 287-297 incl.



**A** BEAVER and muskrat stocking project, whereby the valuable fur-bearing animals were trapped in areas where they were populous and removed to sections of the state where they were scarce or absent, was started on June 1, 1940, by the Department of Conservation through the Inventory of Wildlife project, Federal-State sponsored program. With Frederick S. Barkalow as leader of the project, and T. J. Gleaton, an experienced trapper, in charge of the trapping, 65 beavers and 45 muskrats have been caught and released in areas where it was believed they would flourish and repopulate the section.

Most of the 65 beavers were caught in Russell County, while the muskrats were taken in Cleburne, Sumter and Russell Counties—all with the permission and cooperation of landowners. The animals were released in the Pea River State Forest, Oakmulgee and Choccolocco branches of the Talladega National Forest, the Black Warrior National Forest, and other places.

A series of interesting and informative pictures, made by Frederick S. Barkalow, depict methods of trapping, as well as typical muskrat and beaver habitat.

1. A large beaver house on a Russell County stream.

2. Young beaver, taken near Seale, Russell County.

3. T. J. Gleaton setting a live trap at the entrance of a muskrat



den. Muskrats frequently make their homes in a bank, rather than build stick and mud homes.

4. Trapper T. J. Gleaton and son with two young live beavers.

5. A small supplementary baffle-dam below the main pond shown in Picture 9. These dams provide a series of small ponds which are used as highways by the beavers and which make excellent feeding grounds for raccoons, mink, otters and muskrats. Such dams reduce severe silting and aid in flood control.

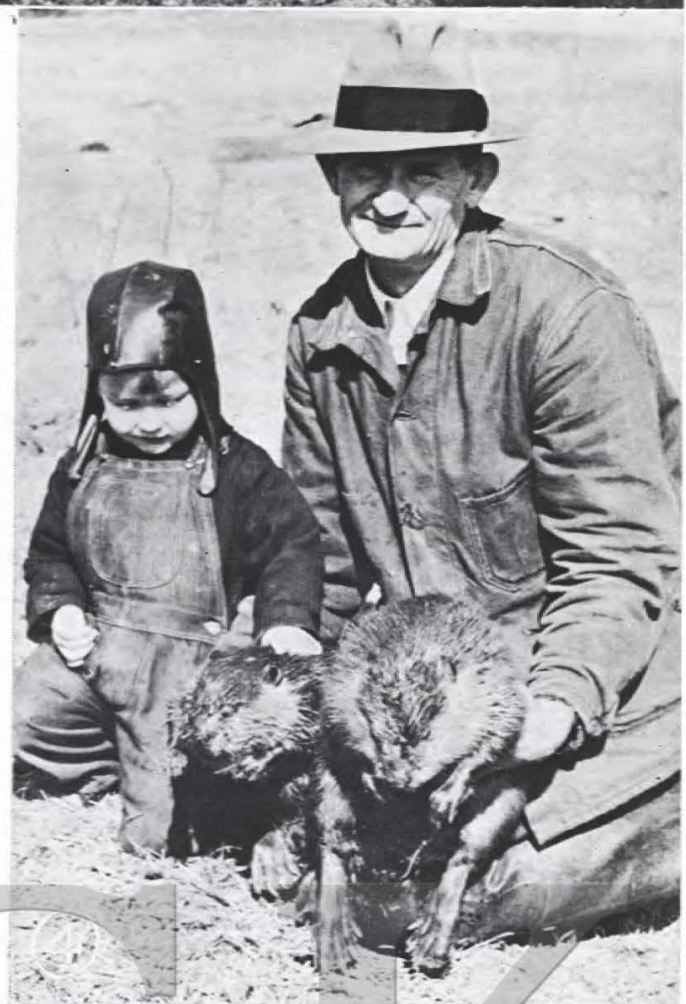
6. Young northern muskrat (*Ondatra z. zibethica*) captured in Sumter County.

7. Game Warden Fred Smith viewing typical muskrat habitat in Mobile County.

8. Trapper Gleaton setting a Bailey live trap for beaver. In the closeup above No. 8, Gleaton is removing a 38-pound male beaver from the trap.

9. A large beaver pond near Seale, Russell County. Such ponds provide excellent fishing. Mallards and wood ducks often frequent this pond during the winter, and bullfrogs are desirable permanent residents. The establishment of similar ponds throughout the State is one of the objectives of the Beaver and Muskrat Restocking project.

In pioneer days beavers were found on every stream system in Alabama, but relentless trapping, hunting, and clearing of swamps and woodland have all but exterminated this valuable fur bearer. A closed season on beaver was declared several years ago in an effort to prevent the complete extirpation of this species in the State. Beavers are rapidly increasing now.



422

Frederick S. Barkalow, Jr.

STATEMENT OF PLAN OF WORK

(REVISED)



STATEMENT OF PLAN OF WORK

(REVISED)

(Note: A shift of problem is believed desirable in view of the economic importance of the game and fur resources in the South and my experience in game work)

1. FULL DESCRIPTION OF PROJECT

a. Character

The completion of all major requirements for the PhD degree in Zoology.

b. Scope

The project will be divided into two phases as follows:

- (1) The completion of the Spanish language requirement and the preliminary examination.
- (2) Completion of the thesis "An Ecological Study of the Game and Fur Animals of Alabama".

c. Significance

The economic and recreational value of the game and fur resources of the South have been recognized for years, but it was not until 1936 that the first scientific study of a game animal was undertaken in Alabama. The Alabama Cooperative Wildlife Research Unit first projects "Life History of the Mourning Dove", and food habit studies on the deer, wild turkey, and red and gray fox began that year.

In October 1939 under the Pittman-Robertson Program a state wide INVENTORY OF WILDLIFE RESOURCES PROJECT was initiated under my leadership. The objectives of this project were (1) "To determine the present distribution and approximate populations of the more important game and fur bearing animals in Alabama" and (2) "To catalog and evaluate the environmental influences for each species in order that a program of long range planning for wildlife restoration and management can be initiated". As an outgrowth of this inventory a

Frederick S. Barkalow, Jr.

beaver and muskrat stocking project, a farm game habitat restoration project, a waterfowl food planting project, and a turkey and deer restocking program were begun. These projects were completed during the war. However, with the exception of a few progress reports, the data accumulated have never been compiled into a comprehensive published report for any of the specific animals investigated. During the course of these projects sufficient information on the game and fur bearing animals in Alabama was secured to furnish the basis of a complete ecological study. It will be necessary for someone thoroughly familiar with the game research programs and the accumulated data to complete a work of this scope.

This proposed project has as its objective a comprehensive study of the game and fur bearing animals of Alabama, the results of which will be published in book form. This publication would include such topics as a brief life history sketch of each species, its distribution, habitat, abundance, management, economic and recreational value. Each animal and its habitat will be illustrated by photographs, pen and ink sketches and by paintings. An attempt will be made to compile a comprehensive bibliography of the major works on these species.

2. THE PRESENT STATE OF THE PROJECT

a. Time of commencement

Field notes have been kept on the game and fur animals of Alabama from the time I was employed as a temporary summer assistant on the "LIFE HISTORY OF THE MOURNING DOVE PROJECT" in the summer of 1936. Full time work

on these species was begun by me in October 1939 with the initiation of the INVENTORY OF WILDLIFE RESOURCES OF ALABAMA and subsequent projects under the Pittman-Robertson Program. These projects were continued by my successors during my tour of active duty in the army. Several of these projects have been completed and the field notes and observations need to be correlated, compiled and published.

Formal work to complete my doctorate will begin in June 1946 at the University of Michigan.

b. Progress to date

The following progress toward the degree of Doctor of Philosophy in Zoology has been made:

- (1) German reading examination passed.
- (2) Residence requirements have been met.
- (3) All formal course work completed.
- (4) Accepted by the qualifying committee.
- (5) Doctorate committee appointed.

The following requirements have not been met:

- (1) Spanish reading examination.
- (2) Preliminary examination.
- (3) Final examination.
- (4) Thesis (Rather complete field notes and life history observations have been kept on all species since 1936 so that the majority of the field work required by the problem has been completed).

c. Work to be completed during the period of the fellowship.

- (1) Bibliography
- (2) Spanish and preliminary examination requirements
- (3) Thesis put into draft form.

d. Work which could not be finished during the fellowship period.

(1) Final examination (The final examination cannot be taken within one year of the successful completion of the preliminary examination).

(2) Some additional field work may be required to complete the study. This would depend entirely upon the problems presenting themselves during the progress of the work.

3. THE PROPOSED UNIVERSITY AND AUTHORITIES SUPERVISING THE WORK.

a. University:

University of Michigan

b. Supervisor:

Dr. William H. Burt, Curator of the Division of Mammals, Museum of Zoology, is the doctorate committee chairman and supervisor of all academic and field work.

c. Field Work:

Due to the nature of the problem all field work will be done in Alabama.

4. EXPECTATION AS TO THE PUBLICATION OR USE OF THE RESULTS OF YOUR STUDY.

It is expected that the results of the study will be published in book form by the ALABAMA DEPARTMENT OF CONSERVATION or as a publication of the University of Michigan. Several smaller papers probably will be published in such scientific magazines as the "Journal of Mammalogy", "The Wildlife Journal", etc..

b. Use of the results of this study:

Publication of this study would be of invaluable aid to the Alabama Department of Conservation in their educational program as well as a valuable reference to the wildlife

students and game technicians in the South. It will provide the farmers and landowners of Alabama with factual information on the State's natural resources and their best use. The compilation of the bibliography would in itself be a contribution to science.

5. SUBSEQUENT PLANS FOR MY CAREER

On completion of my doctorate work, I plan to continue in the field of game research in the South and, in all probability, in the State of Alabama. It is my desire to be connected with either a state conservation department or with a college.

It is my belief that the South offers the most promising future for the scientist in the field of game research. Born and reared in Georgia, I am well acquainted with the game problems in the Southeast, and, therefore, it is my desire to continue work in this section.

Frederick S. Barkalow, Jr.



Dogs pointing a covey of quail during the State wide quail census. Complete field notes were kept of each covey location, cover, food, and activity. Good steady shooting ("meat") dogs were used in preference to highly bred expensive field trial dogs due to their ease of handling and less likelihood of missing birds.

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Frederick S. Barkalow, Jr.



Snakes are important predatory species. This five and a half foot Diamondback was sunning himself on a South Alabama roadside one October afternoon. Early fall quail census work was not without risk to the project's dogs.

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Frederick S. Barkalow, Jr.



Alabama has some of the finest wild turkey hunting in the United States, however, the majority of the best turkey range is now controlled by hunting clubs and large landowners. The average sportsman has little chance of getting a turkey unless he belongs to a club or has an invitation to hunt on a private preserve. A wild turkey hen (taken in Mobile County).

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A mourning dove on a nest in a pine tree. The nest contained two squabs, one a day old and the other two days of age. Auburn, Alabama.

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Frederick S. Barkalow, Jr.



A state trapper with a beaver skin from an animal accidentally drowned in a Bailey Live Trap. All animals taken were sexed, measured, weighed and tagged before liberation thus furnishing much valuable life history data.

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Frederick S. Barkalow, Jr.



A wild turkey nest in Clarke Co.



Highly bred dogs of field trial caliber were occasionally used. These are owned by Mr. L.B. Maytag.



A beaver house in a beaver lake in Russell County. The lake is some fifty years old and is excellent fishing.



Two young mourning doves in a nest with two freshly laid eggs. This is a rather unusual occurrence.



Two baby Swamp Rabbits or "Cane-cutters" as they are called by the rural inhabitants.



The free ranging hog is a serious predator of the wild turkey for he will destroy the nests, eat the eggs, and kill the poults. It also competes for mast with the deer and turkey. Mobile County.



Alabama has little to offer in the way of waterfowl shooting. A lucky hunter in Mobile Bay looks over his bag of Lesser Scaup.



The cottontail is one of the most important game animal in Alabama. More individuals hunt him than any other species.



FRED S. BARKALOW, JR., AND C. H. STANLEY, VIEWING A WILD TURKEY'S NEST AND EGGS IN CLARKE COUNTY. BARKALOW IS LEADER OF ALABAMA WILDLIFE RESOURCES INVENTORY PROJECT, AND STANLEY IS A GAME WARDEN.

WCH 3/26

Alabama Polytechnic Institute  
Auburn, Alabama

SCHOOL OF AGRICULTURE  
AGRICULTURAL EXPERIMENT STATION  
AND AGRICULTURAL SUBSTATIONS

March 23, 1946

FELLOWSHIPS

Mr. William C. Haygood  
Director for Fellowships  
Julius Rosenwald Fund  
4901 Ellis Avenue  
Chicago 15, Illinois

Dear Mr. Haygood:

In accordance with instructions contained in your letter of February 27, 1946, I am enclosing a revised "Statement of Plan of Work" and some additional information on my experience and publications which was not included in my original application. Six copies are included.

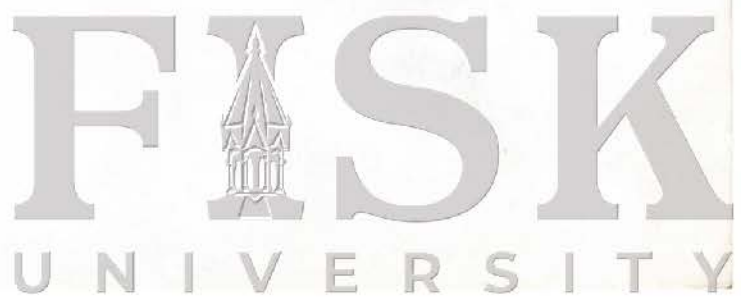
If any additional information is needed, I will be glad to furnish it.

Thanking you very much, I am

Sincerely yours,  
*Frederick S. Barkalow, Jr.*  
Frederick S. Barkalow, Jr.

FSB/aw

Enclosures



Alabama Polytechnic Institute  
Auburn, Alabama

SCHOOL OF AGRICULTURE  
AGRICULTURAL EXPERIMENT STATION  
AND AGRICULTURAL SUBSTATIONS

March 25, 1946

	WCH	3/28	WCH	3/28

Mr. William C. Haygood  
Director for Fellowships  
Julius Rosenwald Fund  
4901 Ellis Avenue  
Chicago, Illinois

FELLOWSHIPS

Dear Mr. Haygood:

I sent six copies of my revised "Statement of Work" by railway express on March 23. I had delayed sending them earlier hoping that reprints from my latest paper would arrive.

I am enclosing six copies of Dr. Burt's and my woodrat paper which arrived today. I would appreciate their being included with the publication section of my revised report.

Thanking you for this favor, I am

Sincerely yours,

*Frederick S. Barkalow, Jr*  
Frederick S. Barkalow

FSB/aw

Enclosures



# FELLOWSHIPS

March 28, 1946

Dear Mr. Barkalow: Thank you for the six copies of the woodrat study, which arrived today. I am adding them to the plans of work and will send them to the members of the committee. I appreciate the trouble you have gone to in getting all this material in to us, and I hope that things at Auburn are going to your satisfaction.

Sincerely,

WILLIAM C. WAYGOOD

WCH:RFL

Mr. Frederick S. Barkalow, Jr.  
School of Agriculture  
Alabama Polytechnic Institute  
Auburn, Alabama

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UNIVERSITY

	WCH	6/14	WCH	o

Frederick S. Barkalow, Jr.  
709 Haven Street  
Ann Arbor, Michigan

13 June 1946

Mrs Dorothy A. Elvidge  
Secretary and Comptroller  
Julius Rosenwald Fund  
4901 Ellis Avenue  
Chicago, 15, Ill.

## FELLOWSHIPS

Dear Mrs Elvidge:

In accordance with your letter of April 18, 1941 and a recent letter from Mr. William C. Haygood on February 27, 1946, I should like my \$1400 grant paid in equal quarterly installments. I desire the payments to begin as of the 15th of June or the 1st of July 1946 whichever is the most expedient for you. I may be reached at the above address for the duration of the payment period.

I wish to thank you for your trouble and to express my appreciation to you and the other members of the Julius Rosenwald Fund for the privilege of being a recipient of this grant.

Sincerely yours,

Frederick S. Barkalow, Jr.

cc. Mr. William C. Haygood ✓

  
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UNIVERSITY

Frederick S. Barkalow, Jr.  
709 Haven Street  
Ann Arbor, Michigan

13 June 1946

FELLOWSHIPS

Mrs Dorothy A. Elvidge  
Secretary and Comptroller  
Julius Rosenwald Fund  
4901 Ellis Avenue  
Chicago, 15, Ill.

DE	6/14	DE	6/17

Dear Mrs Elvidge:

In accordance with your letter of April 18, 1941 and a recent letter from Mr. William C. Haygood on February 27, 1946, I should like my \$1400 grant paid in equal quarterly installments. I desire the payments to begin as of the 15th of June or the 1st of July 1946 whichever is the most expedient for you. I may be reached at the above address for the duration of the payment period.

I wish to thank you for your trouble and to express my appreciation to you and the other members of the Julius Rosenwald Fund for the privilege of being a recipient of this grant.

Sincerely yours,

*Frederick S. Barkalow, Jr.*  
Frederick S. Barkalow, Jr.

cc. Mr. William C. Haygood

FISK  
UNIVERSITY

# Julius Rosenwald Fund

4901 Ellis Avenue  
CHICAGO 15

To

Mr. Frederick S. Barkalow, Jr.  
709 Haven Street  
Ann Arbor, Michigan

Payment Voucher No. 2390

Date June 14, 1946

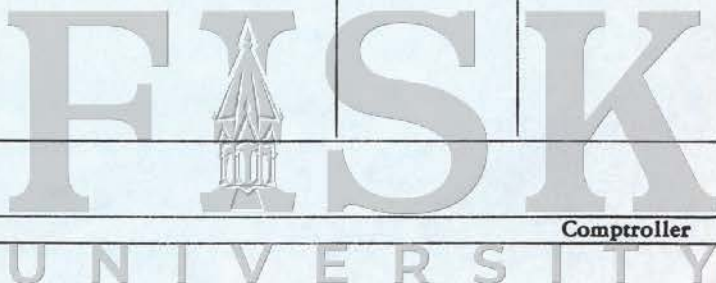
FELLOWSHIPS

First quarterly payment on fellowship ----- \$350.00

Chk. #35155

Accounts	Appropriation No.	Debit	Credit
White Southern Fellowships - Fellowships Reserve - Army Service	41-7D	\$350.00	

Prepared by lem	Checked by	Posted by	 Comptroller

~~WCH 0~~



# FELLOWSHIPS

June 17, 1946

Dear Mr. Barkalow: Enclosed you will find our check for \$350, representing a first quarterly payment on your fellowship. Checks for a like amount will be mailed on October 1, January 1, and April 1.

Very truly yours,

DOROTHY A. ELVIDGE

DAE:LCM

Mr. (Frederick S.) Barkalow, Jr.  
709 Haven Street  
Ann Arbor, Michigan



# Julius Rosenwald Fund

4901 Ellis Avenue  
CHICAGO 15

To

Mr. Frederick S. Barkalow, Jr.

709 Haven Street

Ann Arbor, Michigan

Payment Voucher No. 2781

Date September 30, 1946

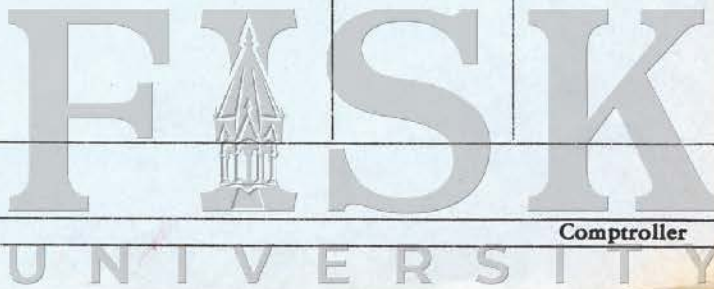
FELLOWSHIPS

Payment on fellowship ----- \$350.00

Ok. #35627

Accounts	Appropriation No.	Debit	Credit
White Southern Fellowships - Fellowship Reserve - Army Service	41-7D	\$350.00	

Prepared by lem	Checked by	Posted by	 Comptroller
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# FELLOWSHIPS

November 18, 1946

Dear Mr. Barkalow: I want to thank you very much for your reply to my recent recruiting letter. Both of the proposed young men sound like excellent candidates, although I am afraid we won't be able to accept Mr. Rinker, since our fellowship definition of the South corresponds roughly to the area of the late lamented Confederacy.

It is swell that your work is going along so well, and I congratulate you on your election to the science research club.

Sincerely yours,

WILLIAM C. HAYGOOD

WCH:rfl

Mr. Frederick S. Barkalow, Jr.  
709 Haven Street  
Ann Arbor, Michigan

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UNIVERSITY

	WCH	11/14	WCH	11/18

November 12, 1946

# FELLOWSHIPS

Frederick S. Barkalow, Jr.  
709 Haven Street  
Ann Arbor, Michigan

Mr. William C. Haygood  
Director for Fellowships  
Julius Rosenwald Fund  
Chicago, 15, Ill.

Dear Mr. Haygood:

In reply to your letter of November 7, I know of two students who are of the caliber you desire. One is Mr. J. H. Wheeler, Jr. of Pisgah, Alabama and the other is Mr. George C. Rinker of Lawrence, Kansas.

Mr. Wheeler is an applicant for the PhD at the University of Chicago in the field of education. He received his BA and MA from the Ala. Poly. Institute majoring in English. He was an honor graduate. Mr. Wheeler was born and reared in a small North Alabama community where his father is the school principal. He entered the service as a Second Lt. in the Field Artillery and was separated as a Major; seeing action both in Germany and Japan. He is married and has two small children. His intense interest in the betterment of the educational system and educational problems of the South as well as his own financial need make him especially deserving.

Mr. George C. Rinker is a graduate student here at the University of Michigan, Mammal Division working toward his PhD in Zoology. He is a graduate of the University of Kansas with an AB in Zoology. While I am not sure that Kansas is included in your consideration of the South I am including his name as possible candidate for one of your fellowships. He is an excellent student and of the type you desire for a grant. He is married and has one small child. Graduating from OCS as a 2nd Lt. in the Air Corps he was separated as a 1st Lt. after having completed some 35 combat missions over France and Germany as a B 26 pilot.

I have asked both of these gentlemen to write you for further details.

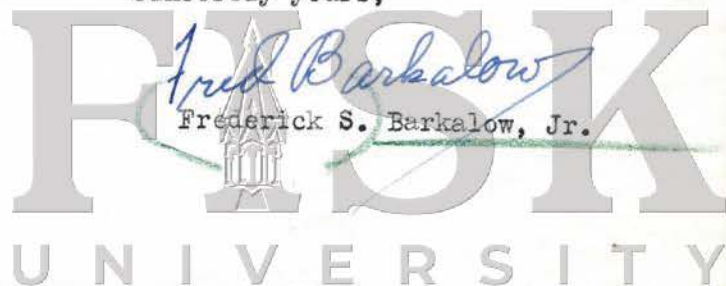
My doctorate language requirements were completed last month so that I have only the prelims, thesis and final exam remaining.

I have recently been elected to membership in The Science Research Club an honor society of the University of Michigan. The majority of the members are faculty men and research fellows. A few graduate students are selected for membership each year.

If I can be of further aid to you please let me know.

Sincerely yours,

*Frederick S. Barkalow*  
Frederick S. Barkalow, Jr.



# Julius Rosenwald Fund

4901 Ellis Avenue  
CHICAGO 15

To Mr. Frederick S. Barkalow, Jr.  
709 Haven Street  
Ann Arbor, Michigan

Payment Voucher No. 3173

Date December 20, 1946

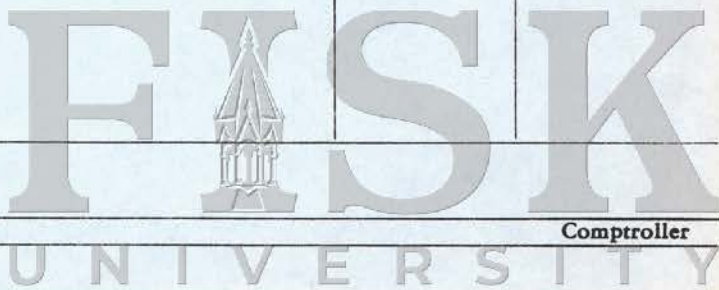
FELLOWSHIPS

Payment on fellowship ----- \$350.00

Chk. #36153

Accounts	Appropriation No.	Debit	Credit
White Southern Fellowships - Fellowship Reserve - Army Service	41-7D	\$350.00	

Prepared by lcm	Checked by	Posted by	 Comptroller

January 7, 1947

DL	1/9	DE	1/9

FELLOWSHIPS

Frederick S. Barkalow, Jr.  
709 Haven Street  
Ann Arbor, Michigan

Mrs. Dorothy A. Elvidge  
Julius Rosenwald Fund  
4901 Ellis Avenue  
Chicago, 15, Ill.

Dear Mrs. Elvidge:

Could you tell me whether or not my Julius Rosenwald Fellowship  
is subject to Federal Income Tax?

Thanking you very much for this information, I am

Sincerely yours,

*Frederick S. Barkalow Jr.*  
Frederick S. Barkalow, Jr.

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# FELLOWSHIPS

January 9, 1947

Dear Mr. Barkalow: Fellowship payments, because they are a gift and not compensation for services, are not subject to federal income tax. The amount you have received does not need to be recorded on your tax return for 1946.

Very truly yours,

DOROTHY A. ELVIDGE

DAE:LCM

Mr. Frederick S. Barkalow, Jr.  
709 Haven Street  
Ann Arbor, Michigan

**FISK**  
UNIVERSITY

# Julius Rosenwald Fund

4901 Ellis Avenue  
CHICAGO 15

To

Mr. Frederick S. Barkalow, Jr.

709 Haven Street

Ann Arbor, Michigan

Payment Voucher No. 3564

Date March 31, 1947


FELLOWSHIPS

Final payment on fellowship ----- \$350.00

Ck. #36623

Accounts	Appropriation No.	Debit	Credit
White Southern Fellowships Fellowship Reserve - Army Service	41-7D	\$350.00	

Prepared by lcm	Checked by	Posted by	 Comptroller



UNIVERSITY

wctH	3/28	wctH	4/11

March 27, 1947

*July  
June 1*

Frederick S. Barkalow, Jr.  
709 Haven Street  
Ann Arbor, Michigan

Mr. William C. Haygood  
Julius Rosenwald Fund  
4901 Ellis Avenue  
Chicago, 15, Ill.

FELLOWSHIP

Dear Mr. Haygood:

This letter is more or less of a follow-up in answer to your letter of November 7, 1946 regarding any changes in my status. I thought you might be interested to know that I have accepted a full professorship of zoology at the North Carolina State College of Agriculture and Engineering in Raleigh beginning next July. I have recently <sup>been</sup> elected to full membership in Sigma Xi and Phi Kappa Phi here at the University of Michigan .

I will have nearly all my doctorate requirements completed by this June but will not be able to have the PhD in Zoology awarded before February 1948 since these degrees are not given in the summer and I can't get my thesis in before the April 15 deadline for the degree in June 1947.

Hoping that this additional information will be of interest to you, I am

Sincerely yours,

*Frederick S. Barkalow, Jr.*  
Frederick S. Barkalow, Jr.

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UNIVERSITY

FELLOWSHIP

April 11, 1947

Dear Mr. Barkalow:      Thank you very much  
   for your letter and  
for the fine news of your appointment to  
North Carolina State College. I appreciate  
having this additional information and I am  
glad to know that your work at Michigan is  
going so well.

Sincerely,  
WILLIAM C. HAYGOOD

WCH:rfl

Mr. Frederick S. Barkalow, Jr.  
709 Haven Street  
Ann Arbor, Michigan

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UNIVERSITY

*Made in the United States of America*

Reprinted from JOURNAL OF MAMMALOGY  
Vol. 23, No. 3, August 14, 1942, pp. 287-297

A COMPARATIVE STUDY OF THE BACULA OF WOOD RATS  
(SUBFAMILY NEOTOMINAE)

BY WILLIAM H. BURT AND FREDERICK S. BARKALOW, JR.

The value of using the baculum to supplement other morphological characters of more general use in showing relationships and natural groupings among North American rodents was pointed out by Burt (1936) for the genera *Perognathus* and *Dipodomys*; at that time the principal literature on bacula of rodents was listed. Recently, Wade and Gilbert (1940) published on the bacula of some of the Sciuridae. Here, too, significant differences and similarities were found and were considered by the authors to be of importance in determining relationships within the family of squirrels. Bacula of wood rats have accumulated in our collections until we now have represented 26 subspecies of eleven species and the four subgenera, *Neotoma*, *Hodomys*, *Teonoma*, and *Teanopus*. All of the species groups recognized by Goldman (1910) for the genus *Neotoma* are represented, but a number of Mexican species are still lacking.

For material not otherwise represented in our collections we gratefully



acknowledge the fine cooperation from individuals in other institutions. We are especially indebted to Seth B. Benson for a specimen each of *Teanopus* and *N. fuscipes*, to Walter W. Dalquest and Harold E. Broadbooks for *N. cinerea*, Claude W. Hibbard for *N. floridana*, and Earl L. Poole for specimens of *N. magister*. The U. S. Biological Survey kindly loaned a specimen of *magister*. The drawings were made from photographs by Grace Eager.

The history of the baculum is not known, fossil elements being rare in collections. The widespread occurrence of the baculum in diverse groups of mammals suggests, however, that it is not a late acquisition. Our arrangement is not intended to represent a phylogenetic series, but rather a series showing progressive degrees of simplification of the bone which in turn might be interpreted as being farthest from the ancestral type. We realize the fallibility of attempting to construct a true phylogeny on recent material alone. In our arrangement of the wood rats we have considered, in addition to the character of the baculum, other morphological characters as well as the present geographic distribution of the various species. A number of Mexican wood rats, some of which undoubtedly will prove to be races of more widely distributed species, are omitted here because of lack of material. These can be intercalated in their proper places as material becomes available. Wherever our arrangement differs from that given by Goldman (1910) we have thought it necessary to reconsider those characters used by Merriam (1894) and by Goldman (*ibid.*) and evaluate them in the light of our present knowledge.

Three measurements—length, dorso-ventral diameter of base, and lateral diameter of base—are fairly definite and reliable. In curved bacula, as those of the species *lepida*, the length measurement does not represent the actual length of the bone; rather, it is a measurement of a chord with the distal and proximal ends of the baculum as the points of intersection with the arc formed by the bone. The basal measurements are the greatest diameters, dorso-ventral and lateral, of this part of the baculum. Measurements of the shaft were taken near the midpoint of that part of the bone. The diameters of the shaft must be considered as approximations. With a gradually tapering bone, a slight shift of the calipers toward one or the other end will give a different reading. These measurements indicate whether the shaft is circular or compressed, laterally or dorso-ventrally, in cross-section. They also give a rough picture of the relative thickness of the shaft in the different species. Only adult specimens were measured. Measurements are given in Table I.

Variation in the bacula of adult wood rats is chiefly in size. There is some variation in detail of outline, but a series representing any one species is fairly uniform in general shape. Occasionally an abnormal specimen is found. In our series of *albigula* (25 specimens, including both young and adults) is one specimen (No. 82441) that has the general shape of the baculum of *Teanopus*. It definitely is an abnormal specimen that did not develop in the regular manner.

Bacula of young individuals are represented in all but the *Hodomys* and *Teanopus* groups. They will be discussed in their appropriate positions under the species groups.

TABLE 1.—Average and extreme (in parenthesis) measurements, in millimeters, of *Neotoma bacula*

SPECIES	NO. SPECIMENS	LENGTH	DIAMETER OF BASE		DIAMETER OF SHAFT— NEAR MIDDLE	
			Dorso-ventral	Lateral	Dorso-ventral	Lateral
<i>lepida lepida</i>	5	11.26 (10.20-12.20)	1.15 (.99-1.25)	1.98 (1.80-2.20)	.50 (.45-.55)	.67 (.61-.70)
“ <i>gilva</i>	1	17.05	1.32	2.50	.60	.70
“ <i>felipensis</i>	2	(14.30-15.60)	(1.0-1.3)	(2.10-2.18)	(.64-.65)	(.70-.80)
“ <i>pretiosa</i>	11	18.01 (17.0-20.2)	1.53 (1.12-1.79)	2.51 (2.20-2.79)	.77 (.61-.80)	.92 (.81-1.10)
“ <i>marcosensis</i>	1	18.55	1.56	2.40	.73	.90
“ <i>insularis</i>	1	8.40	1.22	2.0	.58	.76
<i>bunkerii</i>	1	21.83	1.40	2.60	.81	.92
<i>fuscipes annectens</i>	2	(5.02-5.50)	(1.80-1.92)	(3.50-3.62)	(.80-.89)	(.90-.99)
<i>albigula albigula</i>	13	6.57 (5.80-7.60)	1.53 (1.25-1.79)	3.1 (2.82-3.50)	.60 (.42-.73)	.61 (.51-.73)
“ <i>melanura</i>	1	6.10	1.20	2.92	.44	.70
“ <i>robusta</i>	1	6.89	1.70	3.50	.80	.70
<i>micropus micropus</i>	2	(6.25-6.99)	(1.61-1.70)	3.21	(.70-.89)	(.80-.83)
“ <i>canescens</i>	2	(5.95-7.61)	(1.64-1.65)	(3.29-3.35)	(.80-.90)	(.80-.91)
<i>floridana floridana</i>	1	6.02	1.80	2.90	.79	.78
“ <i>baileyi</i>	5	7.28 (6.80-8.02)	1.52 (1.25-1.90)	3.03 (2.76-3.60)	.74 (.62-.99)	.83 (.68-1.08)
<i>magister</i>	4	6.79 (6.41-7.10)	1.74 (1.45-1.98)	3.32 (2.93-3.50)	.69 (.60-.86)	.82 (.75-.93)
<i>mexicana mexicana</i>	2	(5.38-5.60)	(.89-1.09)	(1.84-2.21)	(.51-.55)	(.61-.70)
“ <i>bullata</i>	1	5.50	.70	2.35	.50	.56
“ <i>fallax</i>	16	6.33 (5.90-7.0)	1.00 (.76-1.28)	2.27 (1.72-2.70)	.57 (.41-.75)	.66 (.54-.90)
<i>alleni</i>	2	(6.01-6.80)	(1.0-1.2)	(2.40-3.0)	(.50-.60)	(.65-.75)
<i>cinerea occidentalis</i>	3	5.54 (5.20-5.95)	.90 (.60-1.10)	1.50 (1.10-1.70)	.49 (.40-.57)	.60 (.58-.62)
<i>phenax</i>	1	3.61	.81	1.51	.42	.50

## SUBGENUS NEOTOMA

*Lepida* group—In this group, two species, *lepida* and *bunkerii*, are represented. In both the baculum is more highly developed than in any other group here

considered. Further, the bone differs so markedly from the bones of other groups as to suggest subgeneric distinction. The long, ventrally-curved baculum, has a slightly expanded proximal end, usually dumbbell shaped in cross section. The bone tapers from the proximal end, first rather abruptly then gradually, to the tip of the long shaft (fig. 1A). At the middle of the shaft the bone is oval in cross section, the lateral diameter being slightly greater than the dorso-ventral. *Neotoma bunkeri*, which was allocated to the "fuscipes group" on the basis of skull characters (Burt, 1932) is in fact a member of the *lepida* group as shown by the character of the baculum. *Neotoma lepida insularis* is placed in this group provisionally. We have but one baculum of this island rat and although it has an abnormal appearance, it seems best to allocate it to this group. On skull characters and on geographic grounds it fits best here.

Age variation is chiefly in size. Young specimens are miniatures of the adults.

*Fuscipes group*—The baculum in this group (fig. 1B) is short, broad, and symmetrical in outline. The basal end, as viewed from the proximal aspect, is dumbbell shaped, deeply concave in both dorsal and ventral profiles. In this character, *fuscipes* resembles *lepida* and differs from all the other groups herein discussed (some specimens of *magister* and *cinerea* have a slight ventral concavity). In the extremely short shaft, however, it differs from *lepida* and resembles the other groups. The shaft is nearly circular in cross-section and slightly constricted in the middle. The skull of *fuscipes*, so far as now known, differs fundamentally from those of other species of the subgenus *Neotoma* only in its larger upper third molar with the middle enamel loop partially or completely divided by deepening of the inner reentrant angle. This character is found in *bunkeri*, the baculum of which conforms with those of the *lepida* group. We feel that the characters of *fuscipes* are not sufficient to warrant subgeneric distinction, but that they do set *fuscipes* apart as a distinct species group.

As in the *lepida* group, the baculum of the young of *fuscipes* (represented by only one specimen) has the same general outline as does that of the adult.

*Albigula group*—The baculum of *albigula* differs from that of *lepida* in being much shorter, in being broadly U-shaped in cross section at the proximal end, and in having a distinct knob on the distal end. The shaft is curved downward slightly from proximal to distal ends and is nearly circular in cross section near the middle. It is slightly longer than that of *fuscipes* and has a smaller basal portion that lacks the dumbbell shape in cross section. The shaft is smaller in lateral diameter than that of *fuscipes* (.73 mm largest for *albigula*, .90 mm smallest for *fuscipes*). From the wide proximal end, the shaft tapers gradually to near the distal end where it again expands into a small knob (fig. 1C).

Bacula of young of this group, represented by nine specimens showing various degrees of development, do not differ materially from those of adults except in size and (in extremely young) in a relatively less expanded basal portion.

*Micropus group*—The species *micropus*, placed in the *floridana* group by Goldman (1910), is in many respects intermediate between the *albigula* and the *floridana* groups. The baculum (fig. 1D), with its shallow U-shaped cross section of the proximal end and its rounded shaft, which is longer (more than half

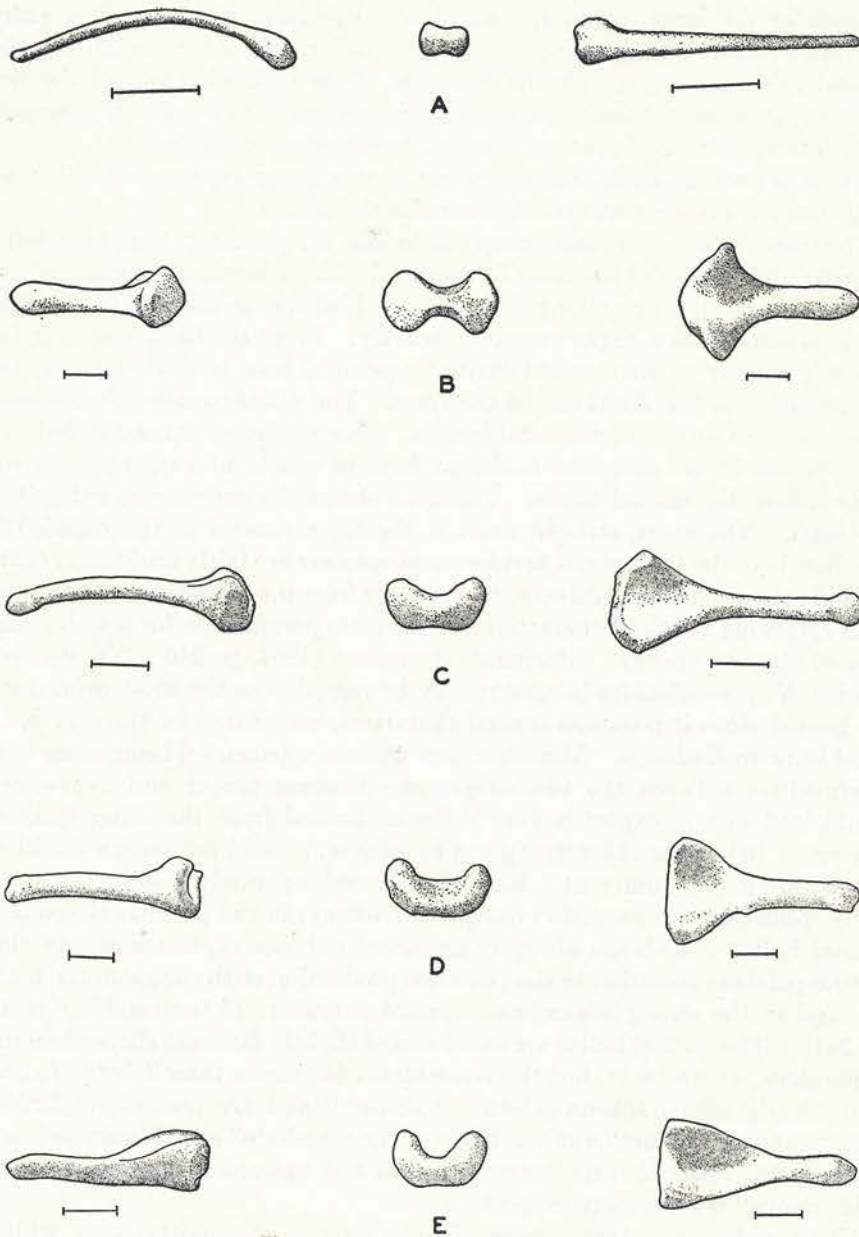


FIG. 1. Lateral, end, and dorsal views of bacula of *Neotoma*; line below each represents actual length of bone. A, *N. l. lepida*; B, *N. fuscipes annectens*; C, *N. a. albigula*; D, *N. micropus canescens*; E, *N. f. floridana*.

the total length) than the expanded basal portion, resembles that of *albigula*. In its thick shaft, deeper U-shape of the proximal end, and reduced knob on the distal end, it resembles that of *floridana*. In the skull, *micropus* approaches

*albigula* in the large, open, sphenopalatine vacuities, in the shallow antero-internal reentrant angle of the first upper molar, and in the relatively short palatal bridge and long palatine foramina. The parietal region of the skull, however, is closer to that of *floridana* than *albigula*. As we see it, *micropus* is truly intermediate in characters between *floridana* and *albigula*.

There is one sub-adult, but no young of this group represented. The sub-adult has the same general configuration as the adults.

*Floridana group*.—In this group, including *N. floridana* (fig. 1E) and *N. magister* (fig. 2E), the baculum is short. It has a broad proximal end with upturned lateral wings giving it a distinct U-shape as seen in cross-section. There is sometimes a slight ventral concavity. From the basal part, the bone tapers gradually to the rounded shaft at a point at least half way or more from the proximal to the distal end of the bone. The distal rounded shaft thereby comprises half or less of the total length. This condition is approached in *N. fuscipes* and in the subgenus *Hodomys*, both of which, in some respects, have quite differently shaped bones. *Teonopus* shows the extreme in reduction of the shaft. The short, straight shaft is slightly expanded at the rounded tip. The bacula of the two species *floridana* and *magister* are fairly uniform in character and cannot be distinguished with certainty from the limited material at hand.

In reviewing the skull characters, we see little justification for a wide separation of the two species. Merriam's statement (1894, p. 240), "Of the living species, *N. pennsylvanica* [*magister*] may be regarded as the most primitive [of the genus], since it possesses several characters, not shared by the others, that point back to *Hodomys*. Moreover, *pennsylvanica* [*magister*] being more nearly intermediate between the two subgenera—*Neotoma* proper and *Teonoma*—," would lead one to expect a very different animal from the other species of *Neotoma*. When the characters given by Merriam (*ibid.*) are analyzed critically the picture is quite different. Each is discussed separately below.

"*N. pennsylvanica* [*magister*] resembles *Hodomys* in the peculiar shape of the audital bullae (which are abruptly narrowed anteriorly), in the nearly closed sphenopalatine vacuities, in the posterior production of the angle of the mandible, and in the strong inward and upward curvature of the condylar ramus" (p. 241). The audital bullae are small and of slightly different shape than those of *floridana*, as we see it, but the resemblance is greater than it is to *Hodomys*. The "nearly closed sphenopalatine vacuities," also are present in *floridana*. The "posterior production of the angle of the mandible" can be matched in the *lepida* group where also the "strong inward and upward curvature of the condylar ramus" is even more evident.

"It [*magister*] resembles *Teonoma* in the form of the sagittal area, which is kite-shaped, narrow, sharply angular, broadest far back (on or near plane of interparietal), whence its sides curve abruptly inward and backward to the sides of the interparietal shield" (p. 241). We find this character approached as nearly in *micropus* and *lepida* as in *Teonoma*.

The frontal and posterior nasal region is more nearly like that found in *micropus* and *floridana* than in *Teonoma*, and the "...trough-like depression

which occupies the entire length of the frontal and hinder part of the nasals" (p. 241) is quite as apparent in old specimens of *lepida* and *micropus*.

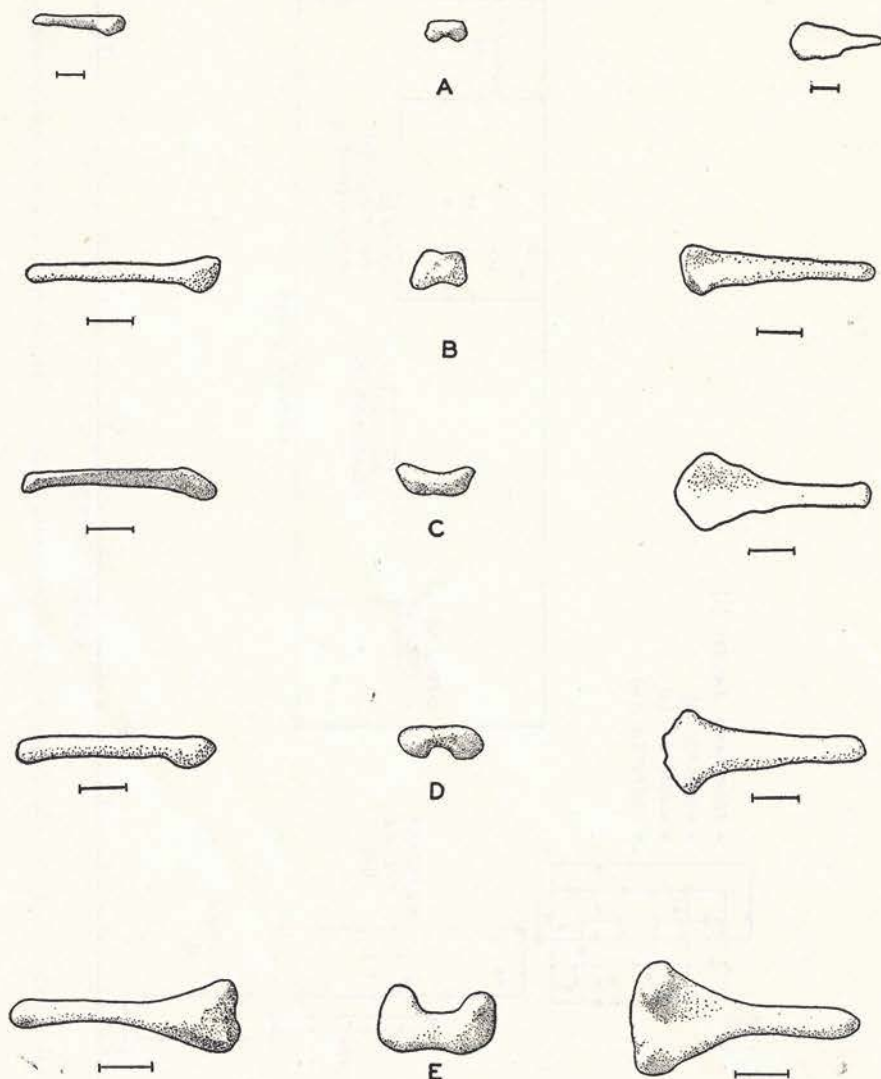


FIG. 2. Lateral, end, and dorsal views of bacula of *Neotoma*; line below each represents actual length of bone. A, *N. (Teanopus) phenax*; B, *N. (Teonoma) cinerea occidentalis*; C, *N. (Hodomys) alleni*; D, *N. mexicana fallax*; E, *N. magister*.

Merriam placed considerable importance on the size of the sphenopalatine vacuities. This, it seems to us, is the most important of his characters and, if so, shows the close relationship between *magister* and *floridana* (fig. 3). As a matter of fact Merriam (1894, p. 250) listed the two species close together and

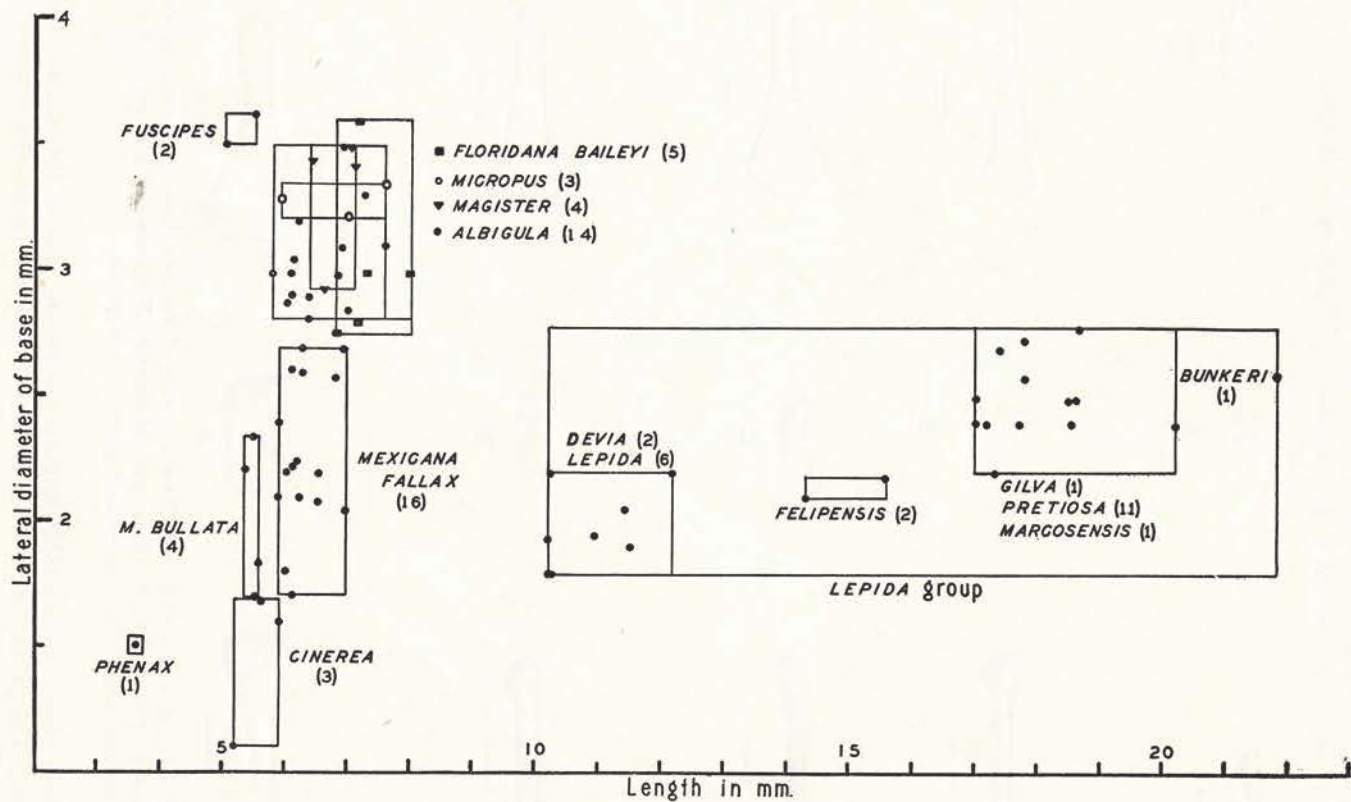


FIG. 3. Graph with length of bone plotted against lateral diameter of base. Each group is enclosed in a rectangle.

placed them in the same group, but Goldman (1910, pp. 14-15) arranged them in distinct groups, separated by all the other species of the subgenus *Neotoma*, thereby indicating distant relationships. We are of the opinion, from the evidence at hand, that *magister* and *floridana* might be shown eventually to be conspecific, but this is beyond the scope of the present paper.

A series of nine young specimens of *floridana* is available. The basal portion of the baculum in the young tends to be parallel-sided for most of its expanded length. As the bone develops, the proximal portion expands laterally so that in the adult this structure is somewhat triangular in shape. Of the young and adult specimens of the genus *Neotoma* represented, age differences are greatest in this series.

*Mexicana group.*—The species *mexicana* is the only one represented in this group (fig. 2D). In this species, the baculum is distinct. It is much shorter than that of *lepida* and the shaft is nearly straight. The basal end is slightly expanded, both dorso-ventrally and laterally, and is inverted U-shape in cross section. From the lateral tips of the proximal expanded portion, the bone narrows first rather abruptly, then gradually. In most cases it actually widens again near the middle of the shaft and in this respect it differs from all the other groups examined by us. It narrows gradually again from the middle to near the distal end where, in many specimens, there is a slight knob.

About the only observable age differences in the bacula of this group are in size and relatively less expanded basal portions in the young.

#### SUBGENUS HODOMYS

*Alleni group.*—This subgenus is represented by two bacula of *Neotoma* (*Hodomys*) *alleni*. The bone resembles, in certain respects, that of *albigula*. It is similar from the dorsal and lateral aspects, but the basal portion is flattened more dorsoventrally and tapers less abruptly into the rounded shaft (fig. 2C). The shaft has a slight curvature and a small knob on the distal end; both of these characters also are present in the baculum of *albigula*. The basal end is only slightly concave dorsally, however, and does not, as seen in cross section, form a distinct U.

We have considered *Hodomys* to be a subgenus because we have failed to find characters of sufficient fundamental importance, in our estimation, to warrant full generic rank. The character of the third lower molar seems to be the most important one separating *Hodomys* and *Neotoma*. We find no approach to the general *Neotoma* type of tooth in a series of *Hodomys* at hand, but we do find an occasional approach to the *Hodomys* type of tooth pattern in *Neotoma* skulls. One specimen in particular, *N. f. floridana* no. 79802, from Florida, has a nearly typical *Hodomys* tooth pattern in the third lower molar. Apparently the difference in pattern results from a shift in position of the reentrant angles and not from an addition or loss of parts in this tooth in either group. In the subgenus *Neotoma* proper, the third lower molars vary in enamel pattern from those with the reentrant angles cutting only part way across the tooth, leaving a dentine connection between front and back lobes, to those with a complete

separation of front and back lobes, each surrounded by enamel. Because of this variability in the pattern of the third lower molar in *Neotoma*, the close approach in certain specimens to *Hodomys*, and because we find no additional pertinent characters, we believe it best to reduce *Hodomys* to subgeneric rank. Other minor differences exist, but these are here considered to be specific, not generic.

No young specimens are available.

#### SUBGENUS TEONOMA

*Cinerea group*.—The shaft of the baculum in *cinerea* more nearly resembles that of *mexicana* than that of any other species considered. It resembles *mexicana* superficially in the slight bulge near the middle of the shaft. The distal end is slightly expanded. The basal portion is quadrate in cross section with a slight concavity on both dorsal and ventral surfaces. In this respect the bone differs from those of all other *Neotoma* (fig. 2B). The expansion of the proximal end is less marked than in any of the other species. The characters of the baculum as well as those of the skin and skull all point toward subgeneric rank for this group.

Here, as in most of the other groups, the bacula of the young are miniatures of the adults.

#### SUBGENUS TEANOPUS

The monotypic subgenus *Teanopus*, restricted in distribution to a relatively small area in southern Sonora and northern Sinaloa, Mexico, possesses a unique baculum (fig. 2A). In addition to being the smallest of the bacula, it differs in having practically no shaft and in being flattened dorso-ventrally. In outline it resembles a violin. The entire bone is much simplified as compared with the others here described. No young of *Teanopus* are available.

Whether the enlarged bullae and the unique baculum are sufficiently important characters to set this off as a distinct genus is a matter of opinion. We are inclined to the belief that subgeneric rank for *Teanopus*, as well as for *Hodomys*, would be more in keeping with the standards now adopted for other groups of mammals—the ground squirrels and heteromyid rodents are two groups in point. We therefore recommend that *Teanopus* be reduced to subgeneric rank under the genus *Neotoma*.

The genus *Neotoma* of the subfamily Neotominae will now include, according to the present treatment, the following subgenera: *Neotoma*, *Teonoma*, *Hodomys*, and *Teanopus*. This places the subgenus *Homodontomys* in synonymy under *Neotoma* and reduces *Hodomys* and *Teanopus* to subgeneric rank.

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