APPLICATION FOR UNITED STATES GOVERNMENT GRANT

for study abroad under programs administered by the Department of State

CONFIDENTIAL REPORT

NAME OF APPLICANT James Henry Stebbings Jr.

FIELD OF STUDY Geography FOR STUDY OR RESEARCH IN Spain (country)

REFERENCE REQUESTED FROM Dr. Hugh M. Raup (Name) Director, (Title or Position) The Harvard Forest (Department) (Institution)

THE SECTION BELOW TO BE COMPLETED BY REFERENCE

Please see bottom of reverse side for instructions.

1. HOW LONG HAVE YOU KNOWN THE APPLICANT? About 8 months IN WHAT CAPACITY? See below

2. STATEMENT BY REFERENCE : Mr. Stebbings spent the summer of 1961 at the Harvard Forest from about mid-June until mid-September, supported by a National Science Foundation grant. He needed a situation in which the soils and forest vegetation were rather well known and mapped in detail, and in which there were laboratory facilities and living quarters at hand. It was also desirable that the forest history be reasonably well understood. All of these requirements could be met at the Harvard Forest to a greater extent than in most parts of the country. Stebbings' research was on the nature and distribution of earthworm populations in the soils of the area as related to vegetation and other immediate site factors, as well as to the history of the land use patterns in this region.

It is the considered opinion, not only of myself but also of the other members of our research staff who worked with him, that Stebbings is thoroughly competent in his field. He has mastered the research techniques that are known, made an exhaustive study of the work of others, and is searching for new methods and new relationships. He is young, and immature in many ways; but perhaps no more so than is to be expected in a graduate student at his stage of development. His work here this past summer indicates that he will be productive.

He wishes to study in Spain, where he plans to associate himself with Dr. Walter L. Kubiena. I am not able to make a judgment on the wisdom of this choice, for my personal knowledge of the field is not adequate for it. However, I think there is no question that Stebbings will profit greatly from his proposed study abroad, and I have little doubt that he himself will make a substantial contribution through it.

So far as our experience with him goes, Stebbings expresses himself clearly and easily, both verbally and in writing. His general training for scholarly pursuits appears to have been good.

Signed Hugh M. Raup, Dir. Date October 30, 1961

Address Harvard Forest, Petersham, Mass.

INSTRUCTIONS FOR APPLICANT:

1. **Give** below, for the information of your reference, a summary of your Statement of Proposed Study.
2. **Complete** the bottom of this form by checking the appropriate box. Enrolled applicants should also enter name and address of institution **through** which applying, and the date by which the form is due.
3. **At the** top of the reverse side of the form enter information requested (name, field of study, etc.).

As indicated in the Curriculum Vitae, this writer has had a certain amount of research experience. Nevertheless, he does not yet feel competent to begin thesis research in his field. The purpose of the desired study abroad is to become familiar with certain techniques not currently used in this country.

This application is explicitly for work at the Instituto de Edafologia y Fisiologia Vegetal in Madrid. Dr. Walter L. Kubiena, currently the leading authority on the classification of humus forms and of European soils, and the individual primarily responsible for the development of micropedological (microscopic) methods for the study of soil and humus forms, works at this Institute two periods a year and directs continuing research.

While thin sections are currently used to some extent in soil studies in this country, other "micro-methods" are very rarely used, and even thin section methods have not been extended to biological studies of the soil, as they have been in Europe.

It is, then, primarily to become familiar with these micropedological techniques as applied to biological characteristics of the soil that this writer wishes to work at this Institute. Two close, but secondary, aims are to become familiar with Dr. Kubiena's soil classification system, and to become familiar with the chemical fractionation methods used commonly in Europe, but rarely in this country, to separate and characterize the soil humic fractions. Other academic aims, such as to become familiar with the current work of Spanish geographers, are understood.

It is felt that the experience thus gained would be a necessary background for any study of humus forms in American soils, if such a study is to be carried beyond the classification by gross morphology that is current. It is also felt that further development of these methods might help to solve numerous problems concerning the original nature and subsequent history of buried organic horizons or layers, either of paleosols, or in sediments.

INSTRUCTIONS FOR REFERENCE:

In evaluating this applicant it is essential to have information on his personality, adaptability, preparation in his field of study, project, project in **relation** to his preparation, general preparation, his ability as an interpreter of his experiences, promise of growth, and any other pertinent informa**tion which** would help to see this applicant as a person and as a potential scholar representing the United States abroad. On the reverse side of **this sheet,** space has been provided for you to express your opinion of the applicant. *(Please use typewriter if possible.)*

Please return by date shown to whichever of the following addresses the applicant has indicated:

[X] FULBRIGHT PROGRAM ADVISER

J. [illegible], [illegible], The Johns Hopkins Univ., Balto. 18, Md. 1 Nov 61

[illegible] (date due)

[ ] INSTITUTE OF INTERNATIONAL EDUCATION, 1 East 67th St., New York 21, N. Y. . . . . November 1st.

(date due)

The Implications of Earthworm Distribution in Conifer Plantations

There exists only one published paper dealing primarily with earthworm populations under conifers in this country. This paper (Stegeman 1960) gives the species composition and population data (based on digging and sieving the top 6" of soil) for the following habitats: old field, northern hardwood, Red Pine, Scotch Pine (less than 3' in height), White Pine and Norway Spruce. Ages and previous uses of these stands were not given. Populations, and, in general, number of species, fall in that order, with no worms found under spruce, about 80,000/A under white pine, and twice that under the old field. No map showing the relative position of these locations was presented.

The implication of the methods used and the data reported is that the current vegetation is the factor governing kind and numbers of the population. Ph, organic matter, and soil particle size were reported, but it was not suggested that they accounted for the observed population difference. It was suggested that the amount, and especially the diversity, of humus materials, and the soil moisture, were of greatest importance. Stegeman states "The distribution of earthworms in such a stand (pure conifer) roughly correlates with the amount and diversity of herbaceous ground cover."

Another relevant paper (Read and Walker 1950) deals with soil properties beneath eastern redcedar and red pine in two pine plantations. Differance in physical and chemical properties appeared correlated with differances in earthworm activity in the two plantations. In one, age 35 years, earthworms were found only under the sparsely scattered redcedar. In the plantation of 25 years age, with more abundant redcedar, they were found throughout the area. (The earthworms were not identified.) It was suggested that over a period of years soil conditions became unfavorable for earthworms and lead to their elimination.

The only previous mention of earthworms of the Harvard Forest was in a paper by Griffith, Hartwell, and Shaw (1950). In this study 62 pine plots and an equal number of hardwood plots were studied. Earthworms were found in only one white pine stand, of twenty years age and previously well cultivated. Earthworms were ~~found~~ noted in digging many (not all) of the hardwood profiles and "were always associated with soils having good tilth." Noted Ph values ran from 3.8 - 5.4.

Methods

Collecting was carried out on 53 plantations of the Tom Swamp and Prospect Hill tracts of the Harvard Forest. Collecting was done by digging. The large area to be covered, rocky and irregular terrain in places, and the highly aggregated nature of earthworm populations precluded random sampling by quadrats. Therefore no formal pattern of sampling was observed, but an attempt was made to cover the area with reasonable thoroughness. Transects, crossing or parellel were often used. The data is given for the plantation (or the portion sampled) as a unit; in only three cases are intra-plantation differences noted. The data is mapped according to the plantation outlines presented on the base maps, which are not always up to date, as not all portions of a plantation may have been successful. As a result data mapped for less than an entire plantation, especially the larger ones, may not be relevant. This limitation, however, is not sufficient to obscure the interpretation.

The map categories are as follows: neither Lumbricus terrestris nor the true soil forms (Allolobophora tuberculata, Eisenia rosea, Octolasium lacteum) found, and no recognizable earthworm casts to be found in the soil; true soil forms present, but in isolated pockets, or in small numbers, such that the entire upper 15 cm of the soil is not so mixed and aggregated as to be homogenous and morphologically

identifiable in large part as cast material; and areas where true soil forms are sufficiently numerous to create an homogenous A horizon of cast material. Details of the associated humus forms will be found in another portion of this paper. Included in the first group are three areas where partially decomposed earthworm cocoons were found with occasional loose pockets of soil with a structure which might be considered as a decomposed crumb mull.

With the maps of earthworm occurence are presented maps from the Harvard Forest files showing cultivation history, stand composition in 1908 and 1919, cover at time of planting, and ultimate forest type, as indicative of moisture relationship. Soil types were not mapped as the U.S.D.A. Soil Survey types have not been found to correlate with forest communities (Stout 1952).

Results

The results of the survey of the Prospect Hill Tract may be seen on the map. There is no need for a verbal resumé. In Tom Swamp Compartments VIII and IX, no earthworms (soil forms) were to be found in plantations 27-E,G,H, & I, or 28-G. Some were found spottily distributed through 23-B (white pine). In the south portion of the Tom Swamp tract, plantations 19-C, 26-A,B, G, M, 30-A, and the whole of Compartment I were checked. In 30-A (mostly red pine) introduced lumbricids were scattered, and in 22-C and 25-A *L. terrestris* of the exotics alone was found. The native lumbricid *Eisenia lonnbergei* was scattered sparsely, through 19-C, 26-G, 22-C, and 25-A. *L. terrestris*, *O. lacteum*, and *A. tuberculata* were found throughout the hardwood area of Compartment I.

Discussion

There are several implications of the distribution pattern shown, but first the validity of the observations relating to the earthworm distribution must be discussed. It is assumed that in the 200 years since the settlement of the area

that earthworms have had adequate access to the entire area. This is borne out by the constant presence of Dendrobaena octaedra throughout the area. It will not be maintained that absolutely no soil forms exist in any plantation, only their comparative rarity will be maintained. Since populations may maintain themselves in very small areas (Read and Walker 1950), the possibility of an isolated population occuring is real. This is particularly true of L. terrestris, which seems to wander at times, and may live as a litter form without showing a midden. Observations in red pine plantations 22-C and 25-A, near abundant L. terrestris under hardwood, indicate that where hardwood litter is present, from a hardwood understory, or near the edges, middens, though rare, will be observed. In plantations where hardwood litter is essentially absent (27-C, 24-B) middens will not be observed. This implies that, if it were present, it would be noted near the borders of plantations where hardwood litter was present, or throughout if a hardwood understory were present. Under pure conifer litter casting still takes place on the surface, but in rather diffuse piles; thus a very low population could have escaped scrutiny. The best evidence for the accuracy of the survey is the consistent pattern shown by associated plantations.

The implications of this pattern are several, and will be discussed separately.

1. The effect of the current forest type is exerted over a period of years or decades, rather than immediately. Whether this corresponds to the rate of changeover of the litter type is not known with certainty: this may lag, but the litter over the highest populations is purely coniferous. A slow changeover of the very slowly decomposable decomposition products is indicated.

Allolobophora tuberculata has maintained itself in large numbers under Red Pine for 35 years, and, in much smaller numbers, for 45 years under spruce. Spruce and larch (whose litter has a very high C:N ratio) have no obvious effects on populations when mixed with red pine.

2. Earthworm populations, where they exist, do not show sharp boundaries coexistent with vegetation type or past land use. Thus they are yet to be found under the highly unfavorable spruce (even L. terrestris is present under spruce as far as hardwood litter blows in), and on lands only grazed in a dominantly cultivated area (part of 37-A, and a white pine - hardwood tract between 14-F and 27-C).

This same phenomenon is shown in TS I where L. terrestris and the soil forms are present over the entire area, which includes old plowed fields, pasture land, pastured woodland, and a bouldery woodlot. L. terrestris is also found, though sparsely, on the nearby plantations 22-C and 25-A where soil forms are quite rare or non-existent.

3. Present significant earthworm populations correlate rather well with past intensity of land use in general, but not in particular. The maps of the Prospect Hill tract show no historical factors unique for the tracts with an earthworm population currently present, but the number of stone walls remaining is an indication of the relative intensity of past use. It may also be significant that most of these plantations were mown yearly (all those with crumb-mull formations) until planting. First successional vegetation which is noted to have been established to some, if not to a great, extent in certain plantations of V and VIII may conceivably be quite unfavorable to earthwoms through formation of a dense rhizogenous endo-humus and by their acidifying and mor-forming tendencies. Potential mor-forming litter appears to be generally less acceptable to earthworms (Handley 1954). Mor-forming tendencies, in the form of notable gelatin-precipitating ability, have been noted for Vaccinium and Viburnum spp. (Handley 1954).

It should also be noted here that the Tom Swamp I Compartment is also the most heavily and the earliest utilized area in the Tom Swamp tract (Raup and Carlson 1941).

4. It seems probable then that earthworms are being gradually eliminated from these plantations. Evidence of this is a small relict earthworm population on a grassy knoll by an old road in 31-A, and by the finding of decomposed cocoons in 31-A, 26-G (2), and 26-P. Age is impossible to estimate. They are not of L. terrestris and almost certainly not Eisenia lonnbergei. O. lacteum and E. rosea cocoons were not available for comparison, but the size, shape, and openings (on 2) almost certainly identified them as A. tuberculata.

No extensive surveys have been made in other than the TS I Compartment for earthworms under hardwoods, but some observations relevant to the problem of the maintenance of exotic forms may be related.

It has already been noted that if L. terrestris was present in the vicinity of a plantation, middens would be noticeable whereever hardwood litter of the proper type was present. That is, around the edges, and throughout if a hardwood understory is present. On this basis L. terrestris seems generally to be absent. High populations of the soil forms would be expected to spread in detectable numbers. It is doubtful that any areas with a high population of L. terrestris would lack a considerable population of true soil forms (if for no other reason than that the middens seem to be an excellant environment for these forms), and the converse also seems unlikely, although no definite evidence can be adduced for this opinion.

The impression gotten by this writer, from scattered observations of hardwood and natural white pine - hardwood stands near plantations is that conditions correspond to those under the plantations, if the drainage class is the same. If this is not so, they may even be absent from hardwood while present under an adjoining plantation, as under 30-A and the west shore of the Harvard Pond. The hardwood observations, it must be noted, depend to an even greater extent on the nature of the soil humus forms than does the plantation survey.

Observation of the hemlock-whte pine uplands in Tom Swamp IX have established with some certainty that earthworms are absent. Likewise an old growth area of hemlock-northern hardwood forest in Slab City X appeared to lack earthworms and the soil was of a type associated with their absence. Under swale or swamp hardwoods, earthworms are unlikely to be present in number for reasons discussed under in the section on environmental factors.

Still, no statement that exotic earthworms are incapable of colonizing or are being eliminated from hardwood stands is possible. It has been noted previously that earthworms are present throughout the transition hardwood forest of Tom Swamp I, and they are also abundant in the transition hardwood forest of the Schwarz Tract.

This is partial explanation for the data of Griffith, Hartwell and Shaw (1930), since they state that most of the hardwood stands were found under moist conditions on southeast, south, and western exposures (which would trend to transition or central hardwood type). Also, maps from which they worked indicate that a large portion of the hardwood plots were located in Prospect Hill I and IX, in Tom Swamp I, and in the Schwarz Tract, which are t e areas in which earthworms would be expected.

THE ISAIAH BOWMAN DEPARTMENT OF GEOGRAPHY
THE JOHNS HOPKINS UNIVERSITY
BALTIMORE 18, MARYLAND

19 October 1961

Dr. Hugh M. Raup
Director,
The Harvard Forest
Petersham, Mass.

Dear Dr. Raup:

I'm sorry this first bit of correspondence from me for a while is a request, rather than a manuscript. I can assure you that manuscript will soon follow, however, due mostly to the fact that I have to give a seminar on what I did this summer. Dr. Wolman knows graduate students. From the comments you made just before I left, so do you. I am quite as busy as you said I would be.

I do hope that the microfilm I requested, and the photocopies I requested, will show up sometime. I can get you a first draft of a manuscript without them, but with references missing.

You may be interested to know that, although you have no earthworms in your sandy soils, and few most anywhere, I found a fair earthworm population of at least two species, plus a whopping enchytraeid population, in a scrub-covered dune hollow not 500 yards from the Delaware coast. More of a "mull" soil than yours.

Anyway, what to do with the enclosed application should be apparent(see the rear): I might add that the value of the project is also an important consideration. Mr. Lyford's name and views on this subject might be of aid.

Please say hello to everyone around for me.

Sincerely yours,

Jim Stebbings

Jim Stebbings

THE ISAIAH BOWMAN DEPARTMENT OF GEOGRAPHY
THE JOHNS HOPKINS UNIVERSITY
BALTIMORE 18, MARYLAND

28 March 1961

Dr. Hugh M. Raup
Director
Harvard Forest
Petersham, Massachusetts

Dear Dr. Raup:

I was glad to recieve your letter officially accepting me at the Harvard Forest this summer. I'm looking forward to the summer as my first chance to concentrate on nothing but research.

There are a few points, however, which I would like to clear up. As to length of stay, you mention three months, or perhaps a little more. As far as time alone is concerned, to get the longest possible period for observations, I had intended to show up as early as possible (near 1 June, but that's not definite) and to extend the observations to the end of September, if desireable. I had intended, though, to take off some weeks during this period, so total time would probably extend little over three months. If accommodations would be a difficulty near the beginning or end of this period, I trust you will notify me.

As to the $75 per month financing, I feel that I should inform you that I have received a NSF fellowship which should pay me starting the first of June (unless difficulties arise concerning location of research activity). I feel that I could receive permission from them to receive the extra money, and that it would be useful to me, since I will doubtlessly come across numerous reference books needed, and papers to be photocopied, for my personal library in the course of the summer's work. It's always useful to a graduate student, even for other things, of course.

I regret I cannot now afford to visit the forest for a weekend to familiarize myself with the place and the facilities. After further consultation with Dr. Goodlett, I may request a few publications or other information which would help in planning my work. I may also check on the availability of various pieces of apparatus.

Anyway, I would appreciate hearing fairly soon as to whether you wish to change or confirm previous financial arrangements so that I may initiate correspondence with the National Science Foundation.

Sincerely yours,

James H. Stebbings

James H. Stebbings

21 March 1961

Mr. James H. Stebbings
Department of Geography
The Johns Hopkins University
Baltimore 18, Maryland

Dear Mr. Stebbings:

I am sorry to be so late in informing you officially that we will be glad to have you come here during the summer of 1961 to pursue your research on earthworms in the Harvard Forest soils. In my letter of December 22 I told you that our budget would not be made up until sometime early in March, and that we would not be able to be specific until then. However, as you know, things looked sufficiently promising late in January, and when I saw Dr. Goodlett in Baltimore on my way west in January I asked him to tell you unofficially that we would take you on. I presume that he did this. I did not get back from this trip until the middle of March, and this has occasioned the delay in my writing you further.

Can we expect you, then, sometime early in the summer? We will arrange your financing in such a way that you will have room and board here in our dormitory and dining room, plus $75 a month. You are at liberty to extend your stay here for as long as three months, or perhaps a little more if necessary.

If this meets with your approval, we should like to know, at least a couple of weeks ahead of time, the date of your arrival. If I remember rightly, you do not have an automobile, and consequently we should meet you at some point that can be reached by bus or train. This can be at Boston or Worcester or Greenfield or Athol -- whatever you find convenient. The main thing is to inform us well in advance so that we can make the necessary arrangements.

Sincerely yours,

Hugh M. Raup
Director

December 22, 1960

Mr. James H. Stebbings
Department of Geography
The Johns Hopkins University
Baltimore 18, Md.

Dear Mr. Stebbings:

I hope you will forgive me for not having answered before this your letter of December 4. We are, of course, much interested in anyone who is likely to pursue the research on earthworm activity that was done here by Johnston many years ago. We have always considered it unfortunate that Johnston's thesis was not published. It is also unfortunate that we do not have a copy of it here at the Harvard Forest. There is one in the University Archives in Cambridge that we can refer to with a little trouble. I think we should explore the possibility of your working here during the summer of 1961. I cannot say at the moment what the Harvard Forest can do for you budgetarily, for I do not know what our budget will look like for our next fiscal year which begins on July 1. I note that you have not made any specific proposal about what you would do here, nor have you made any suggestion about how you might be financed. This is understandable, because I judge you are merely exploring the possibilities first.

It might be useful if you would let me know what you would need for such a project that would cost us money. Meanwhile I shall talk over the matter somewhat further with our people here, and see what we jointly come to with respect to the possibilities. You might also give me some idea of how you might proceed with the research itself. Our budget probably will not be made up until sometime in early March.

Sincerely yours,

Hugh M. Raup
Director

THE JOHNS HOPKINS UNIVERSITY · BALTIMORE 18, MARYLAND

THE ISAIAH BOWMAN DEPARTMENT
OF GEOGRAPHY

4 December 1960

Dr. H. M. Raup
Harvard Forest
Petersham, Mass.

Dear Dr. Raup:

This letter is to explore the possibility of my doing some research on earthworms at the Harvard Forest this summer. Members of the Department here have suggested to me that this is likely to be a subject of interest to you.

It is probable that the 1936 study of J.W. Johnston would be an invaluable base for work on a number of topics. I say probable, because I have been unable to procure a copy: I have heard that it is concerned primarily with habitat studies (which are quite rare in the earthworm literature) and with effect on soil structure. Since no rigorous studies of earthworm populations in time exist, such a study would be of great interest, particularly if more than one species is involved.

A word about my background, before continuing in more detail. By June I will have had one full year of graduate study here: previously I received my Honors B.S. in geography and biology from St. Louis Univ., with an honors thesis on earthworm distribution in Missouri and Illinois (emphasis on forest soils, and on endemic-exotic competition). I consider myself fully familiar with the ecological and agricultural literature on earthworms both of this country and Europe, and sufficiently familiar with the taxonomic literature of earthworms in this country, with the exception of the Pacific Coast forms. Much of the literature relevant to the eastern U.S. I have personally.

There is considerable that might be done: a re-evaluation of the original work in light of the considerable work done since 1945 would certainly be useful, as would studies of temporal change based on the original data. Of particular interest would be extension of Dr. Johnston's studies of the effects of worms on soil, particularly on the compact till layers. A recent study published on the effect of L. terrestris on the lower horizons of chernozem soils in South Dakota suggests that there may be possibly considerable effect. Development of a way to describe quantitatively the extensiveness of casting and burrowing activities beneath the surface, though difficult, would be one goal. If successful, such a method will fill a large gap in present methodology. Possibly the viability and effect of introduced midwestern forms (which can maintain fairly high populations on extremely steep, stoney Ozark slopes) in habitats too extreme for European forms could be tested. These are only the major possibilities.

Hoping to hear from you, I am...

Sincerely yours,

James H. Stebbings

James H. Stebbings

THE ISAIAH BOWMAN DEPARTMENT OF GEOGRAPHY
THE JOHNS HOPKINS UNIVERSITY
BALTIMORE 18, MARYLAND

New Year's Eve

Dr. H. M. Raup
Harvard Forest
Petersham, Massachusetts

Dear Dr. Raup,

I fear my near-Machiavellian doings have caught up with me by now. I'm talking about that feller Stebbings, of course. By the time you read this, he may have been by Petersham to sell you a bill of goods. At least I egged him on. He was going to New York earlier this week, and I told him that he might try to get in touch with you.

Frankly, Reds and I know almost nothing about Stebbings. He isn't taking either of our courses this semester, but Joe Shapiro over in Sanitary Engineering tells Reds that he is doing a good job in his limnology course. He talks as if he knows something about earthworm taxonomy, and cites papers and people for everything. Trouble is, neither of us knows anything about worms. He came to us with extravagant recommendations from St. Louis University, and won honorable mention (I think that is right) in the Woodrow Wilson competitions. He was one of those guys that freezes up any conversation for about his first six weeks--just a gosh-awful sobersides. He smiles occasionally these days, though. But when I say, "Good morning, Jim" he invariably comes back with a "Good morning, Doctor."

He seems to be right interested in the field relations of his worms, particularly in terms of soils. Frankly again, we think he might get more out of a summer with you and Walt than anything we know. It's not fair to ask you two to educate our graduate students, but I have a sneaking suspicion he might be real good if he gets the right treatment. Mary Marrs says he is stiff because he is scared stiff by his competition.

I doubt that this letter makes any sense. I'm writing in the diming room and about every thirty seconds Ginny or Sallie or both explode nearby. Ginny just fell off a stool--concentrating on mixing some cake mix.

Anyway, I don't know enough about Stebbings to rave about him, and I told him he'd have to sell himself to you. We'd like for him to look attractive to you, but won't feel at all put out if he does not. That's not exactly what I want to say, but you know what I mean.

The neighborhood creep just interrupted me for a couple of bourbons, so I'll have to continue next year. The 5 o'clock madness is upon us.

Regards,
Pud

December 22, 1960

Dr. John C. Goodlett
5405 Pioneer Drive
Baltimore 14, Md.

Dear Pud:

I have a letter from a bird by the name of Stebbings, who says he is a graduate student in your outfit. He proposes to come here and do some research on earthworms next summer, following up what Johnston did many years ago. What can you tell me about this fellow? Will you recommend him? In his letter he is not specific about the research itself, nor does he say what he would need in the way of financing. Can you give me any advance information that will help in our judgment as to what kind of material help he would need?

I have written him, asking him to be a little more specific on what he proposes actually to do, and what it might require from us in the way of cash money. Also I have told him that we don't know yet what we can do in the way of support next summer, and probably won't know until we make up the new budget. This we probably will not do until early March.

Lucy and I are planning to drive out to California via the south and southwestern states after I am through with my class, which will be around the 18th or 20th of January. We want to look at some national forests and forest experiment stations hither and yon as we go. Eve Murison's parents are here, and probably will ride with us to some point in our trip and come back independently. They are swell people whom, as you may remember, we visited when we were in Scotland. We plan to be gone five or six weeks. It is just possible that we will go through Baltimore on the way, and shall hope to see you.

Dave and Sue and Mickey left this morning to go down to Falmouth for Christmas. They have been here since last Sunday. Karl and his family, including Jackie's parents, are expecting to drive up here tomorrow to be here for Christmas, so we will have a house full. For once in a blue moon we have a lot of snow for Christmas. A lot of it disappeared in the rain yesterday, but there are still several inches.

Our best to you and Mary Marrs and Ginny and Sally -- and Merry Christmas!

Sincerely yours,

Hugh M. Raup