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Correspondence: Ralph T. King 1930-1948.

Leopold, Aldo, 1887-1948

[s.l.]: [s.n.], [s.d.]

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New York, Northern.

John Burnham, Director American Game Protective Association. Letter to Aldo Leopold, March 2, 1929.

"-----There was a grouse (ruffed) shortage in Northern New York in 1905-06. Our snowshoe rabbits are never reduced in numbers in this section in the same way they are in the extreme north but this was one of the periods in the cycle, and you will find a report of it in the Forest, Fish and Game Commission Report of 1907 or 1908.-----

"We had practically no grouse in the state; the depletion was so serious that I started a study to try and ascertain the cause, and made this one of the chief features of the annual winter convention of the game protective force. I was then Chief Game Protector of New York. We had on our staff as one of the foresters, a very good ornithologist, since dead, whose name was Woodruff. I had previously notified the game protectors to be prepared to make a report on the grouse situation in their respective territories, and when these reports were made, Woodruff sat in with us and checked, and subsequently analyzed the statements. It was at this time that I came to the conclusion that the rabbit plague of the north was the cause of the cycles of grouse depletion, and I believed that this was due directly to the migration of goshawks and snowy owls.

"If you can get a copy of the Forest, Fish and Game Commission Report in your library, you will find that Woodruff added other causes including poor breeding seasons."

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE
BY ALDO LEOPOLD

MADISON, WISCONSIN
421 Chemistry Building

April 14, 1929

Mr. Ralph T. King
1973 Carroll Avenue
St. Paul, Minnesota

Dear Mr. King:

I have just returned from a field trip and I am very glad to know that your visit to Stoddard actually transpired. I enclose herewith my check for \$134.74 to cover your expense account and would appreciate you signing the extra copy of this letter and returning it to me to indicate receipt, for use in my expense account.

I am happy to say that Mr. Stoddard heartily approves of your selection for the Minnesota fellowship. I will write Dr. Chapman within the next few days concerning dates, ratification of agreement, and other details.

With kindest regards, yours sincerely,

Aldo Leopold

ALDO LEOPOLD,
In Charge, Game Survey.

Enc.

Copy to Mr. King

May 14, 1929

Mr. John M. Olin, Chairman
Game Committee, S.A.A.M.I.
East Alton, Illinois

Dear Mr. Olin:

I enclose for approval by the Game Committee an agreement covering the proposed fellowship at the University of Minnesota.

There are 9 copies. Five copies are for the members of the sub-committee and Mr. Henning. If the committee approves, the other 3 are to be signed and forwarded to the Biological Survey for signature, thence to be sent direct to Dr. Royal W. Chapman, University Farm, St. Paul, for presentation to the Board of Regents. After they have approved, he will keep one signed copy and return the others to me and to the Biological Survey.

I am sending Dr. Chapman a copy of this letter and agreement.

I am also sending a copy to Stoddard so that he can advise Mr. Redington whether the text meets with his approval, and one to Mr. Comeaux so that he will know about dates.

The Regents meet late in May. If no objection is raised to the text, I hope the signed agreement can be placed before them at that time. Dr. Chapman is anxious to start work not later than July 1, and sooner if possible, in order to take advantage of the end of the nesting season.

Ralph T. King, who as you know has already been designated as the fellow and has conferred with Stoddard and myself, is available at any time after June 1.

Terms of Agreement. This follows the form customary in industrial fellowships at Minnesota. The deposit has been changed to semi-annual in order to be uniform with Wisconsin. The total is \$3000 per year. The first semi-annual installment is \$1500.

Stipend and Qualifications of Fellow. You have already seen the record of King's education, experience, and references. I will summarize this by saying that his training has been exceptionally broad, his scholastic standing high, and his experience varied. He holds a gold medal as the best all-around student at Utah Agricultural College. He has completed about half his work toward a doctor's degree at Minnesota, and is now head of the Biology Department of St. Thomas College, where

he is receiving \$266 per month and was offered \$333 if he would stay. The proposed stipend of \$180 per month is therefore about half his present earnings.

Reasons for Fellowship. It seems appropriate to summarize my reasons for recommending this project. They are as follows:

1. Over half of our upland game species are subject to cyclic fluctuations in abundance, seemingly due to disease or parasites. The cause and its mechanism, are, however, as yet not understood.
 2. Ruffed Grouse is the most important and typical of these species.
 3. Successful conservation or management of these species is, of course, impossible until the cause of their fluctuations, and its relation to other environmental conditions, is made clear.
 4. Dr. Chapman is in my opinion the leading investigator of population cycles. Stoddard, who will be advisor to the work, is the leading investigator of environmental conditions.
- Dr. Greene, at Minnesota, has organized a special study of upland game diseases (financed mostly by the Minnesota Game Department). Dr. Zon at Minnesota is organizing a special study of the snowshoe rabbit, a probable host of the same parasites and diseases which affect grouse (McSweeney Bill, in co-operation with Biological Survey).
- The mobilization of these independent attacks upon the same problem at the same time and place offers obvious advantages to each.

For these reasons I regard this fellowship as co-operating in the ultimate unravelling of one of the most fundamental (and perhaps the most complex) unsolved problem in American game management.

Dr. John T. Phillips and Carlos Avery assure me of co-operation with the existing Ruffed Grouse Investigation sponsored by the American G. P. A. This investigation has opened the way by a valuable study of grouse parasites.

Dr. Alfred O. Gross, who is to conduct a prairie chicken survey for Wisconsin this summer, assures me of co-operation. This is liable to prove a problem paralleling Ruffed Grouse.

Very sincerely yours,

ALDO LEOPOLD,
In Charge, Game Survey.

Inc.

MEMORANDUM OF AGREEMENT BETWEEN THE SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE, THE BUREAU OF BIOLOGICAL SURVEY OF THE UNITED STATES DEPARTMENT OF AGRICULTURE, THE AGRICULTURAL EXPERIMENT STATION OF THE UNIVERSITY OF MINNESOTA.

I. OBJECT:

The object of this agreement is to promote useful knowledge by conducting an investigation into the life history and ecology of ruffed grouse, and the other birds or animals found to be involved in game population cycles.

II. FINANCIAL SUPPORT AND COOPERATION:

The Sporting Arms and Ammunition Manufacturers' Institute agrees to contribute not to exceed \$3000 per year for a period of three years for the salary and expenses of a fellow.

The University of Minnesota is to furnish laboratory facilities and such usual equipment as is required for the carrying out of this research, and also will contribute the time of a member of the Division of Entomology and Economic Zoology as director of this research, who shall be the major advisor and supervisor of the fellow.

The United States Bureau of Biological Survey of the United States Department of Agriculture will contribute the time of an advisor who shall confer with the fellow and his supervisor from time to time, as to the progress of the research.

III. USE AND DISBURSEMENT OF FUNDS:

It is understood that upon approval of this agreement by the representatives of the Sporting Arms and Ammunition Manufacturers' Institute, the University of Minnesota, and the Bureau of Biological Survey, the sum

of money covering the salary of the research fellow and the annual fund for expense will be deposited ^{in two} ^{installments} semi-annually with the University of Minnesota by the Sporting Arms and Ammunition Manufacturers' Institute. This salary of the research fellow will then be paid by the University of Minnesota on warrants, according to the usual practices of the University in paying salaries of its employees. The expenses covering travel and incidental materials which are required in pursuit of the research, shall be paid out of the expense fund by the University in accordance with its usual practice.

The salary for the first year will be at the rate of \$130 per month, or \$2160.

The expense budget for the first year will be \$840.

Any unexpended balances will be either applied to the fellowship for the succeeding year, or refunded.

Renewals for the second and third year will be made if the progress made is mutually satisfactory to the Institute and the University.

IV. APPOINTMENT OF THE RESEARCH FELLOW AND THE SUPERVISOR:

The fellowship thus created will be known as the "Sporting Arms and Ammunition Institute Fellowship." Nominations for appointment to this fellowship will be made by the Division of Entomology and Economic Zoology. These will be transmitted to the administrative offices of the University as in the instance of appointment of the University employees. It is understood that the nominee will also confer with the Bureau of Biological Survey before the confirmation of appointment. After the approval of this appointment, which will be for a period covered by the funds on hand, the

fellow will begin researches under the direction of the supervisor designated by the Division of Entomology and Economic Zoology. The Bureau of Biological Survey will provide consultation and advice in connection with the carrying out of the research. It is also understood that the work shall be co-ordinated with that carried on in similar fields through the various agencies of the United States Department of Agriculture, at the University of Minnesota.

V. PLANS OF INVESTIGATION:

It is agreed that the research fellow will investigate the life history and the fundamental phases of the ecology of the ruffed grouse. The object of the research is to determine the potential rate of reproduction of the grouse in the natural state, and to determine and evaluate the various environmental factors which tend to reduce the population of the ruffed grouse, under the conditions in nature.

VI. REPORT OF PROGRESS AND PUBLICATION OF RESULTS:

It is agreed that the Sporting Arms and Ammunition Manufacturers' Institute will be advised periodically concerning the progress of the work, through the Bureau of Biological Survey and by the University of Minnesota. Representatives of the Sporting Arms and Ammunition Manufacturers' Institute may consult with the research fellow and his advisors at appropriate times. It is understood that reports based upon investigations conducted by the research fellow in the laboratories of the Division of Entomology and Economic Zoology, will not be published in whole or in part, without the approval of the director of the Agricultural Experiment Station. The Minnesota Agricultural Experiment Station reserves the privilege of pub-

lishing the results of this investigation conducted under the terms of
this agreement as in the instance of all regular University employees.

APPROVED

Chairman, Game Committee, Sporting Arms
and Ammunition Manufacturers' Institute

Date

Chief, Biological Survey
U. S. Department of Agriculture

Date

University of Minnesota

Date

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE
BY ALDO LEOPOLD

MADISON, WISCONSIN
421 Chemistry Building

May 20, 1929

Mr. Ralph T. King
1973 Carroll Avenue
St. Paul, Minnesota

Dear King:

I thought you would be interested in the papers I sent you a day or two ago, which, when approved, will complete the arrangements for the Minnesota fellowship.

I agreed with Dr. Chapman that the work should start not later than July 1, and June 1, if we can get the papers signed and the deposits made by that time, or if the University can find means of anticipating these formal approvals. This matter, of course, is in Dr. Chapman's hands. I have told Dr. Chapman that I am agreeable to an early start regardless of just when Stoddard can get free, because there is plenty of preliminary work to do.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD,

In Charge, Game Survey.

Dictated by Mr. Leopold, but signed
in his absence to avoid delay.

V.H.

June 25, 1929

Memorandum for Dr. R. H. Chapman, Dr. A. O. Gross, Carlos Avery, and the members of the Sub-Committee.

Attached is a preliminary blueprint of a game cycle chart compiled from the field data collected through the game survey, plus certain data encountered in the literature.

This chart is being sent you for such use as you can make of it in guiding the research work under the Institute fellowships, and in guiding allied investigations by other organizations.

The chart is intended to illustrate a method of investigating the history of game, rather than with the idea that it in itself constitutes an execution of that method. It was compiled merely on incidental time, and a much better job could be done by someone with adequate time to pursue the same method.

It is, of course, physically impossible for the chart to show the exact ^{graphic} ~~geological~~ limits of any of the fluctuations represented. Three things however, are indicated as tentative conclusions:

- (1) There is a rough synchronism in the fluctuations of all the species of the grouse family and of snowshoe rabbits throughout the country.
- (2) The violence of the fluctuations, at least in prairie chickens and ruffed grouse, decreases on the south fringe of their range where they occur as isolated colonies.
- (3) The low points appear to be associated with weather, although Conclusion No. 2 would indicate that they can not be caused by weather

2
Chart

alone.

It is requested that none of these data or findings be published without the consent of the Institute.









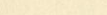


















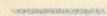
















Comments will be appreciated.

ALDO LEOPOLD,
In Charge, Game Survey.

STANDARD LEGEND FOR GAME MAPS

Used by the Game Survey and Recommended for Use by Institute Fellowships

Aldo Leopold July 10, 1929 (subject to revision)

Species Legend								
Quail & Partridge	Color	Black & White	Grouse, Pheasant, & Misc.	Color	Black & White	Mammals	Color	Black & White
Bobwhite	 (dark blue)		Ruffed	 (orange)		Cotton-tail	 (light green)	
Valley	 (dark blue)		Pinnated & Heatn Hen	 (brown)		Snow-snoe	 (dark green)	
Mountain			Sharptail	 (pink)		Jack or Swamp		
Gambel	 (purple)		Pinnated & Sharptail			Whitetail Deer		WT
Scaled	 (light blue)		Sage			Mule Deer		M
Gambel & Scaled			Spruce	 (yellow)		Blacktail Deer		BT
Mearns	 (yellow)		Ptarmigan	 (light blue)		Mountain Sheep		S
Hungarian	 (purple)		Ringneck	 (red)		Mountain Goat		G
Predators			Turkey	 (pink)		Antelope		A
Fox		F	Waterfowl	 (blue)		Moose		M
Coyote		C				Black Bear		BB
Wolf		W				Grizzly Bear		GB
Housecat		HC						
Bobcat		BC						
Lynx		L						
Cougar		ML						
Distribution Record (use species color)			Game Lands (use species color)		Factor Legend & Misc. (Cycle Chart)			
(number)			(F)	Game Farm	F	Fire		
(year)			(C)	Club	D	Drouth		
	Plant, failed		(P)	Preserve	H	Killing Hail		
	Estabishment or remnant		(R)	Refuge	W	Killing Winter		
	Stragglers seen		(PS)	Public shoot- ing ground	C	Cold or Wet Breeding Season		
	Drift seen				G	Goshawk Migration		
	Non-breeding remnant				O	Snowy Owl Migration		
	Range boundary, accurate					Law passed (label kind of law)		
	Range boundary, approx.				SR	Sick Rabbits		
	Exterminated remnant				SG	Sick grouse		
(year)					SGT	Sick grouse with ticks		

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE
BY ALDO LEOPOLD
421 CHEMISTRY BLDG.
MADISON, WISCONSIN

July 31, 1929

Mr. Ralph T. King
1973 Carroll Ave.
St. Paul, Minnesota

Dear Mr. King:

The Mississippi section of the file set of survey reports has now been returned by Seth Gordon. If you would like to use this further I will send it to you; otherwise I will just keep it here.

Sincerely yours,

Aldo Leopold
ALDO LEOPOLD, *h*
In Charge, Game Survey.

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE
BY ALDO LEOPOLD
MADISON, WISCONSIN

421 Chemistry Building

August 1, 1929

Dr. Royal N. Chapman
University Farm
St. Paul, Minnesota

Dear Dr. Chapman:

I take it from your letter of July 30 that the agreement, including modifications, has now been approved by all parties, and I am recommending the payment of the balance of the semi-annual installment accordingly.

Stoddard and I arrived here today, and he or possibly both of us will reach St. Paul sometime next week. I may join him there later than next week. We will wire you further when the exact date of arrival is known.

I forgot to write you that Dr. Gross had to give up his visit this year because he was booked for a trip to Labrador. Of course his Wisconsin work is only started and he assured me that he would get in touch with you and Mr. King on resuming it next year.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD,
In Charge, Game Survey.

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE
BY ALDO LEOPOLD

MADISON, WISCONSIN
421 Chemistry Building

August 8, 1929

Mr. Ralph T. King
% Dr. R. N. Chapman
University Farm
St. Paul, Minnesota

Dear King:

In disposing of my notes on the recent trip I find the following, which bears on a cycle chart for Minnesota. Since it seemed probable that you and Stoddard would decide to start such a chart I am sending the material to you.

"Ruffed Grouse. (Chapman) In 1909 were everywhere near Grand Rapids and south of Grand Rapids.

In 1913 there were many near Pine City and in the Superior National Forest.

Also high in the Superior National Forest in 1919, dropping off in 1920.

Prairie Chicken. Said to show a considerable comeback in Sherburn Co. in 1929."

I know you will not forget the exceptional opportunity offered by Dr. Roberts' early journals as to high and low points on ruffed grouse in the early years of his Minnesota work.

When I reach northwestern Wisconsin, and if by that time there appear to be any exceptionally interesting problems to look up in that region I will let you know my schedule, so that you can join me for a while if you so desire. I will have plenty of room in my car for us to trip around together. Possibly some of the ways of getting cycle chart data could be gone over together in the course of such a trip. I know I would value your criticism of the methods I have been using and in addition, of course, would enjoy being out with you.

With best regards,

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD,
In Charge, Game Survey.

COPY

University Museums
UNIVERSITY OF MICHIGAN

August 22, 1929

Aldo Leopold
421 Chemistry Building
Madison, Wisconsin

Dear Mr. Leopold:

I have never been on Isle Royale myself and have no personal information about snowshoe hare periodicity there. Adolph Murie, who is there this summer, reports the species rare at present. Adams found it very abundant in 1904. This is about all the information we have, although Murie may be able to secure information from residents covering some intermediate years. If you wish you can write him: Belle Harbor, Mich. (via Duluth, Minn.). I know no other person who might be able to give reliable information.

Sincerely yours,

LEE R. DICE
Curator of Mammals

CLASS OF SERVICE

This is a full-rate Telegram or Cablegram unless its deferred character is indicated by a suitable sign above or preceding the address.

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NEWCOMB CARLTON, PRESIDENT

J. C. WILLEVER, FIRST VICE-PRESIDENT

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Received at 332 Robert Street, St. Paul, Minn. Telephone Cedar 9685

MB376 32 DL=HAYWARD WIS 28 1143A

RALPH T KING=

CARE R N CHAPMAN UNIVERSITY FARM STPAUL MINN=

WILL BE AT HOTEL IN CHIPPEWAFALLS TONIGHT WILL WORK TOWARD
LACROSSE TOMORROW AND FRIDAY IF YOU CARE TO JOIN ME SUGGEST
YOU COME BY TRAIN TO CHIPPEWAFALLS EITHER TONIGHT OR EARLY
TOMORROW=

ALDO LEPOLD.

DUPLICATE OF TELEPHONED TELEGRAM
1929 AUG 28 PM 12 00

*Good done.
7113*

Handwritten: ~~Ne 288t~~
King
7113
mail
called after 1 P

Telephone No. _____
Transmitted To _____
Transmitted _____
To _____
By _____
Date _____

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE
BY ALDO LEOPOLD
421 CHEMISTRY BLDG.
MADISON, WISCONSIN

September 2, 1929

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear King:

The last time I saw you I told you that a friend of mine knew about Isle Royale. I found upon inquiry that it was Grand Island where he has done his work, and accordingly I could get no information.

I then wrote Prof. L. R. Dice of the Michigan Museum, and I am inclosing a copy of his reply. He gives some snowshoe data but no ruffed grouse data.

I suggest that you write P. S. Lovejoy of the Game Division, Department of Conservation, Lansing, Michigan, and if he cannot give you satisfactory information it may be necessary for you to visit the island yourself. I am sending a copy of this to Stoddard.

Yours sincerely,


ALDO LEOPOLD,

In Charge, Game Survey.

Inc.

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

421 CHEMISTRY BLDG.

MADISON, WISCONSIN

September 2, 1929

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear King:

I wired you from Hayward, thinking you might want to meet me at Chippewa Falls last Thursday, but received no reply so I assumed you were out in the field.

I have not yet covered the territory from Chippewa Falls south and may wire you again later when I get to working in that region. I can not predict at this time when that will be. x

With kindest regards,

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD,

In Charge, Game Survey

*Not before week after next - have to go to
New York.*

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE
BY ALDO LEOPOLD

MADISON, WISCONSIN
421 Chemistry Building

September 24, 1929

Mr. Ralph T. King
% Dr. R. N. Chapman
University Farm
St. Paul, Minnesota

Dear King:

I have been trying to get for you an extra set of copies of the reports of the Game Survey to date. I dislike to have an additional set of copies run off because it is a very long job, but I think I can provide you with a set by waiting for various copies that are in circulation among special cooperators to come back to the office. These, however, will show up one by one from time to time. At the present time I am able to furnish you with the following: Iowa, Indiana, Michigan, and Ohio.

You understand of course that these are not for publication and are loaned you to facilitate work under the fellowship. After the report has been compiled on the north central states there will be less need for these individual reports, at which time they may be called back.

I was in the LaCrosse country last week but was traveling on such a hurried schedule that I did not call you. I learned later that you were in the field with Stoddard, so that it would not have done you any good in any event.

With kindest regards,

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD,
In Charge, Game Survey.

P.S. This arrangement will, I hope, allow you to return the file copies now in your possession.

October 3, 1929

Dr. T. C. Stephens
Editor, Wilson Bulletin
Morningside College
Sioux City, Iowa

Dear Dr. Stephens:

I want to thank you for the open-minded attitude expressed in your announcement of the Game Survey in the September Wilson Bulletin.

May I ask you, however, to reconsider in your own mind whether it is correct to designate the Game Survey as "a movement to plant Ring-necked Pheasants, and possibly Hungarian Partridges, in suitable areas throughout the country"?

This is a question not so much of words as of actions.

So far the only action taken has been to establish the following game research fellowships:

<u>Where</u>	<u>When</u>	<u>Subject</u>
University of Minnesota	June 1, 1929	Ruffed Grouse
University of Wisconsin	July 1, 1929	Bobwhite
University of Michigan	Oct. 1, 1929	Hungarian Partridge

To enable you to further appraise the relative emphasis on native and exotic species, and to give you a fuller picture of the objects and methods of the Game Survey, I would like to send you, for your personal examination, a copy of my Wisconsin report, which will be completed about November. Do you want me to do this?

A report on the north-central states is to be published next spring.

With kindest regards,

Yours sincerely,

ALDO LEOPOLD,
In Charge, Game Survey.

C O P Y

Editorial in the Wilson Bulletin, September, 1929

There is now under way a very powerful movement to plant Ring-necked Pheasants, and possibly Hungarian Partridges, in suitable areas throughout the country. This effort is being fostered by the manufacturers of arms and ammunition. They are working openly and above-board. They frankly wish to increase the game in order to develop hunting for profit.

A survey has already been conducted or projected in a few mid-western states (Ohio, Michigan, Minnesota, Iowa, and Mississippi) to determine 1) the status of game birds, 2) the land practice affecting game environment, 3) public sentiment and organization, 4) game administration, 5) game research. This Game Survey program also includes some proposed study of the Bobwhite problem. The important question for bird lovers to consider at the outset of this program of game farming activity is whether it is desirable to supplant our native birds with foreign ones.

Before any concerted effort in behalf of bird protection can be again undertaken, new declarations and alignments will have to be made and appraised. The last great piece of federal legislation in behalf of bird life, which was passed by Congress early in 1929, was sponsored chiefly by Dr. Hornaday and a section of sportsmen headed by Forest and Stream and Outdoor Life. It is our understanding and belief that the National Association of Audubon Societies had the misfortune to be aligned with the opponents of this greatest piece of bird protection legislation ever enacted, with the possible exception of the Migratory Bird Law. So we believe that a new alignment in bird protection leadership must develop in the next few years.

October 15, 1929

Mr. Aldo Leopold
421 Chemistry Building
Madison, Wisconsin

Dear Mr. Leopold:

You no doubt think I have little regard for promptness in answering letters. I have received two letters and a number of memoranda from you since I last wrote you. I am very sorry I didn't get to make the trip to Wisconsin with you. However, your telegram came while I was in the field and by the time they got word to me it was too late to make connections.

I have been in the field almost continuously up to last week. We have had wonderful weather all fall and I have tried to make the most of it. I believe I have a pretty good idea of the distribution of grouse through the middle third of the state and considerable data on conditions from most other areas. Incidentally I have kept all the data that came to hand on prairie chicken, sharptails, bob-white, wood-cock, Ringnecks and Hungarians, also Spruce Partridge.

For the present, until snow comes, I am confining my field work largely to "vermin", both winged and ground. The work on the maps is progressing, as is also the gathering of written data. Both are in the nature of statistics and can be taken up at any time and are easily postponed when there are other things to do. I haven't started gathering statistics on fur shipments from the state yet.

In connection with the field work I am collecting small mammals and birds of prey. Am getting some good experience in skinning, making up study skins, determinations from hairs and tracks, and study of crop contents. I saved all the crops from prairie chickens and sharptails I could get hold of just for practice and for comparison later with grouse.

The data accumulating now will probably permit of the compilation of a cycle chart this winter for Minnesota. My own observations tend to make me believe snowshoes are at a very low ebb at present. Certainly there is no marked increase. During September and the first week of October I drove about 2700 miles, practically all of this over dirt and wood roads in snowshoe country and much of it at night; during this time I think I averaged between twelve and fifteen miles per day of walking, and I saw only six snowshoes. I have not seen one dead on the highway this year. During these same five weeks I have been present at the "running-over" of seven ruffed grouse and in every instance the drivers have tried to avoid hitting them. We might

October 15, 1929

easily have killed several times that many had we tried. Of course, the two animals differ greatly in that the grouse prefer the open wood roads at certain times whereas the snowshoes do not. Nevertheless the comparison strikes me as rather remarkable. It would seem that if the depletion of rabbits drove the birds of prey to feeding on grouse that this present increase in grouse isn't according to the rules.

This present condition of the snowshoes gives the great majority of hunters and game wardens in this state cause for rejoicing. If this group had their way there would be no snowshoes, but most of them shoot the few they see on sight. I have heard several of them say after seeing a single rabbit in several days tramping that "that is just one too damn many". This attitude on their part is due to a certain extent to adverse publicity the rabbit has received the past few years, and to a still greater extent to the misinterpretation on their part of perfectly good publicity. They are convinced (?) that the rabbit has brought in disease that affects the partridge, the muskrat, and burrows. At least they offer that as an excuse for their shooting of rabbits just as they argue that all hawks and owls are detrimental to game birds and poultry.

I am wondering if you would like to get in touch with a man here by the name of Ernest Angelo. He is a graduate student in Horticulture. Was for a number of years a teacher of Horticulture in West Virginia and later Chief Game Protector there for some months. His interests and a considerable part of his training have been along the lines of conservation, wood-craft and game administration. He seemed very much interested in the Fellowships.

This letter is getting entirely too long. I hope to see you again soon and will endeavor to keep you better informed in the future as to progress here. Thanks for the memoranda and the Game Survey Reports.

Very sincerely yours,

RTK-b

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE
BY ALDO LEOPOLD
421 CHEMISTRY BLDG.
MADISON, WISCONSIN

October 19, 1929

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Mr. King:

I am very glad to have your letter of October 15 and to note your confidence and enthusiasm about the work. Your description of moves and plans sounds very good to me and make me look forward with pleasure to our next conference.

The public attitude toward snowshoes which you described is a new one on me and I am glad to have it called to my attention.

If you consider Angelo as an extra good prospect I would suggest that you arrange for Stoddard or Stoddard and myself to see him when we next visit St. Paul.

I am anxious to have you see my Wisconsin report and I speak in advance for your free criticism as well as approval. I hope to have it done in a week but it may not be typed for several weeks.

By all means drop me a line whenever you feel like it. It is fine to hear from you.

With best wishes,

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD,
In Charge, Game Survey.

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE
BY ALDO LEOPOLD
421 CHEMISTRY BLDG.
MADISON, WISCONSIN

October 22, 1929

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear King:

I am handling the sex tally indicated by the inclosed cards for Errington in order to take advantage of the personal acquaintances formed during my survey. The idea is to place cards in all the open states adjacent to Wisconsin.

In Minnesota I have send cards to the following and asked them to handle the matter locally: Dr. F.S. James, Winona, Frank A. Grover, La Crosse (Wisconsin hunters taking out Minnesota licenses), Sam G. Anderson, Hutchinson (with the request that he place them with hunters not liable to be covered by James or Grover).

I am sending you a small supply and know that Errington would appreciate your placing them to the extent that you have opportunity. The closer the locality to Wisconsin the better, but any Minnesota cards are welcome.

If you should want a small supply of these to convert for use with other species I can supply you.

With best regards,

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD,
In Charge, Game Survey.

Quail Sex Ratio Tally, Season of 1929

Name of Observer			Mail Address				City			State		
Date	Place		Number of				Bagged			Sex Ratio--Percent		
	County	Township	Guns	Dogs	Hours	Covies	Cocks	Hens	Total	Cocks	Hens	Total

Covies per day per dog

Bag per day per gun

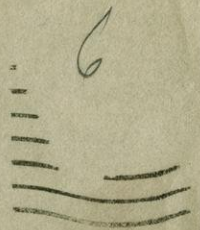
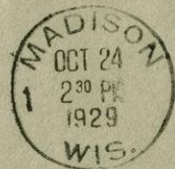
Instructions For Making Tally

Enter your own personal bags on one sheet.

Use separate sheets for the bags of other sportsmen or parties but only if the sexes bagged by them have been personally tallied by you.

The dotted part of the table to the right should be left blank.

At the end of the season please return this sheet to Aldo Leopold,
Game Survey, 421 Chemistry Building, Madison, Wisconsin.



Mr. Ralph T. King
University Farm
St. Paul, Minnesota

ALDO LEOPOLD
421 CHEMISTRY BUILDING,
MADISON, WISCONSIN

Burdette J. Shover,
319 Post Office Bldg.
St. Paul

November 25, 1929

Mr. John M. Olin
Western Cartridge Co.
East Alton, Illinois

Dear Mr. Olin:

When the Minnesota fellowship was instituted the agreement did not specify an exact date of beginning. The signatures were affixed on June 20, July 2, and July 18. Actually Mr. King went to work June 1, in order to take advantage of the end of the nesting season.

A preliminary remittance of \$500, pending completion of signatures, was made by Mr. Comeaux on June 24, and a final remittance, completing the amount due for six months, was made on August 3 in the sum of \$1000.

In short, the Minnesota fellowship is paid up to December 1. Meanwhile all the other fellowships have been arranged for January 1. In order to simplify future arrangements I therefore recommend that one month's payment in the sum of \$250 be sent by Mr. Comeaux to the treasurer of the University of Minnesota, to cover the month of December, 1929.

Upon approval of this recommendation by yourself and General Dill, will you kindly send the extra copy of this letter to Mr. Comeaux as his authority?

Yours sincerely,

ALDO LEOPOLD,
In Charge, Game Survey.

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE
BY ALDO LEOPOLD
421 CHEMISTRY BLDG.
MADISON, WISCONSIN

December 2, 1929

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Mr. King:

The quail season having ended, Mr. Leopold has requested me to call in the cards which were distributed in Minnesota for the purpose of making a sex ratio tally of quail. Will you kindly collect the cards that were sent you for distribution and return them to Mr. Leopold, or have them returned individually by the men who made the tallies?

Yours truly,

Vivian Horn
Secretary

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE
BY ALDO LEOPOLD
421 CHEMISTRY BLDG.
MADISON, WISCONSIN

December 12, 1929

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear King:

Enclosed is a copy of the report on the Wisconsin Game Survey.

I received help from so many people on this job that I am obliged to ask those who receive copies to circulate them among certain persons who extended special assistance. I would appreciate it very much if you would see that the following have a chance to read your copy if they so desire.

R. N. Chapman
R. G. Green
Raphael Zon
T. S. Roberts
Wm. Kilgore

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD,
In Charge, Game Survey.

Signed in Mr. Leopold's absence.

Digest of

"The Vanishing Prairie Hen"

By Clate Tinan

- p.1 5,000,000 Prairie Chickens estimated killed in Nebraska "a few years hence" of which 4,000,000 for market.
- p.2 "The true pinnated grouse is never found, except where man has broken the sod, sown the wheat, and dotted the prairies with groves of trees."
- p.3 600 chickens killed in 10 days in 1872 in McLean Co., Ill. by Capt. A. H. Bogardus and Miles Johnson. 50 birds per gun per day considered "good hunting."
- Winter Range: "large flocks - - - during winter - - - in the immense cornfields of S. W. Iowa, though a fair days sport on them during the open season is unknown."
- p.4 Packs: "In localities where the birds are really scarce the number which will gather into what westerners call a "pack" is really remarkable, every grouse in the country seemingly having his fellows." (These packs can be made to be by repeated flushing).
- p.5 "It is a bird that increases with the first stages of civilization, pauses with the second, and disappears with the third."

Aldo Leopold

QUAIL SEX RATIO TALLY, SEASON OF 1929
 Data Gathered for Game Survey S. A. A. M. I.
 Aldo Leopold

Observer	Number of Localities	Oct.		Nov.		Dec.		Total Birds	Total		Per Cent	
		M.	F.	M.	F.	M.	F.		M.	F.	M.	F.
<u>Illinois</u>												
T. A. Snell	6			48	61	22	25	156	70	86	45%	55%
L. E. Troute	1			46	20	49	47	162	95	67	42%	58%
L. C. Dadant	3			15	12	28	34	89	43	46	48%	52%
V. G. Musselman	1			18	15			33	18	15	55%	45%
E. Phillips	2			5	11	9	10	35	14	21	40%	60%
H. G. Karr	3			15	21	10	10	56	25	31	45%	55%
R. W. Miller	3			26	15	11	9	61	37	24	61%	39%
C. F. Mannsfield	1			57	59	47	45	208	104	104	50%	50%
F. Leopold	1	14	11					25	14	11	56%	44%
<u>Indiana</u>												
C. W. Hymer								78	41	37	53%	47%
T. C. Mathers	2			13	28	5	5	51	18	33	35%	65%
H. Decker								156	81	75	52%	48%
R. E. Llewellyn	5			36	25	16	12	89	52	37	58%	42%
<u>Minnesota</u>												
F. S. James		17	20					37	17	20	46%	54%
<hr/>												
TOTAL	28	31	31	279	267	197	197	1236	629	607	51%	49%

M - Males
 F - Females

SUNSPOTS IN RELATION TO FLUCTUATIONS IN GRASSHOPPERS AND GROUSE AT AWEME, MANITOBA.--

In the April, 1930, issue of The Canadian Field-Naturalist, (44:77), Mr. Norman Criddle presents records of the fluctuations in numbers of grasshoppers and grouse at Aweme, Manitoba. It is worthy of note that these fluctuations show a striking relationship to the variations in the spottedness of the sun. The grasshoppers, sharp-tailed grouse and ruffed grouse show maximum points in their curves of numbers, at or near the minima of sunspots (1901, 1913, 1923); and minimum points near maxima of sunspots (1905, 1917, 1928). Mean curves for the three eleven-year sunspot cycles, show striking correlation and smooth variation:

Maxima

Grasshopper at sunspot minimum,
Sharp-tailed grouse . . at sunspot minimum & next 2 years,
Ruffed grouse at sunspot minimum & next 2 years.

Minima

Grasshopper one year before sunspot maximum,
Sharptailed grouse . . . one year after sunspot maximum,
Ruffed grouse one year after sunspot maximum.

It would seem that the lesser organism, the grasshopper, responds quickly to the sunspot influence, while the grouse lag a little, and may well reflect a grasshopper influence, as Criddle suggests. However--as has been demonstrated in the cases of tree-growth, number of varying hares, and dates of arrival of birds--all three, grasshopper, sharp-tailed grouse and ruffed grouse, do reflect the eleven-year sunspot cycle, whatever be the mechanism (a problem in each case). Grasshoppers will probably be again at a maximum in 1934, at Aweme, and grouse in 1934-6.

At the Dominion Observatory, Ottawa, we have been investigating for some years the relationship of sunspot variations to living things and we should be happy to receive from any readers such valuable and faithfully kept records as these under discussion. Such records are especially desired in connection with the investigation of the change in phase for different parts of Canada, of the sunspot relationship to natural phenomena.--Ralph E. Delury, Ottawa.

Copies to Messrs. Grange & King

Extract from "Bird-Life Changes in Twenty-Five Years in Southwestern Saskatchewan" by Lawrence E. Potter. Canadian Field-Naturalist, September 1930.

"The district referred to in this article lies south of the Cypress Hills in the extreme southwest corner of Saskatchewan. The writer came to this point in the valley of the Frenchman river in 1901.

.....

"The Hungarian Partridge extended its range from the west to this neighbourhood about 1924 and I saw my first pair on May 21st of the following year. By 1926 the partridge had become plentiful, but since then its numbers seem to have fallen again. This apparent decrease is possibly due to the last two summers, 1927 and 1928, having been more than usually wet, and is probably only a temporary setback. The Ruffed Grouse is a bird of general distribution across the continent and it is a curious fact that the Cypress Hills is the only considerable wooded area in Canada in which this species is not indigenous. In the spring of 1922 a number of these grouse were liberated in the district by the Game Department, some of them within 10 miles of here; but that any of their descendants survive today seems unlikely. I have been informed now and again of the Pinnated Grouse occurring here, but it is still scarce; I have never seen it except on one occasion, and that was while motoring in south-east Alberta in 1925."

Aldo Leopold

Aldo Leopold

Excerpt from "Game and Gun and the Country Estate" (English Magazine),
October, 1930, page 476.

"By a 'conditional' disease is meant a disease which is brought about by certain conditions of surroundings and weather which may be prevalent, and which favour the spreading of the disease. When these particular conditions are not present there is no outbreak of disease.

"A parallel is actually drawn between furunculosis and strongylosis, or grouse disease.

"Now strongylosis is certainly a conditional disease.

"As is generally known, it is due to the presence of a certain type of strongyle worm which is found in the caeca of almost every adult grouse, healthy and unhealthy. Normally, the bird's powers of resistance are sufficient to combat successfully any harm caused by this worm. When, however, the bird's powers of resistance are lowered appreciably by any cause, such as lack of food, the worms get the upper hand and the grouse dies. The conditions which favour the spread of strongylosis are, therefore, primarily those which affect food supply; that is, lack of heather and overcrowding. Certain conditions, however, are more favourable than others to the propagation of these particular strongyle worms; and such conditions are cold and damp. Consequently, when the heather has bloomed badly, birds are numerous, and the weather is cold and damp, and outbreak of disease is almost inevitable.

"The root cause of the disease is present all the time, but it only breaks out when certain conditions occur; in other words it is a conditional disease."

Copies for: Grange
King ✓
Yeatter
Errington
Cycle Chart folder
Ruffed Grouse folder

Aldo Leopold ✓

Copies to: Yeatter
King ✓
Errington

Aldo Leopold

Digest of
"Field, Cover & Trap Shooting"
A.H. Bogardus, J.B. Ford & Co., New York, 1874

Petersburg, Sangamon River, Ill. Moved there "17 years ago" or about 1857. At that time:

Quail - "vast numbers"
Pinnated Grouse - "rather numerous"
Deer and Turkey - "abounded"

Osage Hedges planted on J. D. Gillet stock farm (7 mi. across). Quail now more plentiful (1874) than before hedges planted.

Prairie Chicken. At present time young grouse "much more scarce about Elkhart" due to breaking up of prairie.

Prairie Chicken Migration seen at Keokuk, Ia., in November, flying east across Mississippi River into Illinois. Do not return by this route.

Rabbit Shortage. "8 or 10 years ago (1866) - - rabbits used to abound about Elkhart." Killed 160 in a day. "They decreased at one time, but recently have been getting numerous again." (Low 1870? 2)

Geese & Sandhill Crane breed at Winnebago Swamp 30 miles from Elkhart, latter only "occasional."

"Gray Foxes numerous with us".

"Quail are more numerous than they ever were before" - shooting excellent in most counties of Ohio, Indiana, Illinois, Kentucky, Iowa, Missouri, Wisconsin, and Minnesota.

Missouri. "Perhaps the best general shooting is to be had in N.E. Missouri, for there, besides grouse, quail, waterfowl, etc., the sportsman may come upon wild turkeys and deer."

p. 55 Pinnated Grouse. "None in Ohio, few in Michigan and Indiana, but plentiful in Illinois, Iowa, Minnesota, Kansas, Nebraska, and parts of Missouri and Wisconsin."

p. 57 Corn. "A great deal of corn remains standing all the winter in the West."

p. 58 Incubation of grouse. 21 days.

p. 66 In 1872, 2 men killed 600 grouse in 10 days in MacLean Co., Ill.

p. 87 "Where I live the grouse are nearly as abundant in the latter part of the fall (migrants) as they were 17 years ago - - but not anything like as many young grouse - - in Aug. or Sept. as there used to be."

p. 89 Quail "much more numerous now in Illinois and other prairie states than formerly." "Cultivation - - and osage hedges have brought about the increase."

p.90 Quail hide in soft snow to escape hawks.

p.101 In about 1866 on Shoal Creek 50 mi. E. St. Joseph, Mo. on Missouri River were "quail, pinnated grouse, some ruffed grouse, turkeys and deer in large numbers."

Illinois "much the best state for pinnated grouse" (than Iowa).

p.105 Last fall(1873?) in Alabama, Louisiana, Mississippi, Tennessee "there was not one quail to a hundred - - in Illinois."

Ruffed Grouse

p.107 "The ruffed grouse is extensively distributed from east to west, but is nowhere found in any great abundance." "No such multitudes as pinnated." "Sparsely" in N.Y. and N.J. Met in W.Va., Ky. Ohio, Ind., Ill., Mo., Ia. Also found, but "most abundant in some parts of Wisconsin and N.W. part of L.P., Mich."

p.113 Numerous about 1850 in bottoms at mouth of Cass River, Michigan.

p.118 Scarce at Albany, N.Y. (max. 6 per day) before 1857.
Killed max. 15 per day in Cook Co., Ill.
On Shoal Creek, Mo., killed 50 in 3 weeks turkey hunting(this in 1866?).

Woodcock

p.129 "A great many near Lockport, Ill."

p.130 Scarcer in west than in Atlantic states. Many on bottoms and islands of Mississippi down to St.Louis.

Jacksnipe

p.133 Breeds "on the Calumet, and some in the great Winnebago Swamp."

p.136 Max. kill 340 per day. "Bag seldom as small as 75 couple at the right time." (On Sangamon)

p.136 "Snipe are vastly more abundant in the West - - than in the East."

p.139 Wagered to kill 100 snipe in 100 consecutive shots. No takers.

January 23, 1930

If weather killing birds hope you will not miss chance to collect large numbers where sex tally weight and stomach examination also hawks to determine food habits during the emergency weather. Also quail and Hungarians for other fellowships. Do not hesitate to ask cooperation sportsmen and wardens or even offer payment for material if University approves.

Leopold.

59	51	58	58	30		
18	50	51	53	53	54	52
13	13	14	12	10	11	12
2	2	1	8	9	10	11
			1	8		

June
52

52	59	51	58	58	30
11	18	18	50	51	53
10	11	13	13	14	12
3	4	2	6	1	8
					5



January 23, 1930

King, Errington & Yeatter

This letter is premised on the assumption that you have been experiencing killing weather the same as has prevailed here.

I have been strongly impressed that many things can be learned by collecting large numbers of killed birds at this time, which could not be learned by many months of work at any other period, accordingly I wired each of you this morning urging you to take advantage of this opportunity. I would have sent this through Stedard except that I do not know where he is.

I hope you have already organized ^{to} take full advantage of this opportunity for getting material. If so disregard this letter and my telegram.

METHODS OF GETTING MATERIAL

At the present ^{time} it is possible to get almost any number of dead quail by asking sportsmen, wardens, and farmers to send them in, offering a nominal payment for sending such material would doubtless produce an even greater quantity. Such payments, of course, should not be offered without consulting your local wardens. As far as the Institute is concerned however, you need not hesitate to use your expense money for such purposes or for postage or telegrams necessary to get co-operation.

KINDS OF MATERIAL

In addition to the carcasses of birds, which have starved, I am impressed by the chance to study food habits of hawks and owls during this emergency weather. You might want to get a considerable number of all species shot and sent you examination. The hawks here are departing entirely from their normal habits, at this time.



2

EXAMINATION OF DEAD BIRDS

I weighed a pair of starved quail this morning and the two of them eight ounces, which is what one healthy quail ought to weigh. It occurs to me that the weights of starved birds might be very valuable. Especially when examined in conjunction with crop and gizzard contents. A sex tally might also show that one sex dies quicker than the other. The main object of getting birds, however, is of course to examine the food they contain. Quail are starving here with their crops of sunac seed. This certainly is evidence of low value of this food. We might get new light on the value of many foods by examining many stomachs. You might also attempt to examine the birds for grit. Of course all this entails a lot of work, but if you have cold storage facilities available you could take your time about the job.

I am sending a copy of this letter to Stedward and hope you will consult with him on all technical questions, concerning which you may be doubt.

I hope to hear from you that this letter was entirely unnecessary and that you already arranged to take advantage of this chance to get all the material necessary for the study of birds under emergency conditions.

Yours sincerely,

Ardo Leopold

Copies to: Yeatter
Errington
King ✓
Stoddard

February 5, 1930

Dr. F. C. Bishopp
U. S. Dept. of Agriculture
Bureau of Entomology
Washington, D. C.

Dear Dr. Bishopp:

I am very glad to have your letter of January 21, suggesting cooperation with your bureau in the external parasites of wild birds and animals.

This Institute maintains three game research fellowships at Michigan, Wisconsin, and Minnesota respectively. These are under the technical supervision of Mr. H. L. Stoddard, of the U. S. Biological Survey. I am sending copies of this letter to the three men in charge, as well as Mr. Stoddard, so that they may take advantage of your offer if opportunity occurs.

I certainly appreciate your active interest in the subject of game, and would suggest, if you are not already acquainted with Mr. Stoddard, that you have a conference with him.

Yours sincerely,

ALDO LEOPOLD,
In Charge, Game Survey.

Madison, Wisconsin
Feb. 6, 1930

Memo for Errington, King, Yeatter, Grange, Frederic Leopold:

In making up the report on the Game Survey of the North Central Region I want to examine the effect of latitude on the length of the quail breeding season (i.e. earliest and latest hatchings).

I have a hunch there is not much latitudinal difference, but I want to find out.

I did not collect any quail phenology data on Wisconsin, Minnesota, Michigan, Iowa, or Ohio. Attached is the phenological table for Missouri, showing my standard form. Similar tables are in my Illinois, Indiana, and Mississippi Reports, and of course Stoddard has complete information for Georgia.

Can you give me any information, even fragments, for your state? I thought possibly you would have some notes of your own, and could make inquiry of other observers in the course of your regular travels. Whatever you can get for me I would appreciate having by April 1.

Incidentally you may want to use this form for the accumulation of notes on your own species. I have found it very handy.

I will be writing up the North Central Region during the next few months and may have to fall back on you to fill in other gaps in my information.

Your~~s~~sincerely,

ALDO LEOPOLD

TABLE

Phenology of Quail - Missouri

<u>Date</u>	<u>Observer</u>	<u>Place</u>	<u>County</u>		<u>Remarks</u>
(1) <u>Covies Still Intact</u>					
May 1	Goff	Ironton	Iron	37.6	
May 15	W.P. Steele	Sedalia	Pettis	38.6	Sometimes in covies this late.
April	W.L. Schofield	Buffalo	Dallas	37.6	
(2) <u>First Eggs Laid</u>					
(3) <u>Clutches Complete</u>					
May 20	W.P. Steele	Sedalia	Pettis	38.6	Nest with 12 eggs found.
(4) <u>First Young Hatched</u>					
June 20	Phil M. Smith	Williamsburg	Callaway	38.6	Saw 2-wks. old young while cutting wheat July 4.
June 1	Sen. Nick Case	Fulton	"	38.6	On Fulton Country Club.
June 15	C.D. Via	Rolla	Phelps	38	First young seen when cutting wheat.
June 20	Goff	Ironton	Iron	37.6	
May 15	J.I. Coontz	Sedalia	Pettis	38.6	
(5) <u>Late Nests - Clutches Complete</u>					
Aug. 20	W.P. Steele	Sedalia	Pettis	38.6	
(6) <u>Late Hatchings</u>					
Sept. 6	Phil M. Smith	Williamsburg	Callaway	38.6	15 young seen in farmyard. Grown by Dec.
Sept. 15	C.D. Via	Rolla	Phelps	38	Saw 5-day old young Sept. 20, 1929.
Sept. 15	Earl Wylder	Caulfield	(Osark)	36.3	Found eggs Sept. 10; hatched Sept. 15.
Sept. 1	L.P. Faherty	Perryville	Perry	37.6	
Aug. 15	A.D. Stamer	Wright City	Warren	38.6	Found small chicks Aug. 15, 1929.
Sept. 15	J.I. Coontz	Sedalia	Pettis	38.6	
Oct. 1	E.L. Schofield	Buffalo	Dallas	37.6	Found chicks less than week old, Oct. 3, 1928.
Aug. 15	G.R. Johnson	Harrisonville	Cass	38.6	Found chicks less than 2 weeks old Sept. 1.

Latitude in red.

Copy to Mr. King

February 13, 1930

Dr. Wm. A. Bruette
1/2 Forest & Stream, Inc.
80 Lafayette St.
New York City

Dear Dr. Bruette:

During our ride home from Madison, New Jersey, you mentioned that the province of New Brunswick in 1754 had established a closed season on ruffed grouse because of their scarcity at that time, and expressed your opinion that this was an early occurrence of the grouse disease.

I understood you to say that you had the text of this statute or could site where it was published and give me the substance of it without great difficulty. I would very greatly appreciate any information you can give me. As I told you, the Institute has established a fellowship at the University of Minnesota to study the ruffed grouse cycle, and this information is an extremely valuable contribution to their field.

With best wishes,

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey.

Aldo Leaford

PROTECTION OF PARTRIDGE

Legislation on Subject in Province of New Brunswick Dates Back to 1814, when Drastic Law "for the Preservation of Partridges" was Enacted--Long Standing Fears that Ruffed Grouse would Become Extinct in New Brunswick Unfounded--May be Open Season in 1929.

Legislation for the protection of the partridge, or ruffed grouse, in the Province of New Brunswick, Canada, dates back to 1814 and would indicate that fears that the bird would become extinct are of long standing, even if unfounded.

"One hears often reiterated the fear that the partridge will become extinct," writes a correspondent to the Saint John Times-Globe. "It is interesting to find that the same fear existed 114 years ago," adds the correspondent, who appends the first legislation passed in New Brunswick on the subject, as follows:

NEW BRUNSWICK

An Act for the Preservation of Partridges
Passed the 7th of March, 1814

WHEREAS it is necessary to prevent the killing partridges during the time of their breeding; for the preservation of that species of game, be it enacted by the President, Council and Assembly, that from and after the passing of this act, every person who shall take, kill or destroy, or who shall sell or expose for sale, or who shall buy or cause to be bought between the first day of March and the first day of September in any year, any partridge, shall for every partridge so taken, killed, destroyed, sold or exposed for sale, or found dead in his or her possession, forfeit the sum of ten shillings to the use of the person or persons who shall prosecute or sue for the same, to be recovered before any one of His Majesty's justices of the peace for the county where the offence may be committed, on the oath of one or more credible witness or witnesses, or by confession of the party offending, and levied on the goods and chattels of the offender; and for the want of goods and chattels of such offender whereon to levy the same, it shall and may be lawful for such justice to commit the offender to the common gaol of the county, for the space of two days, or until the fine, together with the costs of prosecution and commitment, shall be paid.

There is not this year and has not been for several years an open season for partridge shooting in New Brunswick and, published suggestions

that there may be a short open season during the month of November are not possible of fruition inasmuch as existing legislation provides that in order for there to be an open season for partridge shooting in New Brunswick in any year same must be proclaimed by order of the Lieutenant Governor in Council before August 1st.

There is, however, some likelihood of an open season for partridge hunting in New Brunswick in 1929 as a result of reports of the increasing number of the birds and in this connection Hon. Charles D. Richards, Minister of Lands & Mines, is making some personal investigations on his present trip of inspection in the northern counties of the Province, which includes a canoe trip of more than 100 miles up the Tobique river and down the Nepisiguit.

-----30-----

From: Bureau of Provincial Information
&
Tourist Travel

Fredericton, N. B., Canada.

(Received from Dr. Wm. Bruette)

Copies for: Mr. King ✓
Ruffed Grouse folder
New Brunswick "
Cycle Chart "
Cycle Chart data (desk)

Copies to Errington
King
Yeatter

February 13, 1930

Mr. Davis Quinn
3548 Tryon Avenue, Bronx
New York City

Dear Mr. Quinn:

You may remember my writing you some months ago about our having a conference. I have been in New York since then, but happened to be in such a rush that I did not phone you, although I had not forgotten the matter.

I have now received your pamphlet, "'Framing' The Birds of Prey." It would be impossible to discuss all the important points which you raise, by mail. I shall reserve that for our visit. Just now the only point I want to make sure of is that you understand that (1) the organized ammunition industry is not sponsoring any nation-wide indiscriminate vermin campaign, and (2) that such local vermin-killing contests as you quote on page 3 of your pamphlet are not sanctioned by the organized ammunition industry.

On the contrary the industry, through its recently established game research fellowships, is making an effort to urge the determination of the local facts as a basis for local predator control operations. The present attitude on the whole question of predators is one of the things I would like to have you question me about in person.

Yours truly,

ALDO LEOPOLD
In Charge, Game Survey

Note to Fellows: If you have not received this pamphlet, by all means write for it.

February 17 1930

Mr. Aldo Leopold
In Charge Game Survey
421 Chemistry Building
Madison Wisconsin

Dear Mr. Leopold:

I am sorry that I haven't any notes on the quail nesting season but will see what I can find for you by April 1.

Dr. F. N. Blanchard of the Zoology Department here has given me this record on a ruffed grouse nest which he is willing for you to use if of any good to you:

April 26, 1925

Nest of 10 eggs (Iosco Twp.) Lat. 42.5
Livingston Co., Mich.

You probably have this on bobwhite from Dr. W. B. Barrow's Michigan Bird Life (p. 221) "...young less than half grown are frequently seen in September and nests with fresh eggs have been found occasionally in August and September. Ordinarily the eggs are laid from May 20 to June 10." + 23 = July 3.

George Hebden Corsan, writing in The Game Breeder for September 1927 (p. 139) mentions finding a quail nest with 13 eggs late in July near Battle Creek, Mich.

The Conservation Department of Michigan imported 108 Huns in January and the birds are still held at the game farm to be released soon. Fourteen birds of the lot that died have been sent us. It is interesting and perhaps significant as to the mortality of the sexes that twelve have been females, one male and one intersex. Causes of death are listed by Dr. E. G. O'Roke as pneumonia, aspergillo-sis, suffocation, starvation, and injuries.

I will be very glad to look for any information you need for the report. I want to thank you for the notes on the Pabst Huns and the letter to Dr. F. C. Bishop, and for the other notes.

Yours sincerely,

(Signed) R. E. Yeatter
Research Associate.

Copies to: Errington
King ✓
Yeatter

February 13, 1930

MEMORANDUM FOR STODDARD

During your recent visit we agreed that the work under the quail fellowship has now begun to spread out sufficiently to render visible some of its ramifications in allied scientific fields.

How to induce the University to give attention to the more important of these ramifications is an important problem.

I had lunch today with Dr. B. M. Duggar of the botany department to talk over some of the botanical ramifications and to get his advice on how to get them attended to.

Errington can now foresee the need of the following botanical projects:

- (1) A study of plant successions in Wisconsin woodlots when subjected to grazing.
- (2) Supplementing the seed collection in the agronomy department so that it can be used as a reference collection for identification of stomach contents.
- (3) Finding a substitute for melbomia which will form heavier stands and if possible resist grazing.
- (4) Measuring the proportion of the ragweed seed crop which falls to the ground as compared with the proportion which remains above snow.

As you know, Dr. Duggar was brought to Wisconsin from the Missouri Botanical Gardens, and as I understand it, his particular function is to break down departmental barriers in the botanical field.

I asked him first which of the two moves for mobilizing game research he considered the most promising: (1) the advisory committee, or (2) the proposed game research coordinator. He said by all means the latter.

I pointed out to him that part of the above projects were not suited to execution by graduate students and asked him whether in general there were instructors who might make a specialty of them. He said, "Yes, if duly encouraged by the department heads and the Dean."

I asked him whether it were not true that many botanical research workers were engaged on projects fundamental in nature but

without any prospect of practical application. If so, ^{would} ~~did~~ not such men prefer to emphasize projects bearing directly on conservation if equally fundamental? He said yes, by all means, and gave me examples of men whose effectiveness had shown a marked revival when given a concrete objective.

Dr. Duggar volunteered the information that the National Research Council had been considering the appointment of a regular committee on game conservation research. Such a committee would doubtless deal with the kind of questions here raised.

Dr. Duggar agreed that many of the fundamental aspects of game research would qualify for financial help from endowment foundations, once they were duly defined.

The conclusion I drew from my conference with Dr. Duggar was that the future momentum of the game fellowships depended to a large extent on the universities appointing the right kind of co-ordinating officers, whose duty it would be to push the ramifications the university was equipped to handle.

Aldo Leopold

Mr. King

C O P Y

MASSACHUSETTS FISH AND GAME ASSOCIATION
Boston, U.S.A.

February 26, 1930

Mr. Aldo Leopold
421 Chemistry Building
Madison, Wisconsin

Dear Mr. Leopold:

I have a copy of your letter to Mr. Harkin in regard to the cycles of Ruffed Grouse and rabbits. We must be sure that there is no crossing of wire on this work. We are planning some laboratory work on the north shore of the Gulf of St. Lawrence on the Matamek River where there are some houses owned by Mr. Copley Amory, who has offered us facilities.

There is not doubt that work should be attempted in several different places because the problems and conditions will be very different in different places in Canada no doubt.

Did I tell you that Miss Cram of the Bureau of Animal Industry who was working on the Dispharynx parasite of grouse for us at Bowdoin this fall, apparently hit on the intermediate host of this parasite? It appears that the sexual cycle of the worm goes through a common Fulbug and is again taken in by the grouse by swallowing the bug. At least this is the way it worked out as a laboratory experiment, although we had not enough live grouse material to try it out on a large scale.

It is very interesting to find that the grouse at Matamek and the north shore of the Gulf are absolutely free from the common parasites which infest them in central New England. We also believe that the grouse of the northern Maine woods are free from these parasites, so there is no reason to think that we have hit on any solution of the cycle problem as yet.

Sincerely yours,

JOHN C. PHILLIPS

President

Raleigh, N. C.

March 18th, 1930

TO: Major L. W. T. Waller, Jr.

From: A. C. Heyward

I had a most interesting trip to Pisgah National Forest to confer with Mr. T. D. Burleigh, U. S. Biologist.

Pisgah National Forest comprises 150,000 acres, and contains the Appalachian Forest Experiment Station, with Mr. E. H. F. Rothingham as Director. Part of this experiment station, one thousand acres, is set aside and known as the Bent Creek Laboratory.

Mr. Burleigh was assigned to this laboratory the first of January, he being the first Biologist assigned to a U. S. Forest Experiment Station under the recent act of Congress authorizing the assignment of a U. S. Biologist to each of the Government Stations.

Mr. Burleigh states that his investigations are to come under three separate heads: 1st, The relationship of wild life to timber growth, harmful and beneficial species. 2nd, Population of furbearing animals that a given area can support. 3rd, Introduction of species of wild life originally native to that locality to determine if they can be brought back. While the above three lines of investigation are his primary purpose, he is at the same time going to study the relationship of all three to the problem of conservation and restoration of game birds and animals.

Mr. Burleigh seems to be very greatly interested in the game angle of the proposition, and is going to devote a very large part of his investigations to this question. He is very much interested in the results of Aldo Leopolds game survey, and I think it would be a mighty good idea to get him a copy of Leopolds reports, if this is possible. I suggested to him that perhaps he could be in a position to throw a lot of additional light on some of the lines that Leopold has uncovered that still need a lot of further investigation and study.

The Ruffed Grouse was originally native to the mountains of North Carolina and were present there in great numbers, but have at the present time decreased to such a point that they are rarely seen. This decrease is also true of the 150,000 acres in Pisgah National Forest where there has not been any hunting for practically twenty years. Mr. Burleigh has observed a few Grouse since he has been there and is going to undertake to ascertain as near as possible what is causing their disappearance. He has taken up with the Biological Survey the possibility of their obtaining some additional stock of these birds for release on the thousand acres in the Bent Creek Laboratory, where he can keep them under close observation. He has in mind that it is far more suitable to try to bring back the Ruffed Grouse in that territory than it is to introduce the ring-neck pheasant. He is further convinced that if the ring-neck will thrive and increase anywhere in N. C. that the territory comprising Pisgah National Forest is the most likely. That if they won't do there they won't do anywhere in the state. I suggested to him that we might be able to get him twelve or fifteen pheasants late this coming summer if he would undertake to study their habits, food supply and try to determine, if possible, what is becoming of them in places where plantings have not been successful. He took to the idea right away, and stated that he would cooperate in every way possible to determine the ring-neck could be successfully introduced in North Carolina, and if not, why not.

He is carrying on extensive trapping operations over the entire Forest, through the forest wardens, part of whose income comes from the furs that they take, and he has instructed them in how to preserve the stomach of all animals trapped, these in turn being turned over to him for investigation. He hopes to be able to learn a lot from these stomachs, especially in regard to the Ruffed Grouse and the Pheasant, if we are able to get some for him.

Both Mr. Burleigh and Mr. Frothingham, the Director, seem very friendly toward us and the work that we are doing, and assured me that we could count on their fullest cooperation in any line that we would like for them to study during the course of their own investigations. It appears to me that we can work with these gentlemen to our great mutual benefit, and I am going to keep in very close touch with the work that they are doing.

Please add the following names to the mailing list to receive the Bulletin:

E. H. Frothingham, 612 City Hall Building, Ashville, North Carolina
T. D. Burleigh, 612 City Hall Building, Ashville, North Carolina.

(Signed) A. C. Heyward

March 22, 1930

Dr. Wm. A. Bruette
80 Lafayette Street
New York City

Dear Dr. Bruette:

I appreciate very much your sending me the Canadian news story about early closures on ruffed grouse in the Canadian provinces. This is extremely valuable information and I am much indebted to you for letting me make a copy of it. I am taking the liberty of sending an extra copy to Mr. R. T. King, who is doing the work on the ruffed grouse fellowship established by the Institute at the University of Minnesota.

Should either he or I have future occasion to refer to it in publications, we will cite your courtesy in calling our attention to it, as well as the original source of the data. For the present, however, Mr. King and I are not interested in the publication angle, but in the evidence which you have contributed to the question, "How far back do ruffed grouse cycles go?"

I have traced them back in Wisconsin to 1881, but behind that I was lacking any conclusive information of the kind you have now furnished.

Thanking you very much for your cooperation, and hoping to see you again shortly,

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

Copies to: Mr. Stoddard
Mr. King ✓

March 31, 1930

Major L. W. T. Waller, Jr.
Sporting Powder Division
Du Pont Company
Wilmington, Delaware

Dear Major:

Miss Horn during the next few weeks will be typing the Missouri report, and I want to inquire whether it will again be necessary to give you a copy in standard type rather than in elite type for reproductions for your field force. A set of reports in standard type can be made ~~in standard type~~ by renting a typewriter if you so desire. I fail to recall the exact nature of your difficulty, however, and accordingly thought I had better inquire as to your wishes.

I was exceedingly interested in Mr. Heyward's letter of March 18, and I am taking the liberty of forwarding it to Mr. King, the fellow at ~~Wilmington~~ ^{Wilmington}, for reading and return to you. If Mr. Burleigh can give the attention to ruffed grouse that he has in mind, then by all means he and Mr. King should be in very close contact and, if possible, eventually exchange visits. With Stoddard available to coordinate the two pieces of work, this should be entirely feasible. I am very much indebted to Mr. Heyward for his intelligent comment on Mr. Burleigh's plans.

I am writing Mr. Burleigh direct, asking for historical information needed for the north central report and suggesting that he take advantage of your kind offer to loan him some of the game survey reports.

I am sending a copy of this letter to Mr. King and Mr. Stoddard.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

Note to Mr. Stoddard and Mr. King: Mr. Burleigh is conducting the McSweeney work on the Pizgah National Forest.

Copies to:

Mr. John M. Olin
Major L. W. T. Waller, Jr.
Mr. H. L. Stoddard
Mr. A. C. Hayward
Mr. Ralph T. King ✓

March 31, 1930

Mr. T. D. Burleigh
Pisgah National Forest
Asheville, North Carolina

Dear Mr. Burleigh:

I have heard through Mr. A. C. Hayward of the Du Pont of your very interesting plans for McSweeney Bill game research.

I am especially pleased to hear that the work will give some attention to ruffed grouse, since the behavior of this species in the southern Appalachians is practically unexplored and anything found out there will not only be valuable to the southern Appalachian region, but will throw light on the grouse problem over all North America.

This Institute has recently established a fellowship for the study of ruffed grouse populations at the University of Minnesota. The work is being done by Mr. Ralph T. King under the supervision of Prof. R. M. Chapman, University Farm, St. Paul. The fellowship is under the advisory supervision of Mr. Herbert L. Stoddard of the U. S. Biological Survey. I am very much in hopes that you and Mr. King will get in touch with each other, and use the facilities offered by Mr. Stoddard as well as by exchange of correspondence to coordinate findings and plans.

There is one other matter of lesser ultimate importance, but which happens to be pressing at the present moment, and that is this: I am about to go to work on a report of a game survey of the north central region. In order to describe intelligently the game cycle of the Lake States I will have to give some background as to the game cycle in North America. Both are summarized in a tentative way in the report on the Wisconsin Game Survey, of which I would suggest you borrow a copy, either from Major L. W. T. Waller, Jr., Mr. Hayward's superior officer, or from the U. S. Biological Survey, which has a file copy in its library.

I am very desirous of extending the chart showing the game cycle in North America by adding such information as I can get on the southern Appalachians. The only fragment of information

which I now have was obtained from the working plan drawn by Supervisor C. G. Smith for the Piigah, which was that ruffed grouse were very high in 1920, had declined somewhat by 1921 and hit bottom by 1923, remained very low until 1925, and showed a slight pick-up by 1927.

What I am extremely anxious to find out is whether the past history of the species in your region contains any similar evidences of high points and depressions, and if so, the date and locality of such evidence. Since you will doubtless want this anyhow as a basis for your own study, I thought you might be willing to cooperate with me by letting me have such information as you can collect in the next month or two for use in the north central report.

I am revising the chart for North America in the next week or so, and will send you a blueprint summarizing the information I have to date.

My Missouri report, now being typed, will also contain some new information on the behavior of ruffed grouse in the Ozarks which bears on your problem. You can borrow this from the library of the Biological Survey after it has been sent them, which will be within the next month.

Are you by any chance attending the Forestry Research Conference here in Madison in April? Mr. Austin and I are planning a conference, and it would be of extreme interest to me to meet you at that time. Possibly Mr. Frothingham could authorize your attendance. It seems to me that there should be some provision for a joint annual meeting of men engaged in game research in connection with the National Game Conference in New York each December.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

Dicated by Mr. Leopold,
but signed in his ab-
sence to avoid delay.

V.H.

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD
421 CHEMISTRY BLDG.
MADISON, WISCONSIN

May 14, 1930

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Mr. King:

In Mr. Leopold's absence I am sending you
a copy of his Report on a Game Survey of Missouri for your
permanent use.

Will you kindly see that the following persons
have an opportunity to read the report if they desire to do
so?

Dr. R. N. Chapman
Dr. R. G. Green
Mr. O. L. Austin

Yours very truly,

Vivian Horn
Secretary to Mr. Leopold

May 22, 1930

Dr. Arthur A. Allen
Cornell University
Ithaca, New York

Dear Dr. Allen:

Carlos Avery showed me your radio talk on game research, and I just want to drop you a line to express my appreciation of the able manner in which you have handled it. Naturally I was also pleased with your favorable comment on the Institute's fellowships.

The next time I see you I would like very much to discuss your statement on page 3 as follows:

" . . . after eliminating one disease after another, I finally discovered that in close quarters, the birds become pathogenic to one another without the intervention of any known disease organism."

What I would like your opinion on is whether bacterial diseases not producing lesions or sub-microscopic bacteria might be responsible for this condition. I take it that it must mean something of that sort, but since I have no training in bacteriology I would like to talk it over with you more thoroughly. I am hoping that you will be at the Toronto meeting and that we will have a chance to confer there.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

May 22, 1930

Mr. C. Stewart Comeaux
Sporting Arms & Ammunition Manufacturers' Institute
103 Park Avenue
New York City

Dear Mr. Comeaux:

The Game Committee, at its May 14 meeting, asked me to send you, for transmission to the constituent companies, my recommendations on "Vermin-Control."

Reasons for Caution. There is a large body of public opinion, interested in wild life but not in shooting. Some doubt the wisdom of killing the natural enemies of game at all. Others contend that sportsmen are often inclined to kill any and all possible enemies of game, without first getting substantial evidence of just which species are harmful, and under what conditions.

The latter contention is, unfortunately, often true. The Institute fellowships are, in part, a move to make good this deficiency of evidence, which will take years to gather.

Meanwhile, any move which can be construed as an indication that this industry encourages the indiscriminate killing of "vermin" is sure to give rise to hostile feeling, and to embarrass our game restoration program.

Advertisements. Some companies have published advertisements picturing hawks or owls, and urging the use of certain arms or ammunition to kill them. There is no objection to such advertisements, provided the species shown in the picture is one already proven to be prevalently harmful (such as Sharp-shin Hawk, Copper Hawk, Horned Owl, or Goshawk). It is also preferable that the text refer to these species, rather than to hawks and owls in general. Observance of these precautions need not, I think, detract from the advertising value of the material.

Campaigns. Field representatives sometimes officially organize or take part in systematic "vermin" campaigns. There is no objection to this, provided the campaign be limited to the universally harmful species above mentioned, or to species already proven to be harmful in the locality to be covered. Information on local situations can

often be obtained from the Zoology Department of the State University, or from the U. S. Biological Survey at Washington. In many cases, however, the necessary information does not yet exist.

The cooperation of the member companies in observing the general spirit of these suggested precautions will be much appreciated. I stand ready to answer specific questions to the best of my ability.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

June 11 1930

Mr. Aldo Leopold
In Charge, Game Survey
421 Chemistry Building
Madison Wisconsin

My dear Mr. Leopold:

Replying to your letter of May 22 I am sorry that I will not be attending the Toronto meeting, but hope to see you somewhere else before long. I will be in New York Thursdays, Fridays and Saturdays this month, at the Audubon Society, and if you happen to be in town will be glad to see you. The statement referred to in your letter regarding the ruffed grouse becoming pathogenic to one another did not mean that no lesions of any kind develop, because they did. The young birds at between six and twelve weeks of age, when kept together developed well defined intestinal lesions, similar to those of the so-called quail disease. Our pathologists here, however, with abundant material were unable to locate anything but the *Bacillus coli* from these lesions.

When the Bureau of Animal Industry worked on quail disease some years ago they arrived at practically the same conclusion, that there was no disease organism other than *Bacillus coli* which is ordinarily considered only a saprophyte, and a post-mortem invader. It really looks as though the strain of *bacillus coli* from one bird was pathogenic to another.

This year I am raising one brood of grouse on wire in order to avoid this transference of *B. coli* from one bird to another, but the young birds are now only three weeks old and trouble does not ordinarily develop until they are about six.

Hoping to see you before long, believe me,

Sincerely yours,

(Signed) A. A. Allen

AAA:MP

Professor of Ornithology

June 26, 1930

Mr. John M. Olin
Western Cartridge Company
East Alton, Illinois

Dear Mr. Olin:

When I recommended the renewal of the fellowships I stated that I had not yet personally looked over the recent work in Minnesota, but would do so and send you a report.

I have just returned from a very interesting trip made for the purpose of carrying out this promise. Dr. R. N. Chapman, to whom King reports, is accepting a position in Hawaii in July, and the purpose of going up at this time was to get the advantage of consulting with Dr. Chapman before he left.

King has by this time completed a tentative exploration of many angles of the subject of ruffed grouse and game cycles. He has made a very complete survey of the literature. He has also mapped out a sample area on which to conduct intensive studies, but unfortunately, through no fault of his, a power company bought out this area and announced their intention of flooding the land in the near future. King had taken every reasonable precaution to make sure the ownership of this land was stable before he put in any work on it, and its acquisition for power purposes was, I gather, a surprise to everybody. I therefore regard this loss of a month or two or time as unavoidable hard luck. The time is by no means entirely lost, since King obtained a pretty good census of this area. It might interest you to know that it runs about one grouse per 100 acres. This is one of the first reliable measurements of how low grouse get.

King has made a thorough exploration of the methods of trapping for banding purposes heretofore available, and found none of them yielded any results. He has invented a new trap which consists essentially of the spring from a steel trap operating a net when the bird steps upon a pan.

The progress in all of these lines of work is to me satisfactory. I was less satisfied, however, with the amount of data gathered on the history and behavior of cycles in the state. King himself is dissatisfied with his showing on this angle of the job, and I am convinced that it is entirely due to a case of sickness in his family which

has temporarily prevented his getting into the field on trips long enough for this purpose. He has now made arrangements to overcome this difficulty.

The most important subject which came up during my visit was the discussion of what particular angle of the problem of grouse and cycles King should concentrate on during the next year or two. The conclusion was reached, subject to approval by Grange and Stoddard, that an intensive study of history and behavior of the cycle was the most suitable.

I had a very satisfactory discussion with King as to the probable direction of his future career as well as the more immediate question above mentioned. He has exceptional ability as a teacher and I also have the impression that he has more ability as an organizer and executive than we will usually find combined with research ability. His aim is to work toward a faculty position as coordinator of game research in the University. He also wishes to qualify himself for future openings which may arise in organizing University instruction in game administration. The University faculty asked if I would object to his teaching a course in applied zoology and game management next winter. Since this would fit in very nicely with King's ultimate aims, I stated I would have no objection provided the load were not so heavy as to interfere with the execution of the fellowship work or King's obtaining his degree. This also of course is subject to O.K. by Stoddard and Grange.

In general, my conclusion is that the Minnesota fellowship, after discounting for unavoidable hard luck, has not accomplished quite as much as I had hoped for during the first year, but my confidence in King and in the whole project is entirely unshaken and I am very ready to take the responsibility for promising an entirely satisfactory showing, and possibly an exceptional showing, during the coming year.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

June 26, 1930

Mr. Herbert L. Stoddard
U. S. Biological Survey
Washington, D. C.

Dear Herbert:

I have just come back from St. Paul after a very pleasant visit with King and Dr. Chapman.

My general impressions of the progress of the work are contained in the attached copy of a letter to the Institute. I promised the Institute that I would make an inspection of the Minnesota fellowship since I was not able to say at the time I recommended its renewal that I had done so.

The purpose of this letter is to summarize some conclusions arrived at jointly by King and myself, tentatively O.K.'d by Dr. Chapman, and subject to final approval by yourself and Grange before they can be considered as adopted.

I think everybody is unanimous in the thought that the time has come to pick out a fraction of the total field King has been working in and to concentrate attention to that fraction, at least until his degree is obtained. The question is, what fraction?

I think King had in mind "methods of determining grouse populations." This is certainly an important subject and one which somebody ought to cover soon, but I think that in justice to King his thesis topic should be something which we can be absolutely sure is susceptible of execution within a couple of years. Since the above subject depends largely on the development of a method of trapping, I am not sure that it meets the above requirement. At Illinois King was given the egg shell project, which I think was a pure gamble and might have taken a whole career instead of a couple years' work to solve. Now we have handed him the subject of cycles. I am ready to admit that an adequate exploration of cycles is something better adapted to a lifetime of study than a couple years' work for a Ph.D.

King and I thrashed over the whole ground and I think arrived at the conclusion that the particular fraction which was important, which could be begun just as well during the trough as during

the peak, and which fitted in best with all the other circumstances was a really adequate study of the behavior and history of cycles, concentrating on Minnesota, but giving incidental attention to a larger territory.

If you have any objection to this as a thesis topic and as the immediate subject of his research under the fellowship, it might be well to write him. If it falls in with your ideas and Grange's, the detailed discussion of it can be postponed until both of you come out again in July.

I might say that this proposed subject would certainly include an attempt to measure populations, but the census work would not be the whole thing, and even if no great amount of census data were obtained there would still be plenty of subject matter for thesis purposes.

Since Grange is now with you I am assuming that this letter will reach you both.

With best regards,

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

American Consular Service

AMERICAN CONSULATE

Edinburgh, Scotland, July 1, 1930

Mr. F. F. Bowman
Cedarwood Farm, R. D. 2
Madison, Wisconsin

Sir:

The receipt is acknowledged of your letter dated June 16, 1930, respecting the conditions of grouse shooting in Scotland. You understand that when grouse lands are leased it is usual for the lessee to undertake to shoot a minimum number of birds which prevents the too rapid multiplication of grouse and thereby lessens the chances of "grouse disease." If this fact is true you believe that it is important in connection with the problem of game preservation in the United States.

A commission was set up some years ago in Scotland to study grouse disease and while the commission found many items of interest regarding grouse the cause of the disease was never discovered. It was learned that the disease occurs more often in flocks of large size but on the other hand it has occurred in small coveys and thus it cannot be said that the size of the flock causes the disease.

Grouse shooting in Scotland is of two kinds: (a) by grouse driving, and (b) "over the gun." The former method lessens the chances of the disease occurring because by flushing many coveys the birds intermingle and inbreeding is prevented. Inbreeding, which is thought to be a contributing factor to grouse disease, of course weakens the birds and makes them more susceptible to the disease. Experienced grouse hunters aim to shoot off the old birds, particularly the cocks, and when this is not done by a lessee through ignorance, the owner generally instructs the gamekeepers to shoot off the cocks in order to "round out" the coveys.

In addition to the above it has been found that grouse disease is less apt to occur when the heather on the moor is, in a sense, rotated. That is to say, the owner burns off the heather in small patches every year. Thus in a small area there will be a heather growth of several different years.

The Consulate has been advised that a lessee never undertakes to shoot a minimum number of birds but a maximum figure is usually fixed. However, in a spirit of fair play and for the preservation of game the lessee will not shoot the maximum number if the land is not as well stocked as calculated.

Very respectfully yours,

Harold D. Finley
American Consul

July 3 1930

Mr. Aldo Leopold
421 Chemistry Building
University of Wisconsin
Madison Wisconsin

Dear Mr. Leopold:

I have reserved today for letter writing and yours is among the first I want to get off. Let me tell you again how much we enjoyed your visit and we look forward to seeing you again, oftener than once a year in the future, I hope.

Dr. Chapman left yesterday, but he will be back for a few days this fall when his family goes. Until then he will remain head of my committee. I had a long talk with him Monday and he and Mrs. Chapman were so kind as to spend Monday evening at our home (my birthday). He is quite enthusiastic about the suggested thesis work and took the matter up with both the Dean and Dr. Riley before leaving.

I am enclosing the letter from Dr. Allen that you sent me. I have retained a copy.

The address of the second hand book dealer from whom we purchased D. G. Elliot's "Game Birds of North America" is G. Schmidt, Scientific Books and Periodicals, 415 Woodland Avenue, Leonie, New Jersey. The price to us a month ago was five dollars. The book was published in 1897.

I am enclosing a copy of what I have on the introduction of Ruffed Grouse onto Martha's Vineyard in 1859. I am also sending a note on sex differences in mortality of Ruffed Grouse that you may find of interest and one on "The Destruction of Birds by Telegraph Wires" but I do not believe any game birds were mentioned in this article. I am writing to Mr. Dadiesman about the West Virginia record on sex differences but as that data is now over eleven years old he may be dead. You perhaps know that the Southern N. Y. Fish and Game Association of Westchester County, New York, imported and stocked Ruffed Grouse sometime within the past year. That is too recent, of course, to judge by.

Tell Mr. Stoddard and Mr. Grange that I will keep the time from July 15 on open for them and will be glad to see them here again.

AL #2

I haven't been able to get at the Game Refuge Map of the state yet but will soon. Have already got names of two Minneapolis Game buyers of the old days and will write to Mr. Merslion today about others that he may know of. I will send you soon a copy of the outline on game cycles as I see it.

Mrs. King joins me in sending best wishes to you.

Sincerely yours,

RTK-s

Ruffed Grouse Investigations.

Copies to Mr. King ✓
Mr. Stoddard & Mr. Grange

July 8, 1930

Mr. C. Stewart Comeaux
Sporting Arms & Ammunition Mfgs. Institute
103 Park Avenue
New York City

Dear Mr. Comeaux:

Our fellowship student at the University of Minnesota (Ralph T. King, University Farm, St. Paul, Minn.) want to get in touch with old commission houses or commercial game dealers who may have old books or other records showing shipments or purchases of cyclic game species.

This means ruffed grouse, ^{or} partridge, prairie chicken, and sharptail grouse.

The object is to trace the date of former game cycles by fluctuations in market shipments.

It has occurred to me that the field men of the various companies might know where such records are to be found and might either obtain them for Mr. King or tell him how to obtain them. Naturally the field men now or formerly in the lake states, prairie states, New England, or Canada would be the most likely sources of information.

Would you kindly request the appropriate companies to bring this matter to the attention of the right men, and if anything occurs to them, ask them to correspond directly with Mr. King, if possible sending me carbon copies?

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

APPROVED

Chairman, Game Restoration Committee

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD
421 CHEMISTRY BLDG.
MADISON, WISCONSIN

July 8, 1930

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear King:

I was glad to have your letter of July 3 and appreciate your digging up the very interesting information.

Carlos Avery thought it wise to ask McCullough for the refuge map. I have accordingly done so, as per letter attached.

In response to my question as to old commission houses which might have records, he suggested one Eisenmenger and Joseph Friedman, both of the Twin Cities and both now in the meat business but formerly proprietors of commission houses. Being Germans they might have old records.

It also occurred to ^{us} ~~you~~ that there might be such a thing as records of railway shipments designating game shipped to market by species.

Mr. Avery suggested that you see Henry Hancke of the Federal Cartridge Company for ideas on how to get old records. In general, it was Mr. Avery's opinion that most market shipments from Minnesota were made directly by individual market hunters to Chicago and other firms. If you can find out what the Chicago firms were it might pay to look there later.

I have so far not been able to foresee any specific period of time when I will be working on cyclic game, and hence when it would be advantageous for you to come down. Furthermore, since Stoddard is now here and will be coming up your way, we had better defer action until later.

It occurs to me that some of the field men of the various companies in the Institute might be able to suggest how to lay hands on old records. I am writing them accordingly.

My cycle charts are being further delayed by the draftsman. I hope, however, to get them to you within a week.

Yours sincerely,

Aldo Leopold

Incl.

July 8, 1930

Dr. Raphael Zon, Director
Lake States Forest Experiment Station
University Farm
St. Paul, Minnesota

Dear Raphael:

Here is a preliminary copy of the type map for my north central report, together with some explanatory context.

When I copied my boundaries from your admirable type map I forgot to get in a Minnesota boundary between the pink area which I have called the "Driftless Area" and the gray or transition type. Would you be so kind as to ask one of your staff to pick me out a boundary?

I have placed the boundary on the Minnesota River, but I am quite sure this is not correct. On the other hand, there must be some logical line between the oak country around St. Paul and the transition belt further north which contains aspens and conifers.

I would also appreciate any comments which may occur to you on the map or material in general.

With best regards,

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

Note to King: If you happen to be interested in this you might look over the map in Zon's office and talk with whoever he assigns this job to. I would value your criticism.

A.L.

July 8, 1930

Mr. George McCullough
State Game Commissioner
St. Paul, Minnesota

Dear Mr. McCullough:

I am now writing my report on the north central region and am anxious to include in it a sample map showing the best refuge system for migratory birds which I have found in the region. There will be other maps for refuge systems for other game.

I have about concluded that the system of state, municipal, association, and private refuges for migratory game existing in southern Minnesota is the best to be found in the north central region. Accordingly I am anxious to get a refuge map of the state which shows all refuges, but which includes all migratory bird refuges in detail, classified according to ownership and management. Have you such a map as part of your official records? If so, could I see it and obtain your permission to reproduce it? If not, could you cooperate by compiling one?

I would hesitate to ask this for the sake of my report alone, but no doubt you yourself have need of such a map if it is not already in existence.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

Partial Digest of
"Birds of Minnesota"
(First report of State Zoologist)

Dr. P. L. Hatch

Publ. by Geol. & Nat. Hist. Survey-June, 1892

- p.155 BOBWHITE. "Following up the progress of agriculture steadily, but is nowhere yet abundant. After a series of mild winters it has several times. . . greatly increased . . to be again decimated by an exceptionally vigorous one."

Earliest nesting, May 5.

Alleged Planting. "Rev. Mr. Gear . . an army chaplain . . (says) that there were no quails here (Minn.) until imported . . by sportsmen amongst the army officials on different occasions. . Want of food . . prevented their material increase . . until the advent of general farming."

Now (1902) seen at Red Lake Falls & latitude of Ottertail.

- p.159 CANADA GROUSE. "Was disappointed in not meeting with it at Mille Lacs. . E. O. Garrison (of Mille Lacs) . . said that from 1865 to 1868 the Spruce Partridge was quite common about the lake. . . Since then, however, they seem to have been exterminated in that locality."

- p.160 RUFFED GROUSE. "less abundant in those portions of the state that are occupied by Canada Grouse" according to F. L. Washburn's "Red River Valley, Thief River, & Mille Lacs Report." (King: look up this report?)

"Buds of ironwood (*Ostrya virginica*) . . constitute almost their exclusive food in winter here."

- p.162 PRAIRIE HEN. "When the white man first came to Minnesota these birds were by no means common. Rev. E. G. Gear . . (Fort Snelling & Fort Ripley) . . stated that prairie hens were seldom seen at first but after (settlement) increased . . from year to year. Blackfoot Grouse (Sharptail) were the dominant grouse . . but were never found on the open uncultivated prairies."

PRAIRIE SHARPTAIL. "Thirty years ago (1870?) distributed over nearly the entire state. . . withdraws before agriculture . . Dr. Coues . . traced the southern lines of distribution . . in 1873." (King: might be cycle evidence in Coues "Birds of the Northwest" pp. 407-419).

WILD TURKEY. "33 years ago (about 1865?) . . not a rare bird in N.W. Iowa & S.W. Minn. . . Seen as late as 1871 in Minn. Now (1891) totally disappeared."

Huntsdale Pennsylvania
July 10 1930

Mr. Adolph Leopold In charge
Game Refuge Investigation
431 Chemistry Building
Madison Wisconsin

Dear Mr. Leopold:

This past week end I was honored by a visit from Mr. Gardiner Bump, Superintendent of the New York State Ruffed Grouse Survey who drove down here to discuss matters pertaining to the Ruffed Grouse situation and to see our birds which we have been holding in very close confinement for nearly two years. This Spring nearly every hen layed and one layed twenty-five eggs in twenty-seven days. A reasonable proportion of the eggs proved fertile and while we did not hatch out so great a number of chicks we did hatch out sufficient to complete our experiments. We are endeavoring to work out a system by which the grouse might be handled and bred as economically as the pheasant. I have reason to believe that these birds might possibly be induced to lay a reasonable number of eggs and have already found a diet on which the chicks can be reared very cheaply. I am also endeavoring to control the various diseases of the birds noted by Dr. Allen. I have in the past twelve years reared grouse from eggs taken in the woods on several occasions, in all not so very many birds, yet enough to convince me that the thing is quite possible. I have a few young birds on hand which have already been exposed to several of the worst diseases of poultry which apparently has not affected them and am planning on giving them the final test when they are eight to ten weeks old by exposing them to some disease of the lungs found by Dr. Allen to be very fatal providing I can get a culture of same from Dr. Allen, personally I am not familiar with it. In the event that they stand this test and pull through I believe we can economically produce grouse in captivity. But this is getting away from my purpose in writing you..

Signed - Geo E. Malamphy
Cornucopia Nature Laboratory
Huntsdale Pennsylvania

Eastalton Illinois
July 14 1930

Mr. Aldo Leopold
421 Chemistry Building (U. W.)
Madison Wisconsin

Dear Mr. Leopold:

Replying to your letter of July 8th, I have approved and forwarded the same to Mr. Comeaux. I expect he will send a copy to the members of the Game Committee.

I am doubtful if very much valuable information will result from this action, but if it does it will be definite progress.

Yours truly,

(Signed) J. M. Olin

Chairman
Committee on Restoration
and protection of Game

J. M. Olin:W

Copy Mr. C. Stewart Comeaux.

July 15, 1930.

Dr. A. O. Gross,
c/o Wisconsin Conservation Dept.,
Madison Wisconsin.

Dear Dr. Gross:

Are there any ruffed grouse at present on Martha's Vineyard? I have come across an early record of artificial plantings of this species made there, and would like to know whether any wild grouse now exist on the island.

Very sincerely,

Aldo Leopold,
In Charge, Game Survey.

My dear Leopold:-

There are ruffed grouse in the wooded western section of the island but whether these birds represent native stock or introduced birds I am unable to say. I have seen several of the birds myself and have been told of others. I have received three birds from the Island which were killed by accident and were examined in connection with our investigation.-----"

Sincerely yours,

Alfred O. Gross.

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD
421 CHEMISTRY BLDG.
MADISON, WISCONSIN

July 25, 1930

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear King:

I have gotten together the very meagre stuff I have as to ruffed grouse on islands and am sending you a copy.

I cannot find the letter from somebody who said there were no grouse on Isle Royale. Did I send it to you? If I remember right, it was from Dice.

Lovejoy is starting to find out about Grand Island, and when I hear from him I will let you know.

If you think this line of inquiry is worth following up you might let me know from time to time where you are getting with it. I would like to say something about it in the chapter on cycles in the North Central Report.

Yours sincerely,

Leopold

ALDO LEOPOLD
In Charge, Game Survey

Incl.

Ruffed Grouse on Islands

<u>Name of Island</u>	<u>State</u>	<u>*Area (sq.mi.)</u>	<u>*Mi. from Shore</u>	<u>Any Grouse?</u>	<u>Remarks</u>
<u>Lake Superior</u>					
Isle Royal	Mich.	125	15	No	(Dice?)
Pie Island	Ont.	20	7		
Edward Island	Ont.	10	3?		
Slate Islands	Ont.	20	28		
Michipicoten	Ont.	50	5		
Caribou	Ont.	4	40		
Isle Parisienne	Ont.	7	9		
Grand Island	Mich.	30	1		
Apostle Islands	Wis.	1-10	1-10		
<u>Lake Michigan</u>					
Mackinac Island	Mich.	10	3		
Beaver Island	Mich.	50	20		
Manitou Island	Mich.	30	8		
Washington Island	Wis.	5	3		None till planted in 1900 (Phillips)
Chambers Island	Wis.	2	6		None now, maybe never. Prairie chicken seen there 1927. Used for fox farming. (Leopold)
Rock Island	Wis.				None now (Grange). Many deer.
<u>Lake Huron</u>					
Bois Blanc	Mich.	50	4		
Drummond	Mich.	100	1		None. Probably spruce hens. (Lovejoy)
Cockburn	Ont.	60	16		
Duck	Ont.	10			
Manitoulin	Ont.	large			
Les Cheneaux	Mich.	10	1		Yes. (Leopold)
<u>Miscellaneous</u>					
Martha's Vineyard	Mass.				Yes (Gross) but apparently absent in 1859, when a plant was made (Shields).

* Very rough. Est. from map.

King:

This is excellent. I didn't know you could write so well. Few "zoologists" can.

I have no suggestions except to split up the paragraph on p 3. at top, to make it clear that the first part is the data on cycles, while the second part is merely check-up stuff to make sure that the decrease was a cycle, and not something else.

Otherwise you may get swamped with more history of fires, lumbering, etc.

I would use the word "data" as little as possible. Call it "history", "dates", etc.

Yrs
AK

PS after publication get me 10 copies for
Game Committee

UNIVERSITY OF MINNESOTA
DEPARTMENT OF AGRICULTURE
UNIVERSITY FARM, ST. PAUL

Bring up
when King
is here.

DIVISION OF ENTOMOLOGY AND ECONOMIC ZOOLOGY

July 29 1930

Return to Leopold

Mr. Aldo Leopold
421 Chemistry Building
University of Wisconsin
Madison Wisconsin

Dear Mr. Leopold:

After a three weeks absence I am back in town and have a dozen or more letters to write. Thanks a lot for the very valuable memos, charts and letters you have sent. I am enclosing a number of them that you have marked return after making such copies as I need. I am also sending back the material that Errington sent and the ten copies of the article on the historical study that you requested. As regards this article - the editor told me it would not be published until August. They, however, published it July 10th and I had no opportunity to make the changes you suggested. I will see that I do not make the same mistakes in any future writing.

Suggestions and data on the historical study have been coming in quite rapidly the past two weeks. The responses from the field men from the various companies have been especially prompt and worthwhile. I am much pleased with the reaction and more than pleased with the prospects.

You, no doubt, have seen Stoddard and Grange since they were here so I will not bother you with a report of our nine days in the field other than to say it was the usual very enjoyable and valuable thing for me, as was also my three days with Dr. Gross and Mr. Schmidt. They were much pleased with the Pine County country.

This week I am writing out a complete program of what I have done and what I intend doing for the next two years. Copies will be sent each member of the committee and to the others concerned. I hope each of you will give me your very frank opinion of the plans for the future.

I am enclosing in this letter a copy of a list of the questions which I think should be answered in the historical work. The list isn't complete, in fact, the first page is given over to a number of species and activities for which I haven't known how to frame the questions. There are no doubt others I have completely overlooked as well as many points I have failed to cover in the ones included in the body of the questionnaire. You, of course, know that I do intend to send this out to be answered. It is intended simply as a guide for my own use in collecting this data. I am sending you, Stoddard and Grange copies. I hope you will each find the time to go over them and please mark them up hideously. I want every suggestion, criticism and comment you can offer and as soon as they are returned I will make up the final copy. You will recognize the whole idea as yours. At least I hope it is near enough to your method to be recognizable. I hope very much that I will sometime have the opportunity to actually be present

AL #2

in the field with you and learn first hand of your methods.

Dr. Riley has just informed me that I will teach the one course in the fall quarter this year with a salary equal to that I now receive from the Fellowship.

As for the trapping of birds, I have in the last three days made arrangements with the two best trappers in this state for cooperation. They are keen about the problem and I am optimistic enough to hope for very definite results by fall.

I will be glad to come to Madison any time you think best and am looking forward to the trip.

Sincerely yours,

Ralph S. King

Ruffed Grouse Investigations

RTK-s
Enc.

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD
421 CHEMISTRY BLDG.
MADISON, WISCONSIN

July 31, 1930

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear King:

I am glad to have your outline and will try to go over it carefully within the next few days.

Your paper has been distributed to the Game Sub-Committee. Don't worry about the editor's mistaken title, etc. (see my letter to the Sub-Committee).

By far the most important news is that the University will pay you for the proposed teaching work. I was about to write advising you by no means to undertake this without pay.

I will be glad to have you come down at almost any time which fits conveniently with your schedule. My suggestion is that while here you actually undertake the compilation of Grange's cycle data obtained from game observers. This will automatically raise a lot of questions which we can then talk over I am sure to our mutual benefit. It is also my suggestion that you and I jointly work up the chapter on cycles at that time.

Let me know as soon as you schedule your trip, so that I can conform my work to it.

With kindest regards,

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

Incl.

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

421 CHEMISTRY BLDG.

MADISON, WISCONSIN

Aug. 1, 1930

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear King:

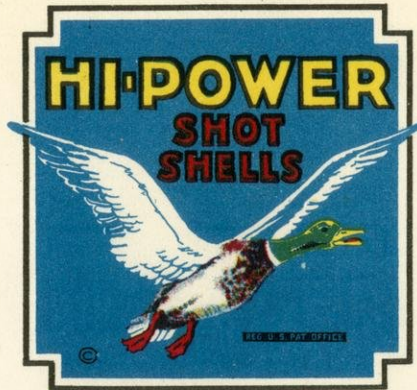
I have now gone over your check list and the suggestions I have are of such a nature that they will be hard to transmit by mail. Let's save them up to talk over during your visit.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD

In Charge, Game Survey



FEDERAL CARTRIDGE CORPORATION

MINNEAPOLIS, U.S.A.

Charles L. Horn, President

*Mr. King
(need not return)*

July 29, 1930.

Mr. Aldo Leopold,
421 Chemistry Bldg.,
Madison, Wisconsin.

My dear Mr. Leopold:

I think you will find Summer
Johnson one of the finest men Mr. King ever talked to.
He is one of a great number of game men left in this
territory.

If there is anything more I
can do for you, I shall be very glad indeed to work with
you and Mr. King.

Yours very truly,

FEDERAL CARTRIDGE CORPORATION

CLH:DW

C. L. Horn
President.

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FRED A. WESTERMAN
FISH & FISHERIES
P. S. LOVEJOY
GAME
L. R. SCHOENMANN
LAND ECONOMIC SURVEY
EDWARD A. HYER
EDUCATION
HOMER S. MURPHY
POLLUTION

*Enter: Then send
King (to keep)*

July 25, 1930

Mr. Aldo Leopold
421 Chemistry Building
Madison, Wisconsin

Dear Sir:

We have just received word from John M. Bush, Land Agent for the Cleveland Cliffs Iron Company, at Negaunee, to the effect that "there are and always have been a few partridge on Grand Island."

I mentioned only ruffed grouse in my letter and so assume that he refers only to this species; and yet you may want to find out whether spruce hen are also present on the island.

Last evening I spent several hours reading part of your Missouri report. It is of course no news to you that Lovejoy and the rest of us agree heartily with your conclusions as to the effect of intensive agriculture on quail (pheasant) increase. I wish that I had more opportunity to discuss these things with you.

Very truly yours

M. D. Pirnie

M. D. Pirnie

Ornithologist
Game Division

MDP:Mc

Copy to Mr. King

Entomological Laboratory
Treesbank, Manitoba
August 2, 1930

Mr. Aldo Leopold
421 Chemistry Bldg.
MADISON, Wis.

Dear Mr. Leopold:

I have received and looked over your wild life charts with a great deal of pleasure and interest. They should be of great value in assisting to obtain a true idea of the causes for wild life fluctuations as well as prove conclusively that such natural fluctuations occur.

I fear I can add little to your information at the present time, but the following high and low years in snowshoe rabbit prevalence as they occurred at Aweme, Manitoba, may be of interest. They are taken from the journals of my father, Percy Criddle, and my own.

Low Years

1896
1899
1909
1918
1928

High Years

1897
1904
1905
1912
1921
1922
1923

I am convinced that much important research remains to be done in checking the causes for wild life fluctuation and that many factors are involved about which we at present know very little.

Yours very truly,

NORMAN CRIDDLE

Aug. 5, 1930

Mr. Norman Criddle
Entomological Laboratory
Treesbank, Manitoba
Canada

Dear Mr. Criddle:

I am indebted to you for the additional information on snowshoe cycles. Probably you realize how exceedingly hard it is to find written records. I take it you have no objection to my entering this record, and also the ones previously sent you, on my charts for publication.

I am able to give this matter of cycles only incidental attention in connection with my work on other game, but at the University of Minnesota my institution finances a fellowship devoted entirely to cycles. This work is being done by Mr. Ralph T. King, Administration Building, University Farm, St. Paul. I know Mr. King would appreciate the privilege of corresponding with you personally. What scientific or conservation meetings are you expecting to attend within the next year where Mr. King and I might have the opportunity of a personal conference?

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

421 CHEMISTRY BLDG.

MADISON, WISCONSIN

Aug 5

Dear King -

I'll be out of town most
of next week, and also will be gone
to Toronto Aug 25-26. I thought I'd
better tell you this in connection
with your trip here.

Yrs
AL

ADDRESS ALL CORRESPONDENCE TO THE COMPANY.

Mr. King

WESTERN CARTRIDGE COMPANY

MANUFACTURERS

WESTERN AMMUNITION



EAST ALTON, ILL.

Aug. 11, 1930

Mr. Aldo Leopold,
421 Chemistry Bldg.,
University of Wisconsin,
Madison, Wisconsin.

Dear Mr. Leopold:

We have reference to Mr. Comeaux's circular communication of July 16th, requesting assistance in obtaining some information on game cycles desired by Mr. King at the University Farm.

We tried a number of the commission houses in St. Louis through the St. Louis Chamber of Commerce and the Missouri Game & Fish Department, but they were unable to help us. We then took up the matter with several of our salesmen, and have to-day the following from our Mr. Perry Hooker, 1935 Lamar, Apartment 11, Memphis, Tennessee:

"The information I have been able to obtain from these houses and from Mr. Walt, a personal friend, of the Martin-Walt Co., who tells me they handled possibly forty per cent of all game shipments coming into Memphis is as follows:

Time of year shipments begun was in October, extending thru to March with the peak of the shipments coming in December and January.

Localities of shipments were from Mississippi, Arkansas and Missouri, with the maximum shipments coming from Mo.

Average amount paid for ducks was \$5.00 and \$2.00 for rabbits, with a commission charged for selling of 5 to 10%.

No shipments were made outside of the state and no game of any kind was handled outside of ducks and rabbits."

Mr. Hooker did not mention in reference to the above as to what the unit for ducks and rabbits was. I have written him for this further information, and when I hear from him I shall again advise you.

Very truly yours;

[Handwritten signature]
Sales Department.

R.F.Riggs/W

August 14, 1930

Mr. R. F. Riggs
Sales Department
Western Cartridge Company
East Alton, Illinois

Dear Mr. Riggs:

Thanks very much for the information on Memphis game shipments.

The only game bird subject to cycles which would be handled through Memphis would be prairie chickens, of which there was an original abundance in parts of Arkansas and Missouri. May I suggest, therefore, that any further investigation by Mr. Hooker concern itself solely with the numbers of prairie chickens, if any were handled?

Thanking you for your excellent cooperation,

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

cc: Stewart Comeaux
J. M. Olin
Ralph T. King

Aug. 11, 1930

Mr. Aldo Leopold,
421 Chemistry Bldg.,
University of Wisconsin,
Madison, Wisconsin.

Dear Mr. Leopold:

We have reference to Mr. Comeaux's circular communication of July 16th, requesting assistance in obtaining some information on game cycles desired by Mr. King at the University Farm.

We tried a number of the commission houses in St. Louis through the St. Louis Chamber of Commerce and the Missouri Game & Fish Department, but they were unable to help us. We then took up the matter with several of our salesmen, and have to-day the following from our Mr. Perry Hooker, 1935 Lamar, Apartment 11, Memphis, Tennessee:

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Mr. Hooker did not mention in reference to the above as to what the unit for ducks and rabbits was. I have written him for this further information, and when I hear from him I shall again advise you.

Very truly yours,

Sales Department.

R.F.Riggs/W

August 12, 1930

Mr. Gardiner Bump
Buffalo Museum of Science
Buffalo, New York

Dear Mr. Bump:

I have read with interest the prospectus of your project published in American Game, and notice that your first move is to determine just what has already been done by various agencies, including myself.

I want to be sure that you have had access to my reports, insofar as they touch upon ruffed grouse. Unless Mr. Avery has furnished them to you I take it that you have not seen them. The ones containing the most material on this species are Wisconsin, Missouri, and Indiana. I do not have extra copies which I can send you outright, but if you have not seen them and will let me know, I will watch for a chance to loan you copies of the states in question.

Has Dr. Allen showed you the June 10, 1930, revision of my cycle charts, copies of which were sent him? Since these are blueprints I can furnish you with a copy for your own use on request.

No doubt you are in touch with Mr. Ralph T. King, Administration Building, University Farm, St. Paul, who is doing the work on our ruffed grouse fellowship.

I am anxious to cooperate toward the success of your project, and wish you would call on me for any service within my power.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

Dictated by Mr. Leopold
but signed in his absence.

August 13 1930

Mr. Aldo Leopold
421 Chemistry Building
University of Wisconsin
Madison Wisconsin

Dear Mr. Leopold:

I am enclosing a copy of the outline of my work and a letter, copies of which were sent to all the individuals noted in the letter.

As for the trip to Madison how would the first week in September suit you? If it is satisfactory to you it would be most convenient for me to come then. Immediately after that I hope to make a trip with Grange into the northern part of the state to be gone about three weeks.

The work on cycles is going fine. I am getting a tremendous amount of data. It is, of course, too early to tell what the gaps will be and how serious they will be, but it is very evident that there is abundant data available. Your suggestion that I undertake the compilation of Grange's cycle data while in Madison suits me fine.

Have just had a good visit with Errington and we are going in the field together tomorrow.

The many things I have to ask you I will postpone until I come to Madison.

Sincerely yours,

RTK-s
Enc.

Ruffed Grouse Investigations.

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF BIOLOGICAL SURVEY
WASHINGTON, D. C.

ADDRESS REPLY TO
CHIEF, BUREAU OF BIOLOGICAL SURVEY
AND REFER TO

King

August 13, 1930

Mr. Aldo Leopold
The Game Survey
421 Chemistry Bldg.
Madison, Wisconsin

Dear Mr. Leopold:

Mr. Stoddard expects to meet his people in New York on the 19th and will know after that whether or not he can go down to Arizona. It is purely a matter of the status of the Quail Report, and we are both very eager that he go if at all possible.

I am making my plans to arrive in Tucson on or about August 25 and am writing Dr. Vorhies and Mr. Gorsuch to the effect that if we can get down together we will do so.

Perhaps you can get in touch with your friend, F. C. W. Pooler, in regard to Mr. Cooperrider (or Cooperwrighter?) on this basis. I expect to be in Washington until leaving for Arizona.

With best regards,

Sincerely,

Wallace B. Davenport

On your memo "Ruffed Grouse on Islands", Chamber's Island is noted to be used for fox farming. I do not recall that this was ever the case. Certainly not now. There are wild red foxes and an occasional coyote on the island, especially in winter. Sorry if this in any way came from me. Overgrazing by deer probably will prevent grouse succeeding on the island in the future.

WBD

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

421 CHEMISTRY BLDG.

MADISON, WISCONSIN

August 15, 1930

Mr. Ralph T. King
Administration Building
University Farm
St. Paul, Minnesota

Dear King:

I will be in the office during the first week in September and will be delighted to see you. I must leave for an Institute meeting September 17, and have a lot of heavy stuff to finish before that, so that early September will be the best time for me also.

I will reserve discussion of your very interesting report until you get here.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

August 19 1930

Mr. Aldo Leopold
421 Chemistry Building
University of Wisconsin
Madison Wisconsin

Dear Mr. Leopold:

I am enclosing the answer to your question about the data of Rev. Gear's arrival at Fort Snelling and some additional information that you may find interesting if you don't already have it. I can find no dates for either Steele's introduction of quail or Steven's observations. Have given what dates I could find.

Stevens came to St. Paul in April, 1849.

Steele filed on a claim near Fort Snelling in 1838. From the text of Steven's book I judge that Steele's introduction of quail falls somewhere between those two dates.

I will arrive in Madison on September 2 unless I notify you to the contrary.

Very sincerely yours,

RTK-s

Ruffed Grouse Investigation.

Rev. Ezekial Gilbert Gear, Chaplain at Fort Snelling, from April 1839 to 1858.

Notes from - Personal Recollections of Minnesota and Its People and Early History of Minneapolis. 1890.

John H. Stevens. Mr. Stevens arrived in St. Paul, April 24, 1849.

P. 14 - "At the time of my first visit to the Falls (St. Anthony) I learned from unquestionable authority that Franklin Steele made the first permanent claim in St. Anthony that was recognized in 1838. At that time he was sutler at Fort Snelling."

P. 49-50 - "Game was plenty in those early times in Minnesota. Indians were plenty too; but some way the more Indians the more game. At the proper season of the year elk, buffalo and bearsteaks, could be obtained at very reasonable rates, while there seemed no end of wild geese and ducks in the fall and spring. Prairie-chickens were abundant but there were few quails. Mr. Steele tried the experiment of introducing quails into the country. He had a large number of them brought up the river in the fall. They were taken out to Morgan's Bluff, some two miles from the Fort and given their liberty. At the same time he deposited wheat, oats, and corn in the immediate vicinity so that they would not suffer for the want of food. The birds seemed to go through the first winter in good condition but in the spring of the second year there were none left; they all perished during the extreme cold winter months. As there was no grain raised in the country it was thought by many that they starved to death; but it was evidently too cold for them. Probably if there had been grain-stacks or fields of cornstalks in the neighborhood for them to winter in - which would have afforded not only protection, but food - the result might have been different. Yet since the country has become so thickly settled and every protection has been afforded them, quails have never become plenty. The Indians claimed they never would become numerous because of the extreme cold."

VROMAN MASON
T. M. PRIESTLEY
RICHARD RYNDERS
ELLIOT N. WALSTEAD

MASON AND PRIESTLEY
ATTORNEYS AND COUNSELORS
609 STATE BANK OF WISCONSIN BLDG.
MADISON, WISCONSIN

Mailing

August 20, 1930.

Mr. Aldo Leopold,
421 Chemistry Bldg.
Madison, Wisconsin.

Dear Mr. Leopold:

I have just returned from my trip to Espanore Island. There are no grouse on the Island, but there have been spruce hens there; however, I did not see any spruce hens either on Drummond or Espanore, but I know they were there.

I made inquiries from an old timer who lives on Drummond and he says there have never been any grouse on Drummond and he knows there have never been any on Espanore. It is a long time since I have seen any grouse, but as far as I can judge Espanore looks as if grouse ought to prosper there. It has about every kind of timber and vegetation that the North woods produces, including pine, spruce, balsam, birch, poplar, ash, cedar, and there are, of course, plenty of different kinds of berries in the open places. There is quite a little lake of perhaps 50 or 60 acres right in the center of the Island which has a little meadow at one end. This lake is quite a curiosity, because it has no inlet or outlet and is apparently a result of seepage from the waters of Lake Huron. I may add that we stocked this lake with black bass several years ago and once in a while you catch some whoppers there. The other day I caught three in one hour averaging over four pounds.

It may be that Howard and I will take a trip up to the Island again sometime and if we do we would like to have you go with us.

Yours very truly,

T. M. Priestley

P:J

King:

Corrections and additions
invited.

Also Leopold

[C Aug 1930]

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

421 CHEMISTRY BLDG.

MADISON, WISCONSIN

Mr. Ralph T. King
Administration Building
University Farm
St. Paul, Minnesota

Dear King:

Here are preliminary photos of ² ~~three~~ quail maps. I would appreciate your giving me a lift insofar as you can without special expenditure of time or making trips, as follows:

(1) Quail Populations. Kindly enter any samples that you know of in Minnesota, and also locations of straggling covies on the boundary of the range. Second-hand information is good enough if you know the observer and have checked to see that he is talking about early fall in a normal recent year. In my dope on covies all were converted at 15 birds each, unless the observer had a more exact count.

(2) Quail History, Range, and Management. I have already written you asking if you can find out from Dr. Roberts as to which date Hatch's observation on quail at Fort Snelling applies. If you can get the approximate date, kindly fill it in.

The Central States Forest Experiment Station at Columbus has just issued a very excellent mimeographed map showing, up to the north boundary of Iowa and Illinois (a) counties in which at least 90% of the land is in farms, (b) counties in which farm woods are stocked with more than one cow per 4 acres.

I would like very much to extend this information into Minnesota and Wisconsin. If you can get an approximation from the dairy department of the University Farm of either (a) or (b) or both for Minnesota, I would appreciate it very much.

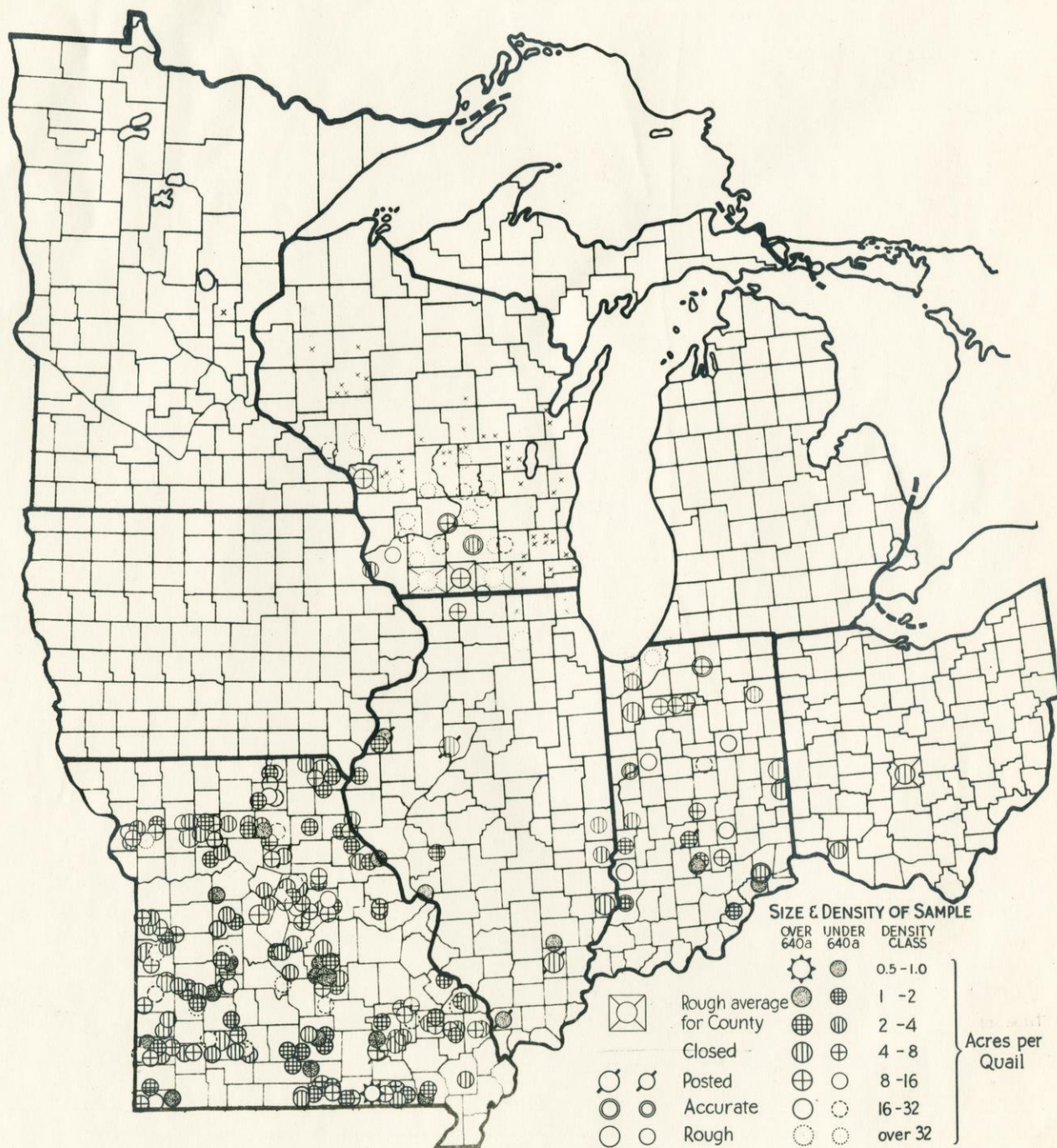
I would also like to have for this map a north boundary for the quail range similar to that entered in Wisconsin. The Wisconsin boundary is of course based on Map C.

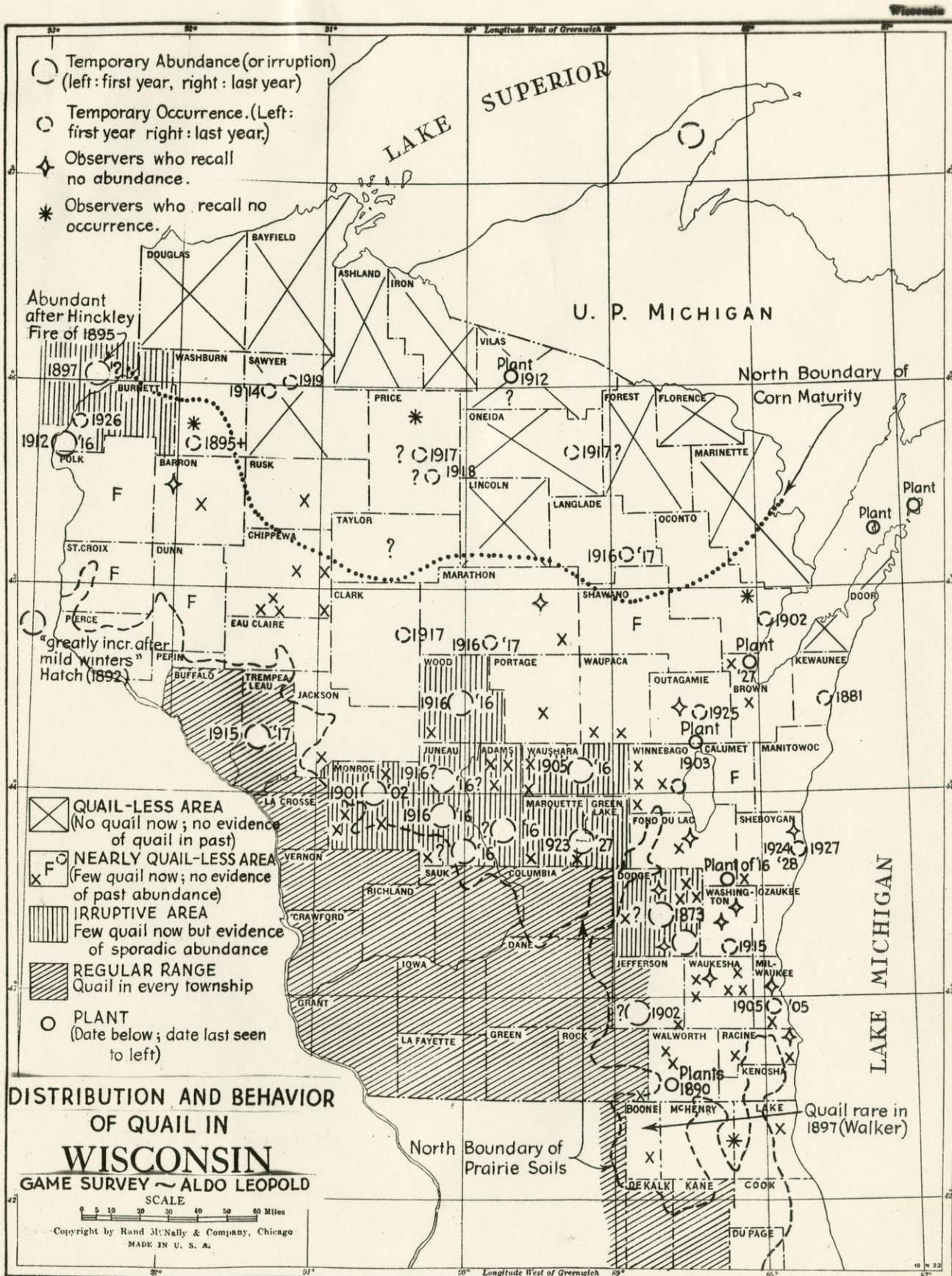
(3) Map C. If you have an particular information on "irruptive" counties other than that already given on Map C, I might enter them on Map B if the information is sufficiently pronounced and important. I would not advise, however, spending any special time on this point.

Yours sincerely,

AL

This map not ready to send you, we can take it up here in Sept.





GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

421 CHEMISTRY BLDG.

MADISON, WISCONSIN

August 21, 1930

*McCullough is
making survey -
ready by Sept 15.*

Mr. Ralph T. King
Administration Building
University Farm
St. Paul, Minnesota

Dear King:

Here is a preliminary photo of my pheasant map. I would appreciate any help you could give me, without undue expenditure of time, in refining my very rough dope for Minnesota.

The particular points on which I would like your help are as follows:

(1) Distribution. I would like to indicate "full" and "scattering" establishments by counties. The weakest part of my classification is in the counties north of St. Paul, with which you are probably quite familiar. Could you re-classify these, as well as any others which look wrong to you?

(2) I am also in doubt about the southeastern counties below St. Paul, not knowing whether to call them "full" or "scattering" establishment. I cannot ask McCullough about this because I do not think he knows the difference.

Could Dr. Surber or anybody else easily available to you suggest any corrections in the map?

If you happen to know of any isolated colonies north of both the scattered and full establishment, I would appreciate your entering them, also any conspicuous failures in the northern territory.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD

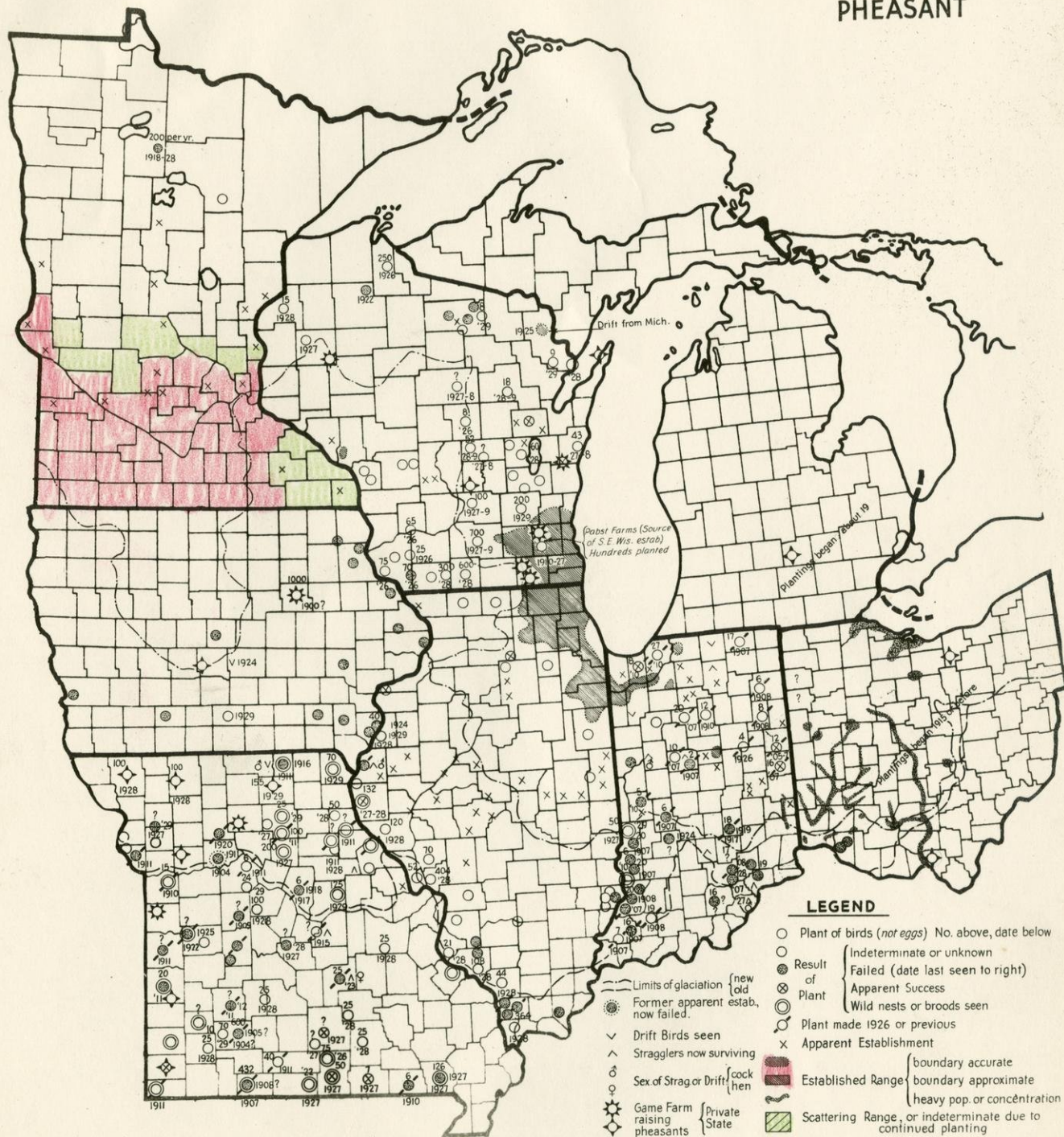
In Charge, Game Survey

Incl.

Bece fastens
with long shield anphidom
No. 12
American Cig Co.

Alden Russin - Sept. 1930-31

PHEASANT



GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE
BY ALDO LEOPOLD
421 CHEMISTRY BLDG.
MADISON, WISCONSIN
August 21, 1930

Mr. Ralph T. King
Administration Bldg.
University Farm
St. Paul, Minnesota

Dear King:

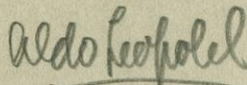
Here is a preliminary photo of the Hungarian map. I would appreciate your looking over the Minnesota dope with special reference to the following points:

(1) Boundary of Established Range on Iowa Line. Dr. Surber or the Museum or somebody else known to you might be able to suggest some corrections. If by any chance any relatively accurate boundary can be laid down, please do so in dots rather than dashes.

(2) Present Status of Plants. My plants are up to 1928 and I do not care particularly to have any more recent ones included on the map, since they would be too new to be conclusive. I would, however, appreciate any additional evidence as to what plants have failed or taken hold. (I do not expect you to get this dope for all of them, but only for such as you can readily get information on.)

(3) Status of Driftless Area. I do not yet know how to classify the result of Dr. James' plantings in the Winona region. If you can make up your mind how to do so, please enter. Possibly one or more counties should be thinly hatched and classified as "indeterminate due to continued planting." So far I have hatched only Winona County.

Yours sincerely,



ALDO LEOPOLD
In Charge, Game Survey

Incl.

HUNGARIAN (OR GRAY) PARTRIDGE

LEGEND

- Plant. Number of birds above, date below
 - Indeterminate or unknown
 - ⊗ Result Failed (date last seen to right)
 - ⊗ Plant Apparent success
 - ⊗ Wildnests or broods seen
- × Apparent establishment
- Established Range
 - boundary accurate
 - boundary approx.
- Indeterminate due to continued recent planting
- Southern limits of New glaciation
- Old
- ∨ Drift birds seen
- ^ Stragglers now surviving but no broods known
- ◆ Game farms attempting to get eggs under wire

Map Annotations:

- No plantings until 1926. 4500 planted 1926-8
- Drift from Minn. Plantings
- From Iowa Drift
- Pabst Farms 5000 planted 1910-29 (Source of S.E. Wis. Establishment and only successful planting before 1929)
- No plantings until 1929 (From Ohio Drift)
- Whole state planted 1915-17
- Scattering Plants 1914-27; No records.
- 10,15000 Planted 1908-9-10
- 5-10,000 planted 1909-12 Details not available except for 1911

○ Plant. Number of birds above, date below
 ○ Indeterminate or unknown
 ⊗ Result of Plant { Failed (date last seen to right)
 ⊗ Apparent success
 ⊗ Wildnests or broods seen

Established Range { boundary accurate
boundary approx.
Indeterminate due to continued
recent planting

1930.

Allen, A. A. - in letter to Aldo Leopold dated Aug. 30, 1930.

"-----With regard to the water requirements of the ruffed grouse and other game birds I find it rather difficult to state exactly what the requirements are, particularly for the ruffed grouse. All of the grouse coverts with which I am familiar have water available within flying distance, but I do know that in captivity, when they have sufficient range and green stuff, they go for days without touching the water in the drinking vessels or apparently missing it after these go dry. At the same time one frequently sees them drinking.

"The young grouse in captivity when given plenty of insects do not get very thirsty, but without them, or without milk curd they do a great deal of drinking.

"It has been my experience that Ring-necked pheasants require more water than grouse, but they do not visit drinking places with any such regularity as the Mourning Doves or the Valley Quail."-----

King:

Corrections and additions invited.

Leopold

*Present Game Research Projects

<u>Institution</u>	<u>Research Worker</u>	<u>Subject</u>	<u>Place</u>	<u>Remarks</u>
Univ. of Arizona	David Gorsuch	Gambel Quail	Tucson, Ariz.	S.A.A.M.I. fellowship
U.S. Biological Survey	O.L. Austin	Snowshoe Rabbit?	St. Paul	} In cooperation with U.S. F.S. McSweeney-McNary Bill
	T. D. Burleigh	?	Asheville	
	S. B. Locke	Mule Deer?	Great Basin Sta.	
Bowdoin College	A. O. Gross	New England Grouse Investigation	Brunswick, Me.	Financed by private contri- butions thru A.G.P.A.
Univ. of California	Joseph Dixon	Nat'l Park Game	Berkeley	Nat'l Park Service
	Joseph Grinnell	Predators	"	Financed by Game Commissi
Cornell University	Gardiner Bump	N.Y. Grouse Investigation	Ithaca	Financed by State Con- servation Commission
U.S. Forest Service	M. Musgrave	Mule Deer	N. Mex.	S.W. Forest Expt. Sta.
Univ. of Michigan	R. E. Yeatter	Hungarian Partridge	Ann Arbor	S.A.A.M.I. fellowship
	H. M. Wight	Refuge Study	" "	Mainly pheasants. Finance by Conservation Dept. & Univ. of Mich.
	Paul Dalke	Pheasant Study	" "	
Mich. Conservation Dept.	Miles D. Pirnie	Waterfowl Food Study, etc.	Lansing	
Ohio Game & Fish Dept.	Lawrence Hicks, Robert McCormick	Hungarian Partridge Distribution Survey	Columbus	Conservation Department in cooperation with Yeatter.
Univ. of Minnesota	R. G. Green	Diseases of grouse & rabbits	St. Paul	Financed in part by State Game Dept.
	R. T. King	Ruffed Grouse	" "	S.A.A.M.I. fellowship

*Canadian projects to be added later

<u>Institution</u>	<u>Research Worker</u>	<u>Subject</u>	<u>Place</u>	<u>Remarks</u>
Pennsylvania Game Commission	Dr. _____ Brueckner Vernon Bailey	Food Habits. Whitetail Deer	Harrisburg Washington, D.C.	Agric. College U.S.B.S.
South Dakota Agric. College	_____ Johnson	Pheasant Food Investigation	Brookings, S.D.	Financed by State Game Commission
Washington Agric. College	J. Paul Miller	Bobwhite Quail & Hungarian Partridge	Pullman, Wash.	?
Wisconsin Con- servation Dept.	A. O. Gross, Franklin Schmidt	Prairie Chicken Investigation	Madison, Wis.	Financed by Conservation Department
Univ. of Wisconsin	Paul L. Errington	Bobwhite Quail	Madison, Wis.	S.A.A.M.I. fellowship

* Present Game Research Projects

<u>Institution</u>	<u>Research Worker</u>	<u>Subject</u>	<u>Place</u>	<u>Remarks</u>
Arizona, Univ. of	David Gorsuch	Gambel Quail	Tucson, Ariz.	S.A.A.M.I. Fellowship
U.S. Bureau of Animal Industry	_____ Cram	Parasites of Grouse & Quail	Washington, D.C.	
U.S. Biological Survey	T. D. Burleigh S. B. Locke O. J. Murie	Snowshoe Rabbit? Ruffed Grouse, W.T. Deer Mule Deer Elk	St. Paul, Minn. Asheville, N.C. Ogden, Utah (at Forest Expt. Sta. Jackson's Hole, Wyo.) In cooperation with U.S.F.S.) McSweeney-McNary Bill)) Southern herd.
Bowdoin College	A. O. Gross	New England Grouse Investigation	Brunswick, Me.	Financed by private contri- butions thru A.G.P.A.
California, Univ. of	Joseph Dixon Joseph Grinnell Paul Shaw	Nat'l Park Game Predators Duck Disease	Berkeley, Cal. " " " "	Nat'l Park Service Financed by Game Commission " "
Cornell University	A. A. Allen Gardiner Bump	Nat'l Grouse Investigation N.Y. Grouse Investigation	Ithaca, N.Y. " "	Financed thru A.G.P.A. Financed by Game Commission
U.S. Forest Service	M. Musgrave	Mule Deer	New Mexico	S. W. Forest Expt. Station
_____	Wm. Rush	Elk	Montana	In coop. with U.S. Park Ser- vice
Mich. Agric. College	Poultry Dept.	Mechanical incubation & nutrition of pheasants	E. Lansing, Mich.	Financed by college?

*Canadian projects to be added later. This list includes only localized projects focused on some particular species or subject.

<u>Institution</u>	<u>Research Worker</u>	<u>Subject</u>	<u>Place</u>	<u>Remarks</u>
Mich. Conservation Dept.	Miles D. Pirnie	Waterfowl Food Study, etc.	Lansing, Mich.	
Michigan, Univ. of	R. E. Yeatter H. M. Wight	Hungarian Partridge Refuge Study	Ann Arbor, Mich. " " "	S.A.A.M.I. Fellowship Mainly pheasants. Financed by Conservation Dept. & Univ. of Michigan.
	Paul Dalke	Pheasant Study	" " "	
Minnesota, Univ. of	R. G. Green	Diseases of grouse & rabbits	Minneapolis, Minn.	Financed in part by State Game Dept. S.A.A.M.I. Fellowship
	R. T. King	Ruffed Grouse	St. Paul, Minn.	
Ohio Game & Fish Department	Lawrence Hicks, Robert McCormick	Hungarian Partridge Distribution Study	Columbus, O.	Conservation Department in cooperation with Yeatter.
Oregon Agric. College	_____	Pheasant food	Corvallis, Ore.	Financed by Game Dept.
Pennsylvania Game Commission	Brueckner Vernon Bailey	Food Habits, Whitetail Deer	Harrisburg, Pa. Washington, D.C.	Agric. College U. S. Biological Survey
South Dakota Agric. College	<u>H. C. Severin</u>	Pheasant Food	Brookings, S.D.	Financed by State Game Commission
Spotted Fever Lab.	_____ Parker	Diseases of Grouse	Hamilton, Mont.	
Washington Agric. College	Arthur Svihla	Hungarian Partridge?	Pullman, Wash.	?
Western Wild Life Protective Assoc.	_____	Duck predators in Alaska	Alaska	Manly S. Harris, 1140 Post St. San Francisco

<u>Institution</u>	<u>Research Worker</u>	<u>Subject</u>	<u>Place</u>	<u>Remarks</u>
Wisconsin Conservation Dept.	A. O. Gross, Franklin Schmidt	Prairie Chicken	Madison, Wis.	Financed by Conservation Dept.
Wisconsin, Univ. of	Paul L. Errington	Bobwhite	Madison, Wis.	S.A.A.M.I. Fellowship

Compiled by Aldo Leopold for use of Dr. A. A. Allen
in calling a conference of North American game research
workers in connection with American Game Conference
December, 1930.

Copies to: Mr. Carlos Avery
Mr. R. T. King ✓

Sept. 9, 1930

Dr. A. A. Allen
Laboratory of Ornithology
Cornell University
Ithaca, N.Y.

Dear Dr. Allen:

I certainly owe you an apology for omitting your project from the tentative list of research projects. I need hardly explain that it was not absent from my mind. It shows on the tentative map that was meant to go with it and probably was on the list originally but got lost in the process of scratching and re-copying. Thank you very much for calling my attention to the matter.

I have added the Spotted Fever Laboratory and the Bureau of Animal Industry in accordance with your suggestion.

I have also added to my table your opinion on water requirements of ruffed grouse, since it agrees with that of all the other observers on grouse as a whole.

Mr. King is preparing a paper on the need for historical studies of cycles which I would recommend be presented either at the proposed research conference or the main Game Conference. It will not be technical and hence will be suitable for the main conference if you and Mr. Avery want it. I am sending Mr. Avery a copy of this letter simply as advance information that King is working on the paper.

I had a very pleasant visit with Mr. Bump at Toronto and formed a high opinion of his attitude and ability. I was also pleased with the painstaking care he took in presenting his findings graphically in order to make them more clear.

With kindest regards,

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

Copy to Mr. King

Sept. 18, 1930

Mr. Joseph P. Knapp
580 Fifth Avenue
New York City, N.Y.

Dear Mr. Knapp:

I appreciate your courtesy in asking me for further suggestions on the Foundation prospectus as now printed.

As you know, I have nothing but enthusiastic praise for your fundamental idea of a big-scale game program, adequately financed through a Foundation. I am more than ever convinced, however, that the prospectus is the wrong way to execute your idea.

My suggestions all boil down to one point: the function of a foundation is to help the country evolve its own system of game production.

The prospectus commits the Foundation to exactly the opposite course; it selects a system without consulting even the proposed staff or the proposed additional Founders, and proposes to use the resources of the Foundation to get it adopted by the country at large.

Possibly it was not the intention of the prospectus to commit the Foundation to any one system. I can assure you, however, that the prospectus is being so interpreted by sportsmen generally. If this was not the intention, then a corrective statement is urgently needed.

It so happens that I am personally opposed to the system of individual game ownership, and of its logical corollaries, open markets and unlimited bags. While I admit that it conserves upland game in Europe, it has the opposite effect on migratory game. Moreover it is open to certain abuses which are important to other conservationists, and should be to sportsmen. As you know, I personally favor commercializing the shooting privilege but not the game, thus getting the advantage of private production incentive, without losing the advantage of state ownership and supervision. However, what I personally favor is beside the point. Even if the prospectus committed the Foundation to my particular "system," I would still consider it a mistake for the Foundation to espouse it to the exclusion of all others.

The Foundation should have only one commitment: to see that any and all promising proposals for the actual practice of game management are promptly brought to the test of experience, regardless of the theory on which they are based. Some proposals which are based on unsound theory will have to be tried along with the rest. This may teach their proponents that the theory is unsound, but your advance opinion, or mine, will never

do so, even if backed by millions of dollars.

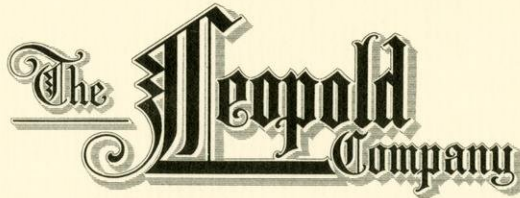
By and large, the country has wasted several decades already debating about conflicting theories, instead of trying some of them out. The Foundation, by its advance commitment to one of them, now threatens to prolong the debate indefinitely, instead of ending it by trying all of them, and letting experience be the umpire.

Let me put the whole thing positively in terms of a Foundation "Platform," instead of negatively in terms of criticism of the prospectus. I would suggest something like this:

- (1) America has the land to raise an abundant game crop, the means to pay for it, and the love of sport to assure that successful production will be rewarded.
- (2) There are many conflicting theories on how to bring the land, the means of payment, and the love of sport into productive relationship with each other. The Foundation does not know which theory is best, but it proposes to devote its resources to bring all promising theories to the test of experience. The public can then choose for itself.
- (3) There are some, but not enough, biological facts available on how to raise game. The Foundation proposes to make available the known facts, to promote research to find the additional facts needed to produce game crops, and to promote training of experts qualified to apply them.
- (4) The Foundation has only one objective: more game; and only one policy: to help evolve ways and means of getting it which will be mutually satisfactory to all three parties at interest, namely the landowner, the sportsman, and the general public.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey



Builders of DESKS and OFFICE FURNITURE

Mail King

September 18, 1930.

Mr. Aldo Leopold
2222 Van Hise Avenue
Madison, Wisconsin

Dear Aldo:

Edith and the family and I just got back a few days ago spending ten days with Marie at the Club. It is still a nice place even if it is over-decorated. In September it is sufficiently deserted to enable you to get around a little without bumping into everybody.

We went over to Mackinac Island for a day with the youngsters. We took one of the conventional drives to show the children around. Our driver was a young lad who lives across the straits a few miles and I asked him a few questions about ruffed grouse.

He has been working on the Island for the summer during the past six or eight years. During that time he says he has not seen any grouse around Mackinac Island. He says that he thinks the reason is that the Island contains no suitable winter cover such as Cedar swamps.

He said that he knew definitely that there are lots of grouse on Round Island and Bois Blanc. Perhaps these islands are not far enough out to be of any value to you on the investigation that you are working on.

In general the Northern Peninsula is still short on grouse but some of the natives say that there is a little better stock this year than last year.

Are you making arrangements to come to Burlington in October for some duck shooting? We hope you can bring Starker or Luna along.

Yours,

FL:R.

BURLINGTON, IOWA

W. H. H. H.

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

421 CHEMISTRY BLDG.

MADISON, WISCONSIN

Sept. 30, 1930

Mr. Ralph T. King
Administration Building
University Farm
St. Paul, Minnesota

Dear King:

I have been writing the chapters on cycles and cyclic species. In order to dovetail this material with our joint article, I have elaborated the article somewhat and am sending you herewith a revised copy.

I am still a little puzzled as to the extent, if any, to which the article should cite evidence. I will leave this matter in your hands. I have no objection to your including the evidence which you have and also the evidence which I have. On the other hand, there is no necessity of including it, since I have my two publications to put out my accumulation and you have your prospective bulletin to include yours. It would not particularly change the structure of the article, but rather only its length.

As soon as you have done any filling in I would be interested to see it from time to time.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

Oct. 2, 1930

Dr. Frederic E. Clements
% Outdoor America
549 West Randolph St.
Chicago, Illinois

Dear Dr. Clements:

I was much interested in your article, "The Seven Lean Years," in Outdoor America for October.

I have been working, and am about to go to press, on the cycle in game birds.

Your evident acceptance of the sunspot theory leads me to ask where I can get in touch with the latest correlations between meteorological data, botanical data, and zoological data.

I know in general about Douglas' work in Arizona, Huntington's work in California, and the work of some of the Canadian ornithologists. If you have them in mind, I would appreciate your listing what you consider the most significant papers in the various fields, so that I can get in touch with them, including papers by the above authors.

In the event you would like to look over my game cycle stuff, I will shortly have it in available form.

I might add that I was in touch with the general nature of the range management work through my former connection with the Forest Service in the Southwest, so that brief answers to the above questions will be entirely understandable.

I would like this information not only for my own use, but for the use of the fellowship on game cycles which my outfit maintains at the University of Minnesota.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD
421 CHEMISTRY BLDG.
MADISON, WISCONSIN

Oct. 14, 1930

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear King:

The attached letter is self-explanatory.

I do not think it wise for you to ~~go~~ to see Mr. Horn right now, since that would look like a studied effort to sell him.

I am not worried about this situation, but the instance should remind us that we have to keep our feet on the ground if we are going to successfully maintain support for the kind of a research program we believe in. This historical study should by all means be carried through, but we should be careful to chop it off at the right time and place and to know where we are going next. Where all this is I of course gladly leave to you and Grange, to whom I am sending a copy of this letter.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

Copies to Messrs. E. C. Dill
C. L. Horn
R. T. King ✓
W. B. Grange

Oct. 14, 1930

Mr. John M. Olin
Western Cartridge Company
East Alton, Illinois

Dear Mr. Olin:

I have had correspondence with Mr. Horn of Minneapolis, in which he makes it clear that (1) he considers the historical investigation of game cycles, on which the Minnesota fellowship is temporarily engaged, as a waste of time, and (2) he considers taking the fellows to the next game conference at official expense as unjustified.

I do not think that the Game Committee can afford to allow Mr. Horn's opinions on these matters to go unacted upon. Either he should persuade the Committee or the Committee should persuade him that one or the other is wrong.

I therefore that the Game Committee or, if necessary, the Executive Committee urge Mr. Horn to attend the next meeting and to discuss these questions in confidential session. At the same time the Game Committee should urge any other companies who believe that error is being made in the present research policy to have representatives present competent to thresh out this question.

I want to say that I feel indebted to Mr. Horn for coming out clearly and explicitly with his doubts. It is always possible that he is right, and I urgently request that you provide an opportunity for him to be heard. I am sending him a copy of this letter.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

Copies to Messrs. Olin
Grange
King ✓

Oct. 8, 1930

Dr. W. A. Riley
University Farm
St. Paul, Minnesota

Dear Dr. Riley:

This is to confirm our long distance telephone conversation in which you called attention to the provision in the fellowship contract that King is to give at least 85% of his time to the fellowship, whereas his proposed teaching schedule will consume 20%.

In my opinion the development of the University's conservation activities is more important than the 5% infringement on King's time. I therefore approve the proposed teaching schedule on a trial basis.

I of course would be disappointed if it should materially slow up progress in his field studies, but I anticipate that this will not be the case, and I think that you do.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

421 CHEMISTRY BLDG.

MADISON, WISCONSIN

Nov. 5, 1930

Regent

Mr. R. T. King
Administration Building
University Farm
St. Paul, Minnesota

Dear King:

This is formal notice of the intention of the
Institute to add \$100 to the remittance due on January 1
in the hope that this will make it possible for the Univer-
sity to authorize your expenses to the Game Conference.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

P.S. How are you? Any luck on that pheasant dope?

Copies to Messrs. Davis
Waller
Olin
Grange
King ✓

Nov. 11, 1930

Mr. Alva Clapp
State Game Warden
Pratt, Kansas

Dear Mr. Clapp:

Henry Davis has asked me to write you what, in my opinion, could be accomplished by a prairie chicken investigation in Kansas; also what other game research projects in other states are attempting to accomplish.

I could write two pretty good-sized volumes in filling Henry's order. I know, however, that you do not want me to do that even if I had time. Our best bet is to talk the thing over at the Game Conference. Meanwhile I will attempt only a very brief and incomplete outline of my thoughts. I will make this outline as if I were conducting the investigation.

The first thing I would do would be to gather as complete a history as possible of the ups and downs of Kansas chickens. I would then compare this history with weather records, shooting records, disease records, records of agricultural developments, including cover changes, and anything else that might yield a clue as to the causes of the ups and downs.

As a practical man, you may think it foolish to spend time and money on spilled milk. It happens, however, that in those species subject to cycles it is the quickest way to determine causes. This historical method may not absolutely prove what is the cause, but it will eliminate a lot of possible causes, and it will boil the problem down to two or three things.

Now comes the second move, the deliberate manipulation of the indicated causes on a definite tract of land to see what effects are produced. Suppose, for instance, that the historical study should show that the chickens have declined in proportion to the amount of a certain kind of cover remaining. The second move would then consist in taking a piece of land and deliberately increasing this kind of cover and finding out whether we get a response in chickens.

While these two first moves are going on, the investigation should also make a continuous study of food, cover, predators, diseases,

mechanical accidents, and other sources of mortality. This, too, is merely another process of elimination, trying to get down to the thing that determines the chicken crop.

Nobody can predict in advance in just what direction the investigation would ultimately have to go. It is a case of feel your way.

This may not sound very convincing, but if you will give me another chance when I see you personally, I am sure we can have a meeting of minds.

Henry Davis suggests the matter of the Institute making at least a small contribution to the proposed prairie chicken study. If we had any money available, I would consider this very seriously. As it is, however, all of our available research money is allotted and there is no present prospects.

Why don't you see John C. Huntington while you are in New York and find out whether the newly organized Knapp Foundation, which is to be financed on a large scale, can give your project a lift?

Yoursincerely,

ALDO LEOPOLD
In Charge, Game Survey

MEMORANDUM of conversation with Dr. J. M. Rasek, Game Expert and Entomologist in the Moravian Research Institute for Plant Pathology, Brno, Cerna Pole 201, Czechoslovakia.

Dr. Rasek was introduced to me by Mr. C. L. Horn of the Federal Cartridge Company, Minneapolis. Dr. Rasek during the past year has held a research fellowship in entomology at the University of Minnesota, and is now lecturing at Minnesota, Ames, Ohio, and Cornell. The following notes are taken from memory of his descriptions of game conditions in Czechoslovakia.

Game Populations. Gray partridge attains maximum densities of 8-10 birds per hectare (2 1/2 acres), or 4 per acre. Pheasants attain maximum densities of 2-3 per hectare, or 1 per acre, and this may occur on the same ground as supports a partridge population. In addition, 1 hare per hectare may occur.

Up to 80% per year of the partridge crop is safely killed, but pheasants do not stand quite so heavy a kill.

Artificial propagation is not practiced, except to a minor extent on pheasants.

The annual mobility of a partridge is estimated to lie within 5 hectares or 12 acres. The pheasant is regarded as less mobile than this.

The fluctuation between years is usually under 15% for partridge, except following exceptional winters or breeding seasons, when a greater fluctuation may occur. Pheasants and hares show the same small fluctuation, and there is no consciousness ^{in game men} of heavy periodical fluctuation or cycle even in the hare.

The foregoing characteristics of populations are not defined in these terms in Czechoslovakia. There game management is so old and so habitual

that everybody knows the character of game populations without the necessity of having generalized scientific names for these characters.

In Czechoslovakia no attention is paid to inbreeding. Partridges eggs are not traded as in England, and it is not considered necessary to constantly introduce new blood. ^{most} ~~X~~predators ^{if not too numerous,} are regarded as having a beneficial selective effect in carrying off diseased individuals.

Environmental Controls. The very heavy game crops above described are attained not by artificial propagation but by environmental controls. Winter snowfalls run up to two feet on the ground at one time, so that the problem of environment is very similar to that of ^{our} ~~the~~ northern states. Agriculture is extremely intensive, but heavy populations of game are nevertheless attained by the artificial modification of the environment. Almost all crops, for instance, are not only taken into the barn in fall, but the ground is plowed so there is not winter cover except in the fencerows and on waste land. On these waste places are planted artificial coverts, or remises. The size and composition of each remise is carefully adapted to the needs of each particular tract. Thus there are remises for combined service to insectivorous birds and partridge, remises for combined service to partridge, pheasant, and hare, and still other remises for big game animals.

A partridge remise is usually under 1/4 acre, and consists of an exterior hedge of rose within which are planted spruce, beech, crabapple, and seed-bearing grasses in various combinations. All the trees are treated to enhance their service to game. Thus the spruce are topped to make them spread close to the ground, and the crabapples are topped to produce forks suitable for song bird nests. Bird boxes are freely used in all remises to give song birds service. The thick cover afforded by a remise makes it unnecessary to closely control hawks and owls, and the more beneficial species

of hawks and owls are now being deliberately placed on the protected list. The remise likewise forms a convenient place for the trapping of injurious mammals. All species, including partridge, resort to coniferous remises during severe weather, and pheasants habitually roost off the ground in the limbs of the coniferous trees.

Winter feeding is systematically practiced and is the rule in pheasants. Partridges do not need it except during severe snows. Feeding stations for song birds are also widely used, and a particular method of feeding is used for each species.

Discussion. The most astonishing part of the foregoing description is the dense populations and the absence of cycles, even in rabbits. Even if 4 partridges per acre is somewhat high, the indications are that the saturation point of approximately 1 bird per acre, which holds in England and in the United States, is considerably exceeded in Czechoslovakia. At the same time there is an indication that both partridges and pheasants are less mobile and more resistant to heavy killing and hard winters. I cannot avoid the conjecture that there is some inter-relation between these facts.

It should be remembered that England is probably an acquired range for the gray partridge, as it certainly is for the pheasant. If we may judge by analogy with the prairie chicken and other American species, we would look for a greater tendency toward cyclic fluctuation on the acquired range, but a lesser inclination to adhere to a saturation point. As a matter of fact, we find the tendency toward cycles, but not the other tendency. I am assuming, of course, that Czechoslovakia is approximately in the geographic centre or optimum of the indigenous partridge range, and at least closer to the home of the pheasant than either England or America. The density of gallinaceous populations is especially surprising in con-

junction with the notable lack of fluctuation. It would be easy to see how management could build up a very dense population, but to have that population so free of disease is surprising.

It is also interesting that the natural methods of Czechoslovakia should produce denser populations than the semi-artificial methods in England, although of course it is not surprising that they would be denser than ^{ours.} ~~in the absence of any method characteristic of America.~~

No true grouse are found in Czechoslovakia except the auerhahn, which is a rare species found only on one royal forest. Dr. Rasek did not know its characteristics.

Dr. Rasek is an expert on the filtrable virus diseases of insects, and states that population cycles are a distinct characteristic associated with virus diseases. This leads to the thought that our cycle studies should be brought into contact not only with parasitologists and bacteriologists, but also with the specialists in virus diseases, of which there are only two or three in this country, according to Dr. Rasek. He mentioned Glazer of Princeton and Rivers of the Rockefeller Foundation.

Copies to Messrs Olin
Grange
King ✓
Yeatter

Nov. 19, 1930

Mr. Charles L. Horn, President
Federal Cartridge Company
Minneapolis, Minnesota

Dear Mr. Horn:

I have deferred writing you about Dr. Rasek until the completion of his visit because I wanted to have the entire contact with him in my mind before expressing an opinion of him.

My opinion of him is extremely favorable, and I fully share your judgment that there must be some way to utilize his experience and viewpoint for the betterment of American game conditions.

I have amplified a little bit on your request that he write an article for publication in an American periodical. I have asked him to write two articles, one on the characteristics of game bird populations in Czecho-Slovakia, and another on environmental controls as practiced in that country for the benefit of game and song birds. He has assured me that he will do this, and I have assured him that I will get them published in American Game or some other suitable magazine. I have urged him to illustrate them profusely. I think that the Institute or the new Foundation could well afford to offer him in advance some stipend for these papers in order to make him feel more free to give them his time and attention.

We have not borrowed from European experience in game management because the papers written in English and published in this country have had as their authors game keepers, estate owners, or other persons without biological training, who are accordingly unable to interpret the reasons for European practice, but only its results. Without the reasons it is hard to transplant new technique to any country. If we can get people like Rasek to interpret European experience for us, their articles will be much more useful, not only to scientists, but to skilled game men of all kinds.

Eventually I think that American organizations should finance a systematic gathering together of European experience for American application, but before spending actual money on this the authors will have to look at American conditions first in order that they may judge what is of interest to us. If we can get a man like Rasek started by writing several papers, I think that this larger development will follow later on

in some way or other.

Everything taken together, I am distinctly indebted to you for bringing me into contact with Dr. Rasek. He is not only a good game man and a good biologist, but a very agreeable gentleman, and it has been a great pleasure for me to show him around.

I am returning his paper on game bird foods. No doubt you understand that this is only a fragment of the actual work he has done, since he did not have his complete notes with him.

I would like to talk with you at length about all the questions raised in this letter. This reminds me of my previous request that you attend the forthcoming meeting of the Institute in order that our different opinions about the subject matter of the Minnesota fellowship may be fully and freely discussed before the Game Committee as a whole. Can you not make it a point to attend this meeting?

If this is not possible for you, I shall take the earliest opportunity of calling on you at Minneapolis for a discussion.

I have made a summary from memory of some of the points gleaned from Dr. Rasek and inclose a copy.

Thanking you for your interest in the game work,

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

Nov. 20, 1930

Mr. C. Stewart Comeaux
Sporting Arms & Ammunition Mfgs. Institute
103 Park Avenue
New York, N. Y.

Dear Mr. Comeaux:

It occurs to me that I have been remiss in not furnishing to the holders of our fellowships a list of the firms which are members of the Institute. The fellows are traveling a good deal, some of them more and more widely, and it is always possible that they may inadvertently omit to call upon members of the Institute through not knowing who those members are and where they are located. Will you kindly furnish to each of the following a list which in your judgment is suitable for this purpose?

Paul L. Errington, Biology Building, Madison, Wisconsin
Ralph T. King, University Farm, St. Paul, Minnesota
R. E. Yeatter, School of Forestry & Conservation, Ann Arbor,
Michigan
David M. Gorsuch, College of Agriculture, University of
Arizona, Tucson, Arizona

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

Copies to Messrs. Olin
Errington
King ✓
Yeatter
Gorsuch

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD
421 CHEMISTRY BLDG.
MADISON, WISCONSIN

Nov. 24, 1930

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear King:

Your note was the first word I had received about your being sick. I am extremely sorry to hear this and am anxious to talk things over with you. Do not go to New York unless your doctor says O.K.

Yours in haste,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE
BY ALDO LEOPOLD
421 CHEMISTRY BLDG.
MADISON, WISCONSIN

Dec. 4, 1930

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear King:

Mr. Comeaux has informed me that he received a wire direct from Mr. Griswold, the Comptroller of the University, to the effect that the fellowship fund was exhausted and requesting that the January 1 payment be advanced.

No doubt Mr. Griswold took this action on his own initiative. Ordinarily I would prefer that these matters be taken up far enough in advance to come through me, since Mr. Comeaux is not responsible for the administration of the fellowships and ordinarily looks to me to O.K. adjustments of this sort. Under the circumstances, however, he made the remittance, including the \$100 due for your New York trip, making a total of \$1,600.

At your convenience I wish you would take up with Dr. Riley whether it would be agreeable to the University to place the whole fellowship on a project basis, that is, the Institute would remit \$3,000 per year and the University to take the responsibility of so spending the funds or adding to them as to carry out the project. Michigan was organized on this basis from the outset, and I think it is more satisfactory for both parties. I will take this up formally later, probably during a personal visit.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

Dictated by Mr. Leopold
but signed in his absence.

December 12 1930

Mr. Aldo Leopold
421 Chemistry Building
University of Wisconsin
Madison Wisconsin

Dear Mr. Leopold:

The trip to New York was most certainly worthwhile to me. Aside from the general good that one derives from listening to the various papers and discussions there is a particular benefit in discussing mutual problems with those people working along the same lines. After leaving New York I spent three days in Washington and two in Ann Arbor. In each of the three places I cleared up a number of difficult points and got new ideas I can apply in my work here, besides making very interesting and pleasant contacts with men I have wanted to meet.

There are no developments to report. I wonder if it is possible to obtain a few copies of the Game Policy for distribution among interested individuals. I was very glad to learn you had sent Dr. Riley and Dean Coffey copies. In talking about the policy with heads of interested departments in this and other institutions they have all expressed a desire to have a copy for reference. I do not know how to get such copies or what your plans regarding its distribution are but could place several where they will do good if they are available. I am discussing the policy in the regular meeting of our Entomology and Economic Zoology Club next monday.

Will write you more fully about other things very soon. With very best wishes to you and Mrs. Leopold, I am

Sincerely yours,

RTK-s

Ruffed Grouse Investigations.

DEPARTMENT OF GENETICS

L. J. COLE

R. A. BRINK

THE UNIVERSITY OF WISCONSIN

COLLEGE OF AGRICULTURE

MADISON

H. L. RUSSELL, DEAN AND DIRECTOR

Cycle Chart

December 19, 1930

Mr. King - Please return

Mr. Aldo Leopold,
Chemistry Bldg.


Dear Mr. Leopold:

In connection with your studies of periodicity, it occurs to me you may be interested in the following conclusion in a paper by Gillespie on "Behavior and local distribution of tufted Titmice in winter and spring" published in the July 1930 (Vol. I, No. 3) number of Bird-Banding. Your primary interest is, I know, in game birds but I suspect you are interested in indications of periodicity of abundance in birds and mammals in general.

The paragraph referred to, which is on page 126 of the paper, is as follows:

"Banding data and field observations correspond rather consistently to indicate the presence or absence of Titmice. The results of twelve years' observations show a tendency toward alternate years of presence and absence about the banding station or near vicinity; and a peak of population density every four years, followed by a scarcity of numbers."

Sincerely,



L. J. Cole
Professor of Genetics

Dictated December 18

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE
BY ALDO LEOPOLD
421 CHEMISTRY BLDG.
MADISON, WISCONSIN

Dec. 22, 1930

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear King:

Dr. Cole has called my attention to a very interesting conclusion on fluctuation in titmice in the July, 1930, number of "Bird-Banding." I had missed this.

If it is true that there are cycles of varying lengths in various other species, then I would think it tends to exclude the solar radiation theory of causation for cycles in general. From this angle cycles in small birds might have an important bearing on your project.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD
421 CHEMISTRY BLDG.
MADISON, WISCONSIN

Dec. 23, 1930

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear King:

I wonder if you could find for me, for use in the bibliography of my north central report, the proper citation for Dr. Green's paper in some medical journal, I think in 1929, describing his finding a case of tularemia in wild quail near St. Paul. If you can get hold of a reprint of the article, I would like it for my files.

Due to Dr. Green's illness I am not writing him direct about this.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD
421 CHEMISTRY BLDG.
MADISON, WISCONSIN

Jan. 5, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear King:

I have just read "Animal Ecology and Evolution" by Charles Elton, and am so much impressed with it, and so anxious that you have ready and complete access to it, that I am sending you a copy with my personal best wishes for the holiday season.

Professor Chapman told me two years ago that I ought to read this, but I did not get around to it until now. If I had read it sooner I think it would have considerably modified my thinking on game questions.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

Copy to Mr. King

Jan. 5, 1931

Ans. Jan. 7

Mr. Charles L. Horn, President
Federal Cartridge Corporation
Minneapolis, Minnesota

Dear Mr. Horn:

I have promised to attend the Minnesota Sportsman's Association meeting on January 23, and hope to call on you either before or after the meeting. I will be in the neighborhood of St. Paul for probably four or five days.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

January 7, 1931.

Mr. Aldo Leopold
421 Chemistry Building
University of Wisconsin
Madison, Wisconsin

Dear Mr. Leopold:

I have just received your note stating that you would be in St. Paul for four or five days around January 23rd. It will be fine to have another opportunity to talk things over with you and to show you the results of the winter feeding and the work on cycles.

I know how busy you are and no doubt your time will be well taken up with things you want to get done here but I am writing to ask a tremendous favor of you. Dr. Riley wants to plan a dinner meeting while you are here with you as guest speaker. We all hope that your plans will permit the inclusion of this extra work. The group at the dinner will include the faculty and graduate students from our own department, from Forestry and from the Lake States Station, and any others interested. You will have an opportunity to meet your many friends on the campus and I assure the entire group is interested in what you have to say. Incidentally, we will endeavor to have several deans and the heads of various departments there. The choice of subject we will leave entirely to you. You will recall we talked about this last summer and you know better than we do what should be said.

Friday, the 23rd, will be taken up with the Game League meeting and Saturday and Sunday, the 24th and 25th, would not do for a campus meeting. Any day previous to or following those dates will be satisfactory with us if you can arrange to do this. We would meet at 5:45 or 6:00 and your talk would come after the dinner. You could get away by 8:30, I believe, if it were necessary.

I will reserve discussion of my work until I see you. Hoping to hear favorably from you soon and with best regards to you and Mrs. Leopold, I am

Sincerely yours,

RTK-b
P.S. Mailing copy Green's paper on Quail and Tularemia today.

Ruffed Grouse Investigations.

Copies to Grange
King ✓

421 Chemistry Building
Madison, Wisconsin
January 9, 1931

Mr. Gardiner Bump
Conservation Department
Albany, New York

Dear Mr. Bump:

Summer is the busiest season for all our fellows. Accordingly I think there would be very small chance of their temporarily shifting to a summer survey.

I have, however, gathered a number of names of men who wish to become game research men and who are looking for openings. Your summer survey would be an admirable way to try them out and at the same time enable you to get more than ordinarily interested personnel. The names I have on file are on the sheet attached.

The revised cycle charts will reach you within a few weeks.

With best wishes,

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

421 Chemistry Building
Madison, Wisconsin
January 9, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

My friend, Bill Schorger, is writing a paper on the original distribution of the wild turkey in the Lake States. If you have come across any references in your readings which you think would serve his purpose, I would greatly appreciate your sending them to him and also keeping a lookout for additional references. His address is 2021 Kendall Avenue, Madison.

The original distribution in southern Minnesota is particularly puzzling, although that in Wisconsin and Michigan is, as a result of his researches, fairly well cleared up.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

421 Chemistry Building
Madison, Wisconsin
January 15, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear King:

I will be glad to address the faculty meeting
and suggest the subject, "The Role of Universities in the *Game*
Conservation Movement."

As to dates, I would prefer the 26th or 27th.
I cannot get there much before the 23rd.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

421 Chemistry Building
Madison, Wisconsin
January 20, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I cannot get away from here until Thursday night and will have to sit in on the Minnesota Game Protective Association meeting Friday at least until my speech is over. Possibly you will be taking in this meeting on your own account, hence I hope to see you at the meeting place at the Ryan Hotel Friday morning.

I am bringing with me Mr. John Ball of the Du Pont Company, who is on assignment in my office for training purposes and who will be interested in our game management discussions.

I hope to spend the greater part of the following week going over things with you.

Yours sincerely,

Aldo Leopold
x

ALDO LEOPOLD
In Charge, Game Survey

421 Chemistry Bldg.
Madison, Wisconsin
January 28, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I came down with Mr. Horn on the train, with the result that my liking for him and his views is further enhanced, and I have confidence that you and he will feel the same way about each other once you get acquainted.

I would suggest your calling him up in the near future and having a frank talk with him. I would not bring up the Rasek matter. I would suggest giving him a copy of your paper, since he asked me for it, and also specifically asking him for a manuscript book on early Minnesota birds by some old timer whose name I have forgotten but who is a friend of his. You can borrow this, and I judge it will contain useful information for your history study.

One of my most pleasant discoveries is that Mr. Horn's interest in game does not at all stop at the commercial aspect. He is even more interested in song birds, in the ethics of shooting, and all that sort of thing, than he is in shootable game.

I have dismissed this whole difficulty from my mind with the assurance that you and he will rapidly come to a mutually profitable understanding.

Yours as ever,

Aldo Leopold

P. S. Will you please give me Mr. Swanson's initials and address?

A.L.

Jan. 30, 1931

Aldo Leopold

REPORT ON MINNESOTA FELLOWSHIP

I spent January 23 to 27 inspecting the Minnesota fellowship.

History of Cycles. Six months ago the subject matter of the Minnesota fellowship was, by mutual consent, narrowed down, with primary present emphasis on a study of the history of game cycles in Minnesota and the immediately adjacent states.

Since July 1 King has collected and arranged in a special index file 3,500 observations from the literature bearing on the status of grouse and rabbits in this region. He has covered the period 1870-1886.

Most of these references were obtained from periodicals. Railroad shipments and books of game dealers have been tried, but so far without any particular success.

The material gathered is in my opinion of excellent quality and represents a very satisfactory accomplishment for the time spent on it.

The prospective utility of the historical study has been questioned. It may therefore be well to repeat that only a limited period is to be devoted to it, and that it was, and is, considered by me to be a necessary foundation for the work of the five other men now studying grouse in this country. Just what clues it will yield cannot of course be ascertained until the work of compilation and analysis is completed.

I stand by my original opinion that the historical study was the strategic first move for the Minnesota work.

Course in Game Management. The University, with the consent of the Institute, asked King to give a course entitled "Field Methods in

Vertebrate Zoology" during the fall quarter. This fell through at the last moment due to a fiscal technicality.

In place of it King is giving, during the winter term, a course entitled "Economic Vertebrate Zoology" consisting of three lectures per week from January 5 to March 18. In spite of the fact that this course is elective, and in spite of the absence of any formal announcement in last fall's curriculum, 23 students are enrolled, 6 of whom are graduates auditing the course without graduate credit. This very satisfactory response, and the hearty interest shown by the students, has given rise to the suggestion that the course be given the status of a graduate seminar next year.

The course is virtually an orientation course in game management for juniors and seniors in forestry and agriculture. Several of the students, however, wish to take up game as a profession.

Next year the course will be given in the field as first intended, instead of indoors.

The prompt success of this venture must be principally attributed to King's effective work both among students and faculty.

General Status of Game Work. Dr. Green has turned over a great deal of new ground in his study of tularemia, and is now considering joining with King in a request for financial help from the State Conservation Department.

I gave a lecture on game research, which was arranged by King, and which was attended by 75 members of the faculty and graduate schools. There is an unmistakable increase of interest in the university's conservation program. At least a part of this must be ascribed to the contacts developed by King through the fellowship.

Summary of Plans. Based on the accomplishments to date and the possible rates of performance learned through experience, King estimates that by July 1, 1932, the fellowship will have completed the following jobs:

1. Collection and complete examination of 100 grouse scattered throughout the year, including both young and old birds, their food, parasites, bacteria, weights, etc. (40 birds have been thus handled so far.)
2. Historical study completed and compiled. (This will be King's thesis for his Ph.D. degree.)
3. Three seasons' experience in developing shelters and feeding methods.
4. Six types of traps and three types of snares developed and tested as a means of taking birds for banding or other purposes.
5. Two years of complete history of all factors on the special experimental area, including the following of broods in fenced inclosures for two seasons.
6. Development of a variety of census methods suitable to the species.

Aldo Leopold

February 6, 1931.

Mr. Aldo Leopold
421 Chemistry Building
University of Wisconsin
Madison, Wisconsin

Dear Mr. Leopold:

I was very pleased to get your report of your visit with Mr. Horn. I will write him for an appointment in the near future (as soon as mid-quarter exams are out of the way). I am confident that any apparent misunderstanding will be easily cleared up.

I am also more than pleased with your report on the fellowship here. You will be glad to know that arrangements have already been made for the various game wardens to collect such specimens as I request and furnish such data as is needed for the carrying on of the work of examination of specimens. This will save me at least five days a month in the field, and will also react to interest more individuals in the work and in the collection of data.

I have just received today your copy of the "Reports on Conferences on Cycles". Should you ever run across a copy of this report for sale please let me know, I want it for my own library. (I'll return yours, however.)

I am returning to you today the two books on archery. Thanks a lot for their use, we both enjoyed them, and I am sorry I have kept them so long.

I am sending Mr. Noyes the letters you forwarded to me after making copies for my own files.

The mimeographed copy of the "Game Survey" is proving a mighty big help in my course.

I will have the paper on "Cycles" and the "Progress Report" ready soon and will send them on to you. There have been 146 references added to the "Historical Study" since you were here.

Swanson's first name is Gustave, - his address is 3305 47th Avenue South, Minneapolis, or Dept. of Zoology, University of Minnesota. Minneapolis.

Very truly yours,

Room 404
University Ave. Bank Bldg.
Madison, Wisconsin
February 9, 1931

Mr. Charles L. Horn
Federal Cartridge Corporation
Minneapolis, Minnesota

Dear Mr. Horn:

I, too, referred to the excess of deer in Pennsylvania, and especially to the damage to the deer range which has resulted therefrom. That is what I meant by the word "blow-up". In my opinion, a damaged range is almost as bad as no game.

Thank you for sending me Dr. Rasek's letter. You might be interested in the attached letter I had from him.

Mr. King will furnish you with a copy of his paper.

Yours sincerely,

ALDO LEOPOLD ✓
In Charge, Game Survey

Room 404
University Ave. Bank Bldg.
Madison, Wisconsin
February 9, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear King:

The attached correspondence is self-explanatory.

Have you received an invitation, and if so, what will be your action on it? If not, do you favor the thought of taking my place at the meeting for at least part of the time? I notice it is to last several weeks, and I doubt very much whether I could afford to stay that long.

It seems obvious, however, that our work should be represented in some way or other. Let me know your wishes, and please return the letter.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

Copy to Mr. King

Room 404
University Ave. Nat'l Bank Bldg.
Madison, Wisconsin
February 9, 1931

Dr. Alfred O. Gross
Bowdoin College
Brunswick, Maine

Dear Dr. Gross:

I am extremely sorry that there was a mix-up about Mr. Amory's invitation. As I wired you Saturday, your letter of February 1, which I did not receive until Saturday due to absence from town, was the first intimation I had of the conference or any invitation to it.

Obviously the conference is of very intense interest to me and hence I wired you my acceptance. I need not say that I greatly appreciate Mr. Amory's courtesy in extending an invitation to me. I did not reply to him direct since your letter intimates that I should write you instead.

I have in mind Mr. Amory's request for advance preparation of material, and will take this matter up with King.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

February 11, 1931.

Mr. Aldo Leopold
Room 404
University Avenue Bank Building
Madison, Wisconsin

Dear Mr. Leopold:

I am returning the letters relating to the conference in Quebec this summer.

I had heard of this conference and had wondered if Elton or any of the others might be anywhere near here while on this side. I hadn't thought it would be possible to attend. Certainly you should be there. I will be glad to go either in your place or with you. I want very much to go if it is agreeable with you and the Institute for me to take the time for the trip. Could a part of the expense go on my expense account? It will be worth enough to me for me to take care of a part of it personally.

Whether I go or not, our work should be represented there. If I didn't have to devote all the spring quarter to field work I could just about have the Minnesota Historical study completed by then. Whatever you think best in the way of representation I will be glad to do. I haven't had time yet to think about the matter, but want to get this reply back to you at once. I have kept a copy of the letter. Will write you more definitely shortly. Please keep me informed of your thoughts on the matter.

If I go in your place I suppose that will do in place of an invitation. If it is possible for me to go with you, will that fit in with the invitation idea?

Sincerely yours,

Instructor - Economic Zoology

RTK-b

Enc

[Feb 1931]

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

421 CHEMISTRY BLDG.

MADISON, WISCONSIN

Monday

Dear Ralph -

I was awfully sorry to hear about your misfortune. Please give Mrs King my sincere sympathy.

I hope she is passably well.

Hard luck ought to pass you two by for a while. I wish there were something I could do to share your burdens - but I suppose there isn't.

Yours as ever

Aldo Leopold

Send Angelo's Name + address

Feb. 19, 1931

Dr. Alfred O. Gross
Bowdoin College
Brunswick, Maine

Dear Dr. Gross:

May I inquire in a personal capacity whether it would be agreeable to Mr. Amory and the Conference if Mr. King were to appear in my stead for part of the period at Matamek? It might be quite difficult for me to absent myself for the entire period, and as you know, Mr. King is actually working more in detail on the matter of cycles than I am. I do not wish, however, to bring up anything which would confuse or embarrass our host.

I will appreciate your personal advice.

I think you did a splendid job on the progress report. My expectations were high, but your performance has exceeded them. It ought to clinch the case for a continuance of the investigation on an adequate scale.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

Mr. King - We would like Angelo's name & address.

Leopold

March 2, 1931.

Mr. Aldo Leopold ✓
Room 404
University Avenue Bank Building
Madison, Wisconsin

Dear Mr. Leopold:

Thank you for your very kind letter of a week ago. Both Mrs. King and I appreciate your sympathy and interest. She is making a rapid recovery. The difficulty is in keeping her from going to work too soon.

You will be interested to know that I banded 209 Huns at the Game Farm last Tuesday. All they had left. 147 of these have been released, the other 62 are to be held through the breeding season and released later. We are carrying on a few minor investigations here at the farm on 15 Huns. Experimenting with different foods and feeding methods in relation to egg laying, brooding and rearing.

I made a two day trip to Ely last week for the University to examine and autopsy a sick moose. The Veterinary Department sent a pathologist. We can't report anything definite as to cause yet, but at least, the results were sufficient to cause them to authorize three more trips if sick moose can be located.

I am wondering if there have been any developments in connection with the moose fellowship idea. It is quite possible Jellison (the fellow you talked with about Tularemia) would be interested in such a proposition. Sig Olson is preparing his thesis on the "Predatory Mammals of the Superior National Forest." He has about decided to go to the University of Illinois next year to finish up his M.S. under Ward.

The paper I am enclosing is an account, as near as I can recall, of what I said at the Research Round Table Discussion in New York. Seth Gordon wrote for a paper to be included in the Proceedings. This is what I sent. I hope it is satisfactory.

Angelo's name and address:
Ernest Angelo
Department of Horticulture
University Farm, St. Paul.

Mr. Aldo Leopold -2-

March 2, 1931.

Dr. Green has been out of town so much that we haven't had a chance to finish our outline but I am ready whenever he returns. Will write you as soon as we have reached any decision.

Very sincerely yours,

Ruffed Grouse Investigation

RTK-b

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE
BY ALDO LEOPOLD

404 UNIVERSITY AVE. NAT'L BANK BLDG.
MADISON, WISCONSIN

March 5, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I have not had time to push the moose fellowship idea and I doubt very much whether I can give it any attention for some time to come. Mr. Jellison might be able to promote this as a Minnesota Izaak Walton League project on his own account.

Thanks for sending me a copy of your New York paper.

With best regards,

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

Copy to Mr. King

BOWDOIN COLLEGE
Brunswick
Maine

February 23, 1931

Mr. Aldo Leopold
404 University Ave. Bank Bldg.
Madison, Wisconsin

Dear Mr. Leopold:

I am sure that it would be agreeable to Mr. Amory for Mr. King to take your place, but of course we would all greatly miss your help and advice concerning the conservation problems to be discussed. If you can spare the time I know that you would greatly benefit by the experience and incidentally give you a splendid vacation under interesting conditions. I expect to meet Mr. Elton of Oxford, England, up there in June and we expect to do a great many interesting things in connection with bird studies along the Canadian Labrador coast. We will of course return for the Matamek conference.

Mr. King is a very valuable man and he certainly knows his problem; therefore in the event you cannot come I am sure Mr. King will ably represent you and the Game Survey.

I am very glad to know that you are pleased with the Prairie Chicken report and I sincerely hope that it will be continued on an adequate scale.

Sincerely yours,

Alfred O. Gross

Copy to Mr. King

March 2, 1931

Dr. Alfred O. Gross
Bowdoin College
Brunswick, Maine

Dear Dr. Gross:

My suggestion was not to absent myself from the Conference, but to give King the benefit of taking my place for, let us say, the latter half of it.

I take it from your letter that this would not unduly gum up the arrangements or be objectionable to our host. I will let you know later more specifically about it.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

March 10 1931

Mr. Aldo Leopold ✓
Room 404
University Avenue Bank Building
Madison Wisconsin

Dear Mr. Leopold:

Enclosed is a copy of a paper which has been approved for publication by both the department and the Station. The next step is to find some publisher willing to accept it.

Professor Ruggles suggested one of the more technical journals. I hadn't thought it quite up to their standards. Dr. Riley is away for a couple of weeks so I haven't his opinion. I would like very much to have your opinion.

You know the purpose back of the writing. If it is to accomplish any good at all it will have to come into the hands of those carrying on or directing field investigations.

I see in the March DuPont Game Conservation News that Bump is constrained to do some grouse cycle work.

Will you please return the enclosed copy as it is the only one I have other than the original.

I will mail you the Progress Report this week. In spite of severe scissoring the additions necessary to make it complete have made it quite lengthy.

As ever,

RTK-s

Ruffed Grouse Investigations

Copies to Messrs. Grange
King ✓
Olin

March 11, 1931

Mr. Paul G. Redington, Chief
U. S. Biological Survey
Washington, D. C.

Dear Red:

The difficulties at Minnesota are an utter surprise to me.

Here is my letter to King.

I hope you will withhold judgment until I hear from him and can write you further. He recently lost a baby, and his wife has been very seriously ill. Did Dr. Green know this? It doubtless explains the delay. As to the other alleged matters, I must hear from King before having any opinion.

I am extremely sorry about this. My high admiration of Dr. Green's work, and my earnest desire to cooperate with him, have, if anything, increased since seeing him a month ago, and I was happy in the belief that we were all on the way to complete and effective cooperation.

I will go up there if King cannot untangle this matter by himself, but I am still confident that he can.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE ✓

BY ALDO LEOPOLD

404 UNIVERSITY AVE. NAT'L BANK BLDG.

MADISON, WISCONSIN

March 12, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I think your paper would do the most good in some sporting periodical. If you would substitute the word "date" or "figure" for "data" and add some specific directions as to how a sportsman should go about it, I think the article is suitable for use as is.

I see that you copied out the same quotation from Elton's book that made a great impression on me.

For publication without any change, I would think Ecology would be the most suitable, or else one of the ornithological magazines like The Condor^{aur}. The trouble there, though, is that the waiting list is too long.

I am returning the article herewith.

Yours sincerely,

Aldo Leopold ✓

ALDO LEOPOLD
In Charge, Game Survey

March 13, 1931

Mr. Aldo Leopold ✓
404 University Avenue
National Bank Building
Madison, Wisconsin

Dear Mr. Leopold:

Enclosed is a copy of the Progress Report. In view of the situation here at present I am going to hold up distribution of these reports for a few days, except that I will send Mr. Horn one today. This report differs from the one of last summer only in the way of certain small changes and additions, except that the account of the Pine County area has been left out and a rather full description of the Carlton County project included in its place.

Thanks for the reprints you sent. My students appreciated them. Sometime I want you to read some of the term papers turned in in this course. You will be interested to know that at least 15 students have requested that the course be repeated next quarter. That, of course, is not possible, but it perhaps indicates a fair registration for the work next year if it is given.

You will recall the Harper Fellowship established at East Lansing under Dr. Hunt's direction for a study of the relationship between game and agriculture. A student here by the name of Jerome Standt has applied for this Fellowship. He is graduating in Forestry next week and wants to continue with graduate work on game problems.

Standt is an exceptional student, quiet, congenial, above the average in ability, a good amateur ornithologist, an out-doors man, and a real gentleman. He is intensely interested in this work and took forestry only because it came closest to being what he wanted.

Of course, there is no assurance that he will receive this appointment; he is quite sure he will accept if it is offered him. In any case he is going to start his graduate work here next quarter (the Fellowship begins July 1). He would like very much to know something more of the nature of the work contemplated, and particularly, something as to who he will be working under and with. Will he come in contact with Wight, Dalke and Yeather? Is this Fellowship in any way related to the Williamston Project?

Any information you can send us will be greatly appreciated. I presume Dr. Hunt has already sent what information he thinks necessary. Standt doesn't question the merits of the Fellowship, he wants this data so he can use the time from now to July 1, to better prepare himself for the work he will have to do there if he is appointed.

I hate to bother you with these details but I know you will be keen about Standt when you know him.

Very truly yours,

BTK-f

Ruffed Grouse Investigation.

March 13, 1931.

Mr. Aldo Leopold
404 University Avenue
National Bank Building
Madison, Wisconsin.

Dear Mr. Leopold:

I have just received your letter of March 11th. Your statements relative to relations between Dr. Green and myself are most surprising to me. I believed, until I read your letter twenty minutes ago, that nothing but a few minor details stood in the way of our complete cooperation for the next year.

As for Dr. Green's impressions regarding me:

He says, first, that I delayed seeing him about joint plans as per our luncheon conversation. This conversation took place on January 26th. The understanding at that time was that I was to see Dr. Green in the near future for further consultation on the matter of cooperation between he and I, and after we had decided what we would do, what was needed, and how the State Conservation Commission could help, we would go to Mr. Stewart with our proposals. It was also agreed at that time that inasmuch as Mr. Stewart had just taken office it would be best to wait a short time before going to see him. I mentioned at this time the fact that I was quite busy and would not be able to do anything toward outlining plans for several days. Dr. Green said that he also was pressed for time and would prefer meeting with me later. Nothing was said as to how much later.

On February 11th I called Dr. Green's office and asked for an appointment with him that afternoon. This was granted. When we met at his office he remarked that I had waited so long he thought I had given up the idea of going ahead with the arrangements for cooperation. I told him I was sorry I had waited over-long in his estimation but I was ready then to go ahead with plans. We talked over a number of things. Only one thing was definitely settled, however, namely, that first of all we were each to write out just what work we intended doing on the area at Lake Alexander. We were then to meet again and go over the two outlines together and decide definitely what we would ask of the State Conservation Commission and also decide just how the data obtained on the area was to be divided and what part of this data each of us was to have for publication. Dr. Green insisted that before any work was begun we must have a written agreement covering every foreseeable point regarding the carrying on of the work and publication of results. This I agreed with,

Perhaps the delay of two weeks and two days was over-long. I meant nothing by such delay. At the time of this second meeting Dr. Green again mentioned the fact that Mr. Stewart had not been in office long enough to have taken care of the many details incident to establishing oneself in a new position, and that we should wait a while before going to him. If Dr. Green had thought I was delaying this con-

March 13, 1931.

sultation with him too long he could easily have called me on the phone or written me about it. He did not do this. In fact, he has never called me and has written me only once and that was in reply to a letter of mine. I would like to say in this connection that this last mentioned fact has been an embarrassing point all through our relations. It has put me in the position of petitioner for favors in every case.

At the close of this conference on February 11th we agreed that I was to again see Dr. Green on February 13 or 14 for the purpose of going over the outlines of our proposed work. On February 13th Mrs. King went to the hospital; on the following day our baby died. Funeral services were held February 16th. The same day, February 16th, I called Dr. Green to arrange for another appointment. This was set for February 19 or 20. On February 17 or 18 Dr. Green's secretary called me and said Dr. Green was going east for ten days or two weeks and would call me to arrange an appointment when he returned. I have heard nothing more from his office since that time.

The second point mentioned - that I made cooperative arrangements with Stewart individually instead of jointly as proposed at the luncheon, is a mis-statement of facts. The proposal at the luncheon was to go to Mr. Stewart with our plans for the cooperative work at Lake Alexander in the hope of enlisting the aid of the Conservation Commission in carrying on this work. I know, of course, that such cooperative work as we had in mind could not be confined entirely to a single area.

On February 2, I was in Mr. Stewart's office on business in no way related to the ruffed grouse work. I took this opportunity, however, of asking Mr. Stewart for cooperation from his office in a phase of the grouse investigation that is just as much a part of my work as it is of Dr. Green's and has nothing whatever to do with the Lake Alexander proposal, namely, the assistance of the deputy game wardens in the collection of grouse specimens for examination.

On page 11, under Article V of the "Summary and Plans of Work Undertaken in the Minnesota Ruffed Grouse Investigation," written August 1, 1930, copies of which were mailed shortly thereafter to every individual concerned in this investigation, Dr. Green included, I state: "Inasmuch as the other investigations have at the present time records on well over 2000 specimens it has not seemed necessary or advisable to do extensive collecting in Minnesota. It is, however, desirable to collect a sufficient number of specimens to enable us to check against the findings in the East. It is planned to take four to six birds per month through the next two years or longer. This number, we believe, will provide a sufficient check and at the same time allow for the fullest use being made of the material collected. The procedure of the New England Investigation will be followed in the use of the specimens. Each specimen will be weighed, various measurements taken, the skin made up for plumage study and record, the contents of the digestive tract saved for food study, a thorough examination for parasites will be made, and materials saved for bacteriological study. Particular attention will be given to the collection of young birds of known age and to the taking of specimens at seasons other than the hunting season."

Neither Dr. Green nor any of the others concerned offered any comment on this proposal. Naturally, I concluded it met with their approval. From that date, August 1, to the present, 26 birds have been examined. The collection of these specimens took so much of my time that it was suggested in January that I drop this part of the work and devote the time thus saved to other problems. I hesitated to

March 13, 1931.

do this as there has not been any systematic collection and examination of specimens in this state and I believe that to be a very important part of the investigation.

In order to save time, however, and to insure a wider distribution of the specimens collected, I asked Mr. Stewart on February 2nd to request the deputy game wardens to assist in this work by collecting specimens for me according to my directions and at my request. This request he very kindly granted. A copy of his letter of February 2nd to me is enclosed, as is also a copy of the letter from him to the District Chief Wardens. I am also enclosing a copy of my reply to Mr. Stewart written February 7th and a copy of the letter I wrote to each of the District Chief Wardens on February 18th.

It seems to me this answers Dr. Green's second contention. I cannot see that it was necessary for me to avoid all contact with Mr. Stewart except in Dr. Green's presence or with his consent. Neither can I see that this arrangement between Mr. Stewart and myself in any way affects or bears on the proposed cooperation discussed by us at the luncheon on January 26th. On February 11th, Dr. Green mentioned two meetings he had had with Mr. Stewart since January 26th.

Dr. Green's third contention - that I arranged for specimens from wardens to go to me instead of to him as formerly - can best be understood in the light of certain correspondence and conversations between Dr. Green and myself. Unfortunately there is no record of these conversations. As stated above, Dr. Green has long been aware of the fact that I am collecting and examining specimens. I have on numerous occasions discussed this phase of the work with him and have on each occasion offered him any specimens or materials from specimens that he cared to have. I have not made arrangements with any one else to make bacteriological examinations of these specimens in the hope that Dr. Green would do it. Finally, last November, he told me he would have made up a collecting kit for my use in preserving grouse tissues for bacteriological examination. I have called at his office twice for this kit but have not yet received it. In all our conversations relative to this question of specimens he has repeatedly said he was not interested in any specimens except those dead from disease.

On February 14th, shortly after Mr. Stewart had written the game wardens relative to collecting specimens, I received a grouse and a letter from Chief Game Warden Joseph Brickner of Hibbing. One paragraph of Mr. Brickner's letter reads: "Heretofore I have shipped such specimens to Dr. R. G. Green who was always pleased to receive them." In order to avoid confusion and embarrassment I called Dr. Green and told him I had received this specimen and read to him the paragraph quoted. His reply was something to the effect that I shouldn't worry about it, it was perfectly alright, and he again stated that he wasn't interested in such specimens unless there was some indication that they had died of disease. I told him during this conversation that I was writing Mr. Brickner to thank him for the specimen and I wanted to make clear in my letter that I did not want to interfere in any way with Dr. Green's plans or to side-track any specimens that should go to him. I said I believed this could be best accomplished by my writing a letter to him (Dr. Green) verifying our conversation on this matter of collecting and I would enclose a copy of this letter with Mr. Brickner's. Dr. Green said there was no necessity at all for a letter to him, that we were in agreement as to how such specimens should be cared for, and that only two or three game wardens were sending him such specimens anyway.

Nevertheless, I wrote Dr. Green under date of February 18, as per attached copy, and received from him a rather startling reply dated February 19th, a copy of

Mr. Aldo Leopold -4-

March 13, 1931.

which is appended.

It seems that as long as only verbal agreements existed between us Dr. Green was in perfect accord with all I suggested, but as soon as anything was put in writing it immediately became all wrong.

My arrangements with the wardens for collecting specimens were made in order that we might (1) carry on a piece of work that badly needed doing and that no one other than myself had done or intended doing, (2) save time, and (3) secure a wider distribution of specimens. The request for sick, injured and dead birds was made with the idea of conserving live birds and utilizing all available material. It was my intention, as I had stated to Dr. Green a number of times, to turn over all specimens I suspected of being diseased to him. I was trying to make the fullest use of every specimen received. Each one was weighed, various measurements were taken, the stomach contents saved for food study, and a thorough examination was made for parasites. Dr. Green, according to his statements to me, did none of these things with the specimens he received.

This is as complete an explanation of what has happened here since your last visit as I am able to give. Dr. Green has in no way indicated any disapproval of my activities except that he has not called me as he said he would in his letter of February 19th. I do not know what lies at the bottom of this new difficulty. I have made every effort, in the face of all manner of difficulties, disagreements and misunderstandings, to cooperate with Dr. Green. I am forced now to believe that cooperation is impossible. As for re-establishing relations with him, I am convinced that such attempt will be a waste of time and energy. Even if this present disagreement were patched up the same thing would occur again. The best thing for all concerned and for the future of the work would be to bring this thing to a head, to have a clearing of the atmosphere.

Personally, I would like to see everyone concerned forced to lay all their cards on the table. I would like to see this mess and all its attendant messes cleared up once for all and settled one way or the other. Either Dr. Green or myself is misrepresenting the facts. At this time and under the present conditions I am, it is quite obvious, held to blame by most of the parties concerned. I cannot help but believe that whatever standing I have is impaired both in the Survey and in the Institute because of this situation here. The present situation is, apparently, my fault; if I cannot patch it up I am just that much more to blame. If I do succeed in patching it up and it breaks out again, as it most certainly will, I will be again just where I am now. What would you do under the circumstances?

I would like to send a copy of this letter to Mr. Olin, Mr. Redington, Mr. Grange, Dr. Green and Dr. Riley. However, I will not do so unless you authorize it. I earnestly request that you permit me to do so.

Dr. Riley will not return from New York until March 20th. I do not want to delay acting until that time. I will look for a reply from you Monday. Much as I would like to see you, I sincerely hope you do not have to make a trip up here on account of this. As I am leaving town today and will not be back until Sunday there is little likelihood of any new developments before Monday.

There is nothing more I can add. I have perfect confidence in your judgment and will act in accordance with whatever suggestions you make. Everything contained in this letter was written after careful consideration and expresses the

Mr. Aldo Leopold -5-

March 13, 1931.

truth of the situation as I see it.

Very sincerely yours,

Ruffed Grouse Investigations

RTKing -b
Enclosures

The Game Cycle: A Challenge to Science and a
Threat to Sport

¹R. T. King and ²Aldo Leopold

What is the Game Cycle?

All of the grouse and some of the rabbits of the northern hemisphere experience periods of extreme scarcity, alternating with periods of abundance. This fluctuation has come to be known as the game cycle. The propriety of this appellation will be discussed later.

There are _____ species of grouse in North America. Of these the ruffed grouse, and the pinnated grouse or prairie chicken, are the most important by reason of their wide distribution and the high esteem in which they are held as game birds. Both are now known to be subject to cyclic fluctuation. It is also certain the sharptail grouse, ptarmigan, and blue grouse are subject to the cycle. In all probability sage hens, spruce grouse, Franklin's grouse, and the other minor species are affected. If this proves to be the case, it means that over half of the upland game bird species of North America periodically disappear.

It also appears that the red grouse and black grouse of Europe experience cyclic fluctuation, and possibly to some extent the gray or Hungarian partridge. Fluctuations of some sort are known to exist in the sand grouse of Siberia. The indications are that quail, pheasants and pigeons are the only American genera exempt from this phenomenon which encircles the northern half of the globe.

Both of the authors, and at least a dozen other investigators in the United States and Canada, are collecting evidence on the behavior of

¹Research Fellow, University of Minnesota, in cooperation with the U. S. Biological Survey.

²In Charge, Game Survey, Sporting Arms & Ammunition Mfgs. Institute.

cycles. In view of its widespread importance, many additional investigators must perforce become involved. It is difficult to decide what evidence is pertinent without some working hypothesis as to the nature and mechanism of the cycle. The purpose of this paper is to present such an hypothesis. It is our hope to draw helpful criticism and to stimulate effort.

Our accumulated evidence is too tentative and voluminous to be here presented. It will, however, be published, - that gathered by Leopold ^{now in preparation} in a report/on his Game Survey of the North Central States, and that gathered by King at a later date.

Why Explain the Cycle?

The "Cause" of the game cycle is as yet unknown. Possible methods of control are still entirely obscure. Is it worth while to look for the cause? Having found it, is it possible that methods of control might be developed?

The sportsman's first reaction to this question is one of pessimism. "You can't doctor wild birds, even if you knew how." This pessimistic reaction is well justified if it be true that the "sickness" or other cause of periodic scarcity is an inherent characteristic of the species affected. A later caption will show, however, that there is at least a probability that the "sickness" arises from the condition of the environment, rather than being inherent in the species. At least a part of the environmental conditions can be "doctored." The kind and distribution of vegetation, for instance, is being "doctored" every day by axe, fire, and plow. The kind and abundance of natural enemies is being "doctored" every day, indirectly through vegetation, and directly by trap and gun. It is at least thinkable that the intelligent guidance of these man-made changes in environment might eventually mitigate or even cure the "sickness."

The hope of cure, however, is not the only reason for seeking an explanation of the cycle. Conservation policies cannot be intelligently formulated or applied until we know just how hopelessly the cards are stacked against our cyclic species. At the present moment, for instance, we know that over a period of years grouse are scarce roughly half the time. Hence open seasons for hunting must be closed at least half the time. Some British observers claim that periods of cyclic scarcity are becoming more frequent. If this be true, we must anticipate the necessity of closure more than half the time in the future, and we must entertain less hope of predicting just when the period of scarcity will occur. On the other hand, if it be not true, a study of past cycles will at least tell us about what periods of shortage in the future to expect/and when.

There is a general tendency to introduce pheasants or other non-cyclic exotics as a substitute for ruffed grouse and prairie chickens. The wisdom of this substitution cannot be rightly weighed until we know whether cycles will probably occur about as often as they have in the recent past, or whether they will probably occur oftener.

How Explain the Cycle?

(To be filled in by King. To cover the general method of inferring cause from behavior. To summarize how this method has been applied in other fields.)

Information Needs^{ed} and Why

How Far Back Do Cycles Go? Nobody knows whether the grouse and rabbits have always been subject to cycles or whether cycles are of recent origin. Systematic compilation of facts on game history ought to furnish an answer. If cycles prove to be of recent origin, that fact will constitute prima facie

evidence that their cause inheres in the environment, and does not constitute a fixed property of the species. The environment certainly has changed, but in the light of what we now know about the evolution of species, it is a biological certainty that the species has not. The period of recorded history is probably but an insignificant fraction of the period required for evolution to alter the character of a species.

Historical records of shortages in North American grouse are abundant back to about 1909. They are numerous enough to be fairly convincing back to about 1881. Behind that date they are scarce but not impossible to find. Historical libraries, private journals of sportsmen and explorers, files of sporting periodicals, account books of game dealers, and legislative records of open and closed seasons are all likely to contain fragments of information which, if dug up and pieced together on a large scale, may tell us a coherent story, and help to answer the basic question of whether we are dealing with a new and changeable, or with a permanent and unchangeable condition.

Is the Cycle Universal? Was it Always So? It is becoming constantly clearer that during the recent periods of cyclic mortality, and within the main range of the ruffed grouse and prairie chicken, no piece of ground of large size escapes the ravages of the cycle. It is important to know, however, whether this was true in times past. It is important to know whether any areas, however small, escape its ravages at present. To prove that a shortage occurred in a particular locality a century ago by no means justifies the assumption that a cycle swept the continent at that time. It is entirely possible that shortages formerly occurred in spots, but that recent changes of some sort have made them universal. A reliable answer to this question will be much harder to get than a reliable answer to the question how far back cycles go. Even so the

massing of historical evidence will tell us more than we know at the present time.

How Far Apart? One of the outstanding characteristics of the last three cycles is the existence of a "lag" as between localities. That is to say, grouse do not die off during the same year over an entire state. The last county may be hit a year or two behind the "average" or most frequent date, while the earliest county may be hit a year or two ahead of it. In short, the incidence of the cycle in point of time is very spotty. It follows that some old record establishing the fact that a shortage occurred at a certain place during a certain year by no means establishes the date on which that particular shortage prevailed throughout the country. It follows from this that the average period of years between cycles cannot be determined, and the question of whether that period is growing longer or shorter cannot be answered, unless a large mass of historical information is made available, from which the "most frequent" date of incidence for each mortality period may be mathematically established.

A periodic fluctuation of irregular length may, in fact, not be strictly entitled to the appellation, "cycle." This question of nomenclature is of small moment, however, compared with the conservation of grouse. We have a periodic fluctuation, -that much is certain. Whether its length is constant is one of the things we must find out.

Degree of Shortage. Every sportsman and naturalist knows that during the recent shortages only a small percentage of the normal population of grouse survived to re-establish the species. It remains to be determined, however, how much the severity varied as between species and between localities, and it would be highly desirable to know what these variations were in times past. If we should find out, for instance, that cycles go back to the days of early

settlement, and that when they occurred anywhere they occurred everywhere, we should still lack proof whether they were always as severe as they are now, or how their severity varied with time, place, and species.

Peculiarities of the Cycle. It has become a truism among scientists that slight and apparently insignificant peculiarities of a phenomenon under investigation may often yield clues more valuable to the understanding of that phenomenon than those yielded by its more obvious aspects. In the investigation of the game cycle, peculiarities of possible significance have already begun to make their appearance.

Even before the fluctuation in grouse was known to be a continental phenomenon, it was observed that more than the normal proportion of male birds survived the period of heavy mortality. A disturbed sex ratio is always important to the welfare of a wild animal, and particularly so to the welfare of polygamous birds like the grouse. In New Zealand rabbits the disturbance of the sex ratio is deliberately used as a means of exterminating them within fenced enclosures. For this reason it is very important to amass evidence on what is the normal sex ratio of each cyclic species, and whether that normal is disturbed during periods of shortage.

It is also important to know which of the various cyclic species is hit first and which recovers first, and whether this order holds good for various times and places. If the cycle is due to a disease, this order may help establish the species in which the disease originates.

It is also important to know at what season of the year mortality takes place. It is already clear that the total period of mortality usually extends over several years, but this does not preclude the possibility that actual death may be confined to certain seasons. The primary cause of the shortage may in fact lie in impaired powers of reproduction, rather than in

actual death of the existing population.

It is furthermore important to know more about the geographic incidence of mortality. Does it spread from a central focus or source of infection like a wave from a pebble dropped in a pond, or does it attack a state like moths attack a carpet, in numerous irregular and gradually converging patches?

Ruffed grouse are notably absent at the present time from various islands which appear to offer excellent range. This absence is even more stringent than that to be expected from ordinary cyclic shortage. A systematic investigation and classification of islands with respect to their present and past grouse population might yield valuable clues as to the nature of the cycle itself.

Possible Causes of Cycle

(To be filled in by King. To cover:

Migratory predators - goshawk, all hawks
Weather
Bacterial disease
Parasites
Sunspots - weather
food or its contents

Property of Bird or Condition of Range

Cycles as a Border Phenomenon. Even a non-cyclic bird like bobwhite exhibits fluctuations on the borders of its range. Sporadic "irruptions" of quail have occurred in central Wisconsin and central Minnesota at seemingly irregular intervals. These consisted of a sudden abundance of quail along the extreme edge of the range where they are ordinarily scarce or absent.

There are also unverified reports of temporary periods of abundance on the edge of the bobwhite range in Oklahoma and Texas. Nothing of this nature is of record on the border of the quail range in New England, possibly because the native stock was diluted at an early date through the importation of Mexican quail.

Throughout the main body of its range the density of bobwhite populations seems to be limited by a uniform saturation point of about one bird to the acre. Some of the descriptions of quail irruptions suggest that in these border fluctuations the saturation point is exceeded.

If we now adopt a working assumption that irruptions and cycles are both expressions of a single underlying biological force, then we can likewise postulate the assumption that the saturation point and the cycle are two alternative ways of checking excess population, and that either the one or the other is operative throughout the generic group known as gallinaceous birds.

These assumptions are made for the purpose of leading up to two concrete questions: (1) Do the cyclic grouse exhibit a saturation point? (2) Do the cyclic grouse exhibit irruptions as well as cycles?

If quail exhibit a saturation point in the main body of their range, but irruptive behavior around its edge, then it seems logical to look for a saturation point in ruffed grouse or prairie chickens near the center of their original distribution.

Speaking in terms of quality of range (as distinguished from mere geography) it is the opinion of the writers that the center of distribution of prairie chickens was originally the prairies of central Illinois, in which locality they are now almost exterminated. The early records, however, ~~strongly~~ suggest stable rather than cyclic populations in former days, but a lesser maximum density of population than that attained on their acquired range in, let us say, central Minnesota. Practically the entire present

prairie chicken range is "acquired" territory, into which they have been pushed by the plow, after axe, fire and plow had made it habitable for them.

The qualitative center of the ruffed grouse range, in our opinion, was the hardwood timber region extending across the continent to the prairies in the latitude of southern Michigan. Here also the ruffed grouse has been reduced in habitat and numbers to such an extent that a saturation point would be invisible, even if it had once existed. In both the prairie chicken and ruffed grouse, however, Leopold, Allen, Gross and other investigators, have found a tendency for the severity of the cycle to decrease as one approaches this assumed optimum region. There are "islands" of both ruffed grouse and prairie chickens today in Ohio, Indiana, Illinois and Iowa where local observers who do not read natural history periodicals do not know the meaning of cycles or other fluctuations in these species. On these islands they appear to be "straight line" species.

The evidence, as far as it goes, seems to support the assumption that saturation points in gallinaceous birds are the prevailing check on overpopulation near the center of distribution of the species, and that cycles or irruptions are the prevailing check on the edge of the range of each species. When we have said this we have said that both cycles and the saturation point are a property of the environment, and that each gallinaceous species exhibits either the one or the other, depending on whether the environment is central or peripheral, *favourable or adverse.*

This cannot be adopted, however, even as a working hypothesis without reconciling it with the known fact that all of the grouse exhibit violent cycles throughout Canada and Alaska. Can this enormous area be regarded as on the "edge" of their range? In the sense of geographic miles, obviously not. In the case of species such as ptarmigan, it is not the edge in any

sense, but rather the whole. Even so it seems not impossible, in the qualitative sense, to regard the Canadian range as on the edge of adversity, which after all is what determines the species boundaries.

Cycles and Continuity of Range. The decreasing severity of ruffed grouse and prairie chicken cycles as one proceeds southward may be interpreted in other ways than those suggested in the preceding caption. One of the most obvious ways is that the continuity of the range decreases southward. As one progresses from central Wisconsin to central Illinois, for instance, the range for both species changes from large, continuous blocks to small, isolated blocks of prairie or woodland respectively. It is possible to assume that the isolation of these blocks is the reason why the cycle is less severe in them.

The way to test this assumption is to look for continuous blocks of range still farther south. In prairie chickens these do not exist, but in ruffed grouse they exist both in the Ozarks, and in the southern Appalachians.

Leopold finds evidence that the ruffed grouse of the Ozarks are definitely irruptive. The species has not been carefully investigated in the southern Appalachians, but there is definite evidence of violent fluctuations in that range, as well as in the Ozarks. Whether the Appalachian behavior is cyclic or irruptive cannot be determined without further study. In either event, however, we again find fluctuation associated with continuity of habitat, and also with range borders. Either the one or the other is presumably connected with the cause. If we only had some large blocks of habitat left in the centre of the original range, then if it exhibited fluctuation we could associate it with continuity, or if it did not, we could associate it with border conditions. Unfortunately this page in our book of game is torn out, forever.

Who Can Help and How?

(To be filled in by King. To cover:

Fact-finding under way. Map - Minnesota, New York,
Criddle, Seton, Lloyd, etc?
Wisconsin, N. C.

Fact-finding needed. Local investigations. Old records.)

COPY

705 First National Building
Ann Arbor
Michigan
March 23 1931

Dear Leopold:

I may have confused you a bit on the St. Joseph Island grouse. My impression is that they are not recovering faster than on the main land, but that, for a reason I have not tried to account for, they did not slump on St. Joe the way they did on the main land. Again, St. Joe is a big island - bigger than any in the Great Lakes region except Manitoulin and Isle Royale, and biological conditions are somewhat unique. There are no skunks, for example. That is definite enough. I know men who have been on the island for forty years and in the open all the time, and have not seen - nor smelled - one. If a pair was brought in, of course they would spread, I assume. Beech is thick on St. Joe. And not a specimen on the mainland. On the Canadian mainland, I mean, for there is some in the eastern end of the Upper peninsula. The deer are leaving St. Joe, due to hounding. Does and spikers are getting killed. The bucks go to Michigan - usually to Drummond Island. These are casual examples of unique conditions.

I will be very glad to get your report - or any other you may be getting out.

Very sincerely

Pulling ✓

April 13 1931

Mr. Aldo Leopold
404 University Ave. Nat'l Bank Building
Madison Wisconsin

Dear Mr. Leopold:

My delay in returning the papers is due to my absence in the field. Since March 23, I have been in town only two days until this last trip in. Both papers are excellent. Your digest of the British report is thorough-going and judicious, and a most worthwhile contribution to American Game Management. Your statement that the American species of grouse are "probably promiscuous" will stir up some comment and probably meet with some contradiction. I, however, believe you are right. I have more and more reason to believe that in the case of ruffed grouse the presence of old males is a factor of considerable importance and one that we must eventually give some attention. I am inclined to think that losses of extremely young birds are high and will prove to be the most difficult factor to modify.

There are two things that strike me in the "cycle" paper: first, the recoveries in the red grouse records seem altogether too rapid to be accounted for by natural reproduction. I am not nearly so familiar with these data as you are and I should not presume to criticize them, but in several instances both the curves and the text indicate highs, the year following lows.

My collected records on snowshoes in this state are beginning to indicate such erratic and locally different behavior in this species as to preclude the drawing of any general conclusions for an extensive area.

The second point in the "cycle" paper is contained in the third paragraph of your conclusions - "There is no significant synchronism between British and American (species), the periods being different. (This would seem to refute the theory that cycles are basically due to fluctuations in solar radiation or sun-spots)." There can be no doubt that there is no synchronism, you have clearly proven that there isn't. But does this lack of synchronism refute the theory mentioned? If solar radiation plays any important part in the economy of these gallinaceous species it must act largely through their chief foods, i. e., vegetation. Isn't it possible that British grouse management, which is directed almost entirely toward heather control and rotation, may have modified the effects of solar radiation acting through this agency by changing the age class of available or preferred heather?

I am afraid I haven't clearly expressed this point, but I have a sort of half-formed idea that if solar radiation is important, and if it acts through vegetation, and if in the one case the vegetation is modified only as natural succession

affects it and in the other case it is systematized according to a rigidly enforced and widespread rotation scheme giving rise to definite age classes some of which are preferred above others by the birds, then the results in the two cases are found to be different than they would be if controlled rotation wasn't practiced. (What a horrible sentence? It is a relatively unimportant point anyway).

I am returning various letters you have forwarded to me. Thanks for the opportunity to get these records. I am also enclosing a copy of some correspondence relative to pheasant flights that you may be interested in.

The field work is going beautifully. I wish you could spend a day or two on the area with me sometime between now and June 1. Will Mr. Ball be able to come up for a few days in the field? If he could come during the nesting season I believe he would find it enjoyable. I have never had field work as well organized or as promising of results as I have this spring. It would be a real pleasure to have him with me.

The last few grouse examined have provided some very interesting parasitological material, perhaps one new species of a grouse parasite. I wish this other matter was settled. As it now stands I am getting no bacteriological data at all. It is a shame to have to discard these specimens only half examined. Needless to say, Dr. Green has not kept his promise to get in touch with me as soon as he returned from the East. I have heard nothing from him since his return. I hope some settlement of this mess will be accomplished soon.

With best regards, I am

Very truly yours

RTK-s

Ruffed Grouse Investigations

Copies to Messrs. Redington
Olin

Mr. King

April 18, 1931

Dr. R. G. Green
Millard Hall
University of Minnesota
Minneapolis, Minnesota

Dear Dr. Green:

I was very glad to receive your letter of April 16.

Next week I am tied up at the National Izaak Walton League convention in Chicago, but I will run up sometime during the following week, that is, the one beginning April 27. I will avoid the week-end and I note that you are tied up Tuesday and Thursday afternoons.

Yours sincerely,

ALDO LEOPOLD ✓
In Charge, Game Survey

April 27, 1931

Dr. R. G. Green
Millard Hall
University of Minnesota
Minneapolis, Minnesota

Dear Dr. Green:

I have had to rearrange my schedule, and will
visit St. Paul next week instead of this week. I will
call you upon my arrival either Monday or Tuesday.

Yours sincerely,

ALDO LEOPOLD ✓
In Charge, Game Survey

Copy to Mr. King

April 27, 1931

Dean W. C. Coffey
Department of Agriculture
University of Minnesota
University Farm
St. Paul, Minnesota

Dear Dean Coffey:

I will call on you sometime on May 4, 5, or 6,
and will phone in advance to make sure of your convenience.

Yours sincerely,

ALDO LEOPOLD ✓
In Charge, Game Survey

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE ✓

BY ALDO LEOPOLD
404 UNIVERSITY AVE. NAT'L BANK BLDG.
MADISON, WISCONSIN

May 7, 1931

PERSONAL

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I did not run up to Cloquet to see you because I have promised to go to Michigan next week, so we couldn't have made an adequate field trip. In the university matter it was not clear to me that a talk with you was any great advantage at this time, as will appear below.

I talked the university matter over with Dr. Riley, Dean Coffey, Dr. Boss, Dr. Green, Mr. Henderson, and Mr. Kilgore in some detail, and more superficially with Dr. Zon and Dr. Smitz of the Committee.

Dean Coffey told me that due to Dr. Riley's intended absence, it was proposed to throw the supervision of the fellowship to Dr. Boss. I assume this had been taken up with you. (Incidentally I heartily appreciate Dr. Riley's sportsmanship in assenting to this change.) It sounded good to me, as it is clearer than ever to my mind that a large part of Dr. Green's antagonism is against the department, rather than you personally. I also learned it was proposed to revive the Wild Life Research Committee, which I gathered would remove one more sore spot from Green's mind.

Accordingly, when I went to see Dr. Green and Mr. Henderson, I said I did not propose to make any attempt to understand all the details of what had transpired, but wanted to know whether in their view it would be a step in the right direction to transfer the fellowship to the Experiment Station, and to leave the matter of working out future relationships to Dr. Boss with such help as he saw fit to request from the Committee.

Dr. Green said yes, and Henderson concurred.

I also said that I had not seen you, and could not speak for you or say what would be acceptable to you, but that I assumed you felt hurt, not so much because Dr. Green had questioned your actions, as that he had questioned your good faith in such actions, and that to a third party. Dr. Green then explained that he had been asked

by the Biological Survey (Ashbrook) how things were going, and that the question of good faith he had raised had not pertained to you personally, but rather to the department, which he inferred had exerted pressure to prevent your carrying out the proposed cooperative plan.

This was as near to a retraction or apology as I felt able to obtain. Accordingly I asked whether I were at liberty to convey this statement to you in a purely personal capacity. Dr. Green said yes, and I promised to do so. He said he intended to write you a letter asking you to drop in and talk over future plans (not, I take it, the unfortunate joint plan, but simply current procedure on the old basis).

I think I made it perfectly clear that I did not accept anything for you, but only for myself if satisfactory to you.

I did not discuss Dr. Green's explanation or my conveying it to you with anybody else except Kilgore, since I regarded that part as purely personal.

Now, Ralph, this may not be a very good *modus vivendi*, but it is the best I judged it possible to get. I am not urging you to accept it. How far you can go toward a peaceful adjustment is a personal matter for you personally to decide. If you can accept it, I would suggest your telling Dr. Boss right away, so he will not be working in the dark. If you cannot, let me know. The only thing I would urge is that you let the thing cool off in your mind before making a decision.

Let me now give you some additional background to make perfectly clear to you just how far I went in talking with Green, Dean Coffey, and Dr. Boss.

1. I told Green and Henderson that it would be great disappointment to me if the fellowship should have to work apart from his project.
2. I tried to avoid all discussion of detailed history with everybody, but admitted to Dr. Green on his repeatedly bringing the matter up that in my opinion you should not have allowed the subject of grouse to come up with Stewart, even though it had nothing to do with the previous agreement. At the same time I said he should not have aired his feelings about an inferred grievance to others without first talking to you.
3. I told Dean Coffey and Dr. Boss that an open breach with Dr. Green would make it harder for me to keep the Institute satisfied with their expenditure, and would in my opinion badly injure the University's chance to build up game work.
4. I told Dr. Riley that I would tell Redington that in my opinion he is making a mistake in ignoring all but one department at the University, especially in ignoring the Agricultural College.

5. I told Kilgore (personal) that in my opinion an open breach with Green would badly handicap your aiming toward a faculty position at Minnesota, and hence that your heavy and effective investment of time in building up university and public interest in game would, if you moved elsewhere, have to be written off the books as a loss because there would be nobody to bring it to fruition. Also that it was my hunch that if a present breach could be prevented, that Dr. Green would, under the new set-up, be easier to get along with. That it was my guess that Dr. Green, while inflexible in his conviction that the department has worked against him, is inwardly sorry about the breach with you.

Lastly let me say to you that I made a mistake in not letting well enough alone when I was up there before. It is my present belief that Dr. Green is an individual worker by nature, and that the wise policy is (if you can under present circumstances get back to it) to give him cooperation and credit but not expect much in return except to be let alone, plus, of course, the benefit of his research output to your subject.

This is a personal letter and I am not sending copies of it to anybody.

Yours as ever,

Aldo Leopold

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

404 UNIVERSITY AVE. NAT'L BANK BLDG.

MADISON, WISCONSIN

May 20, 1931

Mr. Ralph T. King
Cloquet Forestry Station
Cloquet, Minnesota

Dear Ralph:

I have been in the field in Michigan, which accounts for the delayed reply to your letter of May 12.

Your proposed course of action is not entirely clear to me, but I gather that you read into my letter some things which I did not intend to put there. I did not, for instance, have in mind any apologies to Dr. Green by you. I told him that in my opinion you should not have discussed grouse with Stewart. I felt our position on this point not altogether defensible, and that my admitting it might avoid the necessity of further discussing it at all.

The only action which my letter intended to propose was that if you receive overtures from Dr. Green you do not turn him down cold. Even this I did not urge on you, but simply suggested it as the only way apparently open to avoid a breach.

As to detailed working arrangements for division of game warden material, etc., I have no suggestions. No matter what arrangements were made, they could hardly be serious dampers on either your work or his, whereas an open breach would very likely prove a future injury to your plans. All I had in mind throughout all the negotiations was to bring about an outcome that would not involve the abandonment of your future plans.

No doubt we each feel the difficulty in keeping track of the other's thoughts by correspondence. I still have hopes of finding time for a field trip during the nesting season, but I cannot be sure of any dates at this moment. You can be sure that I greatly wish to make such a trip.

Yours as ever,

Aldo Leopold

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

404 UNIVERSITY AVE. NAT'L BANK BLDG.

MADISON, WISCONSIN

May 23, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I have most of the reports of F. Bradshaw, Chief Game Warden of Saskatchewan, from 1922 to 1930.

I find that each of these contain a very clear and intelligent summary of the status of ruffed grouse and prairie chickens. No doubt you have run into these in your study of the literature, but if not you can have my copies on request at any time.

I do not know, of course, just how far you want to go with information from Canada.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD

In Charge, Game Survey

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

404 UNIVERSITY AVE. NAT'L BANK BLDG.

MADISON, WISCONSIN

June 1, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Mr. King:

At your convenience will you kindly
return the pamphlets on cycles that Mr.
Leopold sent you some time ago? No hurry
about this.

Yours sincerely,

Wesley Horn
Secretary to Mr. Leopold



Thursday

MINNEAPOLIS, ST. PAUL AND SAULT STE. MARIE RY.

Dear Ralph -

I forgot to leave you
the "house rent" - here it is.

I am filled with satisfaction over
the excellent record you are picking up
this spring. A part of my concern
over the Green matter was due to
the fact that I (then) had to
rely mainly on the showing of
university interest as the accom-
plishment of the fellowship. The
more of this field accomplishment
you pick up, the less I am dependent
on the others.

Another thing that makes me
feel optimistic is Hunt's evident

high potential value as a young man.
I like him very much. You can
sensibly cut a notch in your girth
over that turn of events.

Drop me a line once in a
while, and don't overwork yourself.
I am much pleased too to see Huskney
looking so well.

Yours as ever

AC

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

404 UNIVERSITY AVE. NAT'L BANK BLDG.

MADISON, WISCONSIN

June 3, 1931

Mr. Ralph T. King
Cloquet Forestry Station
Cloquet, Minnesota

Dear Ralph:

I was intending to come up this week, but after learning that you have quite a group on your hands I thought I had better postpone the matter, since there are a good many things which I would like to discuss with you personally. Would it be convenient for me to come up next week, taking the sleeper directly to Cloquet?

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

June 15, 1931

MEMORANDUM TO THE GAME RESEARCH FELLOWSHIPS:

The attached letter from John H. Otterson to Major Waller outlining instances of unfavorable public reactions to the work of game research seems sufficiently important to be brought to the attention of all Institute fellows.

I have appreciated the care which the fellows have exercised in guarding against reactions of this kind, and I am proud that none of the instances cited pertain to our own investigations. It will do us no harm, however, to bear in mind constantly the possibility of public misunderstanding. I think Mr. Otterson has done us a favor in bringing this matter up.

The particular instances which he cites as examples should of course be regarded as confidential.

ALDO LEOPOLD

Copies to Messrs. King ✓
Errington
Yeatter
Gorsuch

Waller
Olin

C O P Y

June 11, 1931

MAJOR L. W. T. WALLER, JR.

Public information of the methods employed in scientific game research should be considered by the investigators as being almost as important as the research itself, as numerous instances are coming to our attention from different points of unfavorable reactions on the part of sportsmen's organizations and others to the activities of various investigators.

Have heard several unconfirmed rumors in New York State that there exists considerable objection to the work of Dr. Gardner Bump in the Grouse Investigation, the attitude taken by New York sportsmen being that Bump's work has a tendency to break up the grouse nests and drive out of the areas the few birds that still remain there.

Some unfriendly feeling has been created by the motion pictures shown by Dr. Alfred A. Gross, relative to the Wisconsin Prairie Chicken Investigation at numerous sportsmen's meetings. Some of the things, which Gross has done with prairie chickens appear very much to the layman to be simply 'stunts' with no definite accomplishment in view. For instance: I was present at a sportsmen's meeting where Gross showed the pictures of the Prairie Chicken Investigation and one of the things portrayed was - after the young chicks were hatched, Gross put his hat down beside the nest and put the baby chicks in the hat and then retired to his blind and photographed the actions of the mother bird who, of course, came back to the hat and ran round and round it without having the courage to climb in and brood the calling chicks.

Incidents of this sort, if necessary to the investigation, should not be given public showings, as to the public mind they cheapen the whole investigation and build up unfavorable reactions.

A recent instance in Oregon of the resentment of the lay public toward Jewett of the Biological Survey, in collecting nesting plovers for the museum, which has been given wide publicity in Oregon papers, is an instance of the necessity of more public education along this line and also better judgment on the part of the investigators in withholding from the public knowledge, instances which are likely to be misconstrued.

I am informed by Dr. Emeline Moore of the New York State Conservation Department that there was a considerable amount of unfavorable reaction to the activities of the Fish Survey, which has been under way in New York State now for five years.

Local sportsmen in areas where the Survey was operating originally had the attitude that the investigators were doing more harm than good. This was overcome, however, by the field groups of the Survey operators attending sportsmen's meetings in the immediate vicinity of their work and explaining in patient detail the aims, objects and methods, employed by the Survey. As soon as the local sportsmen had been completely informed, their unfriendly attitude disappeared and in many cases they have been of great help to the field groups in the Fish Survey.

It seems to me that in this research work there is plenty of opportunity for news releases in local papers to acquaint the general public with the necessity of the investigations and also describing some of the methods used by the investigators and in this way enlisting the popular public support, which is necessary to the continuance of the research.

John H. Otterson

JHO:RVC

Copy to Mr. King

June 15, 1931

Mr. W. B. Grange
% David M. Gorsuch
College of Agriculture
University of Arizona
Tucson, Arizona

Dear Wallace:

I think you and Ralph have made an important advance in untangling the Green matter. I thoroughly approve Ralph's proposed course of action, and he does not need to write me about it. I am sending him a copy of this.

With best regards,

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

Return to R. I. King

Aldo Leopold

June 19, 1931

MEMORANDUM TO THE FELLOWSHIPS:

This is my report on the fellowships to the Institute. While it comments rather pointedly on both the strong and the weak points of the fellowships, I thought it preferable to show you the report as it is. I will be grateful if you can point out any errors or omissions.

I want to take this occasion to say that at no time in the course of the venture have I felt as confident of the ultimate success of the fellowships as at present, and this of course is due to the hard and effective work which the fellows collectively have put in.

Will you please pass this on to appropriate members of your faculty for their information?

ALDO LEOPOLD

Dr. W. A. Riley ✓

Prof. Boss ✓

Dean W. C. Coffey ✓?

Dr. Henry Schmitz

Dr. R. S. Green

Mr. Wm. Kilgore, Jr.

Prof. A. S. Ruggles ✓

Dr. Raphael Zou

Please check your name when you have read this report + pass it on to one of the others listed or return it to me. R. I. King

REPORT ON GAME FELLOWSHIPS

Aldo Leopold

REPORT ON GAME FELLOWSHIPS

To the Game Committee, Sporting Arms & Ammunition Manufacturers' Institute,
and U.S. Biological Survey

Aldo Leopold

Reasons for Report. Some of the fellowships have now been in operation for two years and renewals for the final year are due July 1. It therefore seems advisable to present to all members of the Institute in advance of the next meeting:

1. A statement of expenditures and liabilities
2. A review of what the fellowships have accomplished.

It will also be timely to consider:

3. The extension beyond the contract period of those fellowships which started late and hence cannot be completed by the time the contract expires.
4. What changes in organization, finance, or cooperation has experience shown to be advisable if the fellowship system is indefinitely continued.

Expenditures. Tables A and B present the expenditures to date, the liabilities to the end of the contract, and the further liabilities necessary to complete the work.

In order to conform to the fiscal procedure of the Institute, contracts with the universities were written to expire a year from this July. The last payment on these contracts is due next January. Since three of the projects started late, however, their dates of completion run beyond the contract date.

The question of whether the Institute shall help complete the work beyond the contract date will be discussed after the accomplishments have been reviewed.

It may here be said, however, that the completion of all the projects, including those that run beyond the contract date, will cost the Institute \$700 less than its original authorization of \$45,000. Not every Institute activity has succeeded in thus keeping within its original cost estimate.

All five projects combined will, when completed, cost about the same as the Georgia Quail Investigation, for which \$46,260 was subscribed during a 5-year period.

It should also be pointed out that by having our research work done by graduate students working for a Ph.D. degree, we get their services for \$1,300 to \$2,250 per year, whereas the same men will command a minimum of \$3,000 after they get their degree. The same kind of men enter the

federal scientific service without a Ph.D. degree at \$2,400 and \$2,600 and up. Any way one figures it, therefore, we get our man-power at 2/3 market value, and of course all advisory, laboratory and consulting facilities free.

The U. S. Biological Survey contributes over \$3,000 in consulting service per year, plus a variable amount of special facilities not obtainable elsewhere.

If, then, the accomplishments of the fellowships are up to par, the Institute's investment starts with a very favorable "cost of material."

Accomplishments. Field and office inspections of all the fellowships have just been completed both by myself and the Biological Survey. The following summary, therefore, is up to date.

General Public Education

4 of our 5 fellowship universities have started one or more game activities as a direct result of our fellowships:

- 2 have installed game courses (M.A.C., U. of Minn.)
- 3 have started research of their own (U. of Minn., M.A.C., U. of Mich.)
- 2 have started management demonstrations (U. of Mich., M.A.C.)
- 1 is planning a management demonstration (U. of Minn.)

18 other states have become active, probably more or less as a result of our fellowships:

- 5 state departments have started game research (New Mexico, New York, Wisconsin, Ohio, Michigan)
- 6 private parties have started research (1 California, 5 Du Pont demonstrations)
- 6 universities are planning game work (Connecticut, Missouri, California, New York Ranger School, Utah)
- 1 state department is planning game research (Kansas)

The complete game research program of 31 projects, including those pre-dating or not traceable to the fellowships, appears on the map.

Training of Man-Power

- 2 trained game experts available in 1932, both already spoken for by competent institutions
- 2 trained game experts available in 1933
- 6 trained game experts available in 1934 or 1935 as the result of fellowships other than our own
- 20 foresters and county agents given an orientation course in game, and course again booked full for this winter (Minnesota)

New Facts Discovered by Institute Fellowships

A summary of some of the more important new facts bearing on game management discovered so far is given below (exclusive of the I.W.L.A. project, which is not a research project, but rather a demonstration).

Sex ratio in ruffed grouse (Minn.)
Census method for ruffed grouse (Minn.)
Trapping method for ruffed grouse (Minn.)
Chick-banding method for ruffed grouse (Minn.)
Foods of ruffed grouse in Lake States (Minn.)
Cycle characteristics of ruffed grouse (Minn.)
Per cent of winter loss in quail (Wis.)
Foods of quail (Wis.)
Sustenance value of foods eaten by quail (Wis.)
Predator losses in quail (Wis.)
Technique for determining raptor losses (Wis.)
Distribution of Hungarians in Middle West (Mich.)
Census method for Hungarians (Mich.)
Food of Hungarians (Mich.)
Agricultural machinery losses in Hungarians, and method
of prevention (Mich.)
Nest mortality in Hungarians (Mich.)
Water requirements of gambel quail (Ariz.)
Food of gambel quail (Ariz.)

Extension Beyond Contract Period. No worth-while investigation of a game species has ever been made in less than three years. Stoddard's project took five years.

While the Institute is under no contractual obligation to extend any fellowship beyond July 1, 1932, its eventual "dividends" on money already spent, and its reputation for continuity in its undertakings, will be enhanced by carrying each project through to the point where its fellow gets his degree, and enough findings have accumulated to warrant their publication by the university. No extensions beyond this point are contemplated.

As shown by Table B, the extra cost of such extensions will be \$7,500.

Future Changes. The present fellows are quite uniformly stronger in their ability to observe and record usable facts than in their ability to compile and interpret them. This is the reverse of what was anticipated. It speaks well for quality of the field instruction given by their Biological Survey advisers, and not so well for their previous scientific education.

There has been some interference with field work by courses necessary for degree credit.

Accordingly future fellows should be selected with especial

emphasis on (a) their ability to compile, deduce and interpret; (b) the completeness of their degree credits.

Enough experience in management and controlled experimentation has now accumulated to warrant asking the university, in all future fellowships, to furnish the land and other facilities necessary to try out important research findings as rapidly as they come to light. Land to work on is already furnished, but in addition funds and facilities to practice game management on the land should be furnished. The university's liability would vary. In some cases it might necessitate a special state appropriation for the purpose. It is believed, however, that there would be plenty of "takers," even under these specifications.

Some members of the Biological Survey are inclined to believe that the fact-finding work would go faster if performed under their direct authority, the "fellows" becoming their employees instead of graduate students at a university. This alternative idea is worth a trial, to determine its advantages and disadvantages. Should the Survey fail to get appropriations to try it out, the Institute should consider cooperating with the Survey in trying it out after our present projects are finished.

The Survey has also suggested that fellows should be sent on a tour of management projects elsewhere before getting very far into their own. This would be an excellent way to test the candidate's response to the subject, and could be made a sort of probation period.

All minor deficits and over-runs should be carried by the universities in the future. This change has already been made by their voluntary cooperation.

Recommendations

Action Before July 1, 1931.

1. Renewal of 3 contract fellowships to July 1, 1932 . . \$12,000
2. Renewal of 2 other fellowships to July 1, 1932 \$ 3,000

Action Later.

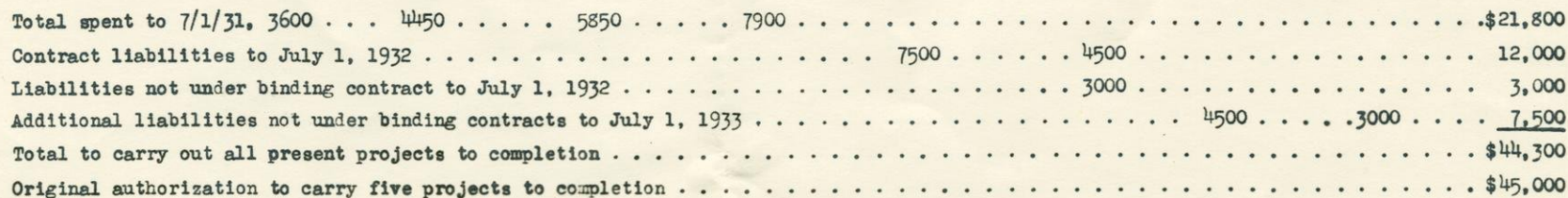
3. Further extensions to completion of last project July 1, 1933 \$ 7,500
4. Permanent continuance of five fellowships under amended specifications. According to past experience this would cost per year about . \$11,000

(A) Financial Summary Table
Game Fellowships, S.A.A.M.I.

University				:	Work				
Year				:	Agreement		Probably		
Beginning	Stipend	Expense	Total	:	Expires	Complete	Stipend	Expense	Total
Minnesota				:	7/1/32	7/1/32			
7-1-29	\$2,160	\$1,090	\$3,250	:					
7-1-30	2,160	940	3,100	:					
7-1-31				:			\$2,160	\$840	\$3,000
Wisconsin				:	7/1/32	7/1/32			
7-1-29	1,300	1,250	2,550	:					
7-1-30	1,300	1,500	2,800	:					
7-1-31				:			1,300	1,700	3,000
Michigan				:	12/31/31	1/1/33			
10-1-29	1,725	525	2,250	:					
7-1-30	2,250	850	3,100	:					
7-1-31				:			2,250	750	3,000
7-1-32				:			1,125	375	1,500
Arizona				:	7/1/32	7/1/33			
7-1-30	1,800	1,200	3,000	:					
7-1-31				:			1,800	1,200	3,000
7-1-32				:			1,800	1,200	3,000
I.W.L.A.				:	(none)	7/1/33			
12-1-30	X	X	1,750	:					
7-1-31				:			X	X	3,000
7-1-32				:			X	X	3,000

Expended to 7/1/31 . . \$21,800
 Additional to complete contracts (carry all to 7/1/32) \$15,000
 Further liabilities to complete projects (carry Michigan
 to 1/1/33 and Ariz. and I.W.L.A. to 7/1/33) 7,500
 Total for completion of present projects \$44,500
 Original authorization \$45,000

GAME FELLOWSHIPS, S.A.A.M.I.



THE RÔLE OF UNIVERSITIES IN GAME CONSERVATION

THE successful production of game crops depends less on the manipulation of game laws by legislators than on the manipulation of game environments by landowners.

The realization of this fact is rapidly changing the subject matter of game conservation programs. They are becoming less and less a matter of what laws are passed by legislatures, and more and more a matter of how farms and forests are operated by their owners.

With this change in subject matter has come a realignment of functions. The new job of finding out how to modify farming methods in favor of game cannot be directly performed by game departments. It naturally belongs in the agricultural colleges, forest schools, and universities—hereinafter referred to collectively as “universities.”

These institutions already have their hands more than full. Should they volunteer to work out methods of game cropping? Are the landowners asking them to do so? This is a very perplexing question. It may be well to remember, however, that the job of working out improved farming methods was not thrust upon our state institutions by farmer-demand. They grasped it as an opportunity, and later showed the farmers why. Neither, to my knowledge, has been sorry since.

The working equipment necessary for a game research program may be roughly classified as follows:

1. Man power in the biological sciences.
2. Experts in the other land crops, such as forestry, with which the game crop must be dovetailed.
3. Field man power, such as county agents, for extension to and education of landowners.
4. Land for demonstrations.
5. Game experts.
6. Funds.

It is clear that the first four items are found in almost any university,

Research work and practical training courses in game management offer some interesting possibilities

BY ALDO LEOPOLD
SPORTING ARMS AND AMMUNITION
MANUFACTURERS' INSTITUTE

whereas the last two are almost always lacking at the outset. How can they be obtained?

Experience has so far disclosed six sources of funds:

1. Conservation departments. In Michigan, for instance, the department has financed a series of fellowships in fish management.
2. Special legislative appropriations. No examples yet.
3. Industrial fellowships. Many industries with a financial stake in the success of game conservation might establish fellowships similar to those now financed by the Sporting Arms and Ammunition Manufacturers' Institute.
4. Private donors. In Michigan some \$25,000 has been underwritten for a demonstration in game and fish management, by private donors.
5. Game foundations, such as "More Game Birds in America, Inc."
6. Scientific foundations. The more fundamentally scientific game problems ought to qualify for fellowships and grants from such organizations.

It is my impression that the conservation public is willing to support direct general treasury appropriations for game research on a larger scale than the universities have as yet asked for.

Money and scientific facilities are not usable without the guidance of game experts. Some universities have obtained qualified men directly from

the U. S. Biological Survey, such men being assigned to field headquarters at the university. The Survey also offers advisory service for specific activities such as game fellowships. The fellowships will eventually create an additional supply of game experts suitable for the guidance of university programs.

There has been a perceptible acceleration of game research in the past few years. Three years ago there were only two or three full-time workers outside the U. S. Biological Survey, which was and is, of course, the natural clearing-house for such work. Today—see map—the universities alone have at least twenty-two men, with new accretions every few weeks, while a total of projects—full or part-time men—under way is thirty-one. The financing of the twenty-two university projects is as follows:

By game commissions	11
By industrial fellowships	4
By universities themselves	2
Privately or by associations	5
	<hr/> 22

In drawing the map, some arbitrary definitions of what constitutes a “project” had to be followed. Much worthy and valuable work is under way which does not appear on the map because it does not meet these definitions, and in some cases possibly because the author does not know about it. The map is as of July 1, 1930.

Possibly this acceleration would have been greater did not many university administrators judge the present opportunity for game research by outworn standards. Until recently ornithology and mammalogy were something different from what is here advocated. They were not fundamental sciences, in that they did not deduce laws, or use quantitative methods. Neither were they practical, in that they did not tell what to do to land—although they occasionally concluded what to do to laws.

AIR-MINDED LUGGAGE

It is light enough for air travel, but ideal for week-end and overnight trips, too

JUST at the moment nothing seems to be unchangeable except gold beating and the continued inactivity concerning the weather. The latter subject was fully covered by Mark Twain years ago, and still nothing has been done about it.

But as one instance of change, consider luggage. At one time it was heavy and ponderous; now it is light, fast-moving. In the brown decades a trunk wasn't a trunk unless it took a man, a boy and three grunts to move it. Overnighters carried bags they could have changed their pajamas in, if necessary.

A shopping bag meant something that the head of the family could put a layer of beer bottles in first, then an enormous Sunday roast, topped with celery, shoes for Johnny, a can of paint and assorted hardware.

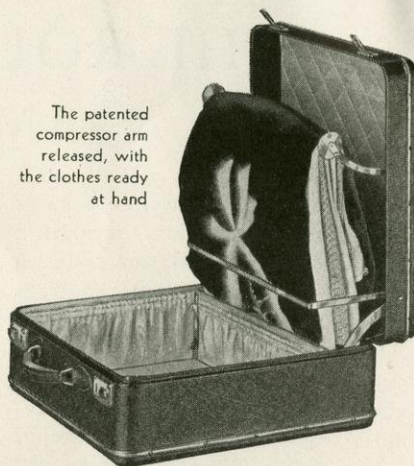
Today, anybody picking up one of these old bags, after being accustomed to the new styles, would be tempted to open it and look for the bricks.

Perhaps we can thank the airplane

for present-day sensible styles. Because excess weight was taxed, the passenger found it profitable to use light luggage. And the alert manufacturer, always two or three jumps ahead of the consumer's demand, had just what was wanted. Then the air traveler, finding light luggage sensible and adequate, wasn't long in demanding the same equipment for travel on land. That may have been the why and wherefore back of the present light luggage. It is as good an explanation as any other.

As an example of something excellent that has been done along these lines, you have only to look at the illustrations on this page. The bags are known as Aero-Pak de luxe modern luggage, and are sold exclusively by these licensed manufacturers: Seward Trunk & Bag Company, Virginia Trunk & Bag Company, Totty Trunk & Bag Company, Independent Trunk & Bag Company, all of Petersburg, Virginia.

The very name of these bags sug-

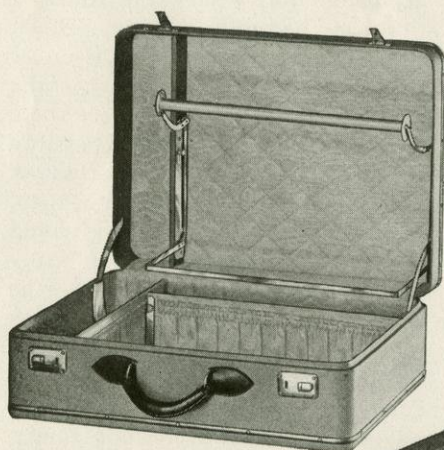


The patented compressor arm released, with the clothes ready at hand

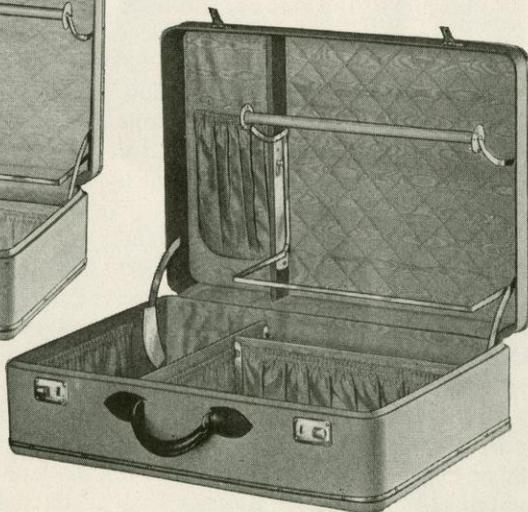
gests air travel, and while they are light enough for that purpose, weekenders and overnighters, too, are using them by the thousands.

They carry garments without wrinkling, by the use of a patented compressor arm, which holds flat the clothes folded over it. Yet its pressure is released by a finger when the clothes are wanted.

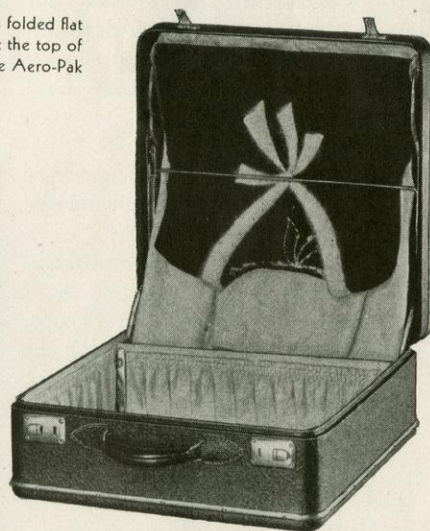
These bags are strongly made and have a large wardrobe space. They are covered with du Pont Fabrikoid—are distinguished looking, tough, waterproof, washable; in short, the kind of luggage that gives a swagger to the owner when he marshals it through Grand Central or Pennsylvania Station.



These bags are light in weight, yet strong. There is plenty of carrying space, and very little of it is wasted in cumbersome construction



Right—Clothes folded flat against the top of the Aero-Pak



Happily, the more recent work has set an entirely new standard which will appeal, I think, to both the fundamental biologist and the agricultural administrator when they become acquainted with it. Stoddard's Georgia Quail Investigation has set the pattern for the new method. His report, just coming off the press, will illustrate my meaning better than I can explain it. His technique consists of an alternation of field observation to get "leads," and controlled experiments to test their validity. As far as I know, his was the first attempt to weigh all the factors which determine the abundance of an American game species. He ends with almost an equation for the abundance of quail. This, as nearly as I know, is fundamental ecology. On the other hand, he also ends up with a distinct system of practice for the landowner. This, as nearly as I know, is applied ecology or agriculture.

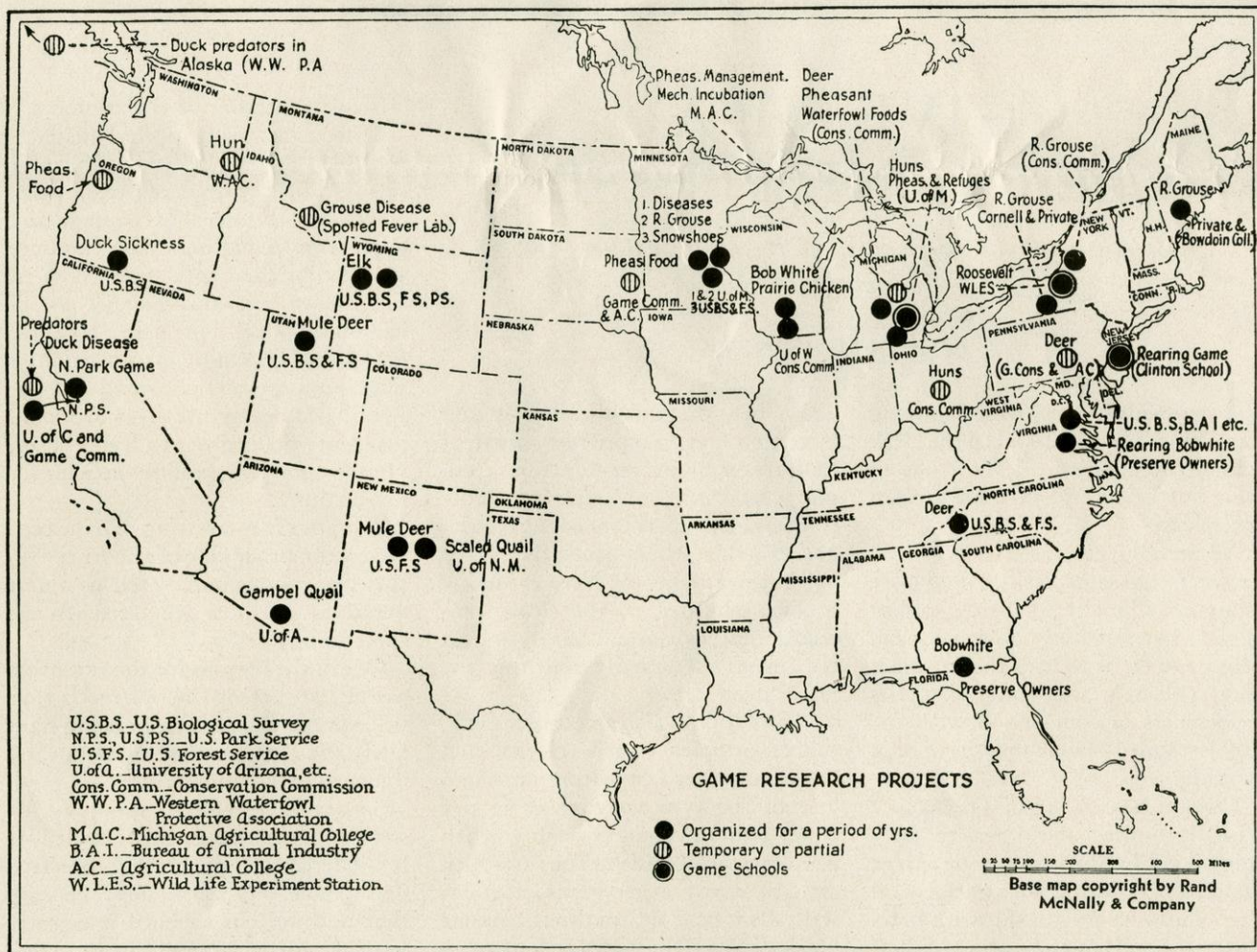
Some universities are starting to teach game management as well as to conduct game research. This is admirable, provided it be not overlooked that facts about game must be found before they can be taught. Writing curriculums for game courses is as easy as pasting labels on a row of bottles, but is important only when there is something in the bottles.

Game education can avoid one of the mistakes made in forestry. It should foresee the desirability of an early choice between the various possible degrees of education. Training for game research, game administration and game keeping are three very different things, not necessarily combined to advantage in a single institution. In addition, there is a very definite place for what might be called "orientation courses" in game, aimed to give the prospective farmer, forester, county agent, or "liberal arts" student an intelligent apprecia-

tion of what game management is, without necessarily qualifying him for professional practice.

I am afraid that some agricultural colleges are deterred from undertaking a game program by too superficial an appraisal of what the farmer wants. I have heard it argued that inasmuch as trespassing hunters have in some places become an intolerable nuisance on farms, it would be impolitic for an agricultural college to encourage the production of more game. This viewpoint fails to realize that the hunter-trespass nuisance is simply one of the proofs that the demand for game crops has outstripped production, and that no orderly system of disposing of the crop is as yet in existence. A similar underproduction in other farm crops would be regarded with anything but alarm. Game is the one farm crop of which there is no present or prospective

(Continued on page 24)





Dainty things for babies seem even more dainty when wrapped in Cellophane, but equally important is the protection afforded by this material. The other personal accessories in the group tell their own story

"GIVE ME A CLEAN ONE, PLEASE"

Cellophane-wrapped merchandise is the well-considered choice of more and more store patrons

By B. C. ROBBINS

How many times, when buying something, have you said to the clerk behind the counter, "I want one of these but be sure to give me a clean one, please?"

We are all "getting that way." A few years ago sales clerks would have thought us finicky for being so particular, but not now. Some of them even go so far as to help the customer select a clean article, emphasizing its spotlessness in comparison with the slightly soiled one he may have been handling.

That the buying public's preference is for clean merchandise was recently pointed out by the manager of a large chain store retailing the same general type of articles we are showing here.

He said, "About a year and a half

ago when the toothbrushes in our store were first wrapped in transparent Cellophane by the manufacturer, people were suspicious and invariably tore off the wrap, thumbing the bristles and examined them generally.

"But today people have evidently become educated to the clean, protected toothbrush and hardly one in ten insists on actually touching the brush itself.

"This applies also to powder puffs, rubber nipples, wash cloths and countless other fast-selling merchandise of the type we display in our store. I think, unquestionably, with people now insisting on unsoiled articles, many other types of goods will also be sold without anyone breaking open the package for a more

critical inspection of the contents."

This man's store openly displays practically every article it has for sale within easy reach of the shopper. So it is easily seen how soilage and dust from handling and exposure would take their toll.

Most of the merchandise is of moderate price, but here, too, we find people becoming more particular when buying even these small articles. Retail people say all of us are more insistent than ever to buy clean, sanitary goods, especially articles for personal use.

It is always interesting to have people on the other side of the fence—in this case, the counter—tell us about ourselves and how we act when we come to buy.

One of the reasons for the extensive use of transparent Cellophane is that it keeps merchandise from being handled and insures its spotless and immaculate condition.

So next time you go shopping for some product that is easily soiled, if it is offered for sale in this protective Cellophane wrap, you may be sure that nothing has touched it since it left the mill or factory.

WE SERVE THE MOTOR INDUSTRY

(Continued from page 2)

purpose it does not constitute a hazard to the public health. Thus, another du Pont product becomes associated with the automobile.

To mention the well-known No. 7 line of du Pont chemical specialties is to call attention to a group of products of particular interest to automobile owners. Speed Blend, the new fast-working No. 7 Duco Polish and its companion products, Auto Top Finish, Nickel Polish, Touch-Up Black, Super-Lustre Cream and Radiator Cleaner, serve well the purposes for which they were designed. They represent the fruition of research work applied in this special field.

Research work is still progressing. At present the organization consists of a Central Chemical Department and twelve industrial research organizations. The President's annual report for 1930 refers to the expenditure of \$1,750,000 for chemical control in order to insure the quality of our products, aside from approximately \$4,250,000 more to improve existing

processes and to develop new lines in which the company has not previously engaged. Every du Pont product represents costly and time-consuming research in order to find the best material for the purpose. Because of its broad experience in diversified chemical manufacture, its research facilities, and its record of achievement, the du Pont organization is certainly qualified to serve this great industry with chemical products.

UNIVERSITIES AND GAME CONSERVATION

(Continued from page 9)

overproduction. The evolution of a mutually profitable relationship between sportsman and farmer is a relatively simple matter. Indeed Michigan may be said to have already found one in her idea of farmer-sportsman coöperatives.

The technique of farm game management consists, by and large, in devoting the less valuable parts of each farm unit to game cover or food. It seems to me that this presents a timely opportunity to reduce the

present overproduction of farm crops, without depopulating any particular farming area. I have already admitted that no orderly system for the marketing of game crops is as yet perfected, but one would soon develop if the over-demand for shooting privileges were geared up to the existing under-demand for marginal farm lands. In the solution of these problems of game economics it is by no means necessary for the university to take an *ex parte* attitude. Why not regard the farmer-sportsman relationships as a research problem, and undertake experiments to find the answer?

Even in the absence of an orderly method for the farmer to dispose of his game crop, there can be no doubt that game management on farms tends to add to beauty of the land and the variety and interest of farm life. From my viewpoint, this alone warrants full steam ahead on the part of the agricultural colleges.

If the reader thinks well of this argument, and if his state university is not yet lending a hand to game conservation, let him clip this article and send it to some acquaintance on the faculty for an opinion.



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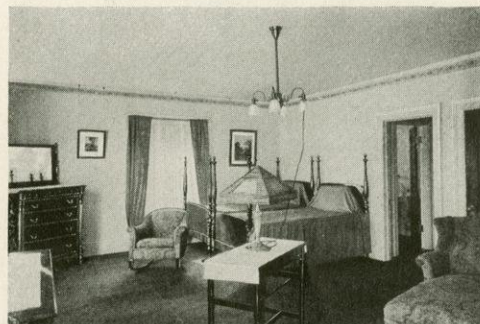
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DUCO ADDS CHARM TO THE STANLEY



Some views of a famous Colorado hotel near Estes Park



The guest rooms are light, airy and well equipped for comfortable occupancy

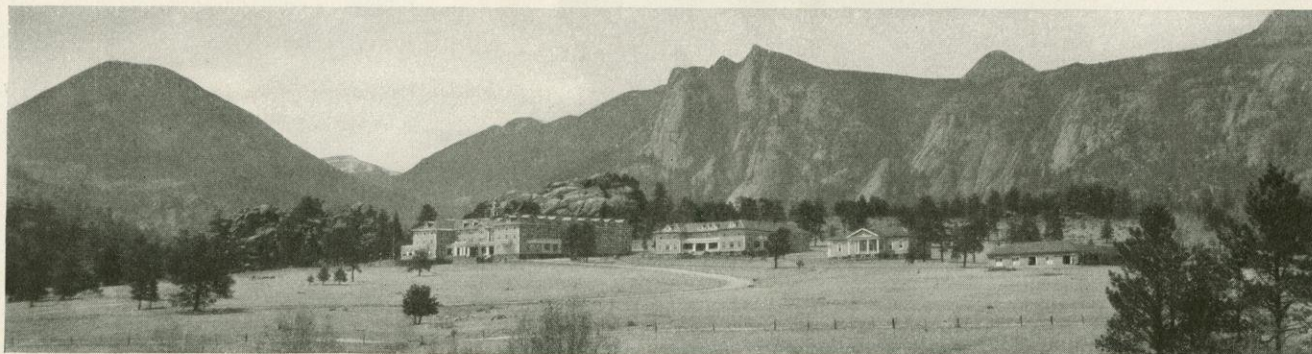
Recently, du Pont Duco was used to refinish all the furniture in the Stanley Hotel, which is one of a chain operated by Rocky Mountain Lodges, Inc., of Denver. This view shows the spacious lobby—a restful place of great charm to visiting tourists

Right—In this cheerful, ivory-tinted dining-room one may view the ever-changing beauties of rugged mountain scenery, while satisfying the "inner man" with delicious food taken mostly from Colorado's own gardens and fields

The panorama below partly reveals the picturesque setting of this hotel property, which is surrounded by 150 acres of rolling country adjoining the town of Estes Park. Note the mountains in the background



PHOTOS BY COURTESY DUCO COLORADO CORPORATION



Text

June 19, 1931

Dr. Alfred O. Gross
Bowdoin College
Brunswick, Maine

Dear Dr. Gross:

I am trying to get a rough idea of the ratio between the weight of the maximum crop and the weight of the bird. Your Wisconsin report enables this to be calculated very satisfactorily for pinnated and sharptail, but I cannot find in your publications any maximum crop weight for ruffed grouse. Could you give me this so I can apply it against your ruffed grouse weights?

I could, of course, get this from King, but since your weights are published and his are not, I thought it preferable to use yours.

It is definitely decided that King had better stick to his knitting this summer and not swap places with me at Matamek. I will be there for the opening date, but cannot stay for the long season.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

King: Gross didn't reply
to this. Can you give me
the information?
AL

July 6, 1931

Mr. Aldo Leopold
Room 404
University Avenue National Bank Building
Madison, Wisconsin

Dear Mr. Leopold:

I can think of nothing in connection with the work here that could give me greater pleasure than the writing of this letter to inform you that every misunderstanding between Dr. Green and myself has been cleared up and every difficulty in the way of our complete cooperation has been removed at last.

Purely as a matter of record I want to review briefly the points giving rise to the difficulties here and the manner in which they have finally been cleared up.

It will be evident to you from Wallace's letter of June 11, that there were two major points about which I had no knowledge. These are (1) that one of the major reasons for locating the Grause Fellowship at Minnesota was Dr. Green's work on Tularemia, and (2) that Dr. Green was promised that the work of the Fellowship was to tie in with his work.

I did not know that Dr. Green's work had anything to do with the choice of Minnesota for the Grause work. I did not even know that Dr. Green knew anything about or had any interest in the Fellowship until sometime after its establishment. Neither did I know that Dr. Green had any right to expect any cooperation from the Fellowship, or even any right to expect information relative to the progress of the work. Both of these things I learned for the first time from Wallace on the night of June 10.

You will recall that on numerous occasions I told you that it was apparently impossible for you and me to see alike on the proposition here, and that there were undoubtedly things bearing on the situation which I did not know. I made these same remarks to Wallace and Mr. Stoddard, the only two members of the Survey with whom I had had any contact. This new knowledge clears up both those points, and puts an entirely different face on the situation.

It is perfectly obvious to me now that Dr. Green's efforts for the past two years most of which I have viewed with suspicion and at some of which I have taken offense, have been directed toward enabling me to live up to these agreements. I am surprised at the patience he has shown in dealing with me.

Friday afternoon, July 3, Dr. Green and I went over this whole matter and, I am confident, arrived at a complete and satisfactory understanding. He, as usual, was willing to come more than half way. We went over the whole affair in detail, discussing even the personalities that have entered in to our relations with each other. We are agreed that as far as we are concerned there is now nothing standing in the way of our complete cooperation and the fullest confidence in each other's work.

After the conference between Dr. Green and myself we met with Mr. Aldous and began formulating plans for our future work. Mr. Aldous and I are to spend Thursday, Friday and Saturday of this week with Dr. Green on his station at Lake Alexander where and when these plans will be completed insofar as it is possible to complete them at this time.

I sincerely trust that the clearing up of this affair will meet with the approval of the Institute and the Survey.

It would, however, be unfair to you and others if the Institute, the Survey and the University were not made aware of the manner in which this clearing up was accomplished. Although you have skillfully camouflaged your own part we all know that your efforts to bring about an understanding and reconciliation have been untiring and invaluable. Furthermore, it is practically a certainty that these difficulties would not have been straightened out at this time, and perhaps would never have been entirely cleared up without the offices of Mr. Grange. His efforts to acquaint himself with every angle of the work and his willingness to go over it point by point on innumerable occasions have made possible these last and most important steps. And finally there is Dr. Green's own part to consider. I am afraid there are not many men who would act as he has acted. He has shown unlimited patience throughout and has willingly made concession after concession, none of which could rightfully be expected of him. His willingness to wipe the slate clean and start anew at this date is ample proof, if such was necessary, that he is not to blame for the conditions as they

existed. In addition, I want to add that Mr. C. H. Aldous of the Survey has also assisted in no unimportant manner in bringing about this new status.

I am sending copies of this letter to Mr. W. B. Grange, Mr. W. S. Stoddard, Dr. R. S. Green and Professor Andrew Boss.

Very sincerely yours,

S. A. A. H. I Fellow
University of Minnesota

BTX-cc

July 6, 1931

Mr. Aldo Leopold
Room 404
University Avenue National Bank Building
Madison, Wisconsin

Dear Mr. Leopold:

I realize that you cannot spend all your time traveling back and forth between St. Paul and Madison, nevertheless I want to notify you of another step we have taken toward the organization of a demonstration area.

On June 29, John was in St. Paul again and he brought Mr. Melrose of the Minnesota Farm Bureau out to talk over possible action on the part of the University and the Farm Bureau in developing Farmer-Sportsmen relations such as exist on the Huntington and Williamston areas.

I, of course, have no right to speak for the University and in addition I want the men at the University to understand fully what it is all about before any steps are taken. I suggested arranging a meeting at which all the interested parties would be present and where the matter could be fully discussed and every point made clear. This was satisfactory to both Mr. Ball and Mr. Melrose.

I have arranged for this meeting to be held here at the University Farm on the afternoon of July 20. Dean Coffey, Professor Boss, Professor Ruggles and Mr. Peck, Director of Extension Work, have arranged to be present. I have written Mr. Ball, Mr. Melrose and Wallace. Both Mr. Ball and Mr. Melrose said that date would be satisfactory with them. I hope to see Mr. Sam Anderson tomorrow. I chose July 20 because it is the Monday following the State I. W. S. A. convention at Red Wing on the 17th and 18th.

I hope you can be present. This is not only an oppor-

tunity to acquaint the University authorities with what is going on in other states and what should be going on here, but it is a real opportunity to begin the development of a demonstration area.

Dean Coffey has requested that a meeting of the interested members of the University Staff be held before the 20th in order that they could all familiarize themselves with the idea and its various angles. Each member has been supplied with a copy of the Game Policy. I expect I'll have a number of questions to answer at this first meeting. I will appreciate any advice you can give me.

If John is in Madison he can give you a much better idea of what he and Mr. Melrose had in mind than I can.

I don't know if you intended to be up to the Red Wing meeting or not. If you are I hope you can arrange to stay over until Monday. If you were here Sunday we could spend a profitable day with Dr. Green. He is leaving that night for Quebec.

We located a number of new broods on the Cloquet area after you left and banded a few more, 58 in all. They were soon too large and strong to catch, however.

Will return your cycle bulletins this week.

Sincerely,

BTK-ss

Sporting Arms Fellow

Mr. King

July 6, 1931

Mr. S. Prentiss Baldwin
Baldwin Bird Research Laboratory
Gates Mills, Ohio

Dear Mr. Baldwin:

I appreciate very much the privilege of seeing the manuscript of "Physiology of Bird Temperatures." I read every word of it with very great interest.

As I wrote you before, I am not competent to make any critical review of the material. I am, however, strongly confirmed in my original conviction that this kind of work is foundational to sound game management and conservation practice.

It is perfectly clear, for instance, that the phenomena of winter survival and winter feeding are greatly illuminated by your work. I supposed it was general knowledge that bird metabolism is rapid and that food must be eaten frequently to enable wild birds to survive a bad winter, but I for one had no idea that the interaction between food and body temperature was so prompt. The ability of predators to catch half-fed birds on a cold day is now clearer than ever.

I am lead to hope that you may be able sometime to run a comparable series of experiments on some game bird, preferably bobwhite. Has it occurred to you that Stoddard, with his new field laboratory at Thomasville, would probably be intensely interested in this and would be able to offer all the facilities which you might lack at Gates Mills, while you of course have everything that he lacks at Thomasville?

Another obvious application of your findings, especially those on incubation temperatures, is offered in the field of artificial propagation of game. I have been contending for some years that the fundamental conditions of incubation temperature and humidity (and possibly other physical factors) should be investigated before large sums were spent in rule-of-thumb attempts to improve technique. You probably know that there has been a sort of landslide toward electrical incubation and that only part of these attempts have proved successful.

I notice that in the discussion of incubation temperatures you suggest that oscillating temperatures may be optimum. Should you ever undertake any experiments on this, I think it would be advisable to write the Forest Products Laboratory, Madison, for their experience with instruments to bring about oscillating controls. They use these instruments in experimenting with dry kilns for lumber.

As soon as the published work is available may I count on receiving a notice of where it is obtainable? I would not only like to own a copy myself, but I would like to have the fellowships in game management have the opportunity of reading the book.

Your invitation to stop over and discuss these matters will not be overlooked. I would like very much to meet Mr. Kendeigh also and discuss these matters with both of you.

With best regards,

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

Copies to Fellows and Mr. Olin

Mr. King

July 8, 1931

Mr. John M. Olin
Western Cartridge Company
East Alton, Illinois

Dear Mr. Olin:

I am pleased to send you King's letter of July 6, which I am confident is a final and mutually satisfactory solution of the difficulties with Dr. Green.

Kindly return the letter after you have read it.

I am sending a copy of this to Redington, who will doubtless have an opportunity of seeing Grange's copy of King's letter.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE
BY ALDO LEOPOLD
404 UNIVERSITY AVE. NAT'L BANK BLDG.
MADISON, WISCONSIN

July 9, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I have figured out all possible train schedules and find that if I attend your meeting the afternoon of July 20 I cannot get into Quebec until 2 P.M. July 22. Mr. Amory has a luncheon on that day at which the Canadian officials are to welcome the "expedition" and which I had promised to attend. I rather expect it would embarrass Mr. Amory if many of his guests did not show up for that luncheon, although I of course do not care anything about it personally. Accordingly I feel obliged to pass up your meeting, much as I would like to be there.

I think you and John are starting this thing exactly right and on the right basis. Considering the McCullough faction, it might possibly be wiser for me not to be there. I have every confidence in your ability to swing this occasion and wish you all kinds of luck..

Naturally I was immensely pleased with your letter about the Green matter.

Do you have our proposed joint article in the form of a rough draft which I could use as a sort of reminder for discussions at Matamek? If so, you might send me a copy. If it is still in the stage where we left it, I can use my own copy.

If convenient, you might also send me a rough one or two page description of your historical information, so that I can answer questions about what will be available when it is compiled.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

905 University Avenue
Madison, Wisconsin
July 9, 1931

Messrs. John N. Ball
Earl C. Doyle
Paul L. Errington
David M. Gorsuch
W. B. Grange
Ralph T. King ✓
P. S. Lovejoy
W. L. McAtee
John C. Phillips
H. L. Stoddard
Walter P. Taylor
L. W. T. Waller, Jr.
H. M. Wight
R. E. Yeatter

Gentlemen:

The first draft of the manuscript for "The Principles of Game Management" will be typed during my absence in Canada and will be ready for criticism by about August 1.

If it is possible for you to do so without undue sacrifice of your personal plans, I would appreciate your going through it from end to end. In addition, I will split up one copy into chapters and submit them for review to various specialists.

The purpose of this letter is to ask whether you are able to take on this job. There will be only a carbon set of six copies, so I cannot furnish each of you with an individual copy, but suggest tentatively the following combinations:

1. Grange, McAtee and Stoddard
2. Wight, Yeatter, Lovejoy and Doyle
3. Waller and Phillips
4. King, Errington, Ball, Taylor and Gorsuch

I would like to have the criticisms before the end of August, and I would appreciate hearing from each of you as to whether this proposal is feasible in your case.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

August 4 1931

Mr. Aldo Leopold
Room 404
University Avenue National Bank Building
Madison Wisconsin

Dear Mr. Leopold:

I am sorry I did not get your letter of July 9 sooner. When I returned to town late on the night of July 18 I found it here too late to get an answer to you before you left for Quebec. I am sorry you were not able to attend the conference here on July 20, but I hardly expected either you or Wallace to make it, however, I did not want to postpone the start any longer. All of the others were here. You will no doubt see John soon and he can give a more complete report verbally than I can write you. Dean Coffey asked me for a written account of the meeting and I am enclosing a copy with this letter. Please return it as it is the only one I have. Everyone present expressed themselves as being well pleased with the progress made in this conference. It may lead to something.

Aldous and I spent an enjoyable three days with Dr. Green at Lake Alexander during the week of July 12. We went pretty well over the Station during this visit and made a number of plans for future cooperation. Probably our first cooperative job will be the making of a detailed map of the area. It may be possible for my students to do a considerable part of this work.

Aldous and I spent July 16, 17 and 18 on the Cloquet area. The morning of July 18 we flushed a hen and six young. One of the chicks was unable to fly and was easily caught. It was obviously sick. We placed it in a cage in the cabin and at three o'clock it was still worse so I brought it down to the University in order to get it examined before decomposition set in. It died sometime that night. Early the next morning, Sunday, I called Dr. Green and although he was leaving for Quebec that evening he spent the entire day working on this bird.

He inoculated rabbits, guinea pigs and young chickens with liver, spleen and muscle and with the 300 young ticks taken from the bird. The carcass was then examined for parasites. Dr. Green made arrangements before he left for his assistants to come to Cloquet and bring back any birds I found sick or dead. The inoculations, however, were negative, as were also the cultures. The parasitological examination showed besides the 300 ticks, two species of tapeworms present in considerable numbers, one species of ascarid and Coccidia. This parasitism was sufficient to account for its death.

You have had an opportunity to talk with Dr. Green during your Quebec trip so it isn't necessary to go into any detail relative to our newly established relations. I hope that Dr. Green is as well pleased with the present situation as I am. You will be pleased to know that only this week when certain circumstances

arose on this campus which again threatened amicable relations between Dr. Green and myself that Professor Ruggles, Dean Coffey and Professor Boss took immediate action to forestall it. Even going so far as to seriously upset the plans of certain men on this campus.

The reaction on the part of Major Waller and Mr. Comeaux to John's report is gratifying.

The copy of your letter to Mr. Baldwin is most interesting. You realize, of course, that such work as this will do a great deal to awaken the interest of University Zoologists and Ecologists. Their interest and approval will make the development of the game research program much easier and more rapid. In addition, it is getting down to fundamentals and this must eventually be the basis of the whole program. As nearly as I can tell this type of work is what we had in mind during our discussion one evening at Cloquet. Our field ecology should not be allowed to grow away from fundamental physiology and physiological chemistry. These are the basis of all real ecology.

You will be interested to know that we have done quite a bit of work here on the effects of oscillating temperatures on insect eggs and have found, as you suggest in your letter, that such temperatures do constitute an optimum.

As far as I am able to tell now I will be in the office from August 1 to 12, and again from the 20th to the 25th. I will be glad to go over a copy of your manuscript although I do not feel that my opinions can add anything of value to the manuscript.

I am just completing arrangements to take over two acres of ground here on the farm campus to be fenced, covered, and landscaped. One acre is timbered. This will provide excellent facilities for keeping captive birds for our food and physiological studies. I am attempting to outline now a series of short experiments to be carried on here during the fall and winter quarters on food preferences, amount of various foods and gravel eaten, the effects of different foods on the condition and activities of the birds, etc.

I am enclosing in this letter a brief outline of last month's work on the Cloquet area. You may find it of interest. The two things about it that worry me most are, first, why is the number of young per brood so small this early in the season and, second, what is the meaning, if any, of the six pairs of birds flushed at this season. There were no other sick birds found aside from the one described above. There is one additional point, namely, if our figures for the number of adult birds on the Station is anywhere near correct why are there so few breeding birds?

The surprising and gratifying thing about the July records is that they check so close with those for April, May and June. Have we developed a method for taking a grouse census or is this purely coincidence? Of course, only continued monthly check-ups for two or three years will give us the answer unless we should have the good fortune to band all of the birds on the station this winter.

I will be interested in your opinion of the methods employed. Are they too academic or is it good field zoology? If it does prove to be an acceptable method there is no reason why any individual couldn't easily take a census of the grouse in any area in a week or ten days. Naturally we will continue the use of

AL #3

the method through each month for the information on the numbers of birds present is only a small part of the data it provides. In addition a census is being taken on all the roads on the Station by car one evening each week beginning August 1st.

Mrs. King and the girls have never been better than they are this summer in spite of heat. Lillian sends her regards.

Sincerely yours

RTK-s
Enc.

Minn. Ruffed Grouse Investigation

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

404 UNIVERSITY AVE. NAT'L BANK BLDG.

MADISON, WISCONSIN

Aug. 7, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I appreciate your taking the pains to send me the account of the St. Paul meeting and also your notes on the strip census at Cloquet.

John Ball had also told me about the St. Paul meeting, and I think you managed the thing wisely and are off to a sound start.

I am not surprised that the strip census seems to work. What interests me immensely is the apparent large proportion of non-breeding grouse. Dr. Green will tell you that one of the greatest vacant spots in our chain of information on cyclic species as revealed by the Matamek Conference is the absence of figures on the proportion of breeding birds and the total absence of information on variations in breeding potential.

Either one of these might be an important part of the mechanism of fluctuation. One way to take a wild shot at the latter would be to attempt to correlate the highs and lows as revealed by your historical study with the recorded information on clutches. This would offer a chance for your high-powered mathematics if you could get enough clutch records. I fear, though, that you will find what we usually find: no date attached to observations.

Of the two I consider the former the more probable, and your recent results lean suspiciously in this direction. If your strip census should establish fluctuation in the proportion of breeding birds, it would of course be a brand new contribution to biology. Nobody has ever conceived of such a thing. *game*

No doubt Dr. Green has seen you by this time concerning possible changes in and enlargements of his plans, including the possibility of moving his operations to Cloquet. I encouraged him in this, in fact I suggested it, for two reasons: (1) it might serve to break down finally the breach between his department and the Agricultural College, (2) the prospect of a controlled environment at Cloquet would be an enormous advantage to his future research, and vice versa.

There can be no doubt about the fact that Green's disease theory was the outstanding contribution to the Matamek conference. Make him take the time to explain it to you in detail.

I formed a strong friendship with Green at Matamek, and you can heartily appreciate what a relief it is to have your relations with him again on an entirely friendly basis.

I am delighted that the family is well and wish you would give my personal regards to Mrs. King.

I am returning the report of the St. Paul meeting, but am assuming that I may keep the census report. If you need it, however, let me know and I will send it back also.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD

In Charge, Game Survey

Incl. report

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

404 UNIVERSITY AVE. NAT'L BANK BLDG.

MADISON, WISCONSIN

Aug. 7, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

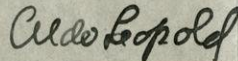
Dear Ralph:

Attached is a self-explanatory letter to Frank Walters. I am wondering whether in your work on the Forest and Stream files you were aware of this index. It is not only an index, but actually contains a one-line synopsis of each article, so that articles pertaining to your historical study could be picked out from the index alone without even reading them.

In the event I can get this copy, and if you do not have access to one, I would be glad to share it with you.

I did not mention in my other letter what hardly needs mentioning: your historical study of cycles is now absolutely needed for the follow-up work of the cycle conference. I think you and I can take some satisfaction from this situation, since practically everybody else doubted the ultimate practical value of this part of your work. It may save a dozen men a couple of years if the compiled results of your study either corroborates or refutes the cycle hypothesis which resulted from the Matamek conference.

Yours sincerely,



ALDO LEOPOLD

In Charge, Game Survey

Incl.

Copy to Mr. King

Aug. 7. 1931

Mr. Frank Walters, Bookseller
512 Grand Central Palace
New York City

Dear Mr. Walters:

My friend A. W. Schorger tells me that you have in stock a copy of the following:

Forest and Stream Bird Notes, an index and summary of all the ornithological matter in Field and Stream. Vols. I-XII. Compiled by H. B. Bailey, Field and Stream Publishing Co., 39 Park Row, New York, 1881.

I am very anxious to obtain a copy of this, and if you have one I wish you would send it, together with your bill. I understand the price is around \$5.00 or less.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

COPY

August 11 1931

Mr. Aldo Leopold
The Game Survey
Madison Wisconsin

Dear Aldo:

I am glad to hear from you again and to know you had an enjoyable time at the Canadian conference. Shall be interested in a detailed account of some of the things suggested in your letter. I will be in Wisconsin sometime in September.

I have no suggestion on the items for the Game Survey Bulletin. King's transect work is particularly worth following up. He undoubtedly knows of the transect work done by Forbes and Gross in Illinois some years ago. In that instance I do not believe broods were particularly sought.

In the case of King's transects I am not sure how much weight can be given tentative conclusions on non-breeding birds, without actual collection and examination. Even so it might be difficult although it should indicate a trend. It is entirely possible, and under certain circumstances probable, that whole families of young grouse succumb, leaving a brood-less parent which might be wrongly classed as non-breeding. I was informed of several cases of total loss of broods in Ring Neck Pheasants near Tucumcari, N. M. during last year's drought, young birds succumbing during the first week of life. At Cloquet last spring we found two dead young grouse near a very young brood which had been reduced, so far as we could determine, to three individuals. So I should say that caution is warranted and I have a hunch many of the Southern "non-breeding" pheasants will eventually turn out this way.

The only method I know of whereby actual measurements on the number of breeding and non-breeding birds can be made is by intensive banding and by the capture of incubating birds, etc. As in the case of practically all measurement attempts it seems to me adequate means of trapping and banding are fundamental. By this, however, I do not imply any doubt about the usefulness of the transect and other supplementary methods.

The Central Wisconsin manuscript is in for official approval at the present time. I hope we can really get somewhere at our meetings this fall. Thanks for suggesting it to Pugh.

I am bound for Missouri within a few days. They are apparently in earnest since they asked for 12,000 bands. It surely is an opportunity to get some quantitative data of various sorts.

Sincerely,
(signed) Wallace B. Grange
Cooperative Agent

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BY ALDO LEOPOLD

404 UNIVERSITY AVE. NAT'L BANK BLDG.

MADISON, WISCONSIN

Aug. 13, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

Dr. Gross told me at Matamek that he and Dr. Allen, and I think Gardiner Bump intend to combine the report of their researches on grouse in a single volume, more or less equivalent to Stoddard's "Bobwhite," to be issued in 1935 or 1936.

We discussed whether or not your findings could be appropriately included in such a volume. I told him that you would probably wind up your immediate project in 1932 and would have to publish a report at that time. I mentioned the possibility, however, that you might continue in grouse work in Minnesota, in which event you might be interested in joining such a venture at a later date. If the volume were not issued till 1936, there would be three or four years' additional work ready for reporting.

I am laying this matter before you for your personal information and I am sending a copy of it to Dr. Gross to make sure that I have correctly represented what he told me.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD

In Charge, Game Survey

AL/vh

August 18 1931

Mr. Aldo Leopold
404 University Avenue
National Bank Building
Madison Wisconsin

Dear Mr. Leopold:

I must get your several letters of the past week answered before I leave for Cloquet today. Paul has been here since Friday and is going to spend two or three days with me on the Cloquet area. I will complete my August check-up there in the next ten days.

I saw John at Hutchinson yesterday. Many new things have come up since Dr. Green returned from the conference. We are either building for remarkable future developments here or riding for a tremendous fall. However, it's too much to tell about in a letter. John and Paul can give you first hand accounts. I would have given a lot if you could have been with us yesterday.

We are going beyond your suggested plans as to change of working areas. It is time we had a permanent and fully equipped field laboratory under our own control. I think we will get it.

I did not know of the index of ornithological matter in 'Field and Stream' and will greatly appreciate the opportunity to use your copy if you obtain one.

Thanks a lot for sending me your notes on the Matamek Conference. I am returning them today although I would like to have a copy made for my files. Whatever the arrangements for publishing the proceedings, please see that I get two copies will you, or let me know to whom I should send my order. It rather looks as though Eiton's work has transformed whatever results we get from the historical study into supplementary data. There can't be any doubt but that the conference accomplished remarkable results and put this matter of research on cyclic species on the basis it deserves.

I am going to write you soon about the possibilities of a conference here at the University Farm sometime this fall. John will probably mention it to you.

Sincerely yours,

S.A.A.M.I. Fellow, University of Minn.

RFK:k
enc.

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404 UNIVERSITY AVE. NAT'L BANK BLDG.

MADISON, WISCONSIN

Aug. 21, 1931

Dear King:

I am having the copy of Bailey's
"Forest and Stream Bird Notes" sent direct to
you from the book dealer's. When you have
used it all you want to, you can send it on
to me.

A.L.

GAME SURVEY

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404 UNIVERSITY AVE. NAT'L BANK BLDG.

MADISON, WISCONSIN

Aug. 21, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I do not at all agree with you that Elton's work for the Hudson Bay Company has done anything but magnify the importance of your historical study. If you really think ~~that~~, I must say that I am a little disappointed. *otherwise*

He has, for instance, no data on lag, which I still think may turn out to have a higher diagnostic value than data on the cycle itself. His evidence on the varying intensity or violence of the cycle in time and space is at best circumstantial, and this also may prove to have higher diagnostic value than the average or most frequent condition. Lastly, he has no grouse data at all.

I have just heard that the proceedings will be issued at a nominal charge, so when they are ready we can get as many copies as we want. I will see that you are notified, since I have already ordered one copy for each fellow.

Your brief allusion to plans with Green sound very interesting.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

Copy to Mr. King

Aug. 31, 1931

Dr. R. G. Green
Millard Hall
University of Minnesota
Minneapolis, Minnesota

Dear Robert:

Here at last is the MSS. of "Game Management." I have delayed writing you about the disease chapter until I could give you the rest of the volume for background.

I would like you to "write your own ticket" as to the chapter on disease. I left the old one in simply to indicate the lines I had been thinking about. Please have no hesitation about scrapping it. The length can be greater if you need it.

Enclosed with the MSS. is an incomplete table on biological distribution of typical game diseases. Will you want such a thing for your chapter? I have not tried to complete it, not knowing whether it would fit in with your scheme of things.

I can run up when you need me.

Could you and King use this copy between you? I'd like for him to criticise the whole thing, so when there are periods of a week or so during which you will not need the MSS., will you shoot it to him? He may also want it as reference material for his field zoology course. You and he can keep this MSS., save for letting me borrow it later on to extract King's criticisms, and yours if you have any.

I am sending King a copy of this letter.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

Mr. King

905 University Avenue
Madison, Wisconsin
September 2, 1931

To those who have consented to
critize "Game Management"

Gentlemen:

Since writing you last about this manuscript, several things have happened to make it impracticable to route copies to fixed groups with a fixed time-limit. Instead, I shall try to write or wire you individually, at such time as I can get a copy to you, to see if you are able to do any reading at that particular time, and if so I will indicate the parts I am especially anxious to have you scrutinize. If you can cover more, so much the better.

A page of special suggestions to critics is enclosed for your use when the MSS. reaches you.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

Suggestions for those asked to
criticize "Game Management"

1. Detailed Criticisms. Please enter these in pencil directly on the text, or on the margin, but please initial all your entries.

If you can add material, I will be grateful.

2. General Criticisms. In addition I would like to have any thoughts which occur to you on structure, balance, emphasis, attitude, style, additions, deletions, etc. This had probably better be expressed by separate letter.
 3. Usage. Your preference on the following details is desired:
 - a. Page references. In quoting Stoddard's "Bobwhite", "The Grouse in Health and in Disease," and the "Game Survey," page numbers are given to facilitate your checking. Shall these be retained in the final printing, or deleted? _____

 - b. References. The full dates are used, - thus "(Maxwell, 1911)."
Would you prefer "(Maxwell '11)"? _____

 4. Bibliography. Are any of your important papers bearing on this subject matter omitted? If so, please cite: _____

- Have you any criticisms of the bibliography items "starred" as good general reading for game students?
5. Photos. The present photographs are tentative, pending the publisher's decision as to paper and format.
 6. Chapter XIII. "Disease." is tentative, pending review by competent specialists.
 7. Chapter XV. Artificial Propagation. This is classified, in its relation to wild management, in Chapters II and IV, and has been sketched very briefly as the first item in Chapter XV. Do you favor a more comprehensive treatment, or is this sufficient? _____

What other special techniques should be included in Chapter XV?
Nesting studies? Trapping and banding? Game maps? _____

Insert in Chapter III, at end of caption, "History of Cycles in America and Britain.

- - - - -

We may draw from these historical studies the following additional postulates:

(5) The length of the cycle period in North America averages about 10 years, and is apparently somewhere near synchronous in the various parts of the continent.

(6) The length of the cycle period in the British Isles averages about 6.5 years, and is somewhere near synchronous in its various parts, but (as is evident from its length) not synchronous with the North American period.

Furbearers and Small Rodents. To this list of tentative conclusions the Canadian Biological Conference (1931) added three more in part entirely new:

(7) The furbearers of Canada in general share the grouse and rabbit cycle, except that the muskrat cycle is inverse to it.

(8) The lemmings and arctic white foxes of the America arctic show a four-year cycle.

(9) Salmon and cod on the Atlantic coast of Canada share the grouse and rabbit cycle.

Possible Causes of Cycles. None of the foregoing speculations deal with causes.

The cause or causes of the wild life cycle are unknown, but the nine postulates drawn from its behavior in time and space at once narrow the possible field of speculation. The continental synchronism of cyclic phenomena makes it necessary to postulate some cause operating simultaneously over the whole continent. Fluctuations in solar radiation, in electro-

magnetic conditions, or in some other cosmic force might meet this specification.

Such a force, however, cannot directly kill grouse, or rabbits, or fish. It must either activate some lethal factor, such as disease, or change some welfare factor, such as food, or else change the breeding potential by some physiological influence as yet unknown. Such a force might conceivably do several of these things.

Because of the sudden nature of the decimation in grouse and rabbits, and the fact that numerous sick and dead individuals are found during the "crash," the most likely hypothesis in the case of these animals is that the cosmic force operates through the agency of disease. It might operate by (1) decreasing disease resistance in the host; (2) increasing the virulence of disease organisms.

Green's hypothesis explains how virulence in a bacterial disease, such as tularemia, might fluctuate rhythmically (see Chapter XIII) without the intervention of any cosmic force. The recent trend of the pathological evidence favors bacterial or virus disease, rather than parasites, as the primary lethal agent in grouse and rabbits, and varying virulence, rather than varying "resistance," as the determinant of mortality. To complete this chain of theory, it is only necessary to assume that Green's virulence-rhythms are in some way synchronized by the cosmic force. Just how this might happen is still "beyond our depth," but it is not unthinkable.

We may label this the "radiation-virulence" theory. It leaves the fish cycle unaccounted for; also the anomalous behavior of muskrats.

The other possibilities, however, should not be left out of account. Irradiation of foods, kinds of food as affected by weather, or reproductive rate as affected by food, or by radiation directly, may be secondary

causes, or they may be primary, with disease playing a secondary role.

In any event parasites certainly play an important secondary role

(various publications of Gross and Allen), or even a primary role in some regions (Grouse Report) as well as predator migrations arising out of the disappearance of buffer foods (suggested by Burnham, 1918).

- - - - -

Next caption - "Cycles and Management."

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BY ALDO LEOPOLD

404 UNIVERSITY AVE. NAT'L BANK BLDG.

MADISON, WISCONSIN

Sept. 2, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

Would you mind forwarding the inclosed letter to *John*
Linklater? I have lost his address.

Is the game warden from Ely whom I met at St. Paul
still on the job? I think his name was Hansen. If so, I
would appreciate his initials and address if you have them.

I wish you would read the Linklater letter and give
me any suggestions which occur to you and which will help me
get in touch with the right people.

Yours sincerely,



Incl.

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BY ALDO LEOPOLD
404 UNIVERSITY AVE. NAT'L BANK BLDG.
MADISON, WISCONSIN

Sept. 5, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Mr. King:

Some time ago Mr. Leopold sent you two booklets on cycle conferences. If you have finished with these would you kindly return them? Mr. Leopold would like to include them in the bibliography of his game management book.

If you have not finished with them, it will be sufficient if you simply send us the citation for them.

Yours very truly,

Vivian Horn

Secretary to Mr. Leopold

September 10 1931

Mr. Aldo Leopold
404 University Ave. National Bank Building
Madison Wisconsin

Dear Mr. Leopold:

I am enclosing a copy of the weights on the forty-seven ruffed grouse specimens on which I have more or less complete data. Analysis of the food material taken from these specimens is not yet available.

You will notice the tremendous variation in the weights of the crop and gizzard contents. Some of this is due to excess preserving fluid. All of these weights were taken from preserved material, air dried to about the stage the Survey considers standard. However, smaller quantities dry out much more under these conditions than do larger ones. I have made arrangements now to take these weights from the freshly killed specimens hereafter whenever possible.

The copy of Bailey's Forest and Stream Index came a few days ago. I will try to finish with it and get it on to you shortly. Haven't seen your Game Management text yet except for a minute or two in Dr. Green's office. I am returning your Carnegie Cycle Reports today. Thanks for the use of them and for Bailey also.

Sincerely yours

RTK-s

Minnesota Ruffed Grouse Investigations

GAME SURVEY

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BY ALDO LEOPOLD

404 UNIVERSITY AVE. NAT'L BANK BLDG.

MADISON, WISCONSIN

Sept. 15, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear *Ralph*

I remember borrowing one of Elton's books from either you or Dr. Chapman and having been so impressed with its value that I thereupon ordered both of his books for myself. The copies now in my library both contain my name, and I assume I would not have written my name in them unless I had bought them myself.

I remember loaning some of Elton's books to Errington, but this was quite recent and I think I remember clearly that they were the copies now marked with my name. I am sending Errington a copy of this letter so that when he returns *he* can let you know whether by any chance your copy is with him.

In order that you may have a copy to work with, I am loaning you mine. I have no immediate need for it.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD

In Charge, Game Survey

P. S. I am adding a new section on nesting studies to Chapter 15. Could I get you to fill out the nesting characteristics of ruffed grouse on Table 21b which is inclosed?

A.L.

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BY ALDO LEOPOLD

404 UNIVERSITY AVE. NAT'L BANK BLDG.

MADISON, WISCONSIN

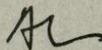
Sept. 17, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

Can I have the summary of your nest
mortality to date for ruffed grouse? All I
want is to fill in the attached table.

Yours sincerely,



ALDO LEOPOLD
In Charge, Game Survey

Inc.

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

404 UNIVERSITY AVE. NAT'L BANK BLDG.

MADISON, WISCONSIN

Sept. 18, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

Can you enter any corrections in the past or present boundary of prairie chickens in Minnesota as shown in the lower half of the attached map?

Have you heard of any additional quail irruptions other than that at Hinckley? If so, I would appreciate your entering them in the upper section.

This map when corrected is to accompany a revision I have made of Chapter III to bring it up-to-date and in conformity with the Matamek findings. It has occurred to me that the proceedings of the conference may not come out in time to be quoted verbatim. In giving me your criticisms of the book I wish your criticism on the last four or five pages of Chapter III as per copy inclosed.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

Incl.

GAME SURVEY

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SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD
404 UNIVERSITY AVE. NAT'L BANK BLDG.
MADISON, WISCONSIN

Des Moines
10/11

Dear Ralph—

There is a young teacher of zoology at Luther College, Decorah Ia, whom we are looking over as a game research prospect. His name is J. L. Strunk.

He was once a pupil of Mr. Riley's. I would like Riley's estimate of him if you can get it. I also asked him to look you up when he goes to St Paul - which he says is frequently. Will you look him over and give me your appraisal of him - either as a man to take over a life history study, or as a man to train for heading up game work at Ames.

Strunk says Van Tyne at Mich. has a graduate student on "territory" on Ruffed Grouse. Are you in touch with him? Can you tell me what he is doing? Best regards
AL

Mr. King

Nov. 10, 1931

Mr. Samuel Rosenberg
187 Rutledge Street
Brooklyn, New York City

Dear Mr. Rosenberg:

Some preliminary findings on the status of ruffed grouse in the Lake States are given in my "Report on a Game Survey of the North Central States," obtainable from the American Game Association, Investment Building, Washington, D. C., at \$1.00.

A fellowship to make a life history study of ruffed grouse is being maintained by this Institute at the University of Minnesota. Ralph T. King, University Farm, St. Paul, is the fellow. He has published no reports as yet, but I am sending him your letter so that he can put your name down for a reprint of anything that is brought out. If you have specific questions in the meanwhile, he would doubtless be glad to correspond with you. The entire outline which you give could not, of course, be covered by correspondence.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE
103 PARK AVENUE
NEW YORK

November 5th, 1931

Mr. Samuel Rosenberg,
187 Rutledge Street,
Brooklyn, New York City.

Our File:
Game

Dear Sir:

Request for Information
Re Grouse Surveys

Yours of the 4th instant asking for
information concerning Grouse Surveys:

We have taken the liberty of referring
your request to Mr. Aldo Leopold, Room 404, University
Avenue Bank Building, Madison, Wisconsin, who is in
charge of the Institute's Game Survey work, who we
believe will be in position to inform you as to the
source of the data you are seeking. You will no doubt
hear direct from Mr. Leopold within a short time.

Yours very truly,

Stewart Comeaux

S:S

Secretary

Copy to Mr. Aldo Leopold:

If you are able to supply the requested
information, as per the attached copy of letter, it will
be appreciated. Thank you.

C.S.C.

C
O
P
Y

187 Rutledge Street
Brooklyn, New York
November 4, 1931

Sporting Arms and Ammunition
Manufacturers' Institute,
103 Park Avenue
New York City

Dear Sir:

Please send me information in the form of publications
or otherwise concerning Grouse Surveys along the following
lines of investigation in relation to the ruffed grouse:

(a) human agencies, (b) weather condition, (c) disease
and parasites, (d) distribution studies, (e) mortality
studies, (f) food and shelter studies.

I would deeply appreciate any assistance that you could
possibly render in the form of sources to which I may
refer or material along the above mentioned lines of
investigation.

Very truly yours,

(signed) Samuel Rosenberg.

Nov. 13, 1931

Dr. John C. Phillips
Mass. Fish & Game Association
41 Mt. Vernon Street
Boston, Massachusetts

Dear Dr. Phillips:

I appreciate your taking the pains to put in letter form your observations on the grouse cycle in New England. I am taking the liberty of having a copy made for Ralph T. King, our ruffed grouse fellow at the University of Minnesota.

I did not know that you were having a ruffed grouse bibliography made at the Biological Survey. King will be interested in this, since he has been trying to complete a bibliography of references having to do with cyclic phenomena, but only for Minnesota and the adjacent states.

I did not know that the European hazel hen was so similar to the ruffed grouse. This being the case, somebody should certainly go after any European records which exist. I am suggesting to King that probably Charles Elton at Oxford, England, might have some information on the fluctuations in the hazel hen. I myself hardly have time to run this matter down.

You say that it is a pity we cannot run our cycles farther back. King has already run them back to 1870, and some farther yet. He has done this by exactly the method you suggest, namely a close study of the literature. His report will be finished before next July.

I hope you are feeling better and that I will have a chance to see you at the Game Conference.

With best regards,

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

Copy to Mr. King

Windyknob
Wenham, Mass.
October 31, 1931

Mr. Aldo Leopold
U. S. Forest Products Laboratory
Madison, Wisconsin

Dear Leopold:

I was much interested to read your paper on grouse cycles, a reprint of which you sent me. It is a pity that we cannot run our cycles back further, and I dare say it might be possible from a very close study of the literature. As perhaps you know, Miss May Cooke of the Biological Survey has been working on a bibliography of the species for me for several years. On account of ill health she has not completed the work as yet, although she has amassed an enormous number of references. It is possible that by going through these one could collect a number of references which would help to fill out the period back of 1900.

By the way, let me give you in an abbreviated form my status records for southeastern New Hampshire and northeastern Massachusetts, as far back as my own figures are really reliable. First, I think I wrote you of the tremendous abundance of grouse which I ran into in Ontario, norther of the C.P.R. station of De Riviere, in September, 1895. This was about the theoretical top of the abundance cycle. Now, with regard to this locality.

The years before 1914 were about average good years, but my records are not absolutely complete and I have not made any notes of the number of birds started. Before 1912, I did very little intensive shooting in the woods. My upland shooting was of such a sporadic nature that it was of no use as far as making deductions from it goes. The first big slump which I noticed took place at Auburn just west of Manchester, New Hampshire, between December, 1914, and the beginning of the next shooting season, 1915. Around Auburn in the fall of 1914 occurred one of those extraordinary concentrations of birds which you have no doubt run across. I remember hearing of one flock, about the time of the first snowfall, consisting of at least 75 birds, which is almost unprecedented in this region. In 1915 I shot almost no grouse in the region around Auburn where they were so plentiful in the previous season. Nevertheless the year 1915 was a pretty good year in general all over southeastern New Hampshire and northeastern Massachusetts. There were plenty of grouse, but we did not think that young birds were as plentiful as they had been the previous year. The season of 1916 showed the first general drop in birds all over the region that I am interested in. 1917 was a very bad year with extraordinarily few

grouse. I was in military service that fall, so could not hunt at all myself. I was also in service in 1918, but according to all the information which I had, those years were extremely bad, 1917 probably being the lower. I was in northern Maine in September, 1917, just before going into service, and grouse were then extremely scarce; and during that winter the trappers could hardly find one or two grouse a week, or even the signs of grouse.

In 1919 the grouse crop was still very poor. The season was closed in Massachusetts, and I hunted very little in New Hampshire. There were a few birds, but scarcely enough to warrant making trips of considerable distance to hunt them.

1920. There was a good comeback in some places, but birds were not evenly distributed. 1921 was a good year all over the country in which I hunt. 1922 was of course a banner year, and in that year I made the biggest shooting record in this region I ever made, or probably ever will make. 1923 was a failure. I was away that season and did almost no hunting. 1924 was a poor year on the whole, although quite a few grouse showed up at the end of the season and late November. In 1925 a fair crop of grouse showed up, and we began to make a pretty good annual bag again. 1926 was a good average year, about two-thirds to three-fourths of the banner year in 1922. In 1927 there came a bad slump in birds, especially in Massachusetts, which resulted in a closure of the Massachusetts season the following year. I suppose theoretically we should not have had this slump, but it was certainly a very marked event, and shows that our ten year cycle in this part of the world is complicated by many unknown factors. 1928 was also a poor year. The season was closed in Massachusetts and I did very little hunting myself. 1929 was a fairly good year again. I did a good deal of hunting, and for the two months open season in southeastern New Hampshire averaged about 21 birds a day, one on starting day, 50 on another, and 37 on another. This year was not as good, however, as 1922, but I hunted harder.

1930 was a good average year. I only hunted in October for a short time, and so have no notes on the whole season, but would say it was about the same or a little better than 1929. The present season, 1931, is not far enough advanced to make comments on, but I have seen more birds along the back woods roads than I have seen for many years.

I suppose you are familiar with the little European hazel hen, which of course is quite closely related to our bird. You know also that this bird, breaking up into various races, extends from Scandinavia across to Japan. I have almost no knowledge as to how this bird is handled by European game experts and as to whether it shows an cyclical behavior. I think it would be well worth while to start a correspondence with some of the European ornithologists and sportsmen, especially in Scandinavia, who could give you some information along these lines. I dare say Dr. Palmer of the Biological Survey could put you on the

track of some good men through his knowledge of ornithologists throughout the world. There has recently been published a list of the total game kill in Japan, which included the hazel hen. I am under the impression that this bird is not holding out well in numbers in northwest Europe, and possibly we might find someone who knew the reason for this.

I hope you will be able to wade through this very long letter, and that some of it at least will be of interest.

Sincerely yours,

(s) John C. Phillips

Copy to Mr. King

Nov. 28, 1931

Mr. H. L. Stoddard
The Hall, Route 1
Tallahassee, Florida

Dear Herbert:

The best way for you to judge the Elton books is to read them. Ralph King has my copy of "Animal Ecology" but I am sending you the more recent one on "Animal Ecology and Evolution" and asking Ralph to send you the other when he is through with it.

Our proposed visit and turkey hunt has been on my mind a great deal. I cannot make it before the holidays because of the Iowa job. Whether I can afterward is at best doubtful. This Iowa thing came up rather unexpectedly and is so extremely promising that I do not feel like taking any time off for the present. By the way, I walready have one private Hungarian fellowship signed up for three years.

I hate to think of all those chufas which you planted being eaten by all those nice turkeys without proper exercise in the form of dodging our arrows. I still have hopes but they are rather dim.

Take care of that first finger of yours, since you will surely need it when we eventually get out together.

Yours as ever,

Aldo Leopold

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

905 UNIVERSITY AVENUE

MADISON, WISCONSIN

Jan. 6, 1932

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

Did Elton send you the following reprint:
"The Study of Epidemic Diseases Among Wild Animals," Jour.
of Hygiene, Vol. XXXI, No. 4, October 31, 1931. Cambridge
University Press.

If not, he undoubtedly sent it to Green,
where you would have access to it. Failing this, please
send for my copy, as the thing bears very directly on your
project.

I am sending copies of this letter to the
other Fellows, since they may want to look up this paper
in their respective libraries.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

February 10 1932

Mr. Aldo Leopold
905 University Avenue
Madison Wisconsin

Dear Mr. Leopold:

The news that Grange is leaving the Survey was a surprise to me. I know no more about it than was mentioned in your letter except that in a brief letter I had from him he said he doubted very much that he would be up here again.

I appreciate your considering me for the Ames appointment. I had hoped that by this time I would know definitely what I could figure on here, but for over two weeks now I have been in quarantine for scarlet fever and haven't been able to find out anything. Such things have to be pushed by the interested party and you can't do much pushing by remote control. We will be out of quarantine by the 17th unless there are new complications. I hope to force a decision soon after. Professor Taylor has informed me that their appropriation didn't come through in Utah. I have been trying to find out what my chances are for the position Locke left vacant at Ogden, but haven't had any reply yet. I'll let you know as soon as I find out anything definite.

In case I do stay here at the University and you are available as a consultant, I will insist on an arrangement that will bring you here regularly.

The man Strunk that you wrote me about some time ago has not been in St. Paul to my knowledge. Dr. Riley is on leave in China this year so I was not able to get his estimate of this man. Is the man he mentions as working on "territory" in ruffed grouse a student of Van Tyne's or Wright's? I have heard nothing about this work except what is mentioned in your letter and the one you sent me of Strunk's.

Elton did not send me a reprint of his article on "The Study of Epidemic Disease Among Wild Animals" but Dr. Fitch of Veterinary Medicine called my attention to it and let me use his copy. By the way, I sent Mr. Stoddard your copy of Elton's "Animal Ecology."

I am enclosing the data I have on Nest Mortality in Ruffed Grouse and that on nesting habits. I am also enclosing the map showing

Mr. Aldo Leopold -2-

February 10 1932

pinnated grouse and bobwhite range. I cannot make any corrections in the prairie chicken boundary as shown. I do not know of any quail eruptions other than the one at Hinckley.

Dr. Green still has the copy of "Game Management." I had it for a day or two during the fall to get some information for use in my class. He asked me to return it and told me about three weeks ago that he wasn't yet through it. If I ever get hold of a copy I will be glad to write you my reactions.

I believe this answers the questions in most of your letters. I will write you again as soon as I know anything definite about my prospects here.

Yours sincerely

S. A. A. M. I. Fellow

RTK-b
Enc

January 11 1932

Mr. Aldo Leopold
404 University Avenue
National Bank Building
Madison Wisconsin

Dear Mr. Leopold:

As usual I must begin by asking your forgiveness for letting your letters go unanswered so long. I am going to answer them all this week but this letter is to let you know that I am still alive and to inform you of the present status of the work. As I have just written Wallace a lengthy account of conditions here I am going to save time by including a copy of it with this.

When are you going to be up this way again? There are so many things to discuss and so much to show you that letters can hardly be made to suffice. Nevertheless if you aren't going to be here soon there is a great deal that must be decided by letter. I would like to go over all of the points mentioned in my letter to Wallace with you and several others as well.

Please do not think my reference to a position with the Survey is in any way indicative of a desire to leave here. If you knew how well everything is going here you would readily see that I do not want to leave. However, you can also see, I believe, that I can not wait until I am without a position and salary before investigating the possibilities of work somewhere else.

I am, of course, not figuring on any extension of time from the Institute. I am somewhat worried about my report to them. If I stay on here and am allowed to continue the work as University research (and that has an important bearing) I wonder if a progress report would suffice at this time. Of course, if the work is not continued a complete report will have to be made.

I will not trouble you with any more details in this letter. The enclosed copy will make clear what we are now doing I think, and I will write you again within a few days.

With kindest personal regards to you and Mrs. Leopold from both Lillian and myself, I am

Sincerely yours

RTK-b

S.A.A.M.I. Fellow-Univ. of Minn.

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

905 UNIVERSITY AVENUE

MADISON, WISCONSIN

Jan. 12, 1932

PERSONAL

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I think you are doing exactly the right thing in asking the University to fish or cut bait. In addition to the strategy of the situation, I mean every word of the attached letter.

I am delighted to hear that things are going so well. It will probably take every bit of my time until the termination of my employment with the Institute on April 1 to finish up Iowa. This will mean that I will regretfully have to forego another trip to Minnesota.

I am trying to tie up with the National Research Council, but that is merely a possibility. More probably I will hang out my shingle and be in line for work in a consulting capacity with various states. With you and Bill Cox both in Minnesota, I would like very much to be a consultant to Minnesota, although I cannot say that the state would need my services very badly as long as you are there. You might, however, keep this in mind. It would provide an opportunity for us to get together occasionally. The work would include lectures or other contacts with universities. This might fit in in conjunction with your university plans.

With kindest regards,

Yours as ever,

Aldo

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

905 UNIVERSITY AVENUE

MADISON, WISCONSIN

Jan. 12, 1932

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

You may have heard by this time that Grange is leaving the Biological Survey. The Survey has made a tentative offer of his position to Errington. I had previously planned to recommend Errington to take charge of the proposed game research program at Ames. However, should he accept the Biological Survey offer, I would be delighted to recommend you for the Ames position. I would like to know about your possible availability ^{about July 1} within the next month, in order that I may be guided accordingly in talking with the Iowa people.

The Utah Agricultural College people have been bombarding me with mail for a year, asking me to recommend a man, and you may be sure that I would recommend you most heartily in the event you are available. I am writing Professor Taylor to find out whether they actually have the money, and if so I will suggest that he communicate with you direct.

Dr. W. C. Curtis of the University of Missouri was also looking for a man, but according to my latest information his appropriation had failed. The next time I write him I will find out for sure.

Yours as ever,

Aldo Leopold

January 13, 1932

Mr. N. L. Stiles
Cherokee State Bank
Cherokee, Iowa

Dear Mr. Stiles:

I have your letter of January 11 explaining that you were not joking when you suggested that migratory prairie chickens may spread Canada thistles. Your description of how circles of thistles spring up around the roosting spots opens up a very attractive little experiment to determine the effect of digestion on the seed and to try to follow through some of these spots by fencing them and noting any new vegetation in the succeeding summer.

I notice that you also suspect that the European leafy spurge is spread by birds and also the Wahoo shrub.

I am writing this out so that I can send copies of this letter to my fellowships, since I know they will be extremely interested.

Your finding of a pheasant frozen down by the tail is one of the first instances where I have received this kind of a report from one whose pronouncement I would unconditionally accept. I have heard the story dozens of times but always from laymen whose assertions in such matters one more or less habitually scouts. Was it a hen or a cock? Can you give me any details as to time of day, actions of bird, etc?

I am asking the University of Nebraska to send you a copy of the bulletin on prairies.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Survey

(Copy)

Course

February 10, 1932.

Mr. Chas. L. Horn, Pres.
Federal Cartridge Corp.
Minneapolis, Minnesota

Dear Mr. Horn:-

Thanks for sending me the correspondence with Dean Freeman.

I am a little at a loss to give you an opinion, because it is not clear whether it refers to a proposed course in Game Farming, or whether it refers to the development of instruction in Wild Game Management.

If Game Farming was the idea, my reaction would be only mildly favorable. The Clinton graduates seem to be having a hard time getting jobs and, hence, it would be difficult to make a strong case for training a lot more game farmers, even though the training might be much better.

If, on the other hand, the proposition dealt with Wild Management, then the answer is that action on it is already well under way. King has been giving a course for the last two (2) years to County Agents and Foresters, giving them a smattering of Game Management, and he also has several graduate students who are taking up some problems in game research. King's course has been very well attended and I think can be counted on to undergo a healthy expansion.

It is entirely possible, of course, that Dean Freeman doesn't know anything about it.

I am sure King would be glad to tell you what he has done and I am sending him a copy of this letter, since he may wish to write Dean Freeman about this, also.

In my opinion the thing which King has done, viz., offering an orientation course to Agents and Foresters, is the thing which should be done first, the offering of a professional course in Game Management can come later.

With best regards, I am

Very truly yours,

Aldo Leopold

In Charge Game Survey

AL:EM

March 10 1932

Mr. Aldo Leopold
905 University Avenue
Madison Wisconsin

Dear Mr. Leopold:

I can at last give you some information relative to my prospects here but it isn't yet as definite as I would like it. Professor Ruggles (Acting Chief of this Division in Dr. Riley's absence) and Dr. Boss are trying to arrange for a combination appointment between the University and the conservation commission whereby I would be appointed assistant professor in charge of Economic Zoology in the University and consulting zoologist or State Economic Zoologist in the Conservation Department, devoting half-time to each with headquarters at University Farm. But Mr. Cox seems to prefer my full time appointment in the Conservation Department in charge of wild life research, the Conservation Department to pay my full salary but allow me to devote about twenty-five per cent of my time to teaching at the University.

I have no idea what the final arrangement will be. I must admit that I would hate terribly to sever my connections with the University. I am listed for three courses next year, one junior college and two senior college. They are Economic Vertebrate Zoology, Vertebrate Taxonomy and Methods in Field Zoology. Each quarter there are a few students registered for Vertebrate Problems and Introduction to Research, and there are now seven graduate students in the work. In addition, we are working now on a four year program in game breeding and rearing for those interested.

Apparently those interested want me to stay on and develop the work here, the difficulty is in raising the necessary funds. The two things I want to be assured of are continued development of the work in the University, and a continuation of the field research. I believe my real opportunity lies in the development of methods, certainly that is where my interest lies. This can be done successfully only with a number of research assistants and time and money for field work. I am wondering if you would care to write a letter to Mr. Cox and Professor Ruggles stating your view of the opportunities here and the need for continuing the work. I believe that both of them are fully convinced of these needs but they might be able to use such a letter in convincing others.

The enclosed manuscript is self-explanatory, as is also the copy of the letter to Mr. Ruhl, the same letter was sent to Grimmer of Wisconsin and the arrangements were made direct with Cox and Stewart for the work here. I hope that between the 26th and 27th of this month at least

Mr. Aldo Leopold -2-

March 10 1932

six three to five thousand acre areas in each of the three states will be censused. In addition to the six areas done by the wardens in this state we will make the regular census at Cloquet and a 5000 acre census in Itasca State Park. One of the warden censuses will be on an adjacent and similar area just outside the park, these two areas differing only in that one will be open to hunting during any open season, the other is permanently closed.

Apparently Kay is at last on the road to recovery but we still speak of it with our fingers crossed. Believe me, her Mother and I haven't yet recovered from those days and nights we waited in the hospital hoping the doctors were wrong. They don't understand her recovery any more than they did her relapse.

I will let you know as soon as I have anything definite from them here. Will you remember my fellows in connection with any temporary summer appointments you may hear about? We would all appreciate it.

As ever,

RTK-s-b

S.A.A.M.I. Fellow
University of Minnesota.

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

905 UNIVERSITY AVENUE

MADISON, WISCONSIN

Feb. 23, 1932

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I have not replied sooner to your letter of February 10 because I have been in Iowa and out of reach.

The Ames opening has been definitely offered to Errington and he has accepted.

I wish you would give me a little more insight into what has happened in Minnesota. I take it that they have simply neglected to give you any tangible assurance that you would be retained after the expiration of the fellowship. Please inform me promptly if Minnesota makes any move toward retaining you, because in the meantime I shall want to be brushing around for chances to place you in some other state.

I am only here for a day, so I will have to defer going over your grouse data and the material for the book. Thank you very much for getting this up for me.

With best regards,

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD
905 UNIVERSITY AVENUE
MADISON, WISCONSIN

March 28, 1932

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I have just seen your letter of March 10 on my return from Iowa, and I am glad that there is at least something started toward a Minnesota position.

Considering the handicaps of the internal situation at the University, the direct connection with the Game Department might not be so bad as it would appear to be at first sight. I for one would rather work for Bill Cox than for a bunch of warring departments.

I am delighted that you have carried the grouse census developments so far. I am seeing Grimmer today and will be interested to learn whether he is cooperating. (yes - he is)

I have not had time to write you very often but you may be assured that I have your situation constantly in mind. I hope you will keep me posted.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Survey

Ralph - I was especially gratified to hear the good news about the youngsters. I fervently hope the improvement continues. Give my regards to Mrs. King.

UNIVERSITY OF MINNESOTA
DEPARTMENT OF AGRICULTURE
UNIVERSITY FARM, ST. PAUL

DIVISION OF ENTOMOLOGY AND ECONOMIC ZOOLOGY

April 1 1932

Hess H.
(send Carnegie
report)
Return to King

Mr. Leopold wrote me recently the proceedings are making progress but he has no data. AR

Mr. Aldo Leopold
905 University Avenue
Madison Wisconsin

Dear Mr. Leopold:

Nothing more has happened here at Minnesota.

The grouse census is going beautifully. Only one area left to do out of ten. That is in Itasca Park and I am leaving this afternoon to finish that one.

I am to give a paper on Periodicity in Animal Numbers in Seminar on May 5th and I wonder if the Proceedings of the Matamek Conference are going to be available before that time. If they are, I will postpone the preparation of this paper until I receive them. Could I borrow your copy of the Carnegie Report on cycles again?

Please excuse this hasty note. This census work has kept me somewhat rushed the last two weeks.

Kay is now rapidly recovering from her illness and fortunately it left no permanent ill effects.

1 Fine.

Sincerely yours

Ralph L. King

S.A.A.M.D. Fellow
University of Minnesota

RTK-b

yes
Benny sent

April 1 1932

Mr. Aldo Leopold
905 University Avenue
Madison Wisconsin

Dear Mr. Leopold:

Nothing more has happened here at Minnesota.

The grouse census is going beautifully. Only one area left to do out of ten. That is in Itasca Park and I am leaving this afternoon to finish that one.

I am to give a paper on Periodicity in Animal Numbers in Seminar on May 5th and I wonder if the Proceedings of the Matamek Conference are going to be available before that time. If they are, I will postpone the preparation of this paper until I receive them. Could I borrow your copy of the Carnegie Report on cycles again?

Please excuse this hasty note. This census work has kept me somewhat rushed the last two weeks.

Kay is now rapidly recovering from her illness and fortunately it left no permanent ill effects.

Sincerely yours

S.A.A.M.I. Fellow
University of Minnesota

RTK-b

Ed. Brown

C O P Y

STATE OF IOWA
FISH AND GAME DEPARTMENT

Des Moines
Iowa.

Lansing, Iowa
April 11, 1932

Mr. Tom Johnston,
State Fish & Game Commission
Des Moines, Iowa.

I am enclosing herein a tracing of an Allamakee map. I have endeavored to show thereon the principal grouse areas in the County. I have entered thereon the section numbers of each township it being the only method by which I could with any degree of certainty show the routes travelled by foot.

The majority of the work was done by Walter Bailey of Lansing, who was selected because of his special knowledge of the territory and who because of years of experience as trapper, guide and hunter is as well posted on the habits of native wild life as any person within the state.

The census was made in Taylor township by Bert Williams of Harper's Ferry an employee of the Department and not especially acquainted with the habits of upland game birds. To which fact I attribute the lower count on his routes as I know this territory to be equally as good for grouse and quail as the territory travelled by Bailey.

Bert Williams, Harper's Ferry, Iowa reported as follows:

Left Harper's Ferry, March 25th, walked south thru sections 23 - 26 - 27 - 34 and 3 in Taylor Township. The day was clear, slight wind and temperature below freezing. Jumped Eleven (11) grouse and Two (2) covies of quail about thirty quail altogether. Saw one (1) red fox. Reports were that grouse, quail and red fox were very plentiful and on the increase.

March 26th. Left Harper's Ferry, walked North thru Sections 23 - 24 - 13 - 26 - 6 - 5 jumped twelve (12) grouse, saw no quail, saw two (2) red foxes. Day similar to previous day as regards weather conditions. Territory covered on both trips lay in Taylor Township and was rough, hilly and about eighty percent timber.

Walter Bailey, Lansing, Iowa reported as follows: April 5th, travelled on foot alone, started in Section 9 - walked thru section 19 - 18 R. 3 W. Sections 13 - 24 - 25 R. 4 W. in Lansing Township saw three (3) covey of quail total about 50, jumped sixty-two grouse, saw many red fox signs and reported rabbits and squirrels plentiful. Day clear and warm. Country travelled hilly, heavily wooded throughout which is found many poplar and birch groves.

Walked through very little open land.

April 6th. Travelled on foot thru sections 18 - 17 and 6 in Makee Township, Sections 32 - 27 - 28 - 29 - 20 - 16 - 15 - 14 - 11 - 10 - 4 - 3 and 2 in French Creek Township, and Section 35 in Union City Township a distance of at least thirty miles, saw and heard drumming one hundred and three (103) grouse, avoided open land and did not see any quail. Returned home by car and drove down the Upper Iowa River bottom road. Talked to farmers along the road and all report a big increase in quail, grouse and red fox in the six northern townships. Reports of several flocks of King Necks on the Iowa River bottom lands in Union City and Iowa Townships, this land is all corn land no other grain raised to speak of. Plenty of food for all game birds Farmers attribute quail increase to the mild winters of the past three years, and some of the older residents report them to be as plentiful as at anytime within their memory. Many complaints as to damage done by red fox to poultry and lambs. Report decrease in skunk and increase in rabbits and squirrels. Day warm, high winds and cloudy. Trip made over rough hilly land and grouse was the chief game bird looked for.

Report of April 6th. Would be applicable to Townships of Waterloo, Hanover, Union City, Iowa and French Creek as the territory is much the same and he talked with farmers from each of the above named townships. (W.E.A. JR.)

April 8th. Walked South of Lansing thru Section 32 Lansing Twp. and Sections 4 - 3 - 10 - 11 - 12 - 30 R. 3 W. and Sections 7- 18 - 17 - 20 R.2W. in Lafayette Township. Jumped sixty three (63) grouse, saw or heard whistling sixty-four (64) quail, 2 Ring Necks Pheasants and One Gray Fox, found six red fox dens, also saw forty prairie chickens in Sec. 4 near Frank Kehellehrers. Evidence of many coon and skunk, talked to no farmers as the country is not accessible by road. Day clear warm and still.

April 9th. Travelled West of Lansing in Lansing Twp. thru Sec. 31 - 36 - 35 - 34 and South thru Sections 3- 11 - 12 in Center Twp. Jumped (29) twenty-nine grouse, heard many more drumming, saw fifteen (15) pair quail, and in Section 36 Lansing Twp. (10) ten prairie chickens. Evidences of many skunk, squirrel and rabbits. Day warm and clear hear quail calling throughout the entire route.

On all the territory covered by Bailey and Williams the Ruffed Grouse was the chief game bird sought after therefore much of the best quail country was not travelled, though to all reports quail are thicker than they have been for many years. The census on grouse speaks for itself. Ringneck pheasants are also reported in the western part of County in Union Prairie, Hanover and Ludlow twp. Bailey stated that the count was in no way exaggerated and was confident that he did not begin to find the grouse that he might had he had an assistant.

I did not use the forms sent me as I could not convey thru them the information Leopold wanted. I hope that this is what he wants. Possibly it would be best to send this letter to him and allow him to analyze as he has a pretty fair idea of the territory.

With kind personal regards, I remain.

Sincerely yours,

Signed: W. E. Albert, Jr.

RUFFED GROUSE COUNT, ALLAMAKEE COUNTY

1931

Under the Direction of W. E. Albert, Jr.

<u>Date</u>	<u>Township</u>	<u>Miles Travelled</u>	<u>Ruffed Grouse</u>	<u>Quail</u>	<u>Game Seen</u>		<u>Red Fox</u>	<u>Gray Fox</u>	<u>Ruffed Grouse Per Mile</u>
					<u>Pr. Chic.</u>	<u>Pheas.</u>			
3/25	Taylor	5	11	30			1		2
3/26	Taylor	6	12				2		2
4/5	Lansing	7	62	50					9
4/6	Makee French Creek & Union	30	(103 ^o)						(3-1/2)
4/8	Lansing & Lafayette	16	63	(64*)	40	2	(6 ¹)	1	4
4/9	Lansing & Center	9	29	30	10				3
Total		73	280						
Average			46						4
			per day						

oNot all seen. Partly drummers

*Not all seen. Partly heard whistling

¹Dens found

905 University Avenue
Madison, Wisconsin
April 19, 1932

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

Mr. W. E. Albert, Jr. of the Iowa Fish and Game Commission has volunteered to get me some quantitative evidence as to the present abundance of ruffed grouse in ~~southern~~^{NE} Iowa. I am inclosing his report and map, and also copy of a table which I derived from these. Kindly return the report and map.

I think you will agree that the number of ruffed grouse per day and per mile is unexpectedly high. I think you and I have both always thought of the populations of north-eastern Iowa and southeastern Minnesota as quite thin. Either the high of the cycle has resulted in a peak or else the mild winters or other environmental conditions have produced an extraordinary number of birds.

You may want to use the summary table, since it may serve as a fair sample of southeastern Minnesota. I would like to get some figures to make a rough comparison between the abundance as indicated by Allamakee County and the abundance in your best territory.

There is no hurry about this.

Yours sincerely,

Aldo Leopold

Incl.

GAME SURVEYS
GAME MANAGEMENT
GAME RESEARCH
CONSERVATION POLICY

ALDO LEOPOLD
CONSULTING FORESTER

905 UNIVERSITY AVENUE
MADISON, WISCONSIN

July 1, 1932

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

The attached is a recent addition to my management book. If you know where and when you are going to publish your material on trapping ruffed grouse, I would like to anticipate the reference instead of quoting it as unpublished material. Any other additions or corrections to the table will be welcomed.

How does your thesis stand and did you get your degree this year? What, if any, are the publication plans? I know that your situation is complicated, and I do not wish to burden you with a long letter, but I would appreciate a brief paragraph on how things are at this moment and what if anything I can do to help things along.

With best regards,

Yours sincerely,

Aldo Leopold
ALDO LEOPOLD

Incl.

Trapping Game

Banding studies such as those referred to in Chapter VI, the artificial extension of outflow from refuges described in Chapter VIII, and the capture of initial stock for artificial propagation, all demand the trapping of wild game, alive and without injury, and often in large numbers.

Most live-traps depend on a display of bait. The bait is usually some preferred food, but sometimes a live female is the most effective (Stoddard, p. 446).

Corrals or nets are often successful without bait. Austin () has pointed out the undeveloped possibilities of nets in this country, as compared with Europe.

In special cases game may be captured cheaply and easily by "shining." Shining of pheasants is referred to in Chapter IV.

The game manager who has need of live-trapping technique should follow down the leads suggested in Table 43. A bibliography on trapping technique for predators has already been given in Chapter X.

Table 43

Live-Trapping Technique

<u>Species</u>	<u>Device</u>	<u>Authority, Locality, Remarks</u>
Deer & Antelope	Salted corrals with trip & trigger gates	Birmingham (1931), New Mexico. Not successful for deer.
Deer	Corral with trip gate on waterhole	Locke (1929), Arizona
Mountain Sheep	Salted corral with self-trip gate	Round (1928), British Columbia
Bobwhite	Traps and nets	Stoddard (1931a, p. 439), Georgia
Hungarian Partridge	?	W. B. Grange, Fish Creek, Wis.
Ducks and Geese	5 types of trap	Lincoln & Baldwin (1929, p. 65)
Birds in general	For banding, many types	Bird Banders Manual, Lincoln & Baldwin (1929), also Baldwin (1931)
Geese	Trip gate pen	Miner (1923, pp. 142-146), Ontario
Elk		
Wild Turkey		

Authorities Who Have Not Published

Scaled Quail		J. S. Ligon, Carlsbad, New Mexico Paul Russell, University of New Mexico
Gambel Quail	Box	David M. Gorsuch, University of Arizona
Ruffed Grouse	Many devices	R. T. King, University of Minnesota
Prairie Chicken & Sharptail	Traps	F. J. Schmidt, Wis. Conservation Commission
Pheasants	Shining	Oscar Johnson, State Game Warden, South Dakota

July 26, 1932

Dr. Frederic E. Clements
Alpine Laboratory
Manitou, Colorado

Dear Dr. Clements:

In response to your inquiry about the prospective paper by King and myself:

This paper was to deal with the possible causes of game bird cycles. After attending the Matamek Conference I realized that there were others better qualified than we were to treat of this subject. Accordingly the paper has been dropped, but King is still due to come out with his Minnesota findings, and a summary of my own work to date will be included in my "Game Management" to be published by Scribner's this fall. I do not know when or where King's material will be out, but I am sending him a copy of this letter with the request that he let you know.

I appreciate your interest in my work and hope you will come back at me if I have left any part of your questions uncovered.

Yours sincerely,

ALDO LEOPOLD

AL/vh

August 12, 1932

Mr. Aldo Leopold,
905 University Ave.,
Madison, Wisconsin.

Dear Mr. Leopold:

I have put off writing since June 1st in the hope that each day would see the status of the work here settled. It has taken just two months to arrive at any certain conclusions, final decisions were finally made day before yesterday. Briefly the arrangements now are as follows:

I am engaged as biologist in the Division of Game and Fish during the summer, July 1 to October 1, with the understanding that I devote part of my time to their work during the school year. From October 1 to July 1, I will be on the University staff as instructor in economic zoology. Both appointments are now approved so there is little doubt about what I will do for the next year.

No permanent arrangement for the grouse work has been made. The University is carrying it until October 1st and the work is going on as usual. As practically all of my time is taken up with work in the department I am not doing any of the field work but it is being done by one of my graduate students so there will be no gap in the records. I am hoping that some funds will be made available by fall so we can continue it. I can manage the time if we can raise the necessary money.

It isn't possible to tell you in a letter of all the trouble we have had here during the last two months. Everything pertaining to conservation has been in an uproar since some time in May and growing rapidly worse. It finally came to a head last week in the attempted discharge of Cox. They weren't able to bring this about so a settlement on another basis was agreed upon. The smoke of battle is now clearing away and as a number of points were cleared up we will probably make considerable progress with a conservation program during the next few months.

I have some rather pretentious plans relative to my own work in the department and I would give a lot to be able to discuss them with you. However, such a discussion could not be carried on by correspondence. I am acting on the principle that we had better find out first what we have to begin with before making too many plans as to future procedure. By the end of the week I will have completed an analysis of our refuge system as far as the office records are concerned. I hope to begin immediately on a field survey of the refuges. In this connection I am also preparing a series of maps showing the distribution by townships of all our fur and game species for the state.

The census work will now be carried on over the entire state, and I hope over the three lake states. In this connection I would very much appreciate your opinion of the method. I believe I sent you a full account of what we do and how we do it as far as the ruffed grouse census is concerned. I wonder what you think of it. Our

2 . A. L.

intention was to develop a method that could be used by wardens and other interested parties and one that would give accurate information.

I am anxious to see your new book in "Game Management." I had hoped to go over the manuscript copy, but Dr. Green kept it all the time it was here except for one afternoon and I understand he has returned it to you now.

I am sorry but I have no idea where my stuff is going to be published. I haven't yet submitted it. It has seemed best to hold it up during all this uncertainty. If the work is to come to a definite close in September I can publish a final report, if arrangements are made for continuing it, then the report would be only a progress report.

I am enclosing a copy of the results of the March and April Census for comparison with the Northeastern Iowa figures. I am surprised at the large numbers of ruffed grouse shown in this Iowa census. These figures cannot, however, be compared directly with mine, at least, I think they shouldn't be. You see our figures were obtained by the method described in the account I sent you last winter. All our lines are straight lines, run with a compass on type mapped areas and the first consideration in taking the census is to take a fair and representative sample of the whole area. The lines go through both good and bad grouse cover, some always fall in open meadow and across open fields where there is little likelihood of flashing grouse but such lines must be included if we are determining the numbers of birds on the entire area. I am inclined to believe that where the lines are run more or less haphazard as they were in the Iowa work that the census-taker would naturally follow the best grouse cover and avoid those areas that were obviously not grouse cover. This seems to be indicated in that case where 62 grouse were seen on one mile trip, this is an average of almost 9 birds per mile, whereas our highest record taken in our best covers at a comparable time of year show an average of only $2 \frac{1}{6}$ birds. Censuses taken on the Cloquet area last September and October show a total of 61 birds seen in walking out 39 miles of line in September when there were 533 birds on the area (an average of 1.56 birds per mile), and 99 birds seen in walking out 48 miles in October when there were 518 birds present (an average of $2 \frac{1}{16}$ birds per mile).

I am holding up the publication of one paper in the hope that the proceedings of the Matamoras Conference will soon be available as the inclusion of material from these proceedings would bring the subject matter up to date.

It would sure be fine to see you again and talk over the many interesting things that have developed since you were last here. I hope you will not postpone writing again as long as I did this time. Please remember I am always glad to supply whatever information I can. Give my regards to Mrs. Leopold, and Mrs. King asked to be remembered to you.

Yours sincerely,

RTK:K

In Charge of Ruffed Grouse Investigations,

Percentage of present
abundance as compared
with the last peak year

County

Miles
Walked

Birds actually
seen

Total area
censused
in acres

Acres
per
grouse

Grouse
per
Sq. mile

40%	Pine	61.6	64	5440	10.99	58.23
20-25%	Lake	48	18	5760	30.80	20.78
40%	Aitkin	49.25	92	3947	7.83	81.73
40%	Pennington	78	52	5760	18.34	34.89
40%	Carlton	36.25	79	2964	9.23	69.34

December 7 1932

Mr. Aldo Leopold
905 University Avenue
Madison Wisconsin

Dear Mr. Leopold;

Mr. Cox tells me he saw you in New York but I haven't yet had an opportunity to talk with him about the meetings or to learn if he had any lengthy conversation with you.

I had hoped to write both you and the Institute long before this and report in detail on the status of the work here and our plans for the future but I have kept postponing it believing each week would see the completion of certain arrangements. I am finally convinced that certainty and any considerable degree of definiteness is too much to hope for, so I will make my report this month.

This short letter is written primarily to obtain answers to two questions: Will your Game Management text be available for use by January 10th, and is the report of the Matamek Conference in August of last year off the press?

I am giving a course in Game Management next quarter and want to use your book as a text. If it isn't available in printed form will it be possible to borrow one of the manuscript copies?

I am anxious to see the report of the Matamek Conference if it is now available but have heard nothing of it since I last saw you.

Details of the work done during the past year and that now being done will be covered in the report to be mailed you this month so I will not include them in this letter.

Hoping we will again have the pleasure of a long visit sometime,
I am

Sincerely yours

RTK-s

Instructor - Economic Zoology

CLASS OF SERVICE DESIRED	
DOMESTIC	CABLE
TELEGRAM	FULL RATE
DAY LETTER	DEFERRED
NIGHT MESSAGE	NIGHT LETTER <input checked="" type="checkbox"/>
NIGHT LETTER	WEEK END LETTER

Patrons should check class of service desired; otherwise message will be transmitted as a full-rate communication.

WESTERN UNION

NEWCOMB CARLTON, PRESIDENT

J. C. WILLEVER, FIRST VICE-PRESIDENT

1206-A

CHECK
ACCT'G INFMN.
TIME FILED

Send the following message, subject to the terms on back hereof, which are hereby agreed to

December 27 1932

Mr. Aldo Leopold
905 University Avenue
Madison Wisconsin

Will your game management text be available for use January 9? If published book not available then can you send me manuscript copy for use in preparing lectures? Students registered and am anxious to use your book. Where can I get a copy of the 1931 Matamek Conference Proceedings?

Ralph T. King

ALL MESSAGES TAKEN BY THIS COMPANY ARE SUBJECT TO THE FOLLOWING TERMS:

To guard against mistakes or delays, the sender of a message should order it repeated, that is, telegraphed back to the originating office for comparison. For this, one-half the unrepeated message rate is charged in addition. Unless otherwise indicated on its face, this is an unrepeated message and paid for as such, in consideration whereof it is agreed between the sender of the message and this company as follows:

1. The company shall not be liable for mistakes or delays in the transmission or delivery, or for non-delivery, of any message received for transmission at the unrepeated-message rate beyond the sum of five hundred dollars; nor for mistakes or delays in the transmission or delivery, or for non-delivery, of any message received for transmission at the repeated-message rate beyond the sum of five thousand dollars, *unless specially valued*; nor in any case for delays arising from unavoidable interruption in the working of its lines; nor for errors in cipher or obscure messages.

2. In any event the company shall not be liable for damages for mistakes or delays in the transmission or delivery, or for the non-delivery, of any message, whether caused by the negligence of its servants or otherwise, beyond the sum of five thousand dollars, at which amount each message is deemed to be valued, unless a greater value is stated in writing by the sender thereof at the time the message is tendered for transmission, and unless the repeated-message rate is paid or agreed to be paid, and an additional charge equal to one-tenth of one percent of the amount by which such valuation shall exceed five thousand dollars.

3. The company is hereby made the agent of the sender, without liability, to forward this message over the lines of any other company when necessary to reach its destination.

4. Domestic messages and incoming cable messages will be delivered free within one-half mile of the company's office in towns of 5,000 population or less, and within one mile of such office in other cities or towns. Beyond these limits the company does not undertake to make delivery, but will, without liability, at the sender's request, as his agent and at his expense, endeavor to contract for him for such delivery at a reasonable price.

5. No responsibility attaches to this company concerning messages until the same are accepted at one of its transmitting offices; and if a message is sent to such office by one of the company's messengers, he acts for that purpose as the agent of the sender.

6. The company will not be liable for damages or statutory penalties in any case where the claim is not presented in writing within sixty days after the message is filed with the company for transmission.

7. It is agreed that in any action by the company to recover the tolls for any message or messages the prompt and correct transmission and delivery thereof shall be presumed, subject to rebuttal by competent evidence.

8. Special terms governing the transmission of messages according to their classes, as enumerated below, shall apply to messages in each of such respective classes in addition to all the foregoing terms.

9. No employee of the company is authorized to vary the foregoing.

THE WESTERN UNION TELEGRAPH COMPANY

INCORPORATED

NEWCOMB CARLTON, PRESIDENT

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A night expedited service.

NIGHT MESSAGES

Accepted up to 2:00 A.M. at reduced rates to be sent during the night and delivered not earlier than the morning of the ensuing business day.

Night Messages may at the option of the Telegraph Company be mailed at destination to the addressees, and the Company shall be deemed to have discharged its obligation in such cases with respect to delivery by mailing such night messages at destination, postage prepaid.

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A deferred day service at rates lower than the standard telegram rates as follows: One and one-half times the standard night letter rate for the transmission of 50 words or less and one-fifth of the initial rates for each additional 10 words or less.

SPECIAL TERMS APPLYING TO DAY LETTERS:

In further consideration of the reduced rate for this special Day Letter service, the following special terms in addition to those enumerated above are hereby agreed to:

A. Day Letters may be forwarded by the Telegraph Company as a deferred service and the transmission and delivery of such Day Letters is, in all respects, subordinate to the priority of transmission and delivery of regular telegrams.

B. This Day Letter is received subject to the express understanding and agreement that the Company does not undertake that a Day Letter shall be delivered on the day of its date absolutely, and at all events; but that the Company's obligation in this respect is subject to the condition that there shall remain sufficient time for the transmission and delivery of such Day Letter on the day of its date during regular office hours, subject to the priority of the transmission of regular telegrams under the conditions named above.

No employee of the Company is authorized to vary the foregoing.

NIGHT LETTERS

Accepted up to 2:00 A.M. for delivery on the morning of the ensuing business day, at rates still lower than standard night message rates, as follows: The stand-

ard telegram rate for 10 words shall be charged for the transmission of 50 words or less, and one-fifth of such standard telegram rate for 10 words shall be charged for each additional 10 words or less.

SPECIAL TERMS APPLYING TO NIGHT LETTERS:

In further consideration of the reduced rates for this special Night Letter service, the following special terms in addition to those enumerated above are hereby agreed to:

Night Letters may at the option of the Telegraph Company be mailed at destination to the addressees, and the Company shall be deemed to have discharged its obligation in such cases with respect to delivery by mailing such Night Letters at destination, postage prepaid.

No employee of the Company is authorized to vary the foregoing.

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An expedited service throughout. Code language permitted.

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Subject to being deferred in favor of full rate messages for not exceeding 24 hours. Must be in plain language of country of origin or of destination, or in French. This service is in effect with most countries throughout the world.

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An overnight, low-rate, plain-language service. Delivery by mail beyond London will be made if a full mailing address is given and the words "Post" and "London" are written in the address. Minimum 20 or 25 words charged for.

WEEK-END LETTERS

At still lower rates. Similar to Cable Night Letters except that they are accepted up to midnight Saturday for delivery Monday morning, if telegraphic delivery is selected. Minimum 20 or 25 words charged for.

GAME SURVEYS
GAME MANAGEMENT
GAME RESEARCH
CONSERVATION POLICY

ALDO LEOPOLD
CONSULTING FORESTER

Soils Bldg.
~~905 UNIVERSITY AVENUE~~
MADISON, WISCONSIN

Dec. 29, 1932

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Mr. King:

Your wire has just been received. The delay in replying to both it and your letter of December 7 is due to the fact that both Mr. Leopold and I have been absent from the office. Mr. Leopold is at present in Missouri, so I am taking the liberty of writing you.

Mr. Leopold's game management text will not be available by January 9--probably not until late in the winter. Mr. Leopold is still reading proof on it. I had thought that we had one extra manuscript copy, but on looking in the files I find that we have not. Mr. Leopold may know some way out of this difficulty and you will undoubtedly hear from him as soon as he returns about January 2.

We have never received a full report of the Matamek Conference. In case you would like to inquire further about it, you might write to Mr. Copley Amory, 1811 Q Street, Washington, D. C. Mr. Amory was in charge of the conference.

Yours sincerely,

Vivian Horn

Secretary to Mr. Leopold

Soils Building
October 28, 1933

Mr. George F. Baggley, Chief Ranger
Yellowstone National Park Service
Yellowstone Park, Wyoming

Dear Mr. Baggley:

I appreciate your expression of interest concerning the book and hope that after you have read it, you will give me a frank expression of the extent to which it fulfills your needs and the strong and weak points from the angle of those needs. The thing is going so well that it is not impossible that a revision will come out sometime, and I want to begin right now to build a basis for improvements.

I wish I knew more about your elk problem. I was much impressed with Joe Dixon's "Fauna of the National Parks." It would please me very much to exchange notes with you from time to time, particularly since my contacts with big game are here subordinated to the farm game problem. If you are particularly anxious to keep up with the farm game problem, I would be glad to put you on my reprint list for publications. I will in any event list you for anything I put out on big game, which does not happen very often.

There is one specific point on which observations from your region are badly needed. That is the chronology of the grouse cycle. This has been measured for most of Canada, Alaska, the Lake States, and New England, but there is virtually no history from the southern Appalachians or the Rockies. To supply this need would fill a large hiatus in cycle research. Could you, in conjunction with your regular duties, compile observations on the current status of grouse and recollections of old-timers on the past status, so as to find out during what years each particular species was high or low in abundance? The wider the area over which you can extend this inquiry, the better, especially the recollections of old-timers. If you care to take this on as a kind of personal hobby, I would be delighted to help you ultimately with its publication. If interested, I will send further details.

Sincerely yours,

ALDO LEOPOLD
Game Manager

AL/vh

Soils Building
October 25, 1933

Mr. Webster Sterba
673 Jefferson Avenue
St. Paul, Minnesota

Dear Mr. Sterba:

Since writing you I have learned that I will be in LaCrosse to speak at a meeting of the Izaak Walton League Wednesday evening November 8.

In case it is difficult for you to come as far as Madison, I thought this might present an opportunity for us to confer. At the same time it would present a chance to make you acquainted with Mr. Davis, the superintendent of the new project.

How soon do you have to give an answer to your CCC offer? What salary would you stipulate for the western Wisconsin job? Unless you are coming down very soon, I would like to have this information in advance of our conference.

Sincerely yours,

ALDO LEOPOLD
Game Manager

AL/vh

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON

DEPARTMENT OF AGRICULTURAL ECONOMICS

Soils Building
October 23, 1933

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I am sending you the picture as requested in your letter.

Mr. Sterba has written me and I have asked him to come down to discuss the proposed work in case he is sufficiently interested. The finances for the project, by the way, are now definitely assured, but I am not able to make a final recommendation to Dr. Bennett until I have located both a forester and a game man, since the two positions are necessarily dovetailed.

Sincerely yours,

Aldo Leopold

ALDO LEOPOLD
Game Manager

AL/vh
Incl.

October 18 1933

Mr. Aldo Leopold
Soils Building
University of Wisconsin
Madison Wisconsin

Dear Mr. Leopold:

Much as I would like to have a year and a half experience in actual management practice in the field, I do not believe it would be advisable for me to give up my University position at present, and, too, I would like very much to continue ruffed grouse work if funds are available. At the present time, we are assured of such funds only to January 1st, 1934, and these, as you know, were supplied through private donations plus a little that the University was able to raise. The University permits me to devote part of my time to the work in connection with my regular teaching, and they have placed Mr. Alan Laidlaw on an assistantship basis to continue with the field and laboratory work, while at the same time he is completing requirements for his master's degree. We are lacking in funds for equipment and are very limited in our traveling allowance and, as noted above, I do not know definitely what to plan on after the first of the year. I can assure you that both Dr. Riley and Dean Coffey are entirely in sympathy with the work and want very much to see it continued. In spite of this uncertainty, I still think I should stay on here. However, I would like very much to recommend one of our men for the job described in your letter.

This man, Mr. Webster Sterba, took his B.S. degree in Forestry here in 1931, studied and completed his M.S. degree in June, 1933, with a major in silviculture and a minor in economic zoology (game management). His thesis was a study of the distribution and amount of ground cover and underbrush on the Cloquet Station, with a view to continuing this same work as a Ph.D. thesis if it became possible. The whole study aimed at determining the value of wild fruits and berries, etc. as game food. He did a very good job of his thesis work, as well as with the course work required for completion of his degree. As an undergraduate student, he spent his summers with the U. S. Forest Service in the Northwest engaged in the ribes eradication campaign. Although he hasn't had as much training in zoology as I believe a game man should have, this is not his fault in as much as he had no opportunity of obtaining such training until just before he undertook graduate work. His transcript of University credits does not fairly indicate the amount of work he has done in zoology, for he has read practically everything available on game problems and field zoology and studied others of the zoological sciences that he was not regularly registered for. His training in forestry is quite complete and Dr. Schmitz would not hesitate to recommend him for the position you describe. Sterba is a congenial, conscientious and absolutely honest individual, one of whom it is a pleasure to work with and one who can be trusted implicitly.

During the course of his graduate work he displayed more than average ability as a research worker and has shown conclusively a keen interest in the work, as indicated by outside study and willingness to undertake work not included within his prescribed tuties. As an example, he chose French to meet his requirements for the master's degree, successfully passed this examination without any formal course work in the subject and then simply to be able to read German game management texts began the study of German and is now ready to take that examination, although this second language is not required for a master's degree. As far as his ability as an exective is concerned, that is pretty hard to judge. However, the fact that the forest service used him as a foreman in Blister Rust camps for two years, while he was an undergraduate student would indicate that he has some ability along this line. Certainly he will not antagonize anyone with whom he may work as he is extremely careful in all relations with his associates. There is one thing that has made it difficult for him. Since recovering from an attack of influenza last year he has suffered considerably from stomach trouble and has had to follow a diet; not a too rigid diet but one that it is impossible to follow in the ordinary camp, and he has had to give up 2 jobs in the E.C.W. on doctor's orders because of this trouble. He certainly meets your requirement as far as forestry training is concerned and also in the matter of ability to conduct research. I would like very much to see him in the job and do not hesitate to recommend him for it. Both Dr. Riley and Dr. Schmitz are also willing to make such recommendations. I am supplying Sterba with a copy of your letter and am asking him to write you. You may write Mr. Sterba in care of me.

I have another favor to ask of you. I want to include in my class work this year a lecture on the leading game men and wild life investigators of North America and I want to run in connection with this a series of lantern slides picturing the various men discussed. Stoddard has very obligingly supplied me with a photograph of himself and I would like one of you, as certainly that would give me the two most famous men in the field. Will you send me such a photograph? It need not be mounted but I would like it to be fairly recent. It doesn't matter whether it shows you in field clothes or in a more formal pose.

Sincerely yours

RTK-s

Instructor - Economic Zoology

P.S. I have just talked with Mr. Sterba. He has an offer of two jobs with the Forest Service at the present time. One is technical forester at a C.C.C. Camp in Missouri; the other is Blister Rust work in this state. Neither are definite but both seem quite likely. He much prefers the work in Wisconsin and will not consider either of the other two if there is a reasonable chance of getting the game management job. He is writing you to nite.

RTK

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON

DEPARTMENT OF AGRICULTURAL ECONOMICS

Soils Building
October 14, 1933

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I am assuming that your prospects in Minnesota are sufficiently good to make it inadvisable for you to consider the possible opening described in this letter to Dean Dana. You would be admirably fitted for the job, but I would prefer, of course, that your ruffed grouse work proceed uninterruptedly. If I am mistaken in this assumption, let me know.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
Game Manager

AL/vh
Incl.

(2)
C O P Y

Soils Building
October 14, 1933

Dean S. T. Dana
School of Forestry & Conservation
University of Michigan
Ann Arbor, Michigan

Dear Sam:

The new soil erosion service of the Department of Interior, of which Dr. H. H. Bennett is chief, has asked me to recommend a game manager for the staff of a new erosion demonstration to be controlled under the public works bill in western Wisconsin. The project is not yet finally approved and its nature and location are confidential for the present. If approved, the duration of the work is 1-1/2 years.

It is proposed to take several townships of farm land and reorganize the physical layout to bring about a combination of farming, forestry, game management and erosion control. Fences are to be moved and erosion dams installed by C.C.C. camps. The crop yield, timber yield, game yield, stream discharge and silt load are to be measured before and after the change.

A game manager is needed to (a) census the area this winter and inaugurate feeding at once to save the present high stock of quail, (b) collaborate with the farming and forestry staff in making the new layout yield as much game range as possible, and (c) organize the farmers for the orderly harvesting of the game crop.

There will be need, of course, for continued technical supervision of game management, but there is no financial assurance that the project will continue that long.

Another way to describe the game manager's work is to say that he has the opportunity of applying to a definite area Errington's accumulated findings, which have so far not been applied to actual land.

If the project goes through, Errington will be asked to act in an advisory capacity.

Have you any graduate game managers who would qualify? If so, can you give me a rating of their strong and weak points, their addresses, and what you think is the salary which must be offered them? If you have any especially strong men who are available, you are at liberty to send them a copy of this letter with the suggestion that they communicate with me direct, but with the request that the project be not publicly discussed until further notice.

A game manager with forestry training is preferred, since he will have to work very closely with the forester and with the agricultural staff. It is, of course, essential that the candidate be an executive as well as a research man.

Sincerely yours,

ALDO LEOPOLD

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON

DEPARTMENT OF AGRICULTURAL ECONOMICS

Soils Building
October 13, 1933

Mr. Ralph T. King
University Farm
University of Minnesota
St. Paul, Minnesota

Dear Ralph:

When I asked you for an outline of your new findings on declining reproductive rate, I had in mind sending it to the National Research Council with a request for funds. On sober afterthought, however, I doubt whether they would know what we are talking about. I heartily agree that you should exercise great caution in releasing this at all, even to McAtee, and certainly not for quotation previous to your own publication.

The next time I am in northwestern Wisconsin I shall run over to see you.

I gather from your letter that your work is in no immediate danger of disruption, which is the main thing I wanted to know.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
Game Manager

AL/vh

October 10 1933

Mr. Aldo Leopold
Department of Agricultural Economics
University of Wisconsin
Madison Wisconsin

Dear Mr. Leopold:

I am sorry I haven't answered your letter sooner but I have been laid up for two weeks and this is my first day back at the office. I believe congratulations are in order for I understand you now occupy the chair of Conservationist at the University of Wisconsin. Personally, I think the University and the State of Wisconsin are the ones most deserving of congratulations.

I would like very much to receive an outline of your setup and some knowledge of your future plans, when you have time to write them. The work here is going along splendidly, except for the continual worry over finance. Paul informs me in a letter just received that word is being circulated to the effect that the State Conservation Department is now financing our work. This is absolutely untrue. The State Conservation Department is contributing nothing, not even encouragement, to our program. Every cent we have is contributed either from private sources or extracted from much reduced budget within our own department. However, the work is still going on and much is being accomplished. I will not take time to outline it here. My intention is to publish in detail the results of the first 4 1/2 years' work by January 1st. I would prefer, however, that this matter of intended publication not be announced publicly. As for the evidence on fluctuations and reproductive rate I will be glad to send you a summary. You can appreciate that I do not care to have this released at the present time, although I believe it is one of our most important findings. I have been working on a paper that embodies this particular phase of our work and had hoped to submit it for publication this week. However, my illness has held up work on this paper and it apparently will be held up further, for I am informed that I will spend the next two or three weeks in the hospital. McAtee has asked for the same data with permission to quote it. I presume there will be no danger in supplying him with this, although I would dislike very much to have anyone beat me to publication. I will either send you this summary or a copy of the manuscript, in which the data are included, within a day or two. I hope it will be possible for you to get up here sometime during the year, not only to fill a lecture date or two, but in order that we may talk over a great many things that have transpired since we last saw each other.

Needless to say, I think your book "Game Management" is a knockout. It marks an epoch in wild life conservation. I am using it for a text in my own class and take some pride in the fact that I have assisted in the sale of probably three dozen copies outside of the University.

With best regards, I am

Sincerely yours

Copy to Mr. King

1 Soils Building
September 29, 1933

Mr. Chas. L. Mann
260 Wighland Avenue
Upper Montclair, N. J.

Dear Mr. Mann:

Your letter of September 21 was forwarded to me by
Scribner's.

I am intensely interested in your theory that the
winter influx of foxes over the ice may account for the absence of
ruffed grouse from islands in the Great Lakes. Your theory is ingenious
and sounds to me very plausible except for one point, on which I wish
you would enlighten me further: If foxes get so thick on these islands
in winter, how is it that commercial trappers have not exploited them
and thus kept them in check?

Although this question remains unanswered in my mind,
I am much impressed by your idea. I am sending a copy of this letter
to Mr. Ralph King, who is doing research on ruffed grouse at the
University of Minnesota, and with whom I have previously discussed the
problem of why grouse are not found on the islands.

Thanks for your good word on the book.

Hoping to hear from you further,

Yours sincerely,

ALDO LEOPOLD
Game Manager

AL/vh

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON

DEPARTMENT OF AGRICULTURAL ECONOMICS

1 Soils Building
September 19, 1933

Mr. Ralph T. King
College of Agriculture
University of Minnesota
University Farm,
St. Paul, Minnesota

Dear Ralph:

Paul and I have been talking about your situation. I wish you would send me a one- or two-page summary of the evidence so far on fluctuations in reproductive rate. This, if substantiated, would, of course, be a knockout, and while I have no opportunities in sight, there might be a chance for me to use it to the end of financial stabilization of your research.

I never made that trip to northwestern Wisconsin, although I am conscious of an unfulfilled promise to you to lecture. If you still want this, I will watch for an opportunity.

With best regards,

Yours as ever,

Aldo Leopold

AL/vh

Aldo Leopold

MEMORANDUM OF AGREEMENT BETWEEN THE SPORTING ARMS AND AMMUNITION
MANUFACTURERS' INSTITUTE, THE BUREAU OF BIOLOGICAL SURVEY OF THE
UNITED STATES DEPARTMENT OF AGRICULTURE, THE AGRICULTURAL EXPERI-
MENT STATION OF THE UNIVERSITY OF MINNESOTA

I. OBJECT:

The object of this agreement is to promote useful knowledge by conducting an investigation into the life history and ecology of ruffed grouse, and the other birds or animals found to be involved in game population cycles.

II. FINANCIAL SUPPORT AND COOPERATION:

The Sporting Arms and Ammunition Manufacturers' Institute agrees to contribute not to exceed \$3000 per year for a period of three years for the salary and expense of a fellow.

The University of Minnesota is to furnish laboratory facilities and such usual equipment as is required for the carrying out of this research, and also will contribute the time of a member of the Division of Entomology and Economic Zoology as director of this research, who shall be the major advisor and supervisor of the fellow.

The United States Bureau of Biological Survey of the United States Department of Agriculture will contribute the time of an advisor who shall confer with the fellow and his supervisor from time to time, as to the progress of the research.

III. USE AND DISBURSEMENT OF FUNDS:

It is understood that upon approval of this agreement by the representatives of the Sporting Arms and Ammunition Manufacturers' Institute, the University of Minnesota, and the Bureau of Biological Survey, the sum

of money covering the salary of the research fellow and the annual fund for expense will be deposited in two semi-annual installments with the University of Minnesota by the Sporting Arms and Ammunition Manufacturers' Institute. The salary of the research fellow will then be paid by the University of Minnesota on warrants, according to the usual practices of the University in paying salaries of its employees. The expenses covering travel and incidental materials which are required in pursuit of the research shall be paid out of the expense fund by the University in accordance with its usual practice.

The salary for the first year will be at the rate of \$180 per month, or \$2160.

The expense budget for the first year will be \$840.

Any unexpended balances will be either applied to the fellowship for the succeeding year, or refunded.

Renewals for the second and third year will be made if the progress made is mutually satisfactory to the Institute and the University.

IV. APPOINTMENT OF THE RESEARCH FELLOW AND THE SUPERVISOR:

The fellowship thus created will be known as the "Sporting Arms and Ammunition Institute Fellowship." Nominations for appointment to this fellowship will be made by the Division of Entomology and Economic Zoology. These will be transmitted to the administrative offices of the University as in the instance of appointment of the University employees. It is understood that the nominee will also confer with the Bureau of Biological Survey before the confirmation of appointment. After the approval of this appointment, which will be for a period covered by the funds on hand, the

fellow will begin researches under the direction of the supervisor designated by the Division of Entomology and Economic Zoology. The Bureau of Biological Survey will provide consultation and advice in connection with the carrying out of the research. It is also understood that the work shall be co-ordinated with that carried on in similar fields through the various agencies of the United States Department of Agriculture, at the University of Minnesota.

V. PLANS OF INVESTIGATION:

It is agreed that the research fellow will investigate the life history and the fundamental phases of the ecology of the ruffed grouse, The object of the research is to determine the potential rate of reproduction of the grouse in the natural state, and to determine and evaluate the various environmental factors which tend to reduce the population of the ruffed grouse, under the conditions in nature.

VI. REPORT OF PROGRESS AND PUBLICATION OF RESULTS:

It is agreed that the Sporting Arms and Ammunition Manufacturers' Institute will be advised periodically concerning the progress of the work, through the Bureau of Biological Survey and by the University of Minnesota. Representatives of the Sporting Arms and Ammunition Manufacturers' Institute may consult with the research fellow and his advisors at appropriate times. It is agreed that the initiative as to the publications of results of the research shall rest with the University and that in all publications due credit shall be given to the Bureau of Biological Survey for its cooperation. The Bureau of Biological Survey shall have the right subject to the approval of the University to publish any or all results of the research done under

this fellowship, it being agreed that proper credit will be given to the University in such publications. The initiative as to publication with respect to this fellowship in relation to other activities of the Bureau of Biological Survey shall rest with that Bureau.

APPROVED:

(Signed)

J. Moe ? (unreadable)
Chairman, Game Committee, Sporting Arms
and Ammunition Manufacturers' Institute

7-2-29

Date

Paul G. Redington
Chief, Bureau of Biological Survey,
U. S. Department of Agriculture

6-20-29

Date

L. D. Coffman

7-18-29

Date

University of Minnesota

February 7, 1933

Mr. Alda Leopold,
Soils Building,
Madison, Wisconsin

Dear Mr. Leopold:

Thanks a lot for supplying me with a manuscript copy of your text. The work is going over great in my course on Game Management and that is due almost entirely to the very interesting and valuable information included in your book. I hope it has not inconvenienced you to let me have this copy. I think most of the members of my class of 18 will purchase the printed edition as soon as it is available. Dr. Schmidt informs me that you will be here to deliver a number of talks sometime in March and that you will probably come in from Burnett County, Wisconsin.

There is a good possibility that I will be in either Pine or Carlton Counties at that time and as these are just across the line from Burnett County I would appreciate it if you would grant me the privilege of picking you up and bringing you down to the cities. If you could possibly find the time to spend a few hours at Cloquet, I am sure that you would be more than repaid. I am not going into any lengthy discussion of what we have done and are doing up there except to state that our trapping is 100% successful, that the census method has been tried and proven beyond doubt that the marking of individual birds so that they can be recognized at 40 and 50 yards has been perfected and that at this date one out of every four birds is so marked and that the method of marking young grouse at the nest has proven successful and we are now recovering these birds that were marked two years ago. Needless to say the use of these methods has given us very accurate information on cruising radii, seasonal range, choice of cover and related problems. It will be a pleasure to discuss these things with you and it would be a privilege to demonstrate them to you in the field.

A letter that I promised to write to you during the Christmas Holidays has not yet been written. Just before that I was called home on account of the illness and death of my father and during the Christmas Holidays, I myself, was laid up with pneumonia. With two classes this quarter, 6 graduate students and devoting 50% of my time to the work of the Game and Fish Division I have had little time to write letters of any kind.

2. A. L.

Again let me express my thanks for the use of your text and I sincerely hope that your appearance on this campus will really materialize.

With very best regards, I am

Very sincerely yours,

In Charge of Ruffed Grouse
Investigations

RTK:K

GAME SURVEYS
GAME MANAGEMENT
GAME RESEARCH
CONSERVATION POLICY

ALDO LEOPOLD
CONSULTING FORESTER

Soils Bldg.
~~205 UNIVERSITY AVENUE~~
MADISON, WISCONSIN
Jan. 3, 1933

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I am sorry that we left you up in the air in the matter of a reply to your letter. Miss Horn tells me she has written you how it happened.

I will mail you tomorrow a copy of the manuscript of "Game Management." Miss Horn did not know of this copy, which was not in the office. You may keep this, unless some unforeseen need for it occurs.

I am completing the galley proof on the book today, so that I suppose it may be expected in print by March.

With best regards,

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD

AL/vh

Lesfeld

Cones, Dr. Elliott

1907

The destruction of Birds by Telegraph Wires. The American Naturalist, Vol. 10, No. 12, Dec. 1876, pp. 734-736.

States "that many hundred thousand birds are yearly killed by the telegraph". Gives an account of a trip by horse-back from Denver to Cheyenne and observations on birds killed along the telegraph wires.

Dadisman, A. J. (Morgantown, W. Va.)

1919

Ruffed Grouse Scarce in West Virginia. Bird-lore, Vol. 21, No. 1, Jan.-Feb. 1919, p.77.

"But a few years ago the Ruffed Grouse was fairly common throughout the hill region of West Virginia. Why it has become so very scarce in the last year or two is a mystery, but, nevertheless, it is true".

"A party of 3, hunting squirrels for 3 days in the Mountainous part of Tucker County in September reports seeing but 2 grouse. Another party of 3, hunting in the Mountains of Webster and Randolph Counties, 6 days in November, reports seeing 31 grouse. In both places there is an abundance of wild grapes, gum berries, beech nuts and other food for the birds. A few years ago grouse were plentiful in these same areas. Some hunters killed a few grouse and it was noticed that all the birds killed were males. One hunter reported that he had killed his quota of grouse this year. Among the 25 birds was but one female. He had hunted over several counties and noticed that there were very few birds this year, whereas he had found them plentiful last year. It was also noticed that practically all the birds killed were old birds. There seems to be a possibility that a large number of grouse froze to death last winter. The female birds might have perished in this way thus accounting for more males than females as well as the few young birds this year".

Field, Dr. George W.

1907

The Heath Hen - A Sketch of a Bird now on the Verge of Extinction. Bird-lore, Vol. 9, No. 6, Nov.-Dec. 1907 pp. 249-255. 3 photos.

"This Grouse (called 'Hethen' by the natives) has been a well-known and characteristic bird of the island (Martha's Vineyard) as far back as memory or local tradition extends. Opinions are widely held that from time to time western Pinnated Grouse or Prairie Hens have been liberated on the island. Careful inquiries indicate that the facts are as follows: (1) In 1859 Dr. Fisher liberated Ruffed Grouse

and Quail on the island, but no western prairie chickens; (2) In 1902 specimens of the Western Prairie Chicken (Tympanichus americanus), which had survived the sportsmen's show at Boston, were liberated on Martha's Vineyard, but no subsequent indications of their presence are known".

"In 1877, foxes and coons were introduced for sport and later liberated from spite, but it is probable that these have now been exterminated..."

New Soils Building
July 1, 1935

Mr. Earl W. Tinker
Regional Forester
Federal Building
Milwaukee, Wisconsin

Dear Earl:

I want to compliment you and your staff on the "Wild Life Handbook" and to thank you for sending me a copy. I am having it bound for my library.

This is a monumental piece of work, and one that far excels all previous like efforts. In fact, it is the only one to date which deals with management technique, as distinguished from policy. I suppose it takes an outsider like myself to appreciate how much work, and what good work, has gone into it.

It is, of course, entirely abnormal for such a comprehensive manual to develop so soon after any work at all was started. This, however, was thrust upon you by the abnormal expansion of your field operations. It goes without saying that the book is full of thin spots, and I would have preferred to see you dismiss many of these with "we don't know." I also notice some important omissions--especially reading facilities for your field men. Perhaps this is to be added later.

The particular purpose of this letter is to point out some of the obligations that go with such pioneering as the Handbook. If your field force carries out even ten per cent of the various compilations of data called for, your office will soon be the repository of a valuable mass of information which needs to be sifted, digested, compiled, and shared with the rest of the world. This will be a stiffer job than writing the Handbook. I am hoping that you can somehow use this job as a whetstone for your young field men to sharpen their brains on, but they can't use it creditably unless they are kept in touch with the scientific world, and with the rest of this particular technical field. Here is a poser. I don't know the answer.

I'm sending copies of this to Clapp, Trippensee, Grimmer, and to the Game Policy Committee of the S.A.F. The appearance of this Handbook is certainly an event of importance to all of them.

Yours sincerely,

Aldo Leopold
In Charge, Game Research

December 22 1934

Mr. Aldo Leopold
Soils Building
University of Wisconsin
Madison Wisconsin

Dear Mr. Leopold:

I have delayed answering your letter relative to the possibility of Laidlaw's undertaking the quail work in Wisconsin in order to talk with Laidlaw about it. He has been employed as one of Trippensee's game men on the Superior and was here with me yesterday. He left this morning for Chicago to spend Christmas day with his folks. He told me to tell you that he would see you in Madison sometime during the week after Christmas. I do not know that he has definitely made up his mind to apply for this position but I will unhesitatingly recommend him for the work in case you and he reach an understanding. His training and experience has been such that he could go ahead immediately with the work once an outline had been prepared. He would not need any amount of coaching. He is absolutely dependable, hard-working, and possesses extraordinarily good judgment. He has definitely made up his mind to complete his Ph. D. work. However, he has thought it best to take advantage of the present opportunity to gain practical experience in management and administrative work. I have no one else that I could recommend at this time.

I have two good men who will complete their Bachelor's degree work in the spring, both of them graduates of the School of Forestry, with some 60 hours of University training in Zoology and game courses. Both are extra good men and have a limited amount of field experience. However, both these men would require some coaching and they would not be ready to undertake graduate work before June.

This letter will be delivered to you by Mr. Jack Manweiler. He is carrying on Ph. D. work here in game management, has taken his Master's degree at Colorado in entomology, and, although his knowledge of and experience in game work dates only from October 1st this year, he is quite enthusiastic and I am sure will turn out to be a good man. He is on his way to his home in Chicago for the Holidays and is keen to meet you and so I am giving him this rather informal letter of introduction to you.

With very best wishes from both Mrs. King and myself to you and the members of your family for the Holiday season and the New Year, I am

Sincerely yours

RTK-s

Instructor - Economic Zoology

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON

DEPARTMENT OF AGRICULTURAL ECONOMICS

New Soils Building
December 17, 1934

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

In connection with my recent inquiry concerning a man for the study of the quail irruption, it occurs to me to ask what Laidlaw is doing. Do you know whether he has any desire to go after his doctorate? If so, how strong a recommendation could you give him for this job? Also, where can I address him at this time?

If you think he is the kind of timbre I am looking for and that he would be receptive, you can send him this letter and the other correspondence and ask him to write me at once.

Yours sincerely,

Aldo Leopold

Aldo Leopold
In Charge, Game Research

vh

Ralph: Do you have anyone whom you could recommend for this study and who would be available at once? If so, let me know.

I would prefer that this opening be not publicly discussed as yet.

A.L.

New Soils Building
December 5, 1934

Mr. Gardiner Bump
Conservation Department
Albany, New York

Dear Gardiner:

I have unexpectedly secured funds to make a study of the present irruption of quail in Wisconsin. The duration of the funds is one year and I am able to offer about \$100 per month, plus travel expense. Do you happen to have an extra good man who would fit into this job and whom you could spare without hurting your own organization? It is so late to begin the study that only a pretty good field man would have a chance of getting anything this winter.

The man should have a car to be operated on mileage, and I would prefer that he take graduate student status and get credit for his work, although my ability to pay him is limited to the one-year period. It would be a good master's thesis.

John Emlen has mentioned a young fellow by the name of Ben Bradley whom he thinks is attached to your crowd, but possibly in a temporary capacity.

Yours sincerely,

Aldo Leopold
In Charge, Game Research

vh

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON

DEPARTMENT OF AGRICULTURAL ECONOMICS

New Soils Building
October 29, 1934

Mr. Ralph T. King
University of Minnesota
University Farm
St. Paul, Minnesota

Dear Ralph:

Stoddard was here only two days and I was not able to get him to Coon Valley and still less to St. Paul. Thanks just the same for your invitation. I am forwarding your letter to Stoddard.

I will certainly let you know the next time I am near St. Paul. I was in Burnett County last summer, but was almost sure you were at Cloquet so did not try to get in touch with you.

I hope there is some prospect of getting your ruffed grouse material into print.

With best regards,

Yours sincerely,

Aldo

Aldo Leopold
In Charge, Game Research

vh

October 19 1934

Professor Aldo Leopold
New Soils Building
University of Wisconsin
Madison Wisconsin

Dear Mr. Leopold:

It has been a long time since we have seen each other. It seems to be almost impossible to arrange for any meeting. While I was at Coon Valley last week Stocker told me that Mr. Stoddard was going to be in Madison this week end and that he was trying to induce you to bring him to Coon Valley and LaCrosse. I realize that both you and Mr. Stoddard are extremely busy and that travel is somewhat expensive but I hope you will find it possible to visit St. Paul sometime during Stoddard's stay. This invitation is not purely personal; you know how glad I would be to see either of you and have a chance to visit with you both, but this is something I dare not hope for. My students in Game Management would consider it the luckiest of lucky breaks if you could be here. I know that Dr. Riley, Professor Boss, and Dean Coffey would be very glad to see you and I know, also, that such a visit would do a lot of good here. Then there are a good many things in the way of new findings and plans for the future that I would like to talk over with you and have the benefit of yours and Mr. Stoddard's experience and advice.

I am going to be in Cloquet today and tomorrow but I will be back here either Saturday nite or Sunday morning and in all the first part of next week and I sincerely hope it will be possible for you two to spend a day or two in the Twin Cities.

Sincerely yours

RTK-s

Instructor - Economic Zoology

Copy to Mr. King

New Soils Building
October 10, 1934

Mr. Martin Gillin
Land O' Lakes
Wisconsin

Dear Mr. Gillin:

Professor Juday has referred to me your inquiry about whether any study is being made of the grouse cycle.

Yes, I have two men working on this subject. Franklin J. W. Schmidt is studying the life history of Wisconsin grouse and will come out with a series of publications this winter on his findings to date. Leonard W. Wing is studying the cycle in Wisconsin grouse, having recently taken over this project from Wallace Grange. Both Wing and Schmidt are graduate students working under the joint supervision of Professor Wagner and myself.

Both studies are supplementary to a laboratory study of the diseases which has been under way for some years under the direction of Dr. R. G. Green of the University of Minnesota. Another life history study has also been made by Ralph King of the University of Minnesota. Green's findings are in print and I can put you in touch with them if you wish, but they are of a highly technical nature. King's findings are only partially in print, but he has some popular accounts of his work of which he may have extra copies. I am sending him a copy of this letter with the request that he supply you with the material which is available.

A general account of the cycle and separate accounts of the species affected by it are contained in my "Game Survey of the North Central States," which is obtainable from Dr. W. L. McAtee, U. S. Biological Survey, Washington, D. C. A further account of the cycle is contained in my "Game Management," prospectus of which is enclosed.

A general appraisal of the present status of research on the cycle is given in the attached mimeograph, "The Game Cycle: A Challenge to Science." After reading this mimeograph you will not need to be told that I am immensely appreciative of any interest shown in this subject. We are now, as you know, right in the middle of the mortality period and are letting slip opportunities for study which will not offer themselves again for another ten years at least. The present man-power engaged on the question is entirely inadequate, although they are doing the best they can. One of my two men is supported by subscriptions from a group of sportsmen in Milwaukee, Kenosha, and Racine. Should you by

Martin Gillin--2

October 10, 1934

any chance know of any other group who might be interested in contributing to further studies, I would be intensely interested to get in touch with them. I feel that we are dealing here with a very important aspect of conservation which has been almost entirely neglected both by science and by laymen.

The specific thing which needs to be studied, but for which we lack funds to pay the travel of a student, is the present "irruption" of quail almost all over Wisconsin. As you will see from the "Game Survey," this happens only once in about every 20 years or so and it is a matter of the utmost consequence that when the die-off occurs, which will doubtless be this winter, we learn how it occurs, where, and why. I have splendidly qualified men who are wishing to make this study, but lack the funds to pay them a little car mileage, which they cannot, of course, pay out of their own pockets.

Yours sincerely,

Aldo Leopold
In Charge, Game Research

AL-vh
Encl.

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON

DEPARTMENT OF AGRICULTURAL ECONOMICS

New Soils Building
August 13, 1934

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

Prof. Tracy I. Storer of the California Agricultural College at Davis tells me that he found a relation between the size of the litter in ground squirrels and the level of the general ground squirrel population. My impression is that he published this information, but I did not get the exact reference. If you want it for use in connection with your work on the clutch in ruffed grouse, I would suggest you write him and use my name.

Yours sincerely,

Aldo Leopold

Aldo Leopold
In Charge, Game Research

AL-vh

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON

DEPARTMENT OF AGRICULTURAL ECONOMICS

New Soils Building
August 6, 1934

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

Here is a letter from the Armour Livestock Bureau referring to a cycle in cattle production. You have no doubt received a copy of the Monthly Letter in question which I sent you a short time ago.

It occurs to me that this may involve something more than economic conditions. The reproductive rate may vary with solar fluctuations, just as you think it does in grouse. I am also sending a copy of this letter to Watson Hall.

The differing periods for sheep, hogs, and cattle may reflect an inherent difference in the reaction of these species to solar fluctuation.

Yours sincerely,

Aldo Leopold

Aldo Leopold
In Charge, Game Research

AL-vh

Leopold

ARMOUR'S LIVESTOCK BUREAU

ARMOUR AND COMPANY, UNION STOCK YARDS
CHICAGO, U. S. A.

August 2, 1934

Professor Aldo Leopold,
New Soils Building,
University of Wisconsin,
Madison, Wisconsin

Dear Professor Leopold:

I regret that I was out of the city when your letter of July 23, concerning our Monthly Letter, was received. My office sent forward to you the copies of the issue requested, and I shall be glad to do anything further that I can to help you on this.

If you or some of your people happen to be in Chicago I will be glad to have them come in some time. We have made some studies of the distribution of cattle and seasonal relation to their marketing that have some ecological aspects about which several ecologists have written us. Possibly you might be interested in this, although it is not as directly in the line you discuss as the Letter we have just issued.

There are similar cycles in the hog industry and in the sheep industry, roughly running up to four to six years and then dropping for a period of about four years in the sheep industry. With hogs the cycle takes three to four years to go up and then down again. Of course, right now with all these methods of control coming from the Federal Government the aspects of the cycle are not quite as clear. I anticipate the drouth and the Government work combined are going to reestablish the cattle cycle on a lower level for some years.

Very truly yours,

Edward N. Wentworth

Monthly Letter to Animal Husbandmen

EDWARD N. WENTWORTH
DIRECTOR

ARMOUR'S LIVESTOCK BUREAU

ARMOUR AND COMPANY, UNION STOCK YARDS
CHICAGO, ILLINOIS

Vol. 13, No. 2

Reprint of any part of this publication is
granted providing source is acknowledged

JUNE, 1934

The Current Status of the Cattle Cycle

A brief survey of the present situation of the cattle industry with reference to its long-time trends is interesting because of several factors. First, the number of cattle on farms and ranges in the United States since January 1, 1928 has tended to increase. Second, an unfavorable price situation existed in the entire beef trade last fall and winter due to low buying power. Third, there is current necessity for relief for cattlemen due to the drouth. Fourth, an opportunity to experiment in production control in cattle is now presented through the Agricultural Adjustment Administration.

The population of cattle, as measured each year by the estimates of the U. S. Department of Agriculture, has varied in a rather regular, wave-like, manner. Each of these waves or cycles has been of approximately fifteen years' duration (Figure 1), with the upswings lasting approximately seven years and the downswings about eight years. Stated more directly, in each case cattle population has increased for seven years, following which the movement has reversed itself and the numbers have decreased for eight years. Not only has cattle production experienced these regular cyclical variations in population, but it has also shown a general and rather constant expansion. Thus each of these cycles has tended to rise somewhat higher than the previous one. (See Figure 1.)

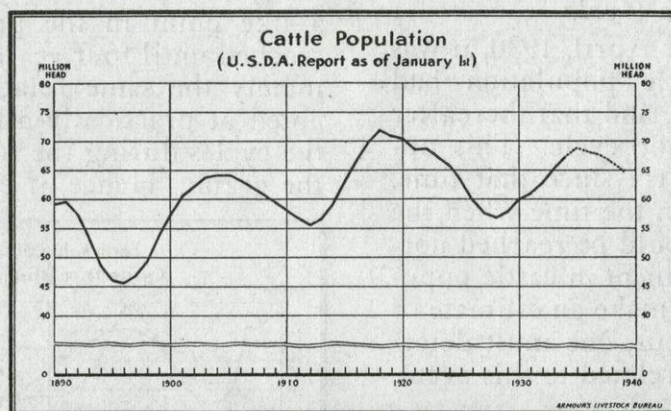


FIGURE 1.

Effect of Dairy Cattle

This long-term trend of expansion resulted rather naturally from the rapid growth in human population and the unusual rate of development of the dairy industry. The following table shows in percentages for alternating years, the change in the proportion of dairy cattle among all cattle.

The striking nature of this increase in milk cows is evidenced by a comparison of the first decade and the last decade shown. The average of the percentages covering these periods indicates that for the decade ending with 1912, there were 29½ percent of milk cows in the United States cattle population, while in the last decade the average is 38½ percent.

The indications from the last two censuses of human population are that the rate of increase has slowed down drastically, and in so far as the number of dairy cows

TABLE I.

Year	Percent Milk Cows	Year	Percent Milk Cows
1904.....	26.5	1920.....	31.1
1906.....	27.4	1922.....	31.8
1908.....	29.5	1924.....	33.8
1910.....	31.3	1926.....	37.2
1912.....	32.9	1928.....	39.0
1914.....	31.9	1930.....	38.4
1916.....	30.0	1932.....	39.1
1918.....	29.2	1934.....	38.7

For the time being, the Monthly Letter will be published every other month.

has depended on the growth of human population, we may expect a sharp decrease in the rate of expansion in milk cattle. It therefore appears that the general increase in the number of cattle in the United States is nearing an end. Cycles in cattle population will undoubtedly continue to persist, but it is doubtful if each cycle will continue to rise higher than the one preceding it—at least in the striking manner demonstrated in Figure 1.

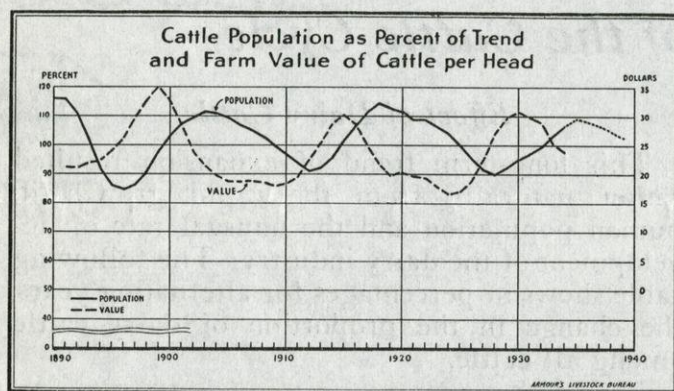


FIGURE 2.

Upswing of the Cycle

In the Monthly Letter for April, 1930, it was pointed out that the cattle population had reached a low point in 1928, and that thereafter it was on the upswing of the cycle. This upswing has continued regularly since that time. Today interest is centered on the time when the peak of the present cycle would be reached normally, and a reducing movement in cattle population initiated. In order to make an estimate of the time when this will occur, one must determine the factors which are related to this event, or which presage it.

Two of the factors related to the general expansion in cattle numbers have already been mentioned. It is obvious that the part of the variation in population, due to the general long-time growth of cattle production, can be accounted for, and the variations due to it removed from the data on cattle population. When this was done, only the cyclical movement was left, and the results are shown in Figure 2. This remaining cycle can be accounted for almost entirely by the response of cattle producers to price. These producers, like most business men, are regulated in their production programs by the profitability of their enterprise. If the cattle industry is profitable to the producer, he tends to expand his operations. If it appears unprofitable to him he will first cease to expand

and will later actually diminish the number of animals in his herd. Consequently, the cycle of production is closely related to profits.

To determine the relative profitability of beef cattle on farms, the value per head of beef cattle at the farm was used, deflated by the farm product index. This procedure relates the value of cattle to the value of all farm products. When the value is high relative to all farm products, cattle production is profitable as related to other forms of agricultural production. If all agricultural production should happen not to be profitable, then the products of cattle would still tend to purchase more for the farmer than the products resulting from other farm enterprises. On the other hand, when this deflated value is low, the cattle enterprise is certain to be an unprofitable form of agricultural production.

Figure 2 indicates that these deflated values move in a cyclical manner during the course of time just the same as does the cattle population. Furthermore, the cycles are of about the same duration. However, corresponding points in the two cycles do not occur in the same years. While the peak of the value cycle was reached in 1899, a like point in the production cycle was not reached until four years later, in 1903. Approximately the same relationship in time may be noted at practically all other turning points in the cycles during the forty-five years covered in the graph. Hence, if each point of the popula-

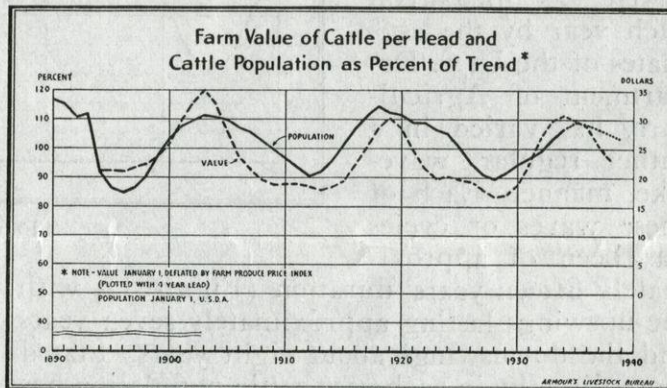


FIGURE 3.

tion cycle be moved ahead by four years, then each will correspond closely to a similar point on the value cycle, as shown in Figure 3. This relationship is quite logical, since the producers' response to profit does not become fully effective for some time to come in a slowly changing industry, such as that of cattle, where it is almost impossible to change rapidly either the size of the herds or the number of cattle ready for the market.

Probable Termination of Increased Cattle Population

Therefore, since these two cycles do move together, and the value cycle runs ahead of the population cycle by a period of some four years, then the value cycle of the past four years may be used as an indication of what the population cycle is likely to do during the next four years. This suggests that the cattle population cycle would reach a peak about 1935, following which numbers may begin to recede rather slowly. However, some irregularity in the movement of the future cycle as related to past cycles may occur, because of the fact that the sex make-up of the population has changed. Since 1920 cows have gradually come to make up a larger percentage both of the total population and of the beef population. This increase has not always been regular, but columns three, six, eight, ten and eleven of Table III show the general rela-

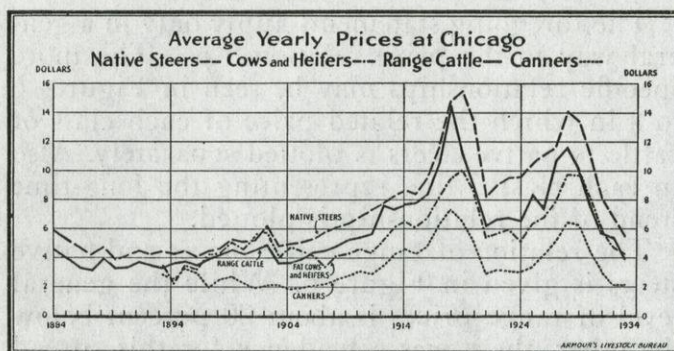


FIGURE 4.

tionship quite clearly. Further evidence is afforded by the inverse relation of cow slaughter. Records exist since 1923 and are shown in the following table.

TABLE II.

Sex Classification—Federal Inspected Cattle Slaughter		
Year	Percent Steers in Slaughter	Percent Cows in Slaughter
1923.....	47.90	48.06
1924.....	46.48	49.42
1925.....	45.31	51.31
1926.....	46.88	49.73
1927.....	47.01	49.27
1928.....	45.34	50.78
1929.....	48.63	47.38
1930.....	51.84	44.38
1931.....	54.75	41.75
1932.....	54.36	42.06
1933.....	52.02	44.09
1934 (Jan.-Apr.).....	53.91	43.02

It will be noted that the percentage of cows in slaughter since 1929 is very much less than the percentage of cows in the slaughter preceding that time. Conversely, the percentage of

steers in slaughter is much higher than in the earlier years. This indicates that a greater proportion of she-stock has been retained in the breeding herds.

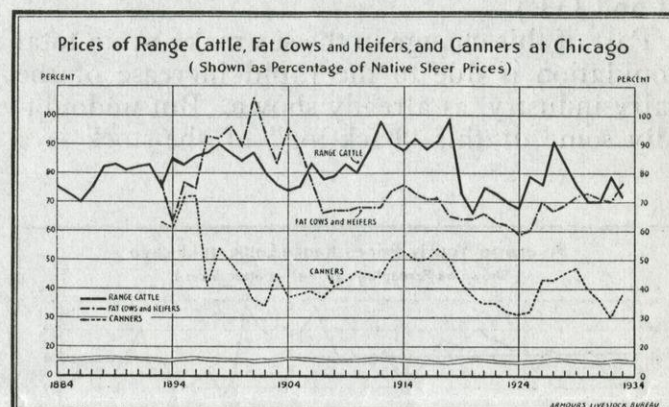


FIGURE 5.

The average for the first four months of 1934 is less than the average for the year of 1933, and apparently indicates that cattlemen are still retaining more breeding females than normally. This figure is somewhat misleading, because of the influence of seasonal variation in cow slaughter. Cow slaughter is very much greater in the late summer, fall, and early winter than in the first four months of the year, and consequently a comparison of these two figures does not reflect the situation accurately. Actually the total number of cows slaughtered during the first four months of 1934 was 32 percent greater than in the same period last year, and 36 percent greater than in 1932, while the increases in slaughter of all cattle for the corresponding periods were 28 percent and 32 percent respectively.

Greater Flexibility of Cattle Production

Nevertheless, the potential capacity for expansion is much greater in 1934 than it was in 1920. There has been a continuing trend throughout the entire country to reduce the proportion of steers over a year old, and to increase the proportion of beef production on a "cow-and-calf" basis.* This, of course, has two effects. If the producer wishes to expand his beef production he can get a bigger increase per year than when a larger proportion of his herd was steers. On the other hand, the rate of reduction in market supplies can be affected equally quickly through

* Reference is made to the tendency of range cattlemen to extend the practice of selling steer and surplus heifer calves in the fall, rather than to carry them over to yearling or greater ages, and consequently to increase the proportion of cows in their herds as recorded the first of the year.

the slaughter of cows. In any event, the present high proportion of cows in beef herds makes the control of beef production much more flexible than fifteen to twenty-five years ago. (Tables II and III.)

Part of this change in the sex make-up in total population is due to the rapid increase of the dairy industry, as already shown. But undoubtedly some of this "back-log" of she-stock is a

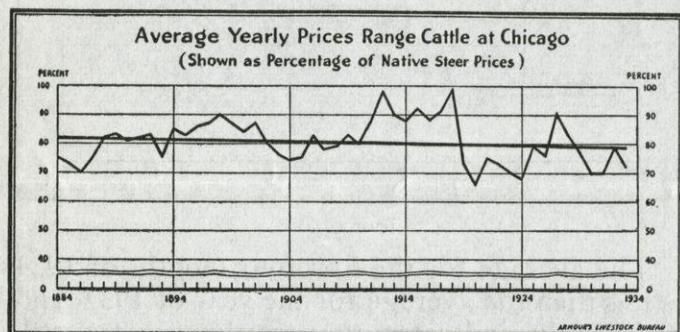


FIGURE 6.

normal part of the cycle. During the early period of expansion in the cycle, cows are kept on farms and ranges, but during the time of reduction near the end of the expansion phase of the cycle, she-stock must be liquidated. The recent low point in the percentage of cows in slaughter occurred in 1931. In both 1932 and 1933 the percentage increased and normally a further increase should occur in 1934.

Complexity of Beef Values

The cattle producer not only has to face the problem of these long-time swings in cattle population related to changes in profits, but also a complex relationship of prices which exists between various classes of cattle. There are numerous grades of beef, the wholesale grades adopted by the Institute of American Meat Packers totaling about forty, and the wholesale price ranges from the best to the poorest, varying from about 20 cents per pound to as low as 4 or 5 cents. Consequently, not all beef is directly competitive with other beef, and, therefore, the prices of all classes of beef do not move always in the same direction. In Figure 4 the actual average yearly prices at Chicago of native steers, range cattle, fat cows and heifers, and cannery are shown. From 1884 to about 1931 a rather general upward movement with some variations of a cyclical or fortuitous nature occurred. In a general way, prices moved together during this

period, but in many instances there were tendencies for the spread between the different classes of cattle to vary.

The relationship between these spreads in price may be demonstrated best by relating them to a common base. For the purpose of this study, the base used was the price of native steers at Chicago, and in Figure 5 the prices of range cattle, fat cows and heifers, and canner cattle were expressed as a percentage of this base. In general, range cattle have been nearest the level of the price of native steers. Fat cows and heifers have been slightly below range cattle. However, in certain instances they have been above them, and in the early part of this century were near the same level as native steers, for one year actually being above them. Canner cattle at all times have been below the level of other classes of cattle.

Range Cattle Values

The foregoing statements apply only in a general way to the price relationships. The more specific relationships may be seen in Figures 6 to 8 in which the related price of each class of cattle to native steers is plotted separately. Also in each class a line representing the long-time trend of the relationship is plotted.

The relation of range cattle prices and native steers is given in Figure 6. While the general level of range prices is about 20 percent below the other, there was a tendency for this spread to become slightly greater throughout the period from 1884 to 1933, as indicated by the trend line. Without doubt this line reflects, over

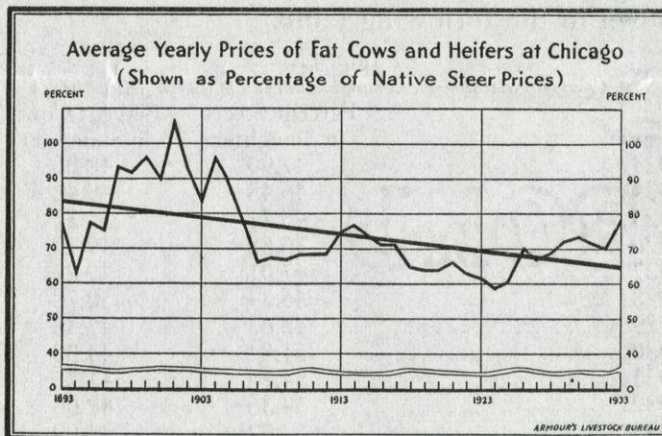


FIGURE 7.

a long time the tendency of consumers to demand higher finish in the beef they purchase; however, when total cattle supply has been light,

range cattle prices have approached native steer prices more closely. To many range cattlemen, the small amount of decline in the long-time trend may actually seem surprising, as the drop over the entire period is only about three percent of the price of native cattle. However, if it is measured in the price of range cattle, it becomes approximately four percent. The yearly relationship of range prices, of course, varies materially from the trend line and, in fact, shows something of a cyclical movement which is inverse to the total cattle population. In other words, as the cattle population increases, the spread between range cattle and native beef cattle widens, and as the cattle population decreases the spread narrows, and range cattle more nearly approach the price of native cattle.

She-Stock Values

The price relationship of fat cows and heifers to native steers is depicted in Figure 7, and shows an even greater downward trend than that of range cattle. Possibly this sharp downward movement is due to the relatively high level of the she-stock prices in the early part of the period studied, but it indicates rather definitely that over a long period of time she-stock has been losing its position in the cattle market. This may have been due in part to the increase in the number of cows, to which reference has already been made. The trend line was less than 20 percent below native steer prices in 1893, but in 1933 it was more than 30 percent below.

In Figure 8 the prices of canners also show a decided downward trend, falling from 50 per-

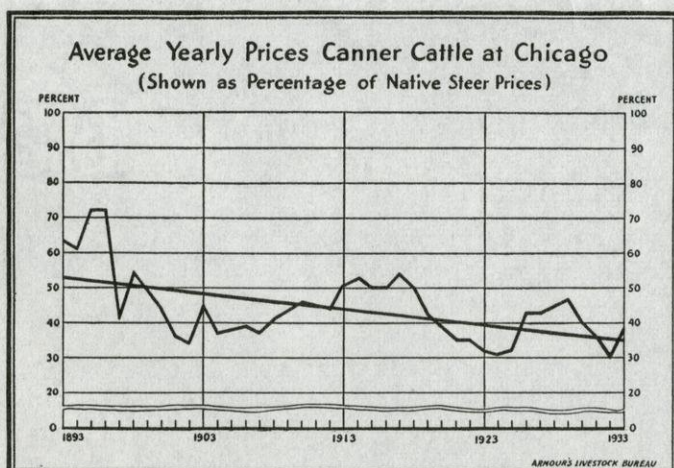


FIGURE 8.

cent below native steer prices to 65 percent below, during the 40 year period ending in 1933. The actual relationship shows slight cyclical variation around this trend.

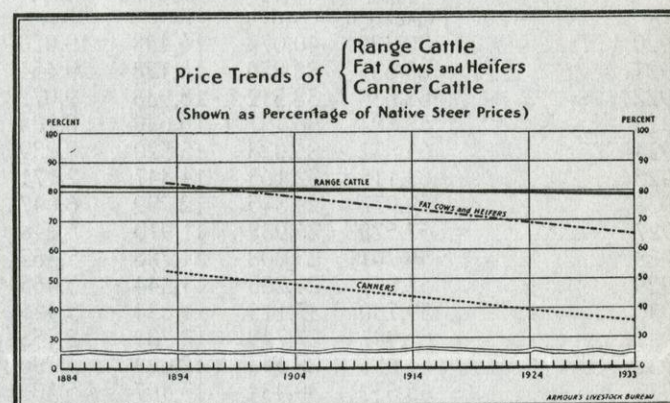


FIGURE 9.

General Relationships

Figure 9 is presented to give a composite picture of the price trends of the other three classes of cattle relative to native steers. It will be noted that range cattle have lost very little of their position during the half century period—however, she-stock has fallen off very decidedly. The loss in the position of canner stuff is not so surprising, as better grades of meat have become more plentiful, but it is interesting to note that the rate of decline in this class of meat has been no greater than in that from fat cows and heifers, even though it has occurred at a different level. Just what influence dairy cows have on the situation is difficult to determine. Undoubtedly large numbers of dairy cows in the cornbelt which have been fed on corn bring as good prices as the best quality of grass-fat range cows, while canner cows from the range or from dairy herds show no important difference in value due to type of breeding. While there may be a tendency on the part of beef cattle breeders to blame dairy cows for the relative decline in value of fat cows and heifers, there is little in the live price situation to prove the point. More probably the declining relative values are due to the increased proportion of she-stock in the slaughter rather than to any question of relative quality.

TABLE III.
Trend of Numbers of Milk Cattle and Cattle Not Kept for Milk
as of January 1, 1920-1934
(Thousand head)

Year	Total Population	All Beef Cattle*	Beef Cows and Heifers	Beef Steers	All Dairy Cattle	Dairy Cows and Heifers	% Beef Cows of All Cattle	% Dairy Cows of All Cattle	% Steers of All Cattle	% Cows of All Cattle	% Beef Cows of Beef Cattle
1920.....	70,325	40,079	16,458	10,020	30,246	25,875	23.4	36.8	14.2	60.2	41.1
1921.....	68,633	38,850	16,128	9,454	29,783	25,604	23.5	37.3	13.8	60.8	41.5
1922.....	68,633	38,512	15,936	9,072	30,151	25,794	23.2	37.6	13.2	60.8	41.4
1923.....	67,384	36,791	15,649	8,704	30,593	26,254	23.2	39.0	12.9	62.2	42.5
1924.....	65,832	35,023	15,520	8,239	30,809	26,431	23.6	40.1	12.5	63.7	44.3
1925.....	63,115	32,165	14,347	7,171	30,950	26,676	22.7	42.3	11.4	65.0	44.6
1926.....	59,977	29,345	12,999	6,647	30,632	26,356	21.7	43.9	11.1	65.6	44.3
1927.....	57,528	26,938	11,910	5,848	30,590	26,207	20.7	45.6	10.2	66.3	44.2
1928.....	56,701	25,808	11,288	5,362	30,893	26,287	19.9	46.4	9.5	66.3	43.7
1929.....	57,878	26,233	11,344	5,465	31,645	26,734	19.6	46.2	9.4	65.8	43.2
1930.....	59,730	37,115	11,634	5,445	32,615	27,610	19.5	46.2	9.1	65.7	42.9
1931.....	60,987	27,749	12,200	5,453	33,238	28,351	20.0	46.5	8.9	66.5	44.0
1932.....	62,656	28,543	12,624	5,206	34,113	29,160	20.1	46.5	8.3	66.7	44.2
1933.....	65,552	30,434	13,407	5,403	35,118	29,981	20.5	45.7	8.2	66.2	44.1
1934.....	67,352	31,276	13,928	5,467	36,076	30,811	20.7	45.7	8.1	66.4	44.5

* Recorded as "Other than Milk Cattle" by U. S. D. A.
Source—A. A. A., *Cattle and Sheep Section*, U. S. D. A., "The Beef Cattle Problem," April, 1934.

Conclusion

The foregoing study brings out several important points.

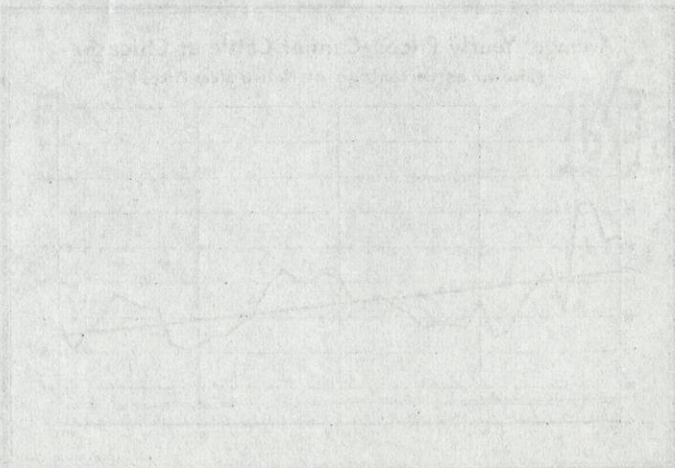
1. Under normal conditions cattle population would be expected to increase for one more year, but the drouth situation and the possible cattle control programs may offset this trend.

2. The rate of increase in dairy cattle that depended on increase in human population has

probably reached its approximate limit, and will be only very gradual hereafter, once the current reduction of milk cows is effected.

3. The spread in price between steers and she-stock has increased constantly over forty years. It is probably more dependent on the increase in she-stock available for slaughter, than on important differences in quality of beef.

K. B.



July 26, 1934

Mr. Aldo Leopold
Department of Agricultural Economics
University of Wisconsin
Madison, Wisconsin

Dear Mr. Leopold:

I have just received a letter from Doctor H. H. Chapman informing me that at your request I have been appointed to a committee of the Society of American Foresters. This committee is to deal with forest game policy I believe, and you are its chairman. Needless to say, I think you and the society have conferred an honor upon me by placing me on this committee, and I accept the appointment with pleasure. I hope I will be able to serve intelligently and satisfactorily. I haven't had time to study the copy of the memorandum Doctor Chapman sent me, but I wanted you to know that I had been informed of ~~the~~ appointment. I hope it will be possible for us to talk this thing over together some time in the near future instead of depending entirely upon written correspondence.

It has been my very great pleasure to spend some time with your son, Stocker, both at Cloquet and Coon Valley during the last two months. I hope that he enjoyed going over my work at Cloquet as much as I enjoyed going over his at Coon Valley.

You might be interested to know that we have three men on game management work in this state under my direction at the present time, two in the field and one in my office.

I may say that the situation in the game and fish division is brighter and more promising now than I have ever known it.

I only wish it were possible for the several fellows actively engaged in wild life work in this general region to keep in closer contact with each other. Michigan and Wisconsin may not feel the need of this to the extent we do here in Minnesota. We seem to be just on the edge, and exhibit eruptions of interest following such meetings as the one in Milwaukee last spring.

Mrs. King asks to be remembered to you, and please give Mrs. Leopold my regards.

Sincerely yours,

RTK: NC

Instructor - Economic Zoology

Mr. King

New Soils Building
June 1, 1934

Dr. Johannes Lid
Botanical Museum
Oslo, Norway

Dear Dr. Lid:

Thank you very much for the reprints, in English, of your publications:

Crop Contents of Ptarmigans from Taimyr. Pub. by Geofysisk Institutt, Bergen, in co-operation with other institutions. 1933.

The Food of Norwegian Grouse Chicks. Nylt Magazin for Naturvidenskaberne, B. LXXIII, 1933.

I am sending you the following Wisconsin publication bearing on grouse food:

Gross, A. O. Progress Report of the Wisconsin Prairie Chicken Investigation. Wisconsin Conservation Commission, 1930.

Additional publications are in preparation by Ralph King of the University of Minnesota (Ruffed Grouse) and Franklin Schmidt of this University (Prairie Chicken and Sharptail Grouse). Dr. Gross, and also Dr. A. A. Allen of Cornell University, Ithaca, New York, have earlier publications on Ruffed Grouse food which they may be able to send you. I have also heard something about Dr. J. Grinnell of California undertaking some work on Blue Grouse. I am sending all of them copies of this letter to acquaint them with your work, and to request them to send you material as it becomes available.

Your work will be a valuable addition to our background for American grouse studies.

Yours sincerely,

ALDO LEOPOLD
In Charge, Game Research

AL-vh

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON

DEPARTMENT OF AGRICULTURAL ECONOMICS

New Soils Building
May 2, 1934

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I suggested to Sig Olson that he not count too strongly on a Forest Service appointment because I had information from other sources that he was persona non grata with them on account of some controversy over forest policy on the Superior Forest. I simply did not want him to waste his time on something which might be vetoed. I could not tell him the reason but I do not hesitate to tell it to you. I hope I am wrong, since I think Sig Olson is exactly the man they need. Possibly it would have been wiser for me to just keep still.

I think the Forest Service is going right ahead with their game program and the chances are excellent that they will take on several men.

I expect to visit Coon Valley in about ten days but cannot fix an exact date because I must first finish my plantings on the demonstration areas. It would be fine to meet you there.

With best regards,

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Research

AL/vh

April 28 1934

Professor Aldo Leopold
New Soils Building
University of Wisconsin
Madison Wisconsin

Dear Mr. Leopold:

Thanks for the references you included in your letter of April 24. Some of them I had seen but some are new to me and I will be glad to look them up as soon as I have an opportunity to do so.

You perhaps know that Chase has begun work for Holt and there seems to be good prospects that Laidlaw will be taken on later. I have talked with Sig Olsen a couple of times in the last month and from one or two things that he has said I have gained the impression that you were not too enthusiastic about the prospects for game management in the Forest Service. I may be all wrong about this but I would very much appreciate knowing just how you do feel. This information would be strictly confidential of course. There are so many apparent possibilities and probable openings right now and so many demands on one's time that I would prefer to avoid devoting too much time to something that holds little prospect of ever amounting to anything. I think you can gather my meaning and will appreciate how I feel about it. I expect to drop down to Holt's area within the next two or three weeks for a couple of days visit, probably over some weekend. I wish it would be possible for you to be there at the same time.

The work at Cloquet is going along beautifully and we have every prospect of cleaning up some very questionable points by the first of July. I will tell you about it in more detail when we meet again and I hope this will be soon.

Sincerely yours

RTK-s

Instructor - Economic Zoology

*marked
personal.*

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON

DEPARTMENT OF AGRICULTURAL ECONOMICS

New Soils Building
April 24, 1934

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

Lovejoy discussed your suggestions on the cycle with his ornithologist, George B. Saunders, on his return from Milwaukee. Saunders was much interested and gave Lovejoy five references which he forwarded to you through me. They are attached.

With best regards,

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Research

AL/vh
Encl.

MICHIGAN DEPARTMENT OF CONSERVATION

INTEROFFICE COMMUNICATION

April 16, 1934

Memorandum to Lovejoy:

Reference Articles on Photoperiodism and the Sexual Cycle in Birds.

Rowan, The Riddle of Migration, *Williams & Wilkins Co.*
" , Proc. Boston Soc. Nat. Hist., XXXIX, 151-208.

Bissonette, T.H., Studies on the Sexual Cycle in Birds,
Journ. Exp. Zool., Vol. 58, p. 281-319


Bissonette, Effect of Light of Different Intensities Upon the
Testicular Activity of the European Starling,
Physiol. Zool. October, 1931, p. 542 -

Bissonette, Light and the Sexual Cycle in Birds,
Physiol. Zool., January, 1932 92-123.

Maxsimov, N. A.; Rozumov, V. I., Borodina, I. N.,
Physiology of Photoperiodism. Proc. All Russian
Cong. Botanists, Leningrad, 1928, p. 42 - .

These papers contain some fundamental facts regarding photoperiodism and reproductive cycles. While none of them give data on nest studies or variations in egg clutches, they do give information on changes in sexual activity as shown by cytological analysis.

Dr. A. O. Gross, in the Transactions of the Eighteenth American Game Conference, p. 193, refers to sun spots and their possible effect on reproduction.


George B. Saunders
Ornithologist
Game Division

BT

March 17 1934

Professor Aldo Leopold
Department of Agricultural Economics
University of Wisconsin
Madison Wisconsin

Dear Mr. Leopold:

As you perhaps guessed, I had not received your letter of March 1st before I went to Milwaukee. I think the suggestion relative to the effect of increasing mean age and declining clutch is decidedly important. I must admit that I had not thought of this connection and I assure you it will receive careful consideration from now on. You may be interested to know that our trapping this fall has shown less than 5% birds of last year caught this winter. I haven't the complete records but it appears that the greatest mortality during the last year occurred in birds of the year. Our returns on last year's birds now equal 29% of the total banded last year and of two years ago we have so far return records on 6%.

The book that I mentioned to you in Milwaukee is "Partridge Disease and its Causes," by Portal and Collinage, published by Country Life Ltd, London. It is a 96 page book describing in detail two methods of partridge production, gives some interesting information on life history and discusses parasites and diseases at considerable length. I do not believe it can be purchased in this country.

I have had no word from either the Regional Forester's Office or from Mr. Holt, except a request for recommendations of men whom they might employ on their contemplated projects. I have supplied them with the names of such men as I feel are qualified for this work and I have suggested that inasmuch as they may probably hire away my best trained men, they might return the favor by giving temporary employment during the summer to some of the younger men in order to provide them with actual field experience. I could place a dozen or so young fellows, juniors and senior, on temporary jobs, from June 1st to October 1st and they would be willing to work for very small pay, if the work included experience in wild life management. These men have all had three or more years training in forestry and in such game management and wild life work as I give in my courses here. I will appreciate it if you will keep these fellows in mind and let me know of any possible openings. They are not yet looking for permanent jobs. All of them want to complete their University work.

I hope you are going to find it possible to get up here during the spring quarter and I sincerely hope you will be able to spend a few

AL #2

days with us at the Cloquet Station. Please let me know when you are coming and several days in advance of your arrival, if possible.

Sincerely yours

RTK-s

Instructor - Economic Zoology

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON

DEPARTMENT OF AGRICULTURAL ECONOMICS

New Soils Building
March 1, 1934

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I was telling my class the other day about your discovery of declining clutch in ruffed grouse as they approach the peak of the cycle. One of my students made a suggestion which had never occurred to me.

He asked whether the declining average clutch might be the result of the increasing mean age of the population. In support of the supposition that advancing mean age might depress the reproductive rate, he cites the prevalent belief in Europe that old cocks are undesirable.

If you have not thought of this possibility, you may want to do so. I would suggest that the criterion lies in the amount of spread above and below the mean that you get at the peak of the cycle. Even at this time some of the individuals are of course still young. If age were responsible for the phenomenon, there should be a big spread. If it is something else, the spread would be no greater than at the trough of the cycle.

I hand this to you for what it may be worth. The suggestion comes from Mr. Carl Bunde.

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
In Charge, Game Research

AL/vh

January 31 1934

Mr. Aldo Leopold
Soils Building
University of Wisconsin
Madison Wisconsin

Dear Mr. Leopold:

Thank you for the references that you sent me. I am enclosing Miss Nice's letter with this one. I haven't had an opportunity yet to check any of these references. In fact, it wouldn't do me any good to try as most of them are printed in Dutch and my only means of translating is to find some student who can read this language.

You wrote me sometime back about material on the original range of the wild turkey, for your friend Mr. Schorger. A couple of years ago I send him what little information I had. Since that time I have heard of only one other source and that I do not think very reliable. However, I have written the man and have not yet received a reply. In case I get anything new I will forward it to him.

I am returning today two of your books that you loaned me quite sometime ago. One of them is a reference to the bird notes of the first 12 volumes of Forest and Stream, and the other is a report on the first and second conferences on cycles. Should you ever run across another copy of these conference reports, we would appreciate knowing about it as the Library here would like to purchase a copy.

We are all watching the papers with interest, waiting for the announcements of your Committee's program. Needless to say, we wish you the very best of luck in this new work. I congratulate both you and Grange on his new position and would like to hear from him sometime when he finds it convenient.

Very truly yours

RTK-a
Enc.

Instructor - Economic Zoology

January 16 1934

Mr. Aldo Leopold
Soils Building
University of Wisconsin
Madison Wisconsin

Dear Mr. Leopold:

I have intended to write you for some time and especially since your appointment to the new Federal Committee. I know, of course, that you realize that there are a number of men here who have had some training in game work and who would be glad of a chance to obtain employment on this new project. I didn't attend the game meeting in St. Paul yesterday, although I had an enjoyable 1 1/2 hour's visit with Mr. Holt. I think you did a fine job of picking when you chose him for the work in Wisconsin. I will be more than glad to give him every assistance that I can. Aldous called me this morning and said that during a conference yesterday evening Mr. Darling requested Ball to send him immediately the names of every individual who might be available or qualified to work under the project your Committee has in charge. I have had no contact with Ball for two years. Nevertheless, I believe the only fair thing to do is to submit the names of my own students for your consideration.

You already know something of Sterba. He has his B.S. in Forestry and M.A. with a major in silviculture and a minor in game management. He is at present making food analysis for me under the C.W.A. but that, of course, is only temporary and I would like nothing better than to see him placed on this new work.

I have another student, Philip Watterberg, who will complete his bachelor's requirements in forestry this quarter and who has had all of the work I give in game and wild life studies and has spent a great deal of his time with me in the field for the last three years.

You met Laidlaw for a short time the week before last. He has his B. S. in forestry and has about half completed his master's degree in this department and has had two years of practical experience in the field. Laidlaw is about the best trained and most reliable of all the students I have had. I do not care to give him up unless it meant a permanent job in this type of work for him.

Robert Montgomery is a sophomore student who has been under the guidance of Dr. Roberts and Mr. Kilgore ever since he entered high school. He has done considerable field work and has recently transferred from the Arts College to the Agricultural College in order that he might major in my own work. I would like to recommend him for any temporary job that he might be able to handle.

Dr. Warren W. Chase has just received his Ph.D. degree in forestry (physiology). Chase is 31 years old, is an excellent man, congenial, reliable and hardworking, and is intensely interested in wild life work. He has not had any formal course work in zoology but has sat in, as an auditor, in most of my courses and we have spent quite a bit of time together in the field for the past few years. Although he is married and has two children, he would be very glad to

accept a position at a minimum salary in order to gain experience and training in game management.

Jack Fry has his B.S. in forestry and one quarter's work toward his Master's in this department. He is now foreman in a C.C.C. camp. He is intensely interested in wild life work, particularly that dealing with water fowl. A very good man.

Lauritz Krefting has his B.S. in forestry and had completed practically two quarters work toward his M.S. in this department before accepting a position as foreman in a C.C.C. camp. A good man.

Herman Olson has his B.S. in forestry, one year's experience on the State Game Farm, where he had a most enviable record, and is now a foreman in a C.C.C. camp. A reliable and hardworking student.

Harry Adams after completing three years in forestry transferred to the Arts College, took his B.S. there in zoology, has almost entirely completed his M.S. requirements in aquatic and animal biology, is particularly interested in fish but also much interested in water fowl, and is now a foreman in a C.C.C. camp. An especially valuable man.

Dale Sanders has his B.S. in forestry, a year's experience in a C.C.C. camp in the Southwest, and is now in the same work in this State.

Any of these men can be reached through me. All are employed in this State at the present time and I believe everyone of them would be glad to accept reductions in salary in order to get employment in wild life work. Each one is anxious to get experience in this field and each one intends taking further training in the nature of graduate work. I will be glad to furnish you with further details relative to their qualifications and the names of men to whom you could refer for recommendations, or with their addresses if you are interested. I think any of them but Laidlaw would consider temporary employment, even though it were only for a few months. I sincerely hope that you will give them some consideration when it comes to choosing men to work on this new project. For that matter, I would like to enter my name as being much interested; although I have no reason to believe that I will not be at the University, neither do I have any assurance that I will be.

I will write you again later relative to other matters. With very best wishes, I am

Sincerely yours

RTK-s

Copy for Mr. J. N. Darling

Instructor - Economic Zoology

Copy to Mr. King

New Soils Building
Madison, Wisconsin
January 5, 1934

Mr. E. V. Willard
State Commissioner of Conservation
St. Paul, Minnesota

Dear Mr. Willard:

I am informed by C. M. Aldous of the U. S. Biological Survey that your Commission is now disposed to make a serious effort to enforce and improve the Red Lake Caribou Refuge, containing the only U. S. remnant of this species.

I am moved to say that I, and I think many other conservationists who know the circumstances, are watching Minnesota's attitude toward this remnant with both hope and anxiety. It is very clear that your commission is, in this instance, the custodian of what in every moral sense is a national property. To let it be dissipated while hundreds of thousands of dollars are spent annually on the protection of other species in no wise threatened would be a permanent black mark against the whole conservation movement. I welcome the news that you are now disposed to take care of these caribou.

Yours respectfully,

ALDO LEOPOLD
Game Manager

AL/gm

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON

DEPARTMENT OF AGRICULTURAL ECONOMICS

New Soils Building
Madison, Wisconsin
January 4, 1934

Mr. Ralph King
Administration Building
University Farm
St. Paul, Minnesota

Dear Ralph:

I think I sent you a copy of my recent letter to Margaret Nice concerning your impending publication on Decline in Clutch of Ruffed Grouse.

She has kindly responded with what looks like a very valuable list of references which I am sending you should you have opportunity to use them. Kindly return her letter.

With best regards,

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
Game Manager

AL:GM
Enc.

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON

DEPARTMENT OF AGRICULTURAL ECONOMICS

New Soils Building
January 2, 1934

Mr. Ralph T. King
Department of Agriculture
University Farm
St. Paul, Minnesota

Dear Ralph:

I will be glad to see Laidlaw, although it has been necessary for me to fill the position meanwhile. I took on a Cornell man by the name of Arthur Hawkins.

Jack Manweiler also stopped in and I was glad to get acquainted with him. He told me you were about to get some of your findings into print, which I hope is correct.

Paul Errington was here during the holidays and we had frequent occasion to think of you.

With best regards,

Yours sincerely,

Aldo

Aldo Leopold
In Charge, Game Research

vh

156 West Patterson Avenue
Columbus Ohio
January 1 1934.

Dear Mr. Leopold:

Thank you very much for your kindness in sending me Capt. Askins letter, which I return herewith. I am sorry that the press of other duties caused such a delay.

I was very much interested in "The Conservation Ethic." I had not realized that the Southwest had been so dreadfully injured by the White Man.

I should be very much interested in Mr. King's findings on the nesting of Ruffed Grouse.

Lately I have been toiling over some Dutch publications that deal with problems connected with laying. In one of these - D. Tollenaar, 1922, Legperioden en Eierproductie. Landbouwhoogesch. (Wageningen) 23, no. 2. 46 p. -

there is a very interesting statement that Blue Titmice in a favorable environment laid earlier, had larger sets and more second broods than in less favorable conditions.

I have found some more references that give the ratio of daily food to the weight of the bird.

Gallus Beck. 1930. Neue Beitrage zur Zweikomponentheorie des Hungers. Ztsch. f. Psychologie. 18, 283-349.

This is a very interesting study on hens, giving the amount eaten during different stages of the molt.

H. Scharnke. 1932. Rythme nycthemeral et variations diurnes du metabolisme chez le pigeon et chez un hibou. Ann. de Physiologie, 8, n. 5, 891-946.

Fluctuations in weight of pigeons during one day; weight of food of one pigeon.

H. Schildmacher, 1929. Ueber den Warmehaushalt kleiner Körnerfresser. Orn. Monat. 37, 4, 102-106.

Small animal needs relatively more food than large; experiments on 2 weaver-birds.

Rörig. 1903. Untersuchungen über die Nahrung unserer einheimischen Vögel. Arbeiten aus der biologischen Abteilung für Land- und Forstwirtschaft am Kaiserl. Gesundheitsamte. IV, Bd. 1. p. 28.

I have not seen then. Rörig has another paper published in 1898; perhaps the reference could be found in the Zoological Record.

Stresemann, E. 1927-1933. Aves. Kuckenthal-Krumbach, Handb. Zool. 7. Bd. 2, Hälfte. pp. 509-515.

These volumes of Stresemann's give a most valuable resume of every aspect of bird life; your library should certainly acquire Aves if it has not already done so.

Leopold #2

Do you read German readily? If so, I will send you a reprint of my long paper on Song Sparrows - translated by Dr. Desselberger and being published in the Journal für Ornithologie. But if German is an affliction and stumbling-block to you, don't hesitate to say so. I will have only a limited number of these reprints.

Sincerely yours

(Signed) Margaret M. Nice.

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON

DEPARTMENT OF AGRICULTURAL ECONOMICS

New Soils Building
December 6, 1933

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

A year or so ago I wrote you asking that any material on the original range of wild turkey which you might encounter in your ruffed grouse studies be taken up with my friend A. W. Schorger of Madison.

Schorger is now trying to complete his manuscript on the original distribution of the wild turkey and I am taking the liberty of reminding you of this in case you might have run into anything. I had heard that you were going over your own material at this time.

With best regards,

Yours sincerely,

Aldo Leopold

ALDO LEOPOLD
Game Manager

AL/vh

Mr. King

New Soils Building
December 6, 1933

Mrs. Margaret M. Nice
156 West Patterson Avenue
Columbus, Ohio

Dear Mrs. Nice:

The quail irruptions in Oklahoma are described in correspondence with Capt. Chas. Askins, Ames, Oklahoma, which I enclose herewith. Kindly return when you have finished with it. There is no publication on this that I know of.

Thanks very much for the ratios on doves. I am glad to permanently record these references.

Ralph T. King, who was formerly the incumbent of my fellowship at the University of Minnesota and who is now on the faculty there, has preliminary indications that the clutch of ruffed grouse decreases at the high of the cycle. He has not yet published, but knowing your serious interest in this question, I am sending him a copy of this letter with the suggestion that he supply you with either a reference or a reprint when he does publish. If substantiated this indication is, of course, a major biological discovery.

I am enclosing a paper on another subject which might possibly interest you.

Yours sincerely,

ALDO LEOPOLD
Game Manager

AL/vh
Incl.

Aldo Leopold
CONSULTING FORESTER
Madison, Wisconsin

Soils Building
April 26, 1933

Ralph T. King
University Farm
St Paul

Dear Ralph:

Just a line to tell you the book is out in the event you are still waiting for it and Scribners should fail to let you know promptly.

My trip to Burnett County has not yet materialized and I am too near scraping bottom to make the trip to St Paul at my own expense. The Commission here is nearly as badly upset as yours so I am uncertain whether my work for the state will continue. If I get up that way I'll let you know.

Yours as ever


Aldo Leopold

Aldo Leopold
CONSULTING FORESTER
Madison, Wisconsin

Soils Bldg
Feb 21, 1933

Dear Ralph:

A trip east to wind up the book has prevented me from replying more promptly to your good letter. Yes - I'd be delighted to ride down to St Paul with you, but the date of my work in Burnett County is not yet fixed. As soon as it is I will get in touch with you and also Dean Coffee about lecture dates. I am reassured by the cheerful tone of your letter and hope things are working out for you tolerably well. With best regards

Yours as ever

Aldo Leopold

Aldo Leopold

Oct. 12, 1932

Mr. O. L. Austin, Jr.
Austin Ornithological Research Station
North Eastham
Cape Cod, Massachusetts

Dear Austin:

I am very appreciative of your sending me "Birds of Newfoundland Labrador." It is beautifully gotten up and I shall greatly prize my inscribed copy.

Of course I turned at once to your grouse and ate up the ptarmigan curve, since there is urgent need of data from the northeast (and the west coast) to determine the degree to which the grouse cycle is synchronous.

Your curve in all of its recent dates is two years earlier than that for this region and New England. The length of the period is puzzling, but not sufficiently less than the assumed ten year cycle to be clearly different.

I tried to superimpose your spruce hen dates. All of them are two years behind the ptarmigan. Did you notice that?

If you can spare a copy of the book for Charles Elton, University Museum, Oxford, England, I'll much appreciate it. If not, let me know so I can loan him mine. He is focusing the cycle work started at the Matamek Conference.

Yours sincerely,

ALDO LEOPOLD

AL/vh

Mr. King

Aug. 16, 1932

Mr. John M. Olin
Western Cartridge Company
East Alton, Illinois

Dear Mr. Olin:

I am now able to tell you the final outcome of one additional fellowship: King has been engaged as biologist to the Minnesota Division of Fish and Game for active duty during the summer and consulting service the remainder of the year. During the remainder of the year he is engaged by the University to continue his course in "Economic Zoology" (actually game management) with several graduate students under him doing research work.

It is uncertain as yet just when King's findings on Minnesota grouse will be published, but his permanent retention assures the fact that they will come out under proper auspices.

In short, both of the fellowships which have so far completed their work have resulted in a trained man placed in a worthwhile position. The two others, as explained in a previous letter, are on their way. It gives me satisfaction to notify you that the system has not broken down in any case so far.

I am sending copies of this to General Dill and also to Seth Gordon, since he will probably want to ask King for some announcement of the new set-up.

Yours sincerely,

ALDO LEOPOLD

AL/vh

Aug. 12, 1932

Mr. John M. Olin
Western Cartridge Company
East Alton, Illinois

Dear Mr. Olin:

The following is quoted from a letter just received from
D. M. Gorsuch of the University of Arizona:

"It certainly was a pleasure to receive the copy of your letter
to Dr. Vorhies which I found in my mail today.

"I do not know how to express the gratitude I feel for the
interest and energy you have spent on this project, but you may rest
assured that I shall do everything in my power to justify the confidence
you have placed in me and try to make the Gambel Quail Investigation a
complete success.

"Dr. Vorhies has been away on a vacation for the past month,
but will return tomorrow when you shall hear from him, and I am sure
he too will be overjoyed at the good news. It was very generous of the
Sporting Arms and Ammunition Manufacturers' Institute to contribute in
this fashion, with a depleted budget, and you may express my personal
appreciate to Mr. Comeaux, and all others who have been instrumental
in this."

.....

"I am returning some of the favors of the Game and Fish Com-
mission by starting a series of educational circulars on wild life,
the first of which is on the Gambel quail, and should be ready to cir-
culate in about three weeks. I intend first going through the game
birds, then taking the hawks, owls, coyote, etc., and hope later to
introduce these leaflets into the public schools of the state. It is
one way to start a real educational campaign and I believe will be
productive of good results."

Dr. Vorhies has written Mr. Comeaux direct as to the business
aspects of this matter, and also to express his thanks. Mr. Comeaux
will doubtless send you a copy.

The educational leaflets which Gorsuch mentions will, I think,
offer additional concrete justification for the investment which the
Institute has made in this project.

8/12/32

I received your note the other day about my consulting announcement and much appreciate your continued interest in my activities.

Yours sincerely,

ALDO LEOPOLD

AL/vh

Dear Ralph:

This reminds me to ask whether you ever sent any acknowledgment to the Institute on the termination of their contribution to your fellowship.

A.L.

[June 1943]

Dear Ralph -

I did not encounter the chemical repellent for red deer described by Nicolas.

I doubt whether it is as effective as he thinks, for if such were the case, German foresters would not spend huge sums to fence out deer (roe and red) from plantations and areas being reproduced to hard woods. Such fences I encountered nearly every where, and have many photos.

I of course heard much talk about repellents, both for rabbits and deer. Most were creosote products. Some had a temporary effectiveness. None were considered more than partially successful.

You no doubt know of:

True, Gordon H Jr. 1932. Repellents and deer damage control. Calif. Fish & Game Vol 18 no 2 April 1932 pp 156-165.

This, plus Leavenworth's recent Michigan paper on fences for deer, as the best American literature on the subject.

With best regards

Yours

Aldo Leopold

Sen. E. Chittles

See also Chatillon, 5.19.43

May 19, 1943

Professor Aldo Leopold,
Department of Wildlife Management,
University of Wisconsin,
Madison, Wisconsin.

Dear Aldo:

Enclosed is a copy of a letter I have just received from Mr. George E. Chatillon. I have no idea what chemical may have been used, and for that matter am not at all sure that the reference is entirely dependable.

I can't think of anyone who would be in a better position to furnish information on this point than yourself. If such a practice is widespread you must have learned something about it when you visited Germany a number of years ago. Any information you can furnish in this connection will be very much appreciated.

With kindest personal regards, I am

Sincerely yours,

Ralph T. King, Director
ROOSEVELT WILDLIFE FOREST EXPERIMENT STATION

RTK:MN

Enc: Copy of Chatillon letter 5.11.43

Aldo Leopold
Madison, Wisconsin

424 University Farm Place
February 16, 1943

Mr. Ralph King
Roosevelt Wildlife
Forest Experiment Station
Syracuse, New York

Dear Ralph:

Thanks for the reprints.

I have to smile a little at your mention of the possibility that I got your grouse paper mixed up with somebody else's. I bet I know your grouse paper better than you do.

I have been in hopes that you would still bring out the remainder of your Minnesota grouse studies, even though the data are old. They are sound, and were carefully gathered, and I think everything has held water except your variation in clutch which no one else has been able to verify. I for one would welcome your publication.

I am sorry that Huntington does not offer very much in the way of grouse.

With personal regards,

Yours as ever,

Aldo

Aldo Leopold

February 11, 1943

Prof. Aldo Leopold,
Department of Wildlife Management,
University of Wisconsin,
Madison, Wisconsin.

On env. = 424 Univ. Farm Pl.

Dear Aldo:

By this time you have received the reprints of the exotics paper that appeared in the Audubon Magazine. These were received from the printer's only a few days ago and copies were mailed out immediately to those who had requested them.

You mention in your letter that you have been laboring over my Minnesota grouse data, and you were kind enough to say that my paper is one of the few containing reliable information on the inside of a grouse population. I presume you are referring to the paper entitled "Ruffed Grouse Management" which appeared in the Journal of Forestry for June 1937 - or maybe you had me mixed up with someone else. At any rate, that is the only one of my very few papers that contained much on grouse populations.

When I left Minnesota I intended to gather a bit more data and publish a lengthy discussion on grouse requirements, behavior, and habits. Unfortunately I have had to confine my work almost entirely to the Huntington Forest since I came here, and grouse are so scarce on this area that I have not been able to accumulate the information that I want. As soon as I came here we laid out a 5000-acre check-area with 57 miles of line, and since October 1938 we have conducted a grouse census on this area every month. During most of the year, however, the population is so low that we do not obtain enough flushing distances to enable us to determine accurately the total population. Furthermore, we have found only a very few nests, not enough to mean anything. Trapping the birds for marking purposes has been impossible. The deer destroy our traps as fast as we can set them up. And anyway, grouse trapping is highly unprofitable with such sparse populations. For these and various other reasons the grouse work has made very little progress and now the data that I accumulated in Minnesota is so old it seems almost like ancient history. I don't know whether to publish it or hang on with the idea of adding to it in the future.

Things here are about what one should expect. I lost the last of my graduate students a year ago and so far have lost five out of a staff of eleven. I expect the sixth one to go within a week. Our program on the Forest is almost completely stalled for the time being, and though we are continuing these monthly censuses, for the life of me I can't see why. I guess I've been taking monthly censuses so long that I can't break myself of the habit.

As far as the teaching goes, we of course have only about half the students we ordinarily have, with every prospect of losing most of the remainder soon. Since coming here I have succeeded in getting the curriculum changed. Now the three courses in forest zoology and wildlife are required of all the forestry students and the only students specializing in wildlife work are graduates, which we kept to two or three a year when we ^{during} the time we had graduate students.

If you attend the ~~the~~ wildlife meetings in Denver next week, give my regards to those others in attendance who may remember me.

Sincerely yours,

RTK:MN

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON, WISCONSIN

DEPARTMENT OF WILDLIFE MANAGEMENT

424 University Farm Place
January 27, 1943

Mr. Ralph King, Director
Roosevelt Wildlife Forest Exp. Sta.
State College of Forestry
Syracuse, New York

Dear Ralph:

If you have any reprints of your series in the Audubon Magazine on exotic game birds, I would much appreciate receiving one of the series.

How are you anyhow?

I have been laboring for a week over your Minnesota grouse data and related questions. Your paper is one of the few really decent pieces of reliable information on the inside of a grouse population.

With best regards,

Aldo

Aldo Leopold

November 28, 1942

Professor Aldo Leopold
College of Agriculture
Madison, Wisconsin

Dear Aldo:

I have just received word from the Audubon Society that they have finally succeeded in making arrangements with the printer for reprints of my "Exotics" paper. As soon as these are received, I will mail you copies.

I am sending you at this time reprints of a few other articles recently published.

With kindest personal regards, I am

Very truly yours,

Ralph T. King, Director
ROOSEVELT WILDLIFE FOREST EXPERIMENT STATION

RTK:DC

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON, WISCONSIN

DEPARTMENT OF WILDLIFE MANAGEMENT

424 University Farm Place
Madison, Wisconsin
November 20, 1942

Mr. Ralph King
Roosevelt Wildlife For. Exp. Sta.
N. Y. State College of Forestry
Syracuse, New York

Dear Ralph:

Did you get reprints of your series on exotics
in the Audubon Magazine? If so, may I have
one? If not, will you kindly forward this
letter to the Audubon Headquarters as my request
for an extra copy of each of the issues in which
your articles appeared?

With personal regards,

Aldo

Aldo Leopold

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON, WISCONSIN

DEPARTMENT OF WILDLIFE MANAGEMENT

424 University Farm Place
January 29, 1942

Mr. Ralph T. King, Director
Roosevelt Wildlife Forest Exp. Sta.
Syracuse, New York

Dear Ralph:

I appreciate your nice letter. I wrote to the Station rather than to you personally because I didn't want to overdo my welcome. I remember last time you gave me a whole set of publications. Naturally I am pleased to again get the new ones on an exchange basis, and can assure you that my materials will continue to reach you.

You are right that I haven't gotten to see you for a long time. Maybe we can have a visit in Toronto.

With best regards,

Aldo

Aldo Leopold
Professor of Wildlife Management

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON, WISCONSIN

NOV 7 1938

DEPARTMENT OF AGRICULTURAL ECONOMICS

Division of Wildlife Management

424 University Farm Place
November 4, 1938

Mr. Ralph T. King, Director
Roosevelt Wildlife Forest Experiment Station
New York State College of Forestry
Syracuse, New York

Dear Ralph:

Elton was here in September and it is my impression that he is back in England by this time. If he is still in the East, you can reach him in care of Dr. Blair of the New York Zoological Gardens.

I appreciate your invitation to come to Syracuse, but I have no immediate prospect of an eastern trip. Should I have a chance to stop, I would let you know in any case.

Yours sincerely,

Aldo Leopold

Aldo Leopold
Professor of Wildlife Management

vh

November 1, 1938.

Prof. Aldo Leopold,
Department of Game Management,
University of Wisconsin,
Madison, Wisconsin.

Dear Professor Leopold:

I have just heard that Elton is in the United States and he has recently paid you a visit at Madison. Do you know if he is intending to spend any time in the East, and can you tell me where I might get in touch with him? I would like very much to have him pay us a visit here at Syracuse if it is possible for him to arrange it.

I suspect that Stone has told you about our summer's work on the Huntington Forest and all I can add at this time is that the check area is now complete and we have taken our first monthly census and obtained our first month's seasonal distributional data.

I am wondering if there is any possibility of your being in the region of Syracuse during the school year. If so, I hope that you will find time to pay us a visit. As a matter of fact, I would like to arrange for your visiting us here and if there ever is a possibility of such an arrangement I have no doubt that some portion of your expenses could be cared for. Please let me know what the chances are.

Very truly yours,

Ralph T. King, Director
ROOSEVELT WILDLIFE FOREST EXPERIMENT STATION

January 25, 1938.

Professor Aldo Leopold,
1532 University Avenue,
Madison, Wisconsin.

Dear Professor Leopold:

I knew Mr. Arnold B. Erickson for two years at the University of Minnesota. As I recall he took two or three courses under me during my last two years there.

My impression of Erickson at the time was that he was a keen and conscientious student, particularly good in class work, but not so good in laboratory work. He gave me the impression that he learned without a great deal of difficulty or else spend much time over his studies, but that he did not have marked ability in applying the knowledge he had thus acquired.

Briefly, I believe that his intensive training in zoology and lack of training in either forestry or agriculture made it difficult for him to see or plan applications of the principles of wildlife management. He might make a good research man. He certainly would not make a good administrator or practical wildlife manager until he had had considerable experience. Although he is somewhat handicapped because of his appearance, he seems to get along excellently with men in the field. At least he did while he was employed as biologist in one of the park CCC camps. Briefly, my opinion of Erickson is that he would be a good research zoologist, but only a fair wildlife manager.

Very truly yours,

Ralph T. King, Director
ROOSEVELT WILDLIFE FOREST EXPERIMENT STATION

Note for Ralph King: Please note below your low-down on this applicant.

Leopold

1532 University Avenue
January 20, 1938

JAN 22 1938

Mr. Arnold B. Erickson
Department of Zoology
University of Minnesota
Minneapolis, Minnesota

Dear Mr. Erickson:

We do not take on any doctorates except by personal interview. My group is now full and there is no prospect of financial aids in the immediate future. However, there is a prospect of some replacements about July.

Your first step is to let me see your papers. The number of applicants here is so much larger than I can accommodate that I am now requiring evidence of output before even considering any candidates. If your papers show special ability then I would be interested in a personal talk. The chance for financial aid, however, is at this moment zero and in no case would it apply to the first year.

If you can stand this much discouragement, I would be glad to hear from you further.

Yours sincerely,

Aldo Leopold
Professor of Game Management

vh

November 5, 1937.

Prof. Aldo Leopold,
Department of Agricultural Economics,
University of Wisconsin,
Madison, Wisconsin.

Dear Professor Leopold:

Please accept my heartiest congratulations on the excellent program printed for the third annual Mid-West Wildlife Conference. I am very sorry that it is not possible for me to be in attendance at these meetings this year.

There is only one thing in the program to which I can object. That's the last line of the first paragraph on the second page "no proceedings are published". Certainly the papers as listed in the program are worthy of publication and just as certainly they would mean a very great deal to those of us who cannot be present. But of course I understand the situation and realize that publication is expensive.

Please accept my very best wishes for a most successful conference and give my regards to those of my friends that attend. I am looking forward to seeing you in Syracuse at the Forestry Society's meetings here next month.

Very truly yours,

Ralph T. King, Director
ROOSEVELT WILDLIFE FOREST EXPERIMENT STATION

UNIVERSITY OF MINNESOTA

DEPARTMENT OF AGRICULTURE

UNIVERSITY FARM, ST. PAUL

April 17, 1937

Dictated but not read

DIVISION OF ENTOMOLOGY AND ECONOMIC ZOOLOGY

Professor Aldo Leopold
Department of Agricultural Economics
University of Wisconsin
Madison, Wisconsin

Dear Professor Leopold:

I am leaving St. Paul in about three hours. I can not take the time to write a lengthy letter in answer to your letter which I received yesterday. I can only say these two things. First, I am extremely sorry that any misunderstanding has developed and second, there is no reason at all for you to hold up the publication you presented at St. Louis and furthermore there is no reason for you to feel that you need make apologies to any one relative to your statements about the Cloquet work. There has been a serious misunderstanding arise but I can not see how you are in any way to blame, except that some people have insisted on misinterpreting and adding to your remarks. However, to straighten this matter out is going to require a very long letter and reference to certain published statements (published by other individuals) and I simply haven't time to go into that this morning. I have gone over this whole matter in detail with Dr. Hansen at Cloquet and Dr. Schmitz here and will write you, as soon as possible after arriving at Syracuse, a detailed statement of the whole thing but I want you to know now that you needn't hold up the paper and that no one here accuses you, or has accused you of saying anything contrary to fact. I did not do it; no names were mentioned in the discussion where your students were present last week and I believe that everyone understood who was being referred to.

I hope that this will prove sufficient for a few days and you will hear from me again shortly.

Very truly yours,

RTK:K

Instructor - Economic Zoology

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON, WISCONSIN

DEPARTMENT OF AGRICULTURAL ECONOMICS

April 14, 1937

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I am very much disturbed by a report, brought me by my students who visited you recently, that I had made an inaccurate criticism of the handling of the Cloquet area by the foresters.

I would like to get to the bottom of this, because if I have criticized unjustly I have to make written apology to all concerned, and also to delete my remarks on Cloquet at St. Louis from the Transactions. I am sending copy of this to Mort Palmer as tentative notice.

My remarks were based on my understanding of your verbal statement to me. I inferred that you were moving your main research operations from Cloquet to a new area further south because you had been cleaned out at Cloquet. Was this inference incorrect? What per cent of Cloquet was actually debrushed? Did the debrushing include the drumming logs? Please give me these main facts.

Let me hasten to add that I positively gathered from you that you did not blame the foresters for giving priority to their own work, and please note that I made the same reservation at St. Louis. Also that the debrushing alone had not spoiled the grouse range, but rather the loss of the logs.

If I have overdrawn the picture, you may send copies of this to Hansen and Schmitz as evidence of my desire to set right any false impression I may have given. My own final opinion, however, must await your reply as to questions I have asked above.

With best regards,

Yours as ever,

Aldo Leopold

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON, WISCONSIN

DEPARTMENT OF AGRICULTURAL ECONOMICS

1532 University Avenue
March 30, 1937

Prof. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I am much relieved to hear that your new set-up includes definite provision for the completion of your grouse report. You do not mention arrangements for publication but I assume that these are likewise completed.

It was nice of you to remember Moore's trip. I understand he has already written you. I doubt if I can get away in May, but thank you just the same for the invitation.

I think it would be very valuable to have a "Segment of a Cycle Curve" in the new Journal. I hope, however, that you are not dismembering your main publication by issuing these fragments.

All of us here wish you satisfaction in your new position and we will, of course, always have an ear open for your enterprises.

With kindest regards,

Yours sincerely,

Aldo

Aldo Leopold
Professor of Game Management

vh

March 25, 1937

Professor Aldo Leopold 1937
Department of Agricultural Economics
University of Wisconsin
Madison, Wisconsin

Dear Professor Leopold:

You have heard by this time that I have accepted a position at Syracuse. I am leaving here April 15 and will take up my work there April 19. I wish there were sufficient time for me to stop at Madison on my way for a visit with you, but that is impossible as I am driving through and have only three days in which to make the trip. I haven't any doubt as to your part in my obtaining this new position, and I want you to know that I appreciate what you have done for me in this case as I have always appreciated the many things that you have done for me in the past.

The arrangements now are for me to work at Syracuse until June 15 or July 1, then return here for the summer. I will have from July 1 to September 15 absolutely free to complete the requirements for my degree. The chief one of those is the writing up of the eight years of grouse work. I expect that to be ready for publication by September 15 this year. This should be good news to you and a number of my friends.

I am planning on a two or three day trip to Cloquet the week-end of April 9 and 10th. I wonder if Mr. Moore would care to come up for that trip. We intend taking a grouse census, and I hope to give the Station one last close inspection. Naturally if any of the others of you can come with him, I would be more than glad to have you. If Mr. Moore will let me know within the next day or so, I will plan definitely on the trip, leaving here any time during the day or evening of April 9 and returning to St. Paul on either the 11th or 12th. There are a great many things I would like to write you about, but time is so short that I am afraid they will have to be postponed until I have gotten settled at Syracuse.

I believe Dr. Schmitz submitted the paper on Rough Grouse Management to you for your inspection. I understand it is to appear in the May issue of the Journal. What would you think of a paper embodying the census figures that we have from 1931 up to the present and titled something like this, "A segment of a cycle curve", for one of the first numbers of the new Journal of Wild-Life Management?

With best regards to you, Wing, Moore, and the other fellows, I am

Sincerely yours,

RTK:W

Instructor in Economic Zoology

December 29, 1936

Professor Aldo Leopold,
Department of Agricultural Economics
University of Wisconsin
Madison, Wisconsin

Dear Professor Leopold:

The publication you refer to in your letter of December 17th is entitled "Propagation of Game Food and Cover Plants of the Lake States". It was published by the Lake States Forest Experiment Station in October, 1935. The title page states it was "compiled by P. L. Fisher, A. H. Briggs, W. A. Elkins, and E. I. Roe with special assistance from C. M. Aldous and the U. S. Biological Survey." It is a mimeographed bulletin of 81 pages. Two printings were made and no copies are now available.

I just called the Lake States Station and they have only two file copies left. They checked their mailing list and said you were sent a copy and that later a number of your students wrote for and received copies. They were sorry they hadn't an extra copy they could send you now. I have only one but I will be glad to loan it to you if you do not succeed in locating a copy down there.

Very truly yours,

RTK:K

Instructor - Economic Zoology

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON, WISCONSIN

DEPARTMENT OF AGRICULTURAL ECONOMICS

1532 University Avenue
December 17, 1936

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I hear discussion of a publication, "Propagation of Game Foods in Minnesota," by someone named Roe. I have a dim recollection of having seen it but cannot find it in my collection. Can you set me straight on who Roe is and where I can get this publication?

Yours sincerely,

Aldo

Aldo Leopold
Professor of Game Management

vh

*Propagation of Game Food and Cover Plants of the Lake States
Lake States Forest Exper. Sta. - Oct. 1935*

*Compiled by P.L. Fisher, H.H. Briggs, W.A. Elkins, + E.J. Roe with
special assistance from C.M. Aldous + U.S. Biological Survey*

81 pp.

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON, WISCONSIN

DEPARTMENT OF AGRICULTURAL ECONOMICS

Nov 16

Dear Ralph -

Will be here for the Nov 19 meeting and suggest, unless you or Cooper have other preferences, that we meet in my office. - Old Entomology Bldg

If you or Cooper get in before lunch give me a ring - lets lunch at Univ Club.

If you and the rest are not entirely done up, could we have an informal meeting with my students Thursday evening?

Yours

Aldo Leopold

Mr. King

September 24, 1936

Mr. Olin Sewall Pettingill, Jr.
Department of Zoology
Carleton College
Northfield, Minnesota

Dear Mr. Pettingill:

I am much interested to hear of your being located in Minnesota. I am wondering whether you will be continuing the woodcock study, also whether you are in touch with Ralph King at the University of Minnesota. I am taking the liberty of sending him a copy of this letter so he will know that you are in his state.

Yours sincerely,

Aldo Leopold
Professor of Game Management

vn

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON, WISCONSIN

DEPARTMENT OF AGRICULTURAL ECONOMICS

August 27, 1936

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

Last spring you were kind enough to give Starker some suggestions about treating seed corn with pheasant repellants. He promised to give you a report of his results. He wrote such a report (see attached), which covers the period up to his departure from Madison in June, but at that time a final inspection of the effects on the growth of the corn was not possible. Meanwhile Douglas Wade has made such an inspection and has attached a supplement giving his findings.

How are your papers coming?

With best regards,

Yours sincerely,

Aldo

Aldo Leopold

Professor of Game Management

vh
encl

June 18, 1936

Prof. E. J. Gaul
Soils Department
University of Wisconsin
Madison, Wisconsin

Dear Professor Gaul:

The accompanying pages are a brief outline of the game work which I have carried on during 1935-36 on the University Farms for which you kindly consented to grant me one credit in Soils 180.

The work consisted of:

1. A winter feeding program for quail and pheasants.
2. A rough winter census of these two species.
3. An experiment carried on in cooperation with Mr. Neal of the Agronomy Department to determine the value of chemical deterrents in discouraging pheasants from pulling sprouting corn.

I regret that I have not had time to take you out in the field and show you at least some of the work.

Sincerely yours,

A. S. Leopold

encl

Winter Feeding

Three feeding stations were established:

Station #1 - under the spruce trees S.E. of the white bridge where the stream crosses Willow Drive.

Station #2 - in the half-acre oak grove on the north side of the dump grounds half a mile west of Station #1.

Station #3 - on the south edge of the dumping grounds on the West Hill farm.

The birds were fed straight shelled corn purchased from the agronomy department, and consumed about 500 pounds during the winter.

Feeders filled:

December 1	50 lbs.	50 lbs.	50 lbs.
December 16	50 lbs.	50 lbs.	50 lbs.
January 4	20 lbs.	30 lbs.	---
January 15	35 lbs.	35 lbs.	---
January 21	30 lbs.	---	---
February 4	35 lbs.	---	---
February 26	15 lbs.	---	---

*From about Jan. 1 to the end of the winter the farmer on the West Hill farm kept this feeder full.

Census

West Hill Farms

On December 1 the census of game birds on this area showed one covey of 22 quail headquartered around the dump grounds in the main woodlot and about 8 pheasants in the same vicinity. All the birds were using the sorghum food patch at the north end of the woodlot. Upon the installation of the feeding station the birds soon centered their activities around that. The survival by spring was approximately 8 quail and 6 pheasants.

University Bay and Eagle Heights Area

An accurate census of this area was difficult because of the extensive cover and the large number of birds. There were at least three covies of quail, one bunch of 15 at Station #1 by the white bridge and two others that were fed on the property of Mr. Ed Young. The size of the latter two covies was not determined, but the white bridge covey pulled through 9 birds by spring.

An estimated winter census of pheasants on this area was 300 birds. One evening 140 birds were flushed out of a single block of pines. Apparently all those birds roosted in that pine grove. The sex ratio of that group of birds showed a very slight excess of hens, 75 hens to 65 cocks.

Treated Corn Experiment

May 2 - Germination tests were run on treated and untreated corn to determine the effects of the chemicals on germination.

May 11- The results of the tests were recorded. It was found that red lead, which was one highly recommended deterrant, did not decrease germination but gave counts of 96 and 95% as compared to 92% for untreated corn. Coal tar showed poorer results, about 65%, probably because of its effect on the seed's imbibing water.

May 12 to 14 - Birds were observed pulling corn on untreated plots (not on the experimental field). One rooster was collected and its crop was found to be filled with the kernels of the sprouted corn. No greens or tops were present in that bird although other individuals had been observed clipping the tops off the young plants.

May 18 - The experimental field of some 12 acres was planted with about 1 acre of red lead treated seed and a half-acre of coal tar treated seed.

From May 25 to June 12 occasional visits have been paid the field. It is still too early to state any conclusions on this experiment, but it looks as though the results may be spoiled by the fact that the farmer has been patrolling the field with a 12-gauge shotgun so that little or no pulling has occurred. The treated corn, both with red lead and coal tar, looked somewhat yellowish as compared with the untreated, but will probably pull through with little loss in vigor.

Observation July 13, 1936, by D. E. Wade

<u>Sample rows</u>	<u>Total</u>	<u>Dry</u>	<u>Small</u>	<u>Medium</u>	<u>Large</u>	<u>Missing</u>
Seed corn untreated	137	18	22	79	11	7
Red lead treated	147	16	23	86	9	13
Coal tar treated	155	13	25	94	6	17

Dry = withered severely by sun and lack of moisture

Small = below knee

Medium = between knee and hip

Large = above hip

Missing = a) not germinated

b) may have been cut by cultivating

c) may have been removed by gophers or pheasants

Samplings from 36 rows - averaged.

The rest of the hybrid corn did not show any real advance over any of the treated corn. Only in the case of the corn treated with coal tar were more plants showing signs of drying up, but this was due undoubtedly to several rows being located under a large elm tree which claimed moisture from the corn.

Four females and one male pheasant were flushed from the field but had been taking dust baths in the shade of trees along east edge of field.

Twenty-four rows of east side of field showed very poor growth and were very dry, probably due to shading and absorption of moisture by shrubs and trees.

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON, WISCONSIN

DEPARTMENT OF AGRICULTURAL ECONOMICS

August 27, 1936

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

Mr. Ellwood B. Moore, a forester connected with the New Jersey Conservation Commission, is spending a year with me here studying game management. He resumes his work in New Jersey next July.

I have no facilities for giving him an insight into ruffed grouse and ruffed grouse management. I would like very much to arrange at some time convenient to you for Mr. Moore to accompany you on a field trip during which questions of grouse census and grouse ecology are being discussed. Knowing that you are tied up, I thought this might be made an incident to some piece of field work that you are going to undertake anyhow. If this is agreeable, could you let me know a little in advance of the possible date?

Mr. Moore is in charge of the Riley area and the game work on the Arboretum, which of course gives him experience and insight with pheasants, quail, etc.

Yours sincerely,

Aldo

Aldo Leopold
Professor of Game Management

vh

Mr. King

1532 University Ave.
May 1, 1936

Mr. Charles L. Horn
2300 Foshay Tower
Minneapolis, Minnesota

Dear Mr. Horn:

Let me congratulate you on your hawk and owl cartoon. I know of no other instance in which an ammunition maker has asserted publicly and positively that promiscuous hawk and owl killing involves danger to game interests as well as farm interests. The industry so far has merely tolerated such assertions by research workers. Your cartoon is, I think, the most important contribution of the year to the predator problem.

Yours sincerely,

Aldo Leopold
Professor of Game Management

vh

March 18 1936

Professor Aldo Leopold
Department of Agricultural Economics
University of Wisconsin
Madison Wisconsin

Dear Mr. Leopold:

Mr. Dyer Ruggles has asked me to write you relative to his application for an appointment to a position in your department.

I have known Mr. Ruggles for ten years. I have had him as a major student in my classes for three years, and have employed him as an assistant in my laboratory for one year. I have had every opportunity to observe him as a student, as a research assistant, and in the field. He has done better than satisfactory work in each instance.

His work as a student is considerably above the average, it is always done neatly, promptly and completely. In the field he has always been careful and painstaking, willing to work in any kind of weather and under any conditions, and willing to put in long hours each day. As a research assistant he is thoroughly reliable and keeps careful records. He is willing to follow instructions but is sufficiently interested and ingenious to contribute worthwhile suggestions of his own.

He is a pleasant and congenial companion and easily makes friends. He is honest, conscientious and reliable in every sense. He is keenly interested in wildlife work and anxious to continue his training in this field.

I do not hesitate to recommend Mr. Ruggles to your consideration and I sincerely hope that you will find it possible to offer him the opportunity of continuing his training in the graduate field.

If I can furnish you with any additional information in this connection please write me.

Very truly yours

RTK-s

Instructor - Economic Zoology

January 25, 1936

Professor Aldo Leopold
Professor of Game Management
1532 University Ave.,
Madison, Wisconsin

Dear Professor Leopold:

I dislike very much to wish any one hard luck or to take pleasure in the fact that they are having any hard luck but I am glad that you find it impossible to take up the matter of the cycle program this quarter. I also am so completely snowed under that devoting any time to a new project of any nature is entirely out of the question before next April.

Thanks to you I have been asked to present the cycle theory at the Washington Conference and I am preparing now a summary of the whole thing which I will submit for publication immediately after the conference. I am also asked to prepare a paper on ruffed grouse management. It is possibly a good thing that circumstances have at last pinned me down and I must take stock of such knowledge as we have which can be used in a grouse management program.

I will see you in Washington next week.

Sincerely yours,

RTK:K

Instructor - Economic Zoology

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON, WISCONSIN

DEPARTMENT OF AGRICULTURAL ECONOMICS

1532 University Avenue
January 7, 1936

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

I have not forgotten our proposal to come and see you for the purpose of writing up a cycle program, but I have done nothing about it for the same old reason, namely, snowed under.

I do not see any way for me to get at this until my courses are over in April. Should you and Wing be able to do anything meanwhile, it would, of course, be fine.

I repeat my suggestion that you should publish your theory, *and am suggesting you be asked to present it to the W.C. Conference in Feb.*

Yours sincerely,

Aldo

Aldo Leopold
Professor of Game Management

vh

UNIVERSITY OF WISCONSIN
COLLEGE OF AGRICULTURE
MADISON, WISCONSIN

DEPARTMENT OF AGRICULTURAL ECONOMICS

1532 University Ave.
December 11, 1935

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Ralph:

Leonard Wing has told me something which I never suspected, namely that the reason you have not written up your cycle theory is hesitation whether to publish. I had always supposed it was a mere matter of lack of time to get up the necessary paper.

I now hasten to urge you by all means to write up your theory and publish it at the earliest possible date. If you can use me in getting the paper placed, do not hesitate to do so. I think this should be done as a kind of preliminary to the project write-up which we have already talked about, although the latter, of course, need not wait the actual appearance of the paper. I wish I had known long ago what the cause of delay was in your case.

Wing entirely shares my view on the advisability of your publishing and I know he joins with me in being anxious to help in any possible way that you can use us.

I suppose Dr. Green thinks all cycle theories premature at this time, at least it is clear that he thinks Wing's paper was. I do not, however, agree with him. As long as all these papers give full credit to his contributions, I do not anticipate any difficulty in that quarter.

With best regards,

Yours sincerely,

Aldo

Aldo Leopold
Professor of Game Management

vh

GAME SURVEY

CONDUCTED FOR THE
SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD
421 CHEMISTRY BLDG.
MADISON, WISCONSIN

Aug. 1, 1930

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear King:

I expect to leave Madison August 8 for Minnesota, so I'll probably arrive about the 9th. If things go all right I will probably spend Sunday at Mora with the Irwins. Perhaps I could meet you up there or at St. Paul, whichever would be most convenient.

Better let me know what plans you have for that time or any suggestions you might wish to make.

Sincerely,

Paul L. Errington

Paul L. Errington

THE UNIVERSITY OF WISCONSIN
MADISON

ZOOLOGICAL LABORATORY

Biology Building
Madison, Wisconsin

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Terry:

I expect to be out your way some time along the middle of August. Do you suppose that we could spend a few days together, both in some of your ruffed grouse country and in possible quail country which you might have discovered?

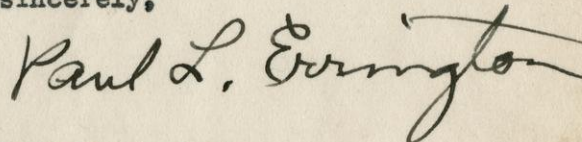
I hear rather interesting things about your new technique of marking young chicks and would like to get further particulars as to how it works out.

I also have some predator data which apply to ruffed grouse, most of which I intend to incorporate in an article for The Condor on general raptor food habits, which article I hope to get done this summer or fall.

I also have a few ruffed grouse stomachs which I can either send in to the Survey direct or turn over to you, if you wish. Perhaps, as you are the one who is studying the grouse, it would look better for you to submit them.

Please let me know at your convenience how your plans stack up for approximately the middle of August.

Yours sincerely,



Paul L. Errington
Quail Investigation

July 31 1931

Mr. Paul L. Errington
Quail Investigation
Department of Zoology
University of Wisconsin
Madison Wisconsin

Dear Paul:

Glad to get your letter and know you are coming out this way again. It will necessitate no change in my plans to arrange a couple of field trips together. Our quail country, such as it is, is not far distant from St. Paul. The country, I believe, is good enough but the quail are mighty scarce. I will be glad to have your opinion of quail possibilities here. I am inclined to think we could increase our stock several times over through the practice of proper management measures. If you see the thing as I do perhaps we can begin the application of the Wisconsin findings in the near future.

My plans now are to carry on a few days of mapping work in Morrison County in Dr. Green's area, beginning August 12 or 13, and then to revisit my own area at Cloquet for a week or ten days beginning about August 16 or 17. I have just returned from nine days at Cloquet. The results of the July check up were excellent as far as the testing of methods was concerned, but not at all satisfactory as to what I learned about the birds. The average size of the broods now is $3\frac{1}{2}$ young as compared with ten young six weeks ago, a mortality of 65% this early in the season. I am writing Mr. Leopold in a day or two and will send him an outline of methods employed and a tabulation of the results obtained. I would appreciate your opinion of these methods.

I hope you will bring along your notes on predator dates applying to ruffed grouse. We have just discovered an interesting and perhaps important parasite-predator relationship and I am trying to plan an investigation that will enable us to check the possibilities more closely. Any additional predator data would help in formulating our plans.

I will be sending in several dozen grouse stomachs soon and would be glad to include those you have. Thanks for the offer.

As soon as you can let me know what day you will arrive in St. Paul and how long you will be here.

Sincerely yours

GAME SURVEY

CONDUCTED FOR THE

SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE

BY ALDO LEOPOLD

905 UNIVERSITY AVENUE

MADISON, WISCONSIN

Biology Building
October 9, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Terry:

Have you scheduled me definitely for those lectures yet? If so, I would like to know upon what dates they will fall.

I think the latter part of this month would be most convenient for me, sometime after the A.O.U. meetings, which I plan to attend. Please let me know just how you stand in this respect, and also anything else that might be of importance to me.

I have not sent Dr. Green his owl yet, as I thought it might perhaps be more convenient for me to take it with me when I leave for St. Paul.

Yours sincerely,

Paul L. Errington

Paul L. Errington
In Charge, Quail Investigation

THE UNIVERSITY OF WISCONSIN
MADISON

ZOOLOGICAL LABORATORY

Answer 2-7-32

Biology Building
November 18, 1931

Mr. Ralph T. King
University Farm
St. Paul, Minnesota

Dear Terry:

I am sending for the use of Breck and yourself a carbon copy of my paper on the technique of raptor food habits study, since I don't know when this paper will be out, and you may wish to refer to it in the meantime.

I trust that the little grouse are giving you a run for your money and that you have by this time probably made another census. The grouse are extremely numerous in some of my own observational areas and I hope to keep an eye on them to some extent this winter. So far this fall, however, I have done very little field work, as my papers, thesis and sundry afflictions have kept me more than occupied.

Will you please see to it that Breck gets this carbon for I haven't his address?

Yours sincerely,

Paul L. Errington

Paul L. Errington
In Charge, Quail Investigation

February 9 1932

Mr. Paul Errington
Department of Zoology
University of Wisconsin
Madison Wisconsin

Dear Paul:

Yes, I am still alive, but perhaps you hadn't actually given me up as dead or there would have been flowers. However, I haven't forgotten you even though I haven't written. I believe in this case my negligence has also been tinged (if not actually saturated) with discourtesy, for I haven't even written my thanks for the very excellent lectures you delivered to my class last quarter. I assure you they were appreciated, not only by me but the entire class. In fact you made quite a hit Paul, not only as a lecturer whose discourses are interesting and quite judiciously touched with humor, but also as a very capable research zoologist. If it weren't for the remarkable control I exert over myself I am afraid I would be jealous, but as it is my natural laziness overcomes the green-eyed goddess and this is an open invitation to deliver lectures in my courses whenever you care to do so.

You, no doubt, enjoyed your trip to the Science meetings at Christmas time. At the risk of giving you a swelled head I will repeat what the members of this division said about your paper - that it was the best given in the ecology section.

The copy you sent me on raptor food habits I turned over to Breck after reading it again.

The news that Grange was leaving the Survey came as a surprise to me. I had always believed he was well satisfied with his position there, and naturally, I did not know what to make of the news of his resignation. I have heard no details, simply that his resignation is effective April 1, and that there is small chance of his being up this way again. It is gratifying to know that they are considering a research man for the vacancy. If you want the job I hope you get it.

The grouse work is still going along as well as ever. The censuses continue to check and I have increasing confidence in the method. We are having fair luck in the trapping and the field-marking of individuals works beautifully. So far we have 25 banded and marked. We would have at least twice that number done if I hadn't been in quarantine for scarlet fever for two weeks. I haven't felt like trusting the trapping, banding and tail-marking to anyone else so the work is temporarily held up. I should be out in another week unless there are some new developments. I hope to have at least one-fourth of the birds on the Station marked by April 1. That will provide a third and indisputable check on the census method, supply abundant data on distribution, daily and seasonal range, and will, I believe, enable us to settle the question of mating habits.

PE #2

The work here at the University is going forward steadily and the big news is due to break in a week or so I believe. There is every indication that the verdict is going to be a satisfactory one.

There is no need to append an invitation to this letter. You know you are always welcome here and at Cloquet. Wishing you the best of luck, I am

Very sincerely yours

RTK-s

Minn. Ruffed Grouse Investigation

OXFORD UNIVERSITY
DEPARTMENT OF ZOOLOGY AND COMPARATIVE ANATOMY.

Address: UNIVERSITY MUSEUM
OXFORD

Telegrams: "MUS. OXFORD"

BUREAU OF ANIMAL POPULATION

July 1, 1932.

Mr. Ralph T. King,

Dear Sir,

I have been very interested to read your article on the saving of vanishing data in the Canadian Field Naturalist. I wholly agree with you as to the importance of recording scientific facts which still remain in private diaries or memories. It may interest you to know that I have collected a good deal of information on Canadian cycles during the last seven years, and I am at present engaged in writing this up for a book on animal population. I am also carrying out an investigation of the old diaries of the Hudson Bay Company in London and I have found that there is an enormous amount of material there which will make it possible to reconstruct at any rate the Snowshoe rabbit and Lynx cycles during the last hundred years. I am just finishing a survey of the MacKenzie River district diaries between the years 1821 and 1930. I hope ultimately to bring it up to the present day. Questionnaire enquiries about cycles are now being carried out in various parts of Canada and the results of some of these are being worked up by the Bureau of which I enclose a notice.

Yours truly,

Charles Epton

Director.

(1932?)

Dr. Charles Elton
Department of Zoology and Comparative Anatomy
Oxford, University,
Oxford, England

Dear Dr. Elton:

The enclosed reprint will indicate to you my interest in field zoology and problems connected with animal populations. You will note that I have quoted at some length from your book "Animal Ecology" which I hope will not meet with your disapproval.

My special interest is wild vertebrate population studies and my work for the past several years has been largely directed toward developing methods for censusing such populations. One method, for ruffed grouse (Bonasa umbellus), has been used each month for twenty-six consecutive months on one 3000 acre area and has been checked on other areas ranging in size from 2500 to 6000 acres and totaling over 100,000 acres, once or twice each year for two years. It has given quite consistent results. We are at present working on other methods for our prairie grouse, snowshoe rabbits, red squirrels and Microtus.

In addition to the census work I have attempted to compile a history of the fluctuations of game species in this region for the last 100 years.

The methods used and the results obtained in the ruffed grouse work will be published this winter at which time I will send you reprints.

I would appreciate very much receiving reprints of your published articles if any are available. I would like especially to obtain one of your paper on "Territory Among Wood Ants (Formica rufa L.) at Picket Hill."

Sincerely yours,

RTK:K

Instructor - Economic Zoology

OXFORD UNIVERSITY
DEPARTMENT OF ZOOLOGY AND COMPARATIVE ANATOMY

BUREAU OF ANIMAL POPULATION

RTK:K

2nd
Sept
1933

Address: UNIVERSITY MUSEUM
OXFORD

Telegrams: "MUS, OXFORD"

Dear Professor King,

Thank you for your letter of August 14th, and the article on Animal Ecology which I am glad to have. I shall be very interested to receive any results of your census work on birds and mammals.

I am at present engaged on an analysis of the Hudson's Bay Company's fur-post diaries during the nineteenth century. These archives are all stored in London and afford an enormously rich mine of information. I am trying to reconstruct the cycles in fur-bearers and snow-shoe rabbits in the McKenzie river district.

I am sending by separate mail some reprints of my own papers.

Yours sincerely,

Charles Elton

Professor Ralph T. King,
University of Minnesota,
Department of Agriculture,
University Farm, St. Paul,
U.S.A.

IOWA STATE COLLEGE⁴
OF AGRICULTURE AND MECHANIC ARTS
AMES, IOWA

DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

June 14, 1933.

Mr. Ralph T. King,
University Farm,
St. Paul, Minnesota.

Dear Terry:

I may be able to spend a day or two with
you possibly at Cloquet after the St. Cloud conser-
vation meeting.

How would this check in with your present
schedule?

Yours very truly,

Paul L. Errington
Paul L. Errington,
Assistant Professor.

PLEPGCM

July 29 1933

(Dictated on July 28, 1933)

Dr. Paul L. Errington
Department of Zoology and Entomology
Iowa State College
Ames Iowa

Dear Paul:

I am sorry I haven't written you sooner. My delay is due partly to illness and partly to the fact that there was nothing definite to write. I didn't get to see Acting Commissioner Willard until last Monday morning. He asked me then to write him a letter giving all of the details of the work; what has been accomplished, how it was financed, what we intended doing during the next year or two and why we believe it important to continue the investigation. He said that with this material he would present the proposition to the Commission and we would have to abide by their decision; that there would be nothing gained by taking the matter up with Mr. Stewart. I wrote him on Tuesday and Dr. Riley wrote him today. Willard has been out of town and I believe was not to return until today. In the meantime, Laidlaw had taken a 5-day vacation and then went down to his home in Indiana. He returned to Cloquet yesterday and found a letter written by Stewart on Monday, telling him that his services were to be dispensed with August 1st. I am sure Stewart wrote this letter without Willard's knowledge and I believe that Willard will present the proposition to the Commission, but I have no idea what the decision will be. However, we should know definitely within a week or 10 days. If they will continue to finance the work everything will be all right. If they do not continue to give us some financial assistance, I am going after the money wherever it is available. One man has guaranteed \$100.00. The University will be able to assist to some extent. They have already told me to continue Laidlaw on the work, without a break, until some definite arrangement is made. So you can see that although a good deal has happened since you were here, I do not know much more about what I am going to do, or how I am going to do it, than I did a month ago. You will hear from me as soon as I have something definite and, perhaps, you had better hold yourself in readiness to submit a money order.

Thank you for the reprints you sent me and I am glad to know of your successful duck nesting season. I think we have nothing new to report on ruffed grouse except that our brood census showed approximately 215 broods. I had figured on 225. These broods averaged $3 \frac{1}{2}$ young each on July 1st.

We returned from Cloquet on the 19th and I will be here at the Farm from now on.

Yours until I have more information.

Sincerely

IOWA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
AMES, IOWA

DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

July 18, 1933

Mr. Ralph T. King,
Univ. Farm,
St. Paul, Minnesota

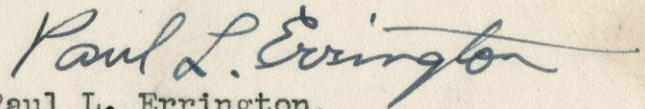
Dear Terry:

I haven't heard from you relative to the Minnesota situation so thought that I had better write to ask if anything of magnitude had turned up; if there has perhaps you had better write me at Ruthven, where I expect to be the greater part of the summer.

My reprints on "The Wintering of the Wisconsin Bob-white" are now available, and I am sending you a few for your own use and for the use of any persons you might have in mind who could use them to advantage. I haven't any too many of this series so I would appreciate it if you would make this supply go as far as possible.

You may be interested to know that we had an exceptionally productive duck nesting season in northwestern Iowa. Bennett had around 133 nests under observation during the summer, of which I seem to recall three-quarters or more were successful. Right now our entire wild life crew is concentrating upon waterfowl in an effort to determine the extent and the causes of juvenile mortality.

Sincerely yours,



Paul L. Errington,
Asst. Prof. In Charge
Wild Life Research

PLE*B

IOWA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
AMES, IOWA

DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

August 2, 1933

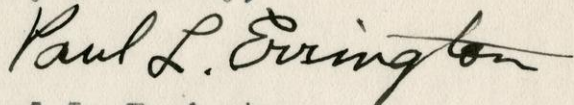
Mr. Ralph T. King,
Dept. of Economic Zoology,
University Farm,
St. Paul, Minn.

Dear Terry:

I just got in from Ruthven and found your letter awaiting me, by which I judge that the prospects of the Fish and Game Commission continuing the Cloquet studies are not any too good. As soon as you find out definitely what you can do, please let me know, and if necessary I will send you a money order as per my original promise. In this event let me know to whom it should be made payable, and anything else that I should know in order to conform to University requirements.

I wrote Abe Harris some weeks ago as to the disposition of the paper on "Mid-West Duck Breeding Grounds", but have received no answer. The next time you find it convenient to see him would you ask him if he has the manuscript and what he intends to do with it? I think that I would rather have it published in the Minnesota Conservationist, where I think it would be of the greatest immediate utility to those interested in managing and restoring waterfowl breeding grounds, but in case Harris does not want it, I would like to have it returned promptly in order that it may be published in the Iowa Journal of Science, the Editor of which has asked me for contributions.

Very sincerely,



Paul L. Errington,
Asst. Prof. In Charge
Wild Life Research

PLE*B

August 14, 1933

Dr. Paul L. Errington,
Department of Zoology and Entomology,
Iowa State College,
Ames, Iowa

Dear Paul:

At last we know where we stand up here as far as the ruffed grouse work is concerned. The Division of Game and Fish has no intention of assisting with the work so it is up to us to carry it as a University Project with what assistance our friends are able to give us.

Laidlaw is going ahead with the work in the field and will receive \$66.66 per month compensation plus actual field expenses, that is traveling, cost of materials and equipment used, etc. He will continue to conduct the regular monthly censuses, trap, band and mark birds this winter, and otherwise carry on the work in the field much as he has been doing. In addition he will go ahead with the mammal work on the Cloquet Station for his Masters thesis. This will deal in part with the snowshoes, particularly censuses of this species.

Dr. Riley has somehow raised enough money to continue the work on this basis until October 1st, and to cover expenses from October 1 to January 1. Your contribution plus one other that has already been promised (and is certain) will take care of Laidlaw's stipend from October 1 to January 1. After that date we are not yet sure what the arrangement will be but I've no doubt the money will be forthcoming from some source. Another \$200.00 would carry it until April 1, at which time I go up there with 25 or 30 students and we could keep it going until June 30th. My report will be completed by January 1 and that, I think, will make a great deal of difference. I'm not worried about getting along after that date.

You will note that in the agreement it says the "sum is to be used in retaining a part time assistant in the Division of Entomology and Economic Zoology for a six weeks period during the academic year 1933-1934". It is so stated because the sum of \$100.00 is just sufficient to cover the expense for a six week s period and not because there is any intention of continuing for only six weeks. The "part time" clause is to make the understanding clear with Laidlaw that he is to carry on graduate work legal and above-board.

Your contribution of this sum means a lot to me personally and to Laidlaw as well as to the cause of conservation. You have a very good idea as to how it is going to be expended and I assure you that both Laidlaw and I will do our

2 - P. L. E.

utmost to make it a profitable investment.

I have seen no one down at Harris' office. I've been down there only once and there was no one in then. Just called there and there is no one available until tomorrow so I'll try again then to find out what they intend doing with your paper.

You can return the signed memorandum of agreement along with the money order to Dr. William A. Riley, Chief of the Division of Entomology, University Farm, St. Paul. Please make the money order payable to the University of Minnesota.

You may of course mention this contribution and the arrangement as you see fit. When you were at Cloquet you spoke of announcing it in some places where it would probably do some good.

Very sincerely yours

RTK:K

Instructor - Economic Zoology

October 19 1933

Dr. Paul L. Errington
Department of Zoology
Iowa State College
Ames Iowa

Dear Paul:

Your letter of October 5th came when I was sick in bed. It was nothing serious but it kept me there for two weeks. Since coming back to the office a week ago, I have postponed writing you at Dr. Riley's suggestion, because he hoped to have some more definite information about what we could expect after January 1st. However, definite information has not been received and I do not believe I should delay answering your letter any longer. The status of the work is unchanged. With your contribution plus that of Mr. Nichols and what the University was able to raise, we see our way clear to continue until January 1st. After that date the status is uncertain but we hope for the best and I can assure you that both Dr. Riley and Dean Coffey are intensely interested and are making every effort to insure the continuance of the work. Laidlaw is now in school. For this quarter he is getting in 12 hours of course work toward his master's requirements and is carrying on regular monthly censuses at Cloquet. We are trying hard to get the data into shape for publication and will have some of it ready within two weeks and most of it ready by the first of the year.

Relative to the statement by Anderson that the Conservation Department had made provision for continuing the work, so far as I know this is a mistake on the part of someone. I have no knowledge of the Conservation Department's intention to do anything at all relative to our project. I have seen nor heard from no one in that Department since last July. I do not know whether or not you saw Aldous at the meeting in Northern Iowa last weekend. I will not get to see him for another day or two as he left here Monday for the northern part of the state before I had had an opportunity to talk with him.

I wonder if Bennett has an additional copy of the pheasant stomach analysis he made last winter. He sent me a copy of the complete report of this work but I have misplaced it and am unable to find it. If he has such a copy I would very much appreciate the loan of it in order that I may have another copy made.

Do you recall the promise you made me one time to give me a photograph of yourself to add to my collection of famous and infamous wild life investigators? I would like very much to receive such a photograph in order that I may get my lantern slides ready for next quarter's work.

PLE #2

In case anything new develops here I will let you know at once.
With best wishes for your continued success, I am

Sincerely yours

RTK-s

Instructor - Economic Zoology

Ref. to Dr. W. A. Riley
R. J. K.

October 5, 1933

Mr. Charles L. Horn, President
Federal Cartridge Company,
Minneapolis, Minnesota

Dear Mr. Horn:

I hope that you will pardon my delay in answering your letter of August 26 in which you ask me to tell you of the ruffed grouse work being carried on by Ralph T. King of the University of Minnesota. I had half expected to visit you in late September or early October, but my work has stacked up in such a way that I don't see how I can make a trip into Minnesota until winter.

Mr. King's studies related to the ecology of the ruffed grouse under natural conditions. I have kept in close touch with his investigations since they started in the spring of 1929, and have followed with particular interest the results of his work at the Cloquet forestry station. In short, King has gathered from his Cloquet area what I believe to be the most accurate ruffed grouse population figures in existence, these figures representing consecutive monthly censuses over a period of nearly three years. As the "high" of the grouse cycle approaches, this material becomes of increasing significance, and the continuation of the study through the period when the die-off comes should be of inestimable value. × It is imperative that we know our grouse population densities when their cyclic peaks topple if we are to make any correlation between density and the severity and incidence of the decimating contagion. This latter is an extremely important point bearing upon possible management of cyclic species.

As I see it the studies of King and of Dr. Green are of an entirely different nature and should be kept separate, especially since the relations of these two investigators have not been free from friction. However, the fact remains that the work of both are of tremendous consequence and, irrespective of personalities, must be carried on, or the interests of science and conservation alike will suffer. Green's work seems assured of permanent status by his University, federal, and state connections but King's is in grave danger of being dropped for lack of funds unless outside parties come across with string-less contributions.

Private contributions (including the hundred dollars which I gave personally) and the little money that the extremely hard up Agricultural College was able to raise will probably suffice to keep the work going until spring; after that nobody knows. From here on some help would come in very handy.

Mr. Charles L. Horn

-2-

Oct. 5, 1933

Leopold and I are planning to attend the Minnesota conservation meeting in early January and hope to discuss the situation with yourself and others who might be either in a position to help or to advise us where help might be obtained. I may possibly see you before then, but I'm not making any promises, as my hands are so full at present that it is not even humorous. The Iowa program is going to take practically every bit of my time until at least the latter part of November.

Sincerely yours,

PLEWB

Paul L. Errington
Asst. Prof. in Charge
Wild Life Research

Jerry:

Have there been any recent developments relative to the grouse research, of which I have not heard? Sam Anderson in a recent letter states: "It was my understanding, talking with an officer of the conservation department some time ago, that provision had been made for the continuance of King's work. Just what the details are I don't know!! Is this anything of significance?"

Sam Anderson wrote me ~~previously~~ previously expressing his views favorably as to the ~~continuing~~ ^{continued} of the work and gave my letter to Horn (this was the letter of which I sent you a copy some time ago). Horn wrote me for more information, saying that maybe he could be of some help. Hence this letter.

P.L.E.

IOWA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
AMES, IOWA

DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

October 30, 1933

Mr. Ralph T. King,
Department of Economic Entomology,
University Farm,
St. Paul, Minn.

Dear Terry:

I have just received your letter relative to the uncertainties associated with the ruffed grouse work. I also received a letter from Leopold to Sam Anderson to the affect that he would be willing to go to Minnesota and see if he could drum-up some funds for you. Even if your funds are exhausted by the first of the year, by all means try to limp along for awhile afterwards, if possible.

I am sending a copy of Iowa Bird Life which contains on page 43 a picture of my "mug" in a characteristically grouchy moment. I trust you may be able to use this in your class, provided you do not think it would have an affect adverse to conservation.

Sincerely yours,

Paul L. Errington
Paul L. Errington,
Asst. Prof., In Charge
Wild Life Project

PLE*B

Dictated Oct. 26, 1933

P.S. I just returned from a trip to Wisconsin. The ruffed grouse are dropping off there in at least some places, according to some reports I know to be reliable.

January 5, 1934

Mr. Paul L. Errington
Department of Zoology
Iowa State College,
Ames, Iowa

Dear Paul:

Thanks for the Christmas card and I hope you enjoyed yourself at the Boston meetings. I expect you are now spending your time in Washington and will go on to the New York meetings the latter part of the month. Some people get all the breaks but I guess we each get just about what we deserve. If you have returned to the Mid-west no doubt you will be in St. Paul on the 15th to attend the Minnesota Game Protective League meetings in which case we will no doubt have some opportunity to renew old arguments.

The primary purpose of this letter is to inform you that the University has somehow seen its way clear to financing the work on the Cloquet station for another six month period. As you know, Laidlaw was inschool during the fall quarter but we continued the regular monthly censuses during the time. He is returning to the station this week and will put in full time there for the next three months, continuing the censuses and carrying on the trapping, banding and marking of birds much as he did last winter. He will return to school for the spring quarter's work the first of April and I will go to Cloquet for the next three months period with a class of some 25 students. So we seem to be pretty definitely fixed up until the middle of the year.

I want to thank you again for the very great help you gave us last fall and now I will not bother about writing any more in the hope that I will see you within a week or so.

Sincerely yours,

REK:K

Instructor - Economic Zoology

IOWA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
AMES, IOWA

DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

January 9, 1934

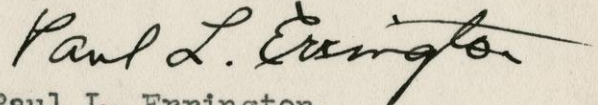
Mr. Ralph T. King,
Division of Economic Zoology,
University Farm,
St. Paul, Minn.

Dear Terry:

I was very glad to receive news that the Minnesota ruffed grouse work was continuing, particularly, since I had been very much at a loss as to how I might help. Possibly in the next six months something else might again turn up to ~~ad~~vert disaster.

I am sorry, but I shall have to postpone my trip to Minnesota until later, and so will not have the opportunity to see you at the Minnesota Sportsmen's Meeting, January 15. Until recently I had planned to make the trip, but I just returned from the East and find myself simply swamped with work, which cannot at this time be postponed. I will probably be around in February, provided that Iowa matters give me a chance. I don't know if Leopold is expecting to attend or not.

Sincerely yours,



Paul L. Errington,
Asst. Prof. In Charge
Wild Life Research

PLE*B

March 14, 1934

Dr. Paul L. Errington
Department of Zoology,
Iowa State College
Ames, Iowa

Dear Paul:

I haven't seen or heard from you for sometime and I am wondering when you are going to be in this vicinity again. I will be leaving for Cloquet the 26th of this month and will be there except for an occasional week-end until sometime in the summer.

Had a fine visit with Leopold, Holt and several others at the Milwaukee meeting on March 2 and 3. The work here is progressing nicely except that I am very much afraid that Laidlaw is going to go on to a better job and I will have to break some one else in to carry on the Cloquet work.

Will not bother to write details of all the developments during the past eight or nine months as I hope to see you either here or at the Station sometime during this spring.

I wonder if you deliberately forgot to send me a reprint of the paper published by you and Bennett entitled "Lost Legends" and printed in Outdoor America for September of last year. If you have such reprints I would appreciate receiving one or two if they can be spared.

With best regards and hoping to see you soon, I am

Sincerely yours,

RTK:K

Instructor - Economic Zoology

IOWA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
AMES, IOWA

DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

March 20, 1934

Mr. Ralph T. King,
Dept. of Economic Zoology,
University Farm,
St. Paul, Minn.

Dear Terry:

I received your sad tale to the effect that I had neglected to send you reprints of the Lost Legion article and, hence, I am sending you a number of copies as well as some from later publications which you may not have.

I have no reprints from the paper on "Waterfowl Breeding Grounds", published in, I think, the September issue of the Minnesota Conservationists. I would appreciate it if you could "mooch" what copies you could lay hands on, and give me some next time I happen around.

I am not making any promises as to when I will be in Minnesota again as the dates of my planned visits seem continually advancing into the future. I suspect that I will be around in a month or so, and if not then, maybe the next month or the next month. At any rate you will probably see me eventually.

Sincerely yours,

Paul L. Errington

Paul L. Errington
Asst. Prof., In Charge
Wild Life Research

PLE*BB

May 16, 1934

Dr. Paul L. Errington,
Department of Zoology
Iowa State College,
Ames, Iowa

Dear Paul:

I am sorry I didn't get to see you again before you left town and even more sorry that I forgot to inquire how much I owed you for the trip from the Station to the Cloquet Valley Refuge and return. However, I couldn't have paid you anyway until I received a check the 16th of this month but if you will inform me as to the amount I owe you I will send it to you within the next week. I appreciate your kindness in helping me out with your car that day. Haven't yet made the calculations for the censuses. In fact, I haven't even obtained the figures from the various fellows yet. I am still tied up here in St. Paul and Bill is running things at Cloquet. I will be back up there in a day or two and will get the census figures together.

In case we are able to gather any more owl pellets I would be glad to forward them to you if you want them. I hope you will not forget to send me a reprint of your article in Ecology. Please don't forget to send me a statement as to the cost of the trip. I will try and get the rabbit skins and skeletons to you within the next month and I hope you will find it possible to send me the quail materials that we talked about.

With best wishes for continued success, I am

Sincerely yours,

RTK:K

Instructor - Economic Zoology

IOWA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
AMES, IOWA

DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

Rutwen Iowa
July 11, 1934

Dear Jerry:

I am sending for your criticism on excruciatingly poor carbon of the manuscript, the subject matter of which I discussed with you some time ago. If you can read it at all, I wish you would make any suggestions which may come to your mind, especially concerning the marked paragraph intended to quote you. If you ~~care~~ ~~don't~~ approve of the way I have stated your material, you might write it as you wish in a letter, ^{from} which I could quote. ~~etc.~~

I would like to hear from you soon as my recently acquired wife and I are planning to leave on a trip into the Prairie Provinces in the next couple of weeks.

Yours
Paul L. Ervington

WINTER CARRYING CAPACITY OF MARGINAL RUFFED
GROUSE ENVIRONMENT IN NORTH CENTRAL STATES

by Paul L. Ervington

Recent bob-white quail (Colinus virginianus virginianus Linn.) population studies, principally in south-central Wisconsin, indicate a remarkably definite maximum carrying capacity of winter environment for the species. (For presentation of data, reference is made particularly to Ervington 1934; also 1933b and 1933c) The question logically arises as to the possibility of this holding true for kindred forms. The following discussion is not expected to provide a full answer, but it may be a contribution.

Incidental to ~~p~~ five years continuous field research on quail populations east of Prairie du Sac, Wisconsin, so some notes were taken relative to the numerical status and mortality of the ruffed grouse (~~Bonasa~~ unbellus unbellus Linn.) cohabitants of the observational area.

The area consisted of five square miles of non-glaciated agricultural land with partially wooded hills and valleys in cultivation or in pasture. The habitability of the wooded tracts for grouse plainly varied with the extent to which wood cutting and pasturing had modified the flora. Grouse environment was restricted to wooded hills comprising roughly one-eighth of the area and broken up into five chief woodlots ranging in estimated area from 20 to 300 acres.

The first winter (1929-30), only three of the five square miles were kept under observation. A population of

about an even dozen ruffed grouse was calculated on the basis of tracks to be found or birds to be flushed in regularly used coverts. No grouse censuses were possible by the direct enumeration techniques so useful in bob-white census work (Warrington, 1933a).

Pro-rata calculations would place the early winter population for the five square miles in the vicinity of 20 birds or one per 160 acres. This population seemed fairly secure, as there was scant apparent mortality except some due to great horned owls (kill evidence seen and remains of grouse in 2 of 50 winter and early spring pellets). Later in the spring, remains were found in the nest of a red-tailed hawk.

Numerical estimates of the wintering grouse population ^{not} could be located among the 1930-31 notes, although there was a strong implication that the population did not differ materially from that of the preceding season. Analyses of 146 horned owl pellets showed no grouse, and no other evidence of winter mortality was recorded.

For 1931-32, the early winter grouse population was estimated at 25 and the mortality rate seemed to rise conspicuously. Aside from a bird shot by a poacher, most of the losses were traceable to grey foxes and horned owls, in about equal proportions. Ruffed grouse remains were listed in of horned owl pellets.

A pronounced increase was observed by the season of 1932-33, and the early winter population figure arrived at

was 33. This increase was attended by a terrific acceleration of predation, and grouse remains were encountered throughout the woodlots during the winter. This winter, as well as the one before, the mortality was largely attributable to grey foxes and horned owls. Of horned owl pellets contained ruffed grouse remains. It is probable that very nearly half of the population was killed by enemies in the course of the winter.

The initial 1933-'34 population amounted to about 18, or about what one would judge to be the maximum number the area could winter, i.e., the carrying capacity of the land. None of the horned owl pellets collected showed grouse contents, nor was there other detected evidence of winter predation.

From what observations we have been able to make on the Prairie du Sac population, then, it appears that the marginal nature of the environment holds species at a low but rather uniform level and does not permit of the strong ascendancies associated with the upsurge of the grouse cycle in regular range. (Cyclic fluctuations are described in Ulton, 1930; Leopold, 1931, 1933.) Whenever the population exceeded the bird per 160 to 180 acres carrying capacity more or less constant for the area under present conditions, the surplus had a way of being reduced from one cause or another. Conversely, populations within carrying capacity exhibited a notable security of position, seemingly irrespective of the kinds and densities of predatory enemies. Of the latter, great horned owls and grey foxes were responsible for most of the mortality traced down, but fluctuations in numbers of these and other possible enemies from winter to winter had no perceptible

effect on the intensity of predation.

As in the case of bob-white populations (Arrington, 1934, pp 118-120), the severity of winter loss from predation appears far more a matter of how many birds the environment can safely accomodate than the composition of the predator factor [^]at least according to the scanty evidence available.

General field experience (1929-'32) in obviously marginal ruffed grouse country in the vicinity of Pine Bluff, Verona, Lodi, and Denzer, Wisconsin, gave no indication of grouse increase, though I was interested in observing any increase corresponding to the cyclic peak which wilderness populations were approaching. Populations in stronger environment near Cross Plains and Denzer, nevertheless, did mount noticeably, and the grouse of the wild and extensive Baraboo Hills became probably as abundant as under primal conditions.

W. J. Breckenridge, of the University of Minnesota, believes that a square mile of partially farmed land near Anoka, Minnesota, has supported a winter ruffed grouse population averaging about eight birds in the three years (1931-1934) that he has had the area under ecological observation. This section has been repeatedly burned and cut over, so the vegetation is predominantly of brushy and herbaceous types, with scattering growths of oak woods. I would call it distinctly marginal for grouse but superior to the Prairie du Sac area.

While my observations have had to do largely with mar-

front

ginal ruffed grouse country, the experience of Ralph T. King, who since 1929 has had charge of the ruffed grouse investigation of the University of Minnesota, leads him to state that even optimum ruffed grouse environment may have a definite carrying capacity delimiting maximum populations. His studies at Cloquet, Minnesota, and elsewhere, point to a maximum carrying capacity of about a bird per 4 acres for the best wilderness and semi-wilderness range; when this capacity is reached, the adult population curve, instead of rising to a really top-heavy peak, flattens out and is thus maintained for a time before the cyclic decline.

Whether the population vulnerability thesis advanced with reference to northern bob-white winter populations (Errington, 1934) proves of broad biological application or not, the probability is that to some degree it may be applicable to other species. Species displaying territorial intolerance not necessarily confined to the breeding season may very reasonably have their upper stable densities limited by the number of individuals for which there is room in a given environment. As the ruffed grouse seems even more intolerant of crowding than the bob-white, it may conceivably belong in this category also.

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July 24, 1934.

Mr. Paul L. Errington,
Department of Zoology and Entomology
Iowa State College,
Ames, Iowa.

Dear Paul:

Sorry that I have not been able to answer your letter of July 11th sooner but I have been out of town practically all of the time since last March. First of all may I congratulate you on the very forward step you have taken in acquiring a wife. Although it has not been my pleasure to meet Mrs. Errington I wish her every happiness and I hope that I will soon have the pleasure of expressing this wish to her in person.

As for the paragraph in your paper which you submitted to me it expresses the idea satisfactorily. I do not think it necessary to restate it. You will recall, of course, that what you speak of as carrying capacity I believe to be saturation point. Therefore I think carrying capacity is a term that refers entirely to a property of the environment whereas saturation point refers to a property of the species. It is possible that future work may prove that only environmental properties are concerned, in which carrying capacity would be correct. This, however, is a relatively minor question and perhaps does not need to concern us at this time. I have no other suggestions to offer and will be looking for the paper in print when it appears.

With best wishes, I am

Sincerely yours,

RTK:K

Instructor - Economic Zoology

Copy

August 24 1934

Dr. C. O. Rost
Division of Soils
University Farm
St. Paul Minnesota

Dear Dr. Rost:

The establishment of a soil erosion project in Southeastern Minnesota is certainly a highly desirable and worthwhile undertaking. No one who has been over the Coon Valley project in Wisconsin and has seen the results accomplished there can fail to recognize the need for the same type of work in the Southeastern part of this state. The establishment of a similar project in Minnesota offers an opportunity for wild life conservation such as we have never had before and are not apt to have again soon. The only way, however, in which this opportunity can be realized is through the inclusion of wild life management in the plans for the project.

The various ways in which wild life management can serve the people of the community, the public, and the cause of wild life conservation in general are discussed at some length in the accompanying memorandum. There are, however, a number of points of particular importance which I believe deserve special emphasis. They may be summarized as follows:

All of the organic natural resources are so interrelated that any attempt to control or influence one is bound to affect the others. Failure to recognize this fact has resulted in much unintentional harm being done in the past and has seriously retarded most conservation work. The changes in environments that must be made in connection with soil erosion prevention will, because of the very nature of things, affect wild life and the other organic resources of the area. A comprehensive program which makes allowances for these interrelations, utilizes such knowledge as is now available relative to these other resources, and provides a coordinated and correlated scheme of work based on this knowledge, will not only avoid making changes detrimental to wild life but will very often greatly enhance wild life conditions at no additional cost in either labor or materials. Perhaps such a program would demonstrate to the conservation public the reality of these interrelations and the desirability of increased cooperation in conservation efforts.

The rapid recuperative rate of most wild species, particularly game species, makes it possible to produce an annual increase which added to the original stock gives a population in excess of that needed for breeding purposes. This annual surplus can safely be harvested through the medium of hunting.

Increased leisure time, a higher standard of living, and rapid and cheap transportation have, along with other developments, resulted in a rapidly growing interest in the out-of-doors and its associated wild life. At the same time there has been a decided change in our attitude toward these resources. Formerly they were considered of little or no value except as they served to supply food or furs. Now their recreational, sporting, aesthetic and social

values are admitted to be greater than their commercial values and yet at the same time it is known that their commercial value is much greater than was formerly suspected. Their biological and scientific values have not grown less, in fact they are more appreciated each day.

Wild life management is not a mysterious procedure impossible of definition and totally lacking in organization, neither is it a hodge-podge of sentiment, tradition and pseudo-scientific detail commonly known as nature-faking. It is a body of scientifically obtained facts relative to the lives, habits and requirements of wild animals which has supplied us with certain definite principles. Practices based on these principles are applied to the land for the purpose of increasing and improving wild life environments and it is recognized that the application of these practices must not be contrary to other land use practices.

An examination into the history of wild life conservation is sufficient to prove the futility of past methods under present conditions. Restrictive laws, predator control and the establishment of public refuges have not sufficed to maintain wild animal populations and can never bring about any permanent or widespread increase in these populations. The restoration and maintenance of productive environments is the only way in which any permanent good can be accomplished and this new order can be brought about only when the proper methods have been demonstrated to and applied by the landholders.

Our wild life resources are deserving of consideration, their values are much greater than is ordinarily realized. Proven methods of conserving and enhancing these values are now available. There is no reason why these methods should not be included in the common-sense attitude we have adopted toward our other natural resources such as forestry, grazing and soil fertility. Their inclusion in a soil erosion program is both logical and timely.

The accompanying memorandum is submitted in the hope that it will make clear the nature of wild life management, the need for such management, and the reasons why it should be included in the soil erosion program. You are free to make such use of it as you think best.

Sincerely yours

Ralph T. King
Instructor - Economic Zoology

RTK-s

IOWA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
AMES, IOWA

DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

June 1, 1935

Dear Jerry:

Enclosed find a copy of the old ms on marginal ruffed grouse territory, which has been revised somewhat since you saw it before. You will also find a copy of a letter to Bump.

Please read this critically and let me have your comments. Note especially page 7, in which I try to express your views. If I am misquoting you, please correct me and make any suggestions you may wish.

What would you think of the Canadian Field Naturalist as a possible place for publication?

You may be interested to learn that some time ago we entertained your old friend Dr W.A. Wardle, now of the University of Manitoba. He had some nice things to say about you, with which I, of course, very properly agreed.

Sincerely, Paul L. Ervington

R. J. K.

May 31, 1935

Mr. Gardiner Bump
Superintendent of Game
Department of Conservation
Albany, N. Y.

Dear Mr. Bump:

I hope that you will not think from the enclosed manuscript that I am trespassing unduly upon your field. We have, however, incidental to our quail studies, picked up some data on marginal grouse populations that seem fairly reliable so far as they go.

Although we have not been carrying on anything of the nature of an intensive study of marginal grouse, it does seem as if grouse and quail populations may have certain things in common, especially as relate to the behavior and vulnerability of biological surplusses. I am, of course, not at all sure of this, but the limited data at hand seem to hint that this may be true. Aside from the differences in habitat types required or favored by the two species, there would seem to be a remarkable similarity in the way that limitations of environmental carrying capacity effectively check population rises past certain levels.

The enclosed manuscript is a rough draft of the data we have and the tentative conclusions which they suggest to us. I would appreciate it, if you would go over the manuscript with some care, and make whatever comments and suggestions may occur to you. Specifically, have you run across anything in your own work which may be looked upon as evidence either supporting or contrary to the population vulnerability thesis as suggested? There are passages in some of your reports which rather indicate that you may have something pointing in either direction, but which in the absence of more detailed data I have not felt able to interpret very precisely.

In the event that you have some more or less distinct evidence pertaining to this subject, perhaps you might care to make a short statement that could be included as a direct quotation. All in all, I don't want to bite off too much territory in the preparation of this paper. I would prefer to restrict its scope largely to that designated by the title, as by so doing I feel that I am staying within my own radius of familiarity. Nevertheless, a brief remark, as to whether the situation does or does not appear to differ significantly in New York or Wisconsin, should not be out of order.

Mr. Gardiner Bump

-2-

May 31, 1935

I wish to thank you for the publications you sent me some time ago. I am especially glad to see that some ecological work is being done on Eastern deer, as the species is surely too important to merit the neglect^x that it has long received.

I have insufficient secretarial help to maintain a mailing list, so my own reprints are distributed in a lamentably haphazard manner, and largely according to requests. I do not have many new ones on hand at present, but a number ^{of papers} are in press or in the hands of editors, and several should be coming out in the course of the year.

Very truly yours,

PLE*BB

Paul L. Errington
Asst. Prof., in Charge,
Wild Life Research.

IOWA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
AMES, IOWA

DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

June 22, 1935.

Mr. Ralph T. King
Division of Economic Zoology
University Farm
St. Paul, Minn.

Dear Terry:

Sometime ago I sent you a carbon copy of the manuscript on the carrying capacity of marginal ruffed grouse environment with a request for comments and suggestions. I sent copies also to Bump and Mc Atee.

~~Max~~Atee has already sent his comments but I haven't heard from Bump. I would, however, particularly appreciate your views as I have a journal paper number for the manuscript and I would like to submit it rather shortly.

I wish you would be frank in telling me just what you think of my publishing this. Mc Atee thinks it is quite a worthwhile publication, but I do not wish to do anything which would be stealing any of your thunder, so to speak. If you think that I am trespassing too much in your field through the publication of this rather incidental paper, I might even be persuaded not to publish it at all.

It would of course be preferable to quote from a publication the material which I am attributing to you, if you have published on the subject since I saw you last. I do not know what you have in preparation or in press at the present time. Please let me know what you think. If you have any suggestions of whatever nature please do not be hesitant about letting me have them. I wish particularly to quote you as you want to be quoted-- if at all.

Yours very truly,

Paul L. Errington

Paul L. Errington
Assistant Professor, in Charge
Wild Life Research.

July 2 1935

Dr. Paul L. Errington
Department of Zoology & Entomology
Iowa State College
Ames Iowa

Dear Paul:

I am sorry I have kept your ruffed grouse manuscript so long and what few suggestions I have been able to add probably won't go far toward justifying my delay.

I find nothing at all in your major thesis with which I can disagree. In fact, I think your contentions are fully justified and will in the course of time be substantiated conclusions. The only corrections, or rather criticisms, that I have noted on the manuscript are all in connection with minor points. For example, I do not believe that tracks are of any value whatever in determining grouse populations. I wish you had had an opportunity to use our own method, which, I believe, gives just as accurate figures in the case of grouse as do the methods you have used in connection with quail. 400 acres of grouse environment is not a very large block and when that is divided into 5 separate blocks these smaller areas must certainly approach minimum units of range in size. One bird per 100 acres in 1929-30 was probably very near normal, even in our good grouse range at that phase of the cycle. I am wondering if these birds could have reached their peak population and have simply maintained it since that time. If your figures for the Barabo Hills are for March or April populations these are as strong grouse populations as I have ever seen.

Your statement of my belief, on page 7, is correct so far as I am concerned except that grouse populations do not always reach the level of 1 bird per 4 acres, in which case they may continue to rise until the actual date of decline. It is only in good environments that they can reach their population of 1 bird per 4 acres and if this happens before the time for the decline they will maintain this population until the decline becomes effective. Of the several points you mention on page 8, it is my belief that intolerance of crowding is most important. But who knows what is implied in the term "intolerance of crowding"?

PLE #2

I hope these suggestions will be of some value to you. I have no doubt that the Canadian Field Naturalist will be glad to use your paper for publication.

With kindest regards, I am

Sincerely yours

RTK-s

Instructor - Economic Zoology

October 7 1935

Mr. Paul L. Errington
Department of Zoology and Entomology
Iowa State College
Ames Iowa

Dear Paul:

I have no serious objections to your using my conclusions in your forthcoming technical bulletin. The statement as you have written it is fair enough except that I wonder if your inclusion of all grouse at Cloquet under the subspecies togata is 100% correct. That has no bearing on the matter of clutch size at all but it is a question for consideration if the data are to appear in a technical bulletin.

I am still looking forward to receiving a letter which will go into the promised details which you mentioned in your last two letters. With best wishes, I am

Sincerely yours

RTK-s

Instructor - Economic Zoology

IOWA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
AMES, IOWA

DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

Sept. 7, 1935

Dear Jerry:

I have included a passage concerning your work in a technical Bulletin manuscript as follows: "R. Z. King (unpublished) has observed at Cloquet, Minnesota, that the size of ruffed grouse (Bonasa umbellus togata Linn.) egg clusters diminishes with rise of population density during the upphase of the cycle." Is this in accordance with the truth and as you care to be quoted? This Bulletin is being prepared with a great deal of care and I want it to be accurate in every possible respect.

Many thanks for criticizing my grouse manuscript. I have made modifications according to your suggestions to the improvement of the paper. I plan to write you in greater detail one of these days, if I can find the time. Best regards to you and your tribe.

Paul L. Errington

IOWA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
AMES, IOWA

DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

October 14, 1935

Mr. Ralph T. King
Division of Entomology & Economic Zoology
University of Minnesota, Univ. Farm,
Saint Paul, Minnesota

Dear Terry:

I have your letter of October 7 in which you mention your doubt of subspecies togata being correct for the Cloquet ruffed grouse. I have accordingly deleted the subspecific name from my reference in the text.

I note that you have taken me to task for my ~~written~~ ^{Correspondence} shortcomings. As a matter of fact, I had forgotten all about the two letters in which I promised to write you in more detail at a later date. I don't seem to recall very clearly what I was intending to write you about, but shall make a heroic effort anyway.

I perceive from your notations on my ruffed grouse manuscript that I shall have to go to bat concerning the usefulness of tracks ~~in~~ studies of the sort that I have made. I agree with you that tracks are probably of no value at all in determining grouse numbers in well populated environment. However, you know that I have been working in such very sparsely populated environment that it was of considerable significance to ascertain whether or not various woodlots were occupied by grouse at all. In establishing this point, tracks have been of considerable usefulness to me as well as feathers, droppings, and other acceptable signs. Tracks have frequently told whether a given covert was occupied, ~~at all~~ ^{and} sometimes I have been able to get a fair idea of the number of birds there, as checked by later flushes. I trust you understand that I am claiming virtue for tracks only under conditions where the population is present at extremely low densities.

Relative to the Baraboo Hills, ~~and~~ ^{for} which I estimated a carrying capacity of a grouse per six acres, I may say that this is represented by a large expanse of almost virgin hardwood timber. There are grouse all over it, just about as thick during peak years as one could imagine the grouse would be. I am inclined to doubt that it is quite as good as some of your territory, but it is, nevertheless, good grouse range.

Altogether I have found your suggestions extremely valuable and I have deleted from the manuscript practically everything which you have questioned. The manuscript has been accepted for publication in the Canadian Field Naturalist.

Ralph T. King

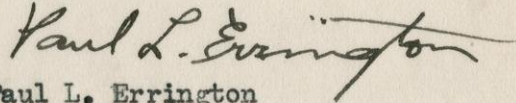
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Oct. 14, 1935

I am sending you under separate cover a supply of reprints for which you may find some use in your teaching. I trust that you will keep me supplied with reprints as your own material comes out, as I have frequent occasion to quote you in some connection or other, and I would much rather quote something published than from something that you may not be quite ready to put out. If I ever show any tendency, however, to quote you prematurely, I hope that you will put your foot down and point out to me the error of my ways.

I am planning to leave tomorrow on a trip of about three weeks' duration, to take in the A.O.U. meeting at Toronto and to spend a few days at Washington. You aren't by any chance planning to go to Toronto are you?

Sincerely yours,



Paul L. Errington
Res. Asst. Professor

PLE*BB

February 16 1936

Dr. Paul L. Errington
Department of Zoology
Iowa State College
Ames Iowa

Dear Paul:

At the American Wildlife Conference held in Washington the week of February 3rd a Society of Wildlife Specialists was formed. I will not go into any detail relative to the proceedings at the two meetings that were held that week for you will receive such an account from Dr. McAtee, the Secretary, within the next week or so. A tentative constitution in the form of an organization committee report was adopted for our guidance during the first year. Officers were elected for the first year. These include President, First and Second Vice-president, and Secretary-Treasurer. It was decided that the president of the new organization should appoint one adviser from each of thirteen regions in the United States, to act as an Advisory Board. You were appointed as Regional Adviser from Region 9, which includes North and South Dakota, Nebraska, Kansas and Iowa.

The elected officers, together with the thirteen regional representatives, must consider during the coming year such questions as the permanent name of the society, qualifications for membership, classes of members, dues, constitution and bylaws. The Advisory Board is to also canvass the entire country for prospective members and secure as many first year affiliates as possible. It shall consider also the feasibility of publishing a professional journal. These matters shall all be reported on and acted on at the next annual meeting of the Society, which will be held in connection with the next general wildlife conference.

It may seem that you have been appointed to a position that is going to take up a great deal of your time. It is true that it will take up some time but I am sure your interest in your profession and your desire to see it grow and develop as it should will lead you to accept. If each of us does his part there will not be too much work for anyone and surely we can not expect this work to be done properly or efficiently unless those of us most interested take on these responsibilities. I sincerely hope you will find it possible to serve in this capacity. You will receive very shortly a more detailed report of the Society formation and the work it must accomplish during the next year.

I was sorry to learn that you could not attend the Washington conference. I hope it will be possible for us to enjoy another visit together before long. With very kindest regards to both Mrs. Errington and yourself, I am

Sincerely yours

President - Society of Wildlife Specialists.

IOWA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
AMES, IOWA

DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

January 9, 1937

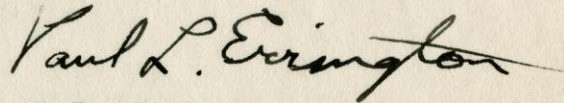
Mr. Ralph T. King
Division of Economic Zoology
University Farm
St. Paul, Minn.

Dear Terry:

I have had some recent correspondence with Mr. Karl A. Jacobson, of the University of Maine. He has inquired as to the opportunities for doing work on grouse in Iowa, and before I reply to him I would like ~~your~~ your opinion of his abilities, personality, etc. I understand that he is a former student of yours.

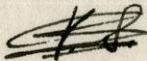
Manweiler dropped in at the Hamerstoms at Necedah, Wisconsin, while I was there a couple of weeks ago, and I was very favorably impressed with him.

Sincerely yours,



Paul L. Errington
Res. Asst. Professor

PLE*BB



March 15, 1937

Mr. Paul L. Errington
Iowa State College
Department of Zoology and Entomology
Ames, Iowa

Dear Paul:

This is a rather late date to answer your letter relative to Karl Jacobson. I believe you asked me about Jacobson at St. Louis but so many things happened in the two days I was there I am not sure whether I discussed him with you or someone else.

Jacobson completed his undergraduate work here in the College of Forestry with a major in Game Management. He has better than average ability as a student and is thoroughly conscientious and reliable. His chief characteristic as far as personality is concerned is absolute frankness. Perhaps the only criticism of his personality would be the statement that this frankness might perhaps be better colored with a little restraint on occasions. However, it is not a serious drawback and one that may be corrected by this time. As for his research ability I am not qualified to speak. He had done no graduate work before leaving here and I do not know what promise he has shown in this respect since going to Maine. I would be willing to accept Gus Swanson's estimate of his abilities in these respects.

I think Jacobson has shown very great promise and I would like to see him provided with the opportunity to continue to develop.

I hope I will find time to get down to Ames before the 15th of April. However, I could not promise that I will. I have resigned from Minnesota effective that date to accept the position at Syracuse University Syracuse, New York. The work there will involve teaching, administration and research and inasmuch as I am to be head of the Department of Forest Zoology as well as Director of the Roosevelt Wildlife Station. For heavens sake, wish me luck and if I can get to Ames before leaving I will certainly do so for I want your advice on many points.

Very truly yours,

RTK:K

Instructor - Economic Zoology

IOWA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
AMES, IOWA

March 18, 1937

DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

Mr. Ralph T. King
Division of Entomology & Economic Zoology
University Farm
St. Paul, Minnesota

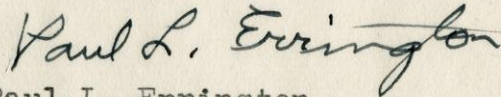
Dear Terry:

I received your letter of March 15 and I am still somewhat dazed by the contents thereof.

I most certainly do wish you luck. The Erringtons are indeed delighted at your recognition and advancement and feel that your new position is a great opportunity. It has the earmarks of a really big job and seems to us just about the sort of thing you would be best qualified to handle.

By all means, come down to Ames if you can before leaving. I can at least give you sage counsel on many things that you shouldn't do. If you come alone, we could doubtless rig up a cot or quarters of some kind for you in the living room of our apartment.

Sincerely,



Paul L. Errington
Res. Asst. Professor

PLE*BB

April 2, 1937

Dr. Paul L. Errington
Dept. of Zoology and Entomology
Iowa State College
Ames, Iowa

Dear Paul:

Thanks a lot for your letter of March 18. I am sorry but it's going to be impossible for me to get to Ames before I leave for Syracuse. I must leave here on the 16th of this month which is only two weeks away, and I simply cannot schedule an additional out-of-town trip in these last two weeks.

I appreciate your invitation, and I regret for more reasons than one that I can't accept it. However, I will be back here about the 1st of July for a couple of months, and I will certainly plan on seeing you then and anyway mail is still delivered between Ames and Syracuse and we needn't discontinue our correspondence simply because we are a few hundred miles apart.

With the very best wishes to both Mrs. Errington and yourself, I am

Sincerely yours,

RTK:W

Instructor in Economic Zoology

The University of Chicago

Department of Zoölogy

CHICAGO, ILLINOIS

April 6, 1937.

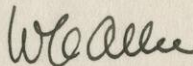
Mr. Ralph T. King,
University of Minnesota,
Minneapolis, Minn.

Dear King:

I was much pleased to see in Science that you had been appointed to head the Roosevelt Wild Life ^{work} at Syracuse in place of Dr. Johnson, deceased. This seems to me to be an excellent opportunity which you richly deserve.

With personal regards, I am

Cordially yours,



W. C. Allee.

WCA:ES

April 16, 1937

A
Dr. W. C. Allee
Department of Zoology
The University of Chicago
Chicago, Illinois

Dear Dr. Allee:

Thank you for your note of April 6. It seems a long step from the Zoology Department at Logan, Utah to the Roosevelt Wildlife Station at Syracuse, New York, and the difference is not one of geography alone. I appreciate that this appointment does give me excellent opportunities, and I sincerely hope that I will be able to make the most of these opportunities. Please be assured that I am very well aware of how much I owe in these respects to the men under whom I took my training, and of these men you rank among the first.

I wish I had time on my way east to stop for a visit with you, but that is impossible. I leave here Saturday of this week and must be there Monday morning. However, I will be through Chicago at least twice this summer and hope that it will be possible for me to see you for a time on one of these trips.

With kindest personal regards, I am

Very truly yours,

RTK:W

Instructor in Economic Zoology

UTAH STATE AGRICULTURAL COLLEGE

ELMER GEORGE PETERSON, President

LOGAN, UTAH

OFFICE OF THE PRESIDENT

April 23, 1937

Mr. Ralph T. King
Director, Roosevelt Wildlife Station
Syracuse University
Syracuse, New York

Dear Mr. King:

I was greatly pleased to learn of your advancement to the position of Director of the Roosevelt Wildlife Station, and Instructor in Economic Zoology at Syracuse University.

Please accept my hearty congratulations on this honor which has come to you. I am sure your many friends at the College would wish to join me in expressing to you every good wish for your future success and happiness.

With personal good wishes,

Sincerely yours,

Elmer G. Peterson
President

May 3, 1937.

P
Dr. Elmer G. Peterson, President,
Utah State Agricultural College,
Logan, Utah.

Dear Doctor Peterson:

Thank you for your very kind letter of April 23rd. It is always a pleasure to hear from any one in Logan, especially any one connected with the College. Even though I have been gone for twelve years, and am now further away than ever before, I still remember clearly the campus as I knew it from 1920 - 1925, and the men who did so much for me there. I sincerely hope that if any one of them is in the East and near Syracuse, that they will find the time to stop here for a visit. Both Mrs. King and myself plan definitely on returning to Logan for a visit some time, but we have no idea at this time when that will be.

You perhaps know that Dr. Vernon Young is also located here in the Department of Forest Botany. We have had a number of long visits, since my arrival, in which we have talked over our many friends in Utah and gone carefully through the several yearbooks that he has with him. Mine have not yet arrived here but they are and will continue to be an important part of my library.

Please give my regards to those members of the staff who remember me, particularly, Prof. William Peterson. I am going to write Dr. George Hill direct, and of course, there is no acknowledgment I can make now to Dr. Herbert Pack. But I can say in all honesty that those three men have done more for me than any other men I have ever associated with.

Let me thank you again for your letter and be assured that I am always glad to hear from any one at the Utah State Agricultural College.

Very sincerely yours,

Head of the
Department of Forest Zoology.

Transd

December 3, 1937.

Dr. Paul E. Errington,
Department of Zoology,
Iowa State College,
Ames, Iowa.

Dear Paul:

It has just occurred to me that we have not written each other since I left Minnesota last spring. I have thought of you a great many times and have intended to write, but as there was no particular need for a letter I have kept postponing it.

Just yesterday I saw a copy of your article on predation, published in the Smithsonian series and it again brought to mind the lapse in our correspondence and also reminded me of the fact that I have not received reprints of your recent articles. I sincerely hope that I am not going to be deprived of the opportunity to keep my library complete insofar as your published articles are concerned.

And that further reminds me that I may not have sent you copies of my grouse management paper. Those were received here during my absence last summer and some were distributed from here and some from Minnesota, so I have no accurate knowledge as to who has received them and who has not. Just in order to be on the safe side I am enclosing a dozen copies with this letter. Make whatever use of them you wish.

I understand that the meeting in Madison last month was most successful. I wish I could have been present. Am looking forward to meeting members of the old crowd at the Wildlife meetings in Baltimore in February. Wish it was possible to attend the Science meetings in Indianapolis this month, but am afraid it is out of the question so far as I am concerned.

I trust that everything has gone well with you and Mrs. Errington and will appreciate it if you will give her my best regards. I hope that if you are ever in the region of Syracuse you will plan to stop over at the Station for a day or so. My work here is progressing as rapidly as I could hope for and so far I have found not a single reason to regret the change I have made. With best wishes for an enjoyable holiday season, I am

Very truly yours,

DEC 1 1937

DEC 4 1937
WJW

Ralph T. King, Director,
ROOSEVELT WILDLIFE FOREST EXPERIMENT STATION

IOWA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
AMES, IOWA

March 16, 1938

DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

Prof. R. T. King, Director
Roosevelt Wild Life Forest Experiment Station
Syracuse University
Syracuse, New York

Dear Terry:

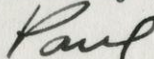
As you may know, I have for some time looked upon the horned owl as being a valuable indicator of vulnerability in certain prey populations. While recently at Washington I talked over with McAtee the possible desirability of elaborating on this concept in print and combining with it a discussion of technique of horned owl food habits study for whatever use such may have to other investigators. He was receptive to the idea of publishing the paper in the Journal of Wildlife Management, so I have made a start on the MS.

In a paragraph relating to the ruffed grouse I have had occasion to cite your findings, some of which I got out of your Journal of Forestry paper and some out of memory from what I think you told me in previous conversations. The following then represents this part of the MS in present form.

"King (1937) recorded for the winter of 1933-34, on his Cloquet study area in north-central Minnesota, a top-heavy fall population of grouse that by April had been reduced to approximately the spring density of the two preceding years. The reduction was accompanied by obviously the most severe predation observed on the area during seven years of intensive study; no horned owl pellets contemporaneous in deposition with the period of heaviest grouse losses were analyzed, but ruffed grouse remains in two of 60 spring pellets in addition to field evidence may suggest that this over-population of birds was decidedly vulnerable to horned owls among other resident predators."

Please let me know if you approve of this statement, whether you agree with its correctness, etc. The pellets referred to were those you gave me to take to Ames for analysis. I also seem to recall that you said that most of the winter predation losses were due to horned owls but am not sure of this. If any suggestions for bettering the discussion come to your mind, I would be indeed pleased to have them.

Sincerely yours,



Paul L. Errington
Res. Asst. Professor

PLE*BB

March 21, 1938.

Prof. Paul L. Errington,
Department of Zoology,
Iowa State College of Agriculture,
Ames, Iowa.

Dear Paul:

I will be very much interested in seeing your horned owl paper when it appears. You probably know that your papers on predation are stirring up any amount of discussion all over the country. I just gave a talk at Hobart College in Geneva, New York, last night, and although in the course of the talk I barely mentioned the matter of predation, it is the only point on which there was any discussion afterward, and the various members of the faculty who talk part in the discussion were all familiar with your late papers dealing with this matter of predation.

As for the paragraph quoted in your letter (taken from your manuscript) it is O.K. as far as I am concerned. It describes the situation as well as it can be described. Maybe as I continue to go through this grouse material I will find a little more. Perhaps something more definite on the relationships of horned owls to grouse, but at present I have nothing more definite than that quoted in your letter.

I can make no other suggestions. When I have succeeded in completing the analysis of my ten years of data, I will send you all that pertaining to predation, for I would want your opinion before publishing.

Very sincerely yours,

Ralph T. King, Director
ROOSEVELT WILDLIFE FOREST EXPERIMENT STATION

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nm*

IOWA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
AMES, IOWA

DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

April 29, 1941

Professor R. T. King, Director
Roosevelt Wildlife Forest Experiment Station
Syracuse University
Syracuse, New York

Dear Terry:

Can you spare me a copy of M. J. Townsend's, "Studies on some of the small mammals of central New York", Roosevelt Wildlife Annals, 4(1):1-120, 1935?

I have a feeling that I do not have copies of all of your grouse papers. The last reprint you sent me was the one of "Ruffed grouse management", Jour. Forestry, 35:523-532, 1937.

The muskrat work here is going on much as usual, with particular emphasis upon population recovery and related phenomena. Right now, I am struggling with an analysis of mink predation upon muskrats but can't say when it will be finished.

Sincerely yours,

Paul

Paul L. Errington
Research Associate Professor

PLE:fh

May 7, 1941.

Dr. Paul L. Errington, Research Associate Professor,
Iowa State College Dept. of Zoology,
Ames, Iowa.

Dear Paul:

Your letter of April 29th was received while I was absent from the office. Miss Merrill, however, has already sent you a copy of Roosevelt Wildlife Annals vol. 4, no. 1 containing Townsend's "Studies on some of the small mammals of central New York". I am glad we were able to send this to you.

You may be interested in knowing that studies very similar to these are being carried on on the Huntington Forest, and we hope that within a few years sufficient information will be available to form the basis for a second paper on small mammals.

I believe you must have copies of the two papers I have published on ruffed grouse, that is, the one on ruffed grouse management which dealt directly with that species and one on the essentials of a wildlife range, which dealt indirectly with the same species. Anyway, I am enclosing a copy of this second paper in case you do not have it.

Those papers that have been published as parts of transactions I do not have available as reprints and since coming here I have not published anything additional on grouse. Right now there are three papers in the hands of the editors and three more that I hope to submit before the end of the summer. If and when they appear, I will see that you are furnished with reprints.

The development of the Huntington Forest and the inauguration of a research program there still keep me pretty busy, along with teaching four courses in the department and supervising the work of three or four graduate students each year. Things, however, are getting lined up and beginning to roll along so there should be more time available for writing in the not distant future.

Sincerely yours,

Ralph T. King, Director
ROOSEVELT WILDLIFE FOREST EXPERIMENT STATION

IOWA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
AMES, IOWA

DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

July 12, 1951

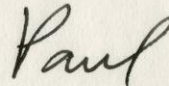
Director R. T. King
Roosevelt Wildlife Forest Experiment Station
New York State College of Forestry
Syracuse 10, New York

Dear Terry;

Enclosed is a preliminary draft of a manuscript summarizing
in part our recent work on "cyclic" manifestations in muskrats.

Although this paper is due to come out soon in final form in
the American Naturalist (at any rate, Editor Dunn wrote July 3
that he would send it to the printer in 10 days, presumably
for the next or an early number), I thought that in view of
your interests and studies you might care to have a carbon
copy for reference now.

Sincerely yours,



Paul L. Errington
Professor

PLE:pah

enc.

December 17, 1951

Dr. Paul L. Errington
Department of Zoology and Entomology
Iowa State College
Ames, Iowa

Dear Paul:

I should have written you long ago to thank you for your kindness in furnishing me with a manuscript copy of your paper on cyclic manifestations in muskrats. This was received during the summer and as I was away all summer I didn't see it until early October. I read it with interest and in fact made some use of it. Fortunately, the published paper was available in The American Naturalist just a few days before I had occasion to make public reference to it.

Gus Swanson and I have inaugurated a series of joint seminars or symposia involving the staff and graduate students from Cornell and this College - that is, all those interested in wildlife - and our symposium of November 28 dealt with population fluctuations. Three of us participated as speakers. I presented the views with respect to ten-year cycles, Bill Hamilton those with respect to short-term cycles, and Dr. Cole the views that he expressed in his paper in the July issue of the Journal of Wildlife Management. There were about 70 graduate students and staff members in attendance, and we had a lively discussion. It was in connection with ten-year cycles and the fact that all conclusions relative to cycles should not be based exclusively on changes in animal numbers that I referred to your paper.

I doubt very much that anyone changed his mind as a result of this symposium, but I know that a number who were there did not feel that Cole's paper had done much more than demonstrate that it was possible to show a similarity in results obtained from random figures and some figures derived from observations on population behavior. My chief contention with respect to Cole's conclusions was that he had taken nothing but changes in numbers into consideration. His chief contention was that other things such as differential sex and age mortality, changes in physiological and psychological behavior, etc., might also fluctuate at random just as do population numbers. And so, you see, little progress was made.

Thanks again for the manuscript and for the copy of your paper. It is a very real contribution to our better understanding of population fluctuations.

With kindest personal regards and best wishes for the holiday season, I am

Sincerely,

Ralph T. King, Head
Department of Forest Zoology

RTK:MN

REC. 8/20/79

August 20, 1979

Mrs. R. T. King
10131 Bolivar Drive
San City, AZ 85351

Dear Mrs. King:

For some time past I have been in correspondence with Dr. Malcolm Coulter regarding your husband's personal files. I know that your husband and Aldo Leopold were close friends and colleagues and both became stalwart in the field of wildlife management. I am pleased that you should have considered to turn over these personal files to the University of Wisconsin. I will see to it that this material is incorporated with Aldo Leopold's in the University Archives. Sooner or later a scholar will have ready use for your husband's papers along with those of Aldo Leopold's. It was indeed kind of you to think of use in this regard, and we appreciate it very much.

Sincerely yours,

Robert A. McCabe
Professor

RAM:dkt

cc M. Coulter
J. Liebig