

Copy loaned to
Pres. office
Oct. 29, 1919

Tucson, Arizona,
October 18, 1919.

Mr. Clarence G. White,
Redlands, California.

My dear Mr. White:

Last spring while you were here you told me that if I did not succeed in getting a fund from the American Scientific societies for rebuilding the periodograph, which I showed you in my laboratory, you would see that I obtained it. The American association found that the sum I asked for, namely: \$750.00, was too much for them to undertake. I then thought that I would be able to bring the study of the age of the old indian ruins to a successful conclusion with the apparatus which I had here, but have concluded that that is impossible and that I shall have to make some improvements on it if I am to get results desired.

Proposed method of getting age of ruins.

The method proposed, as you probably remember, depended upon the fact that different centuries in the life of the sequoias were characterized by different combinations of short period cycles. The pines in Northern Arizona in the last five hundred years show nearly the same cycles as the sequoias. I procured the pines from near Aztec in order to see if these pines also in the last three hundred years show practically the same cycles as the sequoias. If they do I will be justified in believing that any cycles showing in the rings of the beams used in the ruins may be identified in date by the corresponding cycles in the sequoias whose age reaches three thousand years.

mentioned below

Abundant new material is now ready for this study.

I received last spring from the ruins at Aztec, New Mexico, now being excavated by the American Museum of Natural History of New York, N. Y., some very fine material and worked it over as well as I could with that form of instrument. I was able to see immediately that in order to carry conviction in my results I would have to make out the very best case possible.

(See "Status of Problem" below on pg. 3)

Mr. Clarence G. White.

In order to do this I have visited Flagstaff this summer and collected some more very fine samples of yellow pine. After that I visited the ruins at Aztec, N. M., (on request of Dr. Clark Wissler of the American Museum), and obtained a very fine series of cuttings from modern pines growing about thirty miles north of the ruins. I have also had an instrument made for boring into the beams used in the ancient construction for extracting the core, showing all the rings from outside to center in the various beams. In this way I expect to get samples from a large number of beams. I have also procured a very interesting group of buried trees recently washed out by the stream which occasionally flows through the town of Flagstaff. These buried trees are associated with the silting up of many stream beds in Arizona, which phenomenon in turn was, according to Huntington, closely associated with the decline of the old Pueblo civilization in the Southwest. I have also made a visit to the big sequoias and procured a dozen additional tree records for the last five hundred years, and am, therefore, especially well equipped in the matter of material for studying the short period cycles, by means of which I hope to get the age of the Indian ruins.

Instrument needs improvement.

In order to work out this problem I need to have improvements in the instrument so that the very large amount of study of this material now on hand will be reduced as much as possible by rapidity and accuracy of operation. I plan to have the instrument stationary and have the variable distances introduced by a set of mirrors on a small carriage running smoothly on a track about twenty feet long. I have an adjustable analyzing plate which I consider a very great improvement, but which needs a metal mounting. Automatic focusing and signaling devices will have to be redesigned for the stationary instrument. I shall have to arrange for photographic plates instead of films as they will give very much better results. I should have metal mountings for the various lenses, but I do not plan at present to have lenses specially ground, which would be a very heavy expense in itself. It is very difficult to say how much these various items would cost, but I would take the chance of saying that it would be under \$500.00.

Mr. Clarence G. White.

Another important application of the periodograph.

I feel that the work so far done with this instrument is extremely promising of successful and important information in regard to the ancient inhabitants of this region. It has also an extended application in the study of short period climatic cycles such as are especially prominent in the weather of this southwestern region, and while the results which I have referred to above, concerned the archaeologist, it seems to me very probably that very large results should be obtained in the study of existing climatic cycles and even in prediction of future weather conditions. This instrument is, I believe, the only one which by its facility and rapidity of operation has given encouragement to the study of the cycles in common weather variations. This second line of work, as you can see, is well worth doing on account of its possible enormous value to the arid region of the southwest.

Status of the problem.

I might as well confess that I reached a provisional result last May on the age of those ruins, but it makes them older than the American Museum people think. So I have got to make out a good case to convince the public, or else I have an error of my own to correct before publishing any results. A remodelled instrument seems to me now essential in getting a reliable result on this matter of age, *and when obtained it should give almost the very year of building.*

I remember with pleasure our calls at your house while you were here. Mrs. Douglass and I tried to see you before you left, but I had to take an eastern trip just at that time. I shall hope to see you here in Tucson again. With best regards,
I am

Sincerely yours,

Director.

November 8, 1919.

Mr. Hyde,
c/o Ethnology Department,
American Museum of Natural History,
New York, N. Y.

Dear Mr. Hyde:

In our conversation at the Museum last August you were good enough to say that you would have a collection of beam sections obtained from the Pueblo Bonito Ruins for my investigation. I am writing this especially to say that I am developing a tubular saw for securing samples of the tree rings from beams without injuring the structure of the beam as a whole.

If you will be able to use such a tool and obtain borings from a considerable number of these beams making a perfect record of the exact beam from which each boring comes, I would be very glad to supply you with the tool. Of course, the purpose of its use is to prevent actual injury to the ancient buildings.

With pleasant remembrances of our talk at the museum, and with best regards, I am

Sincerely yours,

Director.

November 14, 1919.

Mr. E. H. Morris,
Aztec, N. M.

Dear Mr. Morris:

I am sending you a tubular saw for a try-out on some of the beams. I have been able to get some very good cores 6" long, even when using a quarter inch bit to make preliminary holes. My first idea was to make a series of small holes in a circle in order to give room for the sawdust when using the borer, but if the sawdust is carefully removed after about half an inch of boring this tubular saw will go through pretty well. In your case if you try it on beams in place in the ceiling and tap the beam every little while with a small hammer to get the sawdust out or use a long hat pin for the same purpose I think you can make it work pretty well. You can perhaps devise some convenient means of supporting the brace when you are working this borer. It may be that you can set a plank near the ceiling and do it that way or perhaps you can rig some support underneath the brace in order to get some continuous pressure while boring.

Of course, you understand that the purpose of this borer is to get samples from the various beams without injuring them and I believe you will be able to do it without trouble. If the beam is very weak I should suggest some way of running cement into the hole that is left.

There are several things which seem to me important in any work which you do with this instrument in procuring ring samples from those beams:

1. Number every core individually with the letter "H" and a series number beginning at 30 and going on indefinitely. Place the same number with some permanent mark like paint on the beam so that each beam can be identified in order to correct defects or uncertainties if found later and in order to get a minutely accurate record of places.
2. In selecting beams get a set of four or five beams from one room so as to be sure that all were cut at approximately the same time. Record in every case your number of the room so that you can identify it with certainty.

Mr. E. H. Morris.

11/14/19.

3. Make a similar selection from one room in some part of the ruin supposed to be of very different age.
4. Get a set of five cedars from one room.
5. Investigate topographic relation of most probable locality from which these timbers came, ~~and~~ the actual roads and trails which ~~were~~ passed over ~~in obtaining them~~ so that I can judge as much as possible of the probable variations in the wood.
6. In starting to bore prepare a circle for the borer to work ~~at~~; either by a series of saw cuts or by a chisel.
7. It would be well to have a sample from every beam in the ruin, whose place you know definitely and which is of large size and in fairly good condition.
8. Make any suggestions as to the improvement of the tool which you can.
9. Is it likely that the Indians dragged these beams from the distant hills on the snow in winter? using those snow shoes whose pictures you have published?

to

I have two tubular saws which cost me \$2.25 a-piece last summer in Boston. One of these has eighteen teeth about 5/32" in length, the other has thirty-one teeth about 3/32" in length. Mr. J. F. Freeman, my assistant, has been trying out these two saws on a piece of piñon tree which you sent two years ago, and says that the one with the smaller teeth is more satisfactory to work with.
That is the one I am sending.

Hoping that you will find that you can use these saws with good success, I am

Sincerely yours,

Director.

AMERICAN MUSEUM OF NATURAL HISTORY

77TH STREET AND CENTRAL PARK WEST

NEW YORK

DEPARTMENT OF ANTHROPOLOGY
CLARK WISSLER, Ph.D., CURATOR
PLINY E. GODDARD, Ph.D.,
CURATOR OF ETHNOLOGY

Aztec, N. Mex.

Dec. 5, 1919.

Doctor A. E. Douglass,
Tucson, Arizona.

My dear Doctor Douglass:

The boring tool arrived in good order. I have not tried it out, but know that it will be a success. After some experimentation, I think I will have suggestions as to how to make it cut faster.

We have unearthed a good many beams during the past summer. In the near future I shall have prepared for you samples from them all. Fortunately quite a number are pine.

Although our operations have not been very extensive since you were here, they were very fruitful in so far as the yield of specimens is concerned. Perhaps the most striking find of all was the skeleton of an individual who died as the result of an injury which involved the fracture of the left forearm. An attempt was made to set this fracture, and the splints are still in place around the broken bones.

Have you determined whether or not the sections from Basin Mountain fit into your established sequence?

Very truly yours,

Carl H. Merriam.

Ames
DEC 15 1919

I have 5 large red spruce logs from another possible area of aboriginal supply. Would sections from them be desirable?

December 13th, 1919.

My dear Dr. Shreve:-

The title of the paper better be as follows:-

Evidence of Climatic Effects in the Annual
Rings of Trees.

It will be about 8 minutes and will be illustrated.

The abstract is :-

The rings of the yellow pine in northern Arizona show varying thickness in marked correlation with rainfall; the sequoias of California show similar characteristics in less degree. Climatic effects may also be detected by similarity in ring-growth over large areas. A characteristic called "mean sensitivity" is suggested as a possible measure of climatic reaction.

Thanking you for your trouble in this matter, I am,

Yours,

*Suggestious advice will be
greatly appreciated.*

Many thanks for reprints just recd

December 15, 1919.

Mr. Earl H. Morriss,

Aztec, N. M.

Dear Mr. Morriss:

I have your letter of the 5th and am interested in the number of beam sections which you are getting and in your tests with the boring tool. I congratulate you upon the new finds.

The sections which ~~were~~ obtained from Basin Mountain match the Flagstaff pine trees very perfectly and I am expecting them to show the same or very similar short period cycles. However, I have not tried this out and so am not sure. By all means save sections of the red spruce logs which you mention.

Very truly yours,

Director.

December 20th, 1919.

Dr. J.W. Fewkes,
Smithsonian Institution,
Washington, D.C.

My dear Dr. Fewkes:-

The section of cedar from roof of Kiva "A" came safely and looks like a very interesting piece. It gives a fine sequence of rings if I can work them out. Cedar is less reliable in its yearly ring-identity than yellow pine.

I am leaving tonight for Chicago and St. Louis and perhaps may see you at the latter place.

With best regards and many thanks for the section about which you will hear from me again, I am

Sincerely yours,

AMERICAN MUSEUM OF NATURAL HISTORY

77TH STREET AND CENTRAL PARK WEST

NEW YORK October 27, 1919.

DEPARTMENT OF ANTHROPOLOGY
CLARK WISSLER, Ph.D., CURATOR
PLINY E. GODDARD, Ph.D.,
CURATOR OF ETHNOLOGY

My dear Doctor Douglass:

I am very much interested in your letter of October seventh giving your impressions of the Aztec problem and a statement of the progress you have made. I am glad that you have a method for working out in detail the beam sections for the ruin. I am sure that such a tool as you suggest will make it possible to sample as many of the beams in the ruin as may be necessary. I quite agree with you that the stronger the case, the better. If you can show without a reasonable doubt the probable intervals between the cutting of the logs in the ruin, we shall have one point worth all our effort.

Further, I am interested in your remarks concerning buried trees in the vicinity of Flagstaff and their possible association with Indian burials. Your remarks suggest that we have in this locality a very interesting problem which could be approached by your method. Have you any suggestions as to a definite piece of work which might be undertaken with a view to determining the age of these alluvial deposits and their relation to the Indian burials contained? I should be glad to consider a possible extension of our work in this direction. Of course, I do not know at this writing whether support could be found for it, but should be glad to take the matter up when the time comes.

Very truly yours,

Clark Wissler

Dr. A. E. Douglass,
University of Arizona,
Tucson, Arizona.

AMERICAN MUSEUM OF NATURAL HISTORY

77TH STREET AND CENTRAL PARK WEST

NEW YORK December 1, 1919.

DEPARTMENT OF ANTHROPOLOGY
CLARK WISSLER, Ph.D., CURATOR
PLINY E. GODDARD, Ph.D.,
CURATOR OF ETHNOLOGY

Dear Doctor Douglass:

I have your statement of expenses and have drawn an order for the payment of the same so that a check should reach you in due time. I shall have sections made of all the old timbers in the Museum taken from Bonito and other ruins and forward to you. However, there will not be many of these. From Mexico and Central America, we have nothing of the kind. I hope to see Dr. Fewkes soon and will discuss with him the advisability of having sections cut from timbers in Mesa Verde Park. These, with a Bonito series to supplement those from Aztec, should give you a very satisfactory range of material. I am quite enthusiastic about this investigation and am sure that you will be able to make a very important contribution.

Very truly yours,

Clark Wissler

Dr. A. E. Douglass,
University of Arizona,
Tucson, Arizona.

Wood Sections sent to Prof. A. E. Douglas for examination.

- 1 Section of cross pole. These were laid just above ceiling beams
- 2 Post
- 3 Ceiling beam
- 4 Ceiling beam
- 5 Post
- 6 Ceiling beam, Room 32
- 7 Ceiling beam, Room 36
- 8 H-6259, Log on bench, Kiva 16, ceremonial deposit
- 9 H-11814, Ceiling beam, Penasco Blanco

AMERICAN MUSEUM OF NATURAL HISTORY

77TH STREET AND CENTRAL PARK WEST

NEW YORK January 5, 1920.

DEPARTMENT OF ANTHROPOLOGY
CLARK WISSLER, Ph.D., CURATOR
PLINY E. GODDARD, Ph.D.,
CURATOR OF ETHNOLOGY

Dear Doctor Douglas:

We have forwarded to you nine log sections from the Chaco Canyon, Nos. 1-8 from Bonito, No. 9 from Penasco Blanco. I am enclosing a list of these specimens, the numbers of which are found thereon, and which should be used in citing your readings.

Mr. Morris reports that he is now cutting sections from the Aztec Ruin. You will no doubt receive a shipment of these in the course of a month or two.

Very truly yours,

Clark Wissler

Dr. A. E. Douglas,
University of Arizona,
Tucson, Arizona.

JAN 10 1920

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American Museum of Natural History

77th Street and Central Park West

New York City December 27th 1919

Mr A. E. Douglas;
Office of the Director
University of Arizona, Tucson, Ariz.

Dear Mr Douglas;

Your letter of November 8th has been answered by Mr Wissler and quite possibly by now you will have received the bill sections.

I have made duplicates so that you may have others if you need them.

In regard to the tubular saw for sampling beams, I should like very much to own one personally and purchase it from you. I could make borings in these same logs for comparison.

I am planning to be in the South West next Summer and you may be sure I shall secure many samples for you even from logs in other museums.

The best of good wishes for the New Year

Sincerely yours

B. T. B. Hyde

January
Seventeenth,
1920

Mr. Clarence G. White,
Redlands, California.

Dear Mr. White:

This is only a note to tell you that a few days ago I was much pleased to arrive at a satisfactory relative date of two Indian ruins fifty miles apart up in northwestern New Mexico. I have had beam sections from the Aztec ruins for a year or two. Early this month I received from the American Museum in New York a group of sections from the Puebla Bonito Ruins in Chaco Canyon fifty miles south. This latter group I was pleased to see identified very well with ~~each~~ other and ~~with~~ the sections from Aztec Aztec, so that I was able to say that ~~the~~ records of these two ruins as represented by my sections the Puebla Bonito Ruins were built forty-five years before the others.

Dr. Wissler wrote me a year ago that if we could simply obtain relative dates for different ruins it would be a matter of great value and that I think is done in this case at least. This makes more reliable any read date results that I hope will come before long from the new periodograph.

The reconstruction of the periodograph is progressing finely. I have the truck and carriage and woodwork of the instrument all done and most of the mirrors mounted. I have ~~the~~ brass mounting for the analyzing plates which are going to be much superior to anything heretofore used and which I am sure will give very much better looking photographic results. I have sent the brass part to Chicago for some graduation which I arranged about on my recent visit there. The expense of the optical parts I have not yet ascertained although my inquiry was made a long time ago, but I can temporarily use the old lenses so that I hope before very long to be getting some results.

With best regards, I am

Sincerely yours,

Director.

May
Sixth,
1920

Dr. Clark Wissler,
American Museum of Natural History,
77th & Central Park West,
New York, N. Y.

Dear Doctor Wissler:

I have two matters to write you about. Dr. Hewett of Santa Fe was here a week ago and told me of the work which his school of Archaeological Research together with a Toronto Society and the Smithsonian Bureau of Ethnology are going to do in Chaco Canyon in the near future. They may not start out this summer, but they expect to do some extensive excavating there. I showed him my work on trees and he spoke of the possibility of getting considerable numbers of samples from beams in that ruin. Now, I do not know whether this work is in such co-ordination with yours which you propose to do this summer at that place that your funds will take care of the securing of and work upon samples of beams which they excavate. Dr. Hewett spoke of my going there some time when they are at work. As I say, that may be a year from now instead of next summer. Would your funds cover such a trip of mine in which the material would come in part through the concessions to Dr. Hewett and his associates, but whose purpose, namely: to study the chronology of the prehistoric ruins by the aid of annual rings of trees is really part of the general work which you are supporting?

The other matter which I have to speak about is simply an expense account of work on measuring, tabulating and plotting of ring records of the samples which have come to me from Mr. Morriss and from your Museum. *Enclose memorandum*

I have been devoting a good deal of time this spring to the organization of a Southwestern Division of the American Association for the Advancement of Science, and I have had a number of lecture courses to give also.

This summer I expect to be in Flagstaff from June 14th to July 16th. I am wondering if the proximity to old ruins should be taken advantage of in some way. I am not at all sure that it wont be. I shall look over again "sights of the buried trees" which I have secured from just above the town of Flagstaff. There is only one of those logs which I am pretty sure was directly associated with an Indian burial, and in general I have this spring classified expenses of the buried trees from that vicinity with Carnegie Institution Work, because they are interested

Dr. Clark Wissler.

May 6, 1920.

in the climatic cycles which I get from fossils, but if I can get hold of more material bearing directly on age of indian ruins in any way I will consult you as to expenses of its study.

Owing to the occupation which I mentioned above the new periodograph for the study of climatic cycles is not entirely complete, but it is essentially so and I shall soon be able to get seriously to work with it. The real delay in its completion I should say in justice to myself is due to the slowness of Bausch & Lomb in sending on various optical parts.

Sincerely yours,

Director.

C

August 3, 1920.

Dr. Clark Wissler, Curator,
American Museum of Natural History,
New York, N.Y.

Dear Dr. Wissler:-

I acknowledge with thanks the receipt of the Annual Report of the Museum with its reference to my attempt at dating the ruins. I note with pleasure also my uncle's name on page 98.

I hope to be in New York sometime between the 20th and the 25th of this month and if by chance you are there I would be glad to talk over a possible plan for getting more material from the old ruins of the Southwest.

Sincerely yours,

American Museum of Natural History

77th Street and Central Park West

New York City, Aug. 11, 1920

My dear Prof. Douglass:

Dr. Wissler will not return to
New York until some time in September.
He is now in Honolulu for the scientific
congress.

I am sorry I shall not be in New
York either. You will find Dr. Lowie here
who will be glad to see you.

Very sincerely yours,

R. S. Suddard

Curator of Ethnology

Prof. A. E. Douglass,
UNIVERSITY OF ARIZONA,
Tucson, Arizona.

*Saw Dr Suddard
there on Sept 8
1920.*