

RADIO CORP. of AMERICA

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Froelich

December 4, 1963

Dear Dr. Lozier:

I just have yours of November 27th, regarding our Applied Science Center and am most pleased to learn that you are interested in this sort of thing.

Could you drop in and see what we are doing and perhaps work out some way where you could be of assistance to us. We have many irons in the fire and certainly we try to make all the contacts we can with what is happening in the fields of physics, electronics and chemistry, and so forth.

The Museum is closed on Mondays, but the staff is here on Saturday morning and, of course, all the rest of the week. I will be away in Scranton next Tuesday, but otherwise here at the Museum the rest of the week. Could you let me know when it would be convenient for you to drop in?

Most sincerely,

Froelich Rainey  
Director

Dr. G. S. Lozier  
Radio Corporation of America  
Somerville, New Jersey 08876

RADIO CORPORATION OF AMERICA  
ELECTRONIC COMPONENTS AND DEVICES  
SOMERVILLE, NEW JERSEY 08876



November 27, 1963

Dr. Froelich Rainey  
University Museum  
University of Pennsylvania  
Philadelphia, Pennsylvania

Dear Dr. Rainey:

I recently read your article concerning the Applied Science Center for Archeology in "American Antiquity" and would appreciate learning more about the center.

I have been interested in Archeology for many years and believe I can be of assistance on some of the problems of the center.

My background in the Physical Sciences, in particular Physical Chemistry, has direct applications to many of the procedures being used. Specifically, I received my graduate training in electrochemistry and ultrasonics. These fields provide the background theory required for the resistivity and polarographic techniques referred to in your article and the soil pH measurements mentioned in a later article in the same issue.

I would like to arrange a visit to the Center to explore the possibilities of assisting the Center in these areas.

Very truly yours,

A handwritten signature in cursive script, appearing to read "G. S. Lozier".

G. S. Lozier, Ph.D.

/gk



THE MOST TRUSTED NAME IN ELECTRONICS

rec'd 7/22/78

Dear Elizabeth,

Your reference

Our reference

I'm dreadfully sorry to hear you've been rather sick lately. I hope you'll be up and around in the near future.

In October I shall be submitting my Ph.D. thesis and then, along with thousands of others & joining the ranks of the unemployed. I was hoping I could shorten that existence by getting myself employed somewhere. Is there a possibility of working in your lab. or one you too pushed for money? As the job market worldwide looks bleak I'm willing to do just about anything to stay in the field.

Could you please pass on my regards and this letter to Henry in the hope that he may know of a possible source of employment. There must be some  $^{14}\text{C}$  work going somewhere?

I know I've thanked you before but thanks very much for putting up with Bob O'Hat and myself in June 1976; I savour the taste of those venison steaks, even now.

Hoping to hear from you or Henry soon.

Fond regards

Chris Rednall.

Mr.

14 July 1978

Dear Chris,

Thank you for your recent letter. My legs are not very good, but otherwise I am feeling fine.

That is good news that you will be getting your Ph.D. in October. The job situation is not too good here either. One lab needs someone, but it is supported by the Government and has to employ U.S.A. citizens. Also I've just learned that two good labs in Texas are struggling for existence.

Sorry to be so discouraging, but if I hear of anything, I'll keep you in mind.

Best Regards,

Beth Ralph.

September 26, 1961

Dr. T. A. Rafter  
Institute of Nuclear Sciences  
Department of Scientific & Industrial Research  
Private Bag  
Lower Hutt  
New Zealand

Dear Dr. Rafter:

I read with interest the report in the New York Times of your Kauri Pine measurements. It was encouraging to read, too, that the same peak in  $C^{14}$  content had occurred in the southern hemisphere as had been found in the northern in the period around A. D. 1600.

As you probably know, we are engaged in the slow process of measuring tree-ring dated sequoia and bristlecone pine sections from California. I find it helpful to plot the results of all laboratories on a master graph, and should appreciate it very much if you will send me a reprint of your data when available.

Sincerely yours,

EKR/lm

Elizabeth K. Ralph

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[N.D.]

RAFTER

22 Mahoe Street,  
Lower Hutt.  
New Zealand.

Dear Dr. Ralph,

Dr T.A. (Athol) Rafter, foundation Director of the Institute of Nuclear Sciences, Department of Scientific and Industrial Research, is to retire on 5 March 1978. During his long and productive scientific career he has worked with scientists from many countries, particularly in the development and application of  $^{14}\text{C}$  dating and in the measurement and interpretation of isotopic ratios in sulphur. In recent years, he has made valuable contributions to the work of the International Union for Pure and Applied Chemistry (IUPAC).

We at this Institute have considered suitable ways of paying tribute to him on his retirement. In addition to the customary presentation, we would like to give him something more personal to remind him of his many friends and colleagues throughout the world. We therefore propose to present him with a bound volume of greetings or appropriate messages from his colleagues.

I invite you to contribute a letter to this anthology. The letter could contain, for example, thanks for collaboration or assistance, reminiscences arising from your association with him (particularly humorous ones), a brief assessment of the value and consequences of a joint project, or anything else that occurs to you that will help make a document of human interest rather than a purely scientific one. Photographs would also be welcome. We aim to produce a unique book that Athol will always treasure.

Naturally, we would like to make this presentation a surprise to Athol on his retirement, so we ask you not to mention it to him in the meantime. However, please do not feel that this prevents you writing directly to him as well, if you wish to do this. It is inevitable that a few names of others who would also like to contribute will be unintentionally missing from our list, so please pass on the invitation if you know such a person.

The letter could be either typed or handwritten, provided that only one side of each sheet was used. To help the bookbinder, please use A4 size (30 x 21 cm) or smaller. We set no limit to the length, but we expect that most would be fairly short, with few exceeding two A4 pages. Because of the long holiday period in January, we would appreciate your reply before the end of November 1977. We will acknowledge all replies, and hope to send you a photograph of the presentation. We do not know Athol's future plans, but he will probably have time to reply personally!

Members of the committee charged with preparing the gift volume are: G.E. Coote (convenor), J.R. Hulston, H.S. Jansen, W.J. McCabe, G.J. McCallum and H.C. Sutton.

Please write your message to Athol, but be careful to post it to me, as convenor, at the above address.

We find this project to be an exciting one, and we hope that you will feel the same way. Thank you in advance for your contribution.

Yours sincerely,

*Graeme Coote*

(G.E. Coote)

THE UNIVERSITY OF MISSISSIPPI  
COLLEGE OF LIBERAL ARTS  
UNIVERSITY, MISSISSIPPI

Department of Sociology and Anthropology

April 10, 1961

Miss Elizabeth K. Ralph  
Carbon-14 Laboratory  
The University Museum  
33rd and Spruce Streets  
Philadelphia 4, Pa.

Dear Miss Ralph:

I am sorry to have been so long in sending you the data for the charcoal sample from Palenque which I left with you in January (P-409 was the number, I believe). The information sheets are enclosed. If there is any other information which you wish, I will send it to you promptly.

I believe you are the one to thank for a copy of the article, "New Radiocarbon Dates and the Maya Correlation Problem." I was glad to get the reprint.

Sincerely,



Robert L. Rands  
Professor of Anthropology

Enclosure

RADIATION COUNTER LABORATORIES, INC.  
1844 West 21st Street  
Chicago 8, Illinois

December 11, 1950

Dr. W. E. Stephens  
Randal Morgan Laboratory of Physics  
University of Pennsylvania  
Philadelphia 4, Pennsylvania

Dear Dr. Stephens:

One of our previous chemists here, Dr. Ernest C. Anderson, received his degree on the age determination problem from Professor W.F. Libby. Through this connection and our cordial relationship with Professor Libby we have become close to this problem. I have listed, therefore, equipment that we could furnish for you and which is similar to that used previously in the age determination problem with the exception of shielding--this I would suggest that you procure on the local market inasmuch as it is essentially iron and lead.

Not only would we furnish the Libby Screen Wall Counter but in addition make the anti-coincidence counters and put them in the arch similar to Professor Libby's arrangement, also make the anti-coincidence circuit that limits background and provides a high voltage supply and recorder for the counter and the counts recorded on the sample. I have contacted Professor Libby for his latest recommendations.

We would be most pleased to go ahead with this equipment for you with delivery, subject to future military commitments, about two to three months for \$1,895.00, f.o.b. this laboratory.

Kindest regards,

Ernest H. Wakefield  
Director

EHW:va  
Dupl.

Mr. Cleveland

TA - 20701

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May 10, 1977

Dr. Brian Reeves  
Department of Archaeology  
Faculty of Arts and Sciences  
The University of Calgary  
2920 24 Ave. N.W.  
Calgary, Alberta, Canada T2N 1N4

Dear Dr. Reeves:

Please forgive my delay in replying to your letter of April 25th in regard to Carter's Texas Street site.

Since we do only  $^{14}\text{C}$  and thermoluminescent dating (of pottery), neither of which would be appropriate, I have been trying to think of the right person to consult.

I think that the best one would be Vance Haynes, Department of Anthropology, University of Arizona, Tucson, Arizona 85721. He is also a geologist, and together with Paul Damon (Geosciences Department) Byrant Bannister (Laboratory of Tree-Ring Research) and others, they have the facilities to do methods of dating that might cover your ranges as well as paleomagnetic measurements.

Vance Haynes has also as much expertise with respect to this type of site as any one that I know.

I am sorry that the facilities of our laboratories are of no real help in this respect.

Sincerely yours,

Elizabeth K. Ralph

EKR:mbp



FACULTY OF ARTS AND SCIENCE / DEPARTMENT OF ARCHAEOLOGY

April 25, 1977

Dr. Elizabeth K. Ralph  
Associate Director  
Applied Science Center for Archaeology  
The University Museum,  
University of Pennsylvania  
PHILADELPHIA, P. A.

Dear Dr. Ralph:

I have recently returned to University of Calgary from sabbatical research in San Diego, California where I have been doing field studies related to George Carter's Texas Street site and evidence for Pleistocene cultural remains. Scotty MacNeish, who has seen some of the materials, suggested I seek your advice re various dating techniques which might be applied to the sites.

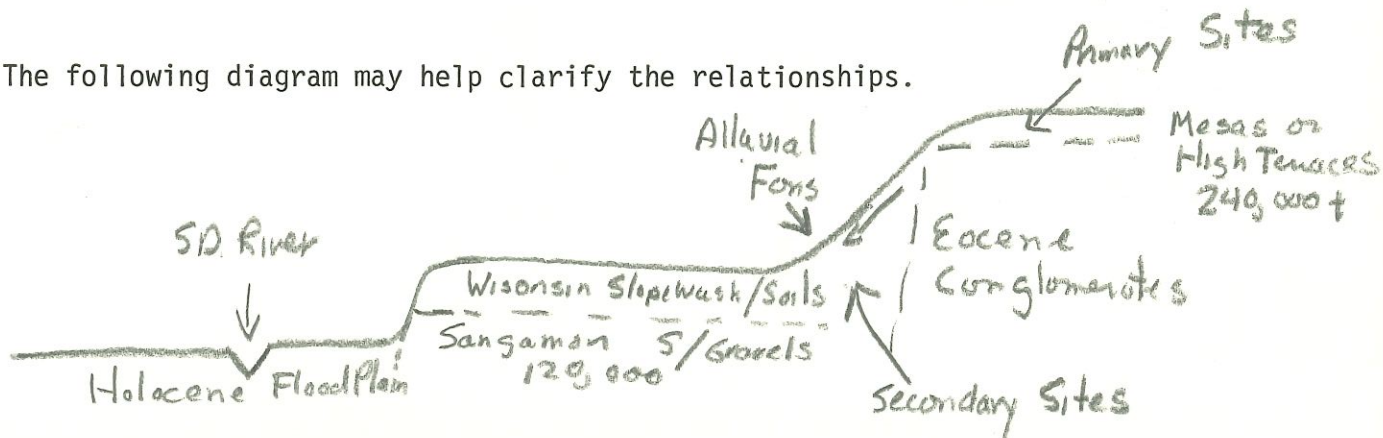
The type site of Carter's Texas Street is an alluvial fan which overlies interglacial river deposits. These correlate with marine deposits radiometrically dated at ca 120,000 years. In the fan sediments and colluvial apron which blankets the riverine sands and gravels at Texas Street and many other locations in Mission Valley are quartzite artifacts and fire cracked rock. The artifacts consist of unifacial core and flake tools derived from cobbles, obtained from Eocene Conglomerates which outcrop along the valley and on high terraces and mesa tops. There are some interesting and disturbing technological elements in the assemblage, but anyone who examines them with an open mind agrees they are artifacts.

Carter claims the artifacts and fire cracked rock represented primary occupations in the Texas Street fan and he also said they were in the Interglacial river sediments. I could find no evidence for this at Texas Street or other sections, however it may occur out at the terrace edge. The deposition of these cultural materials is still going on today at the front of slopes and in more recent fans. The source area from which they are being derived are higher terraces and mesa tops where I have found a number of primary occupations characterized by quartzite artifacts and fire cracked rock of human origin, including hearths, although some may have resulted from Chaparral fires. The sites consist both of occupation "campsites" and quarry/workshops where cobbles eroding out of the Eocene were worked. The latter sites lack the fire cracked rock. This reddened cracked and burned rock does not appear in the Eocene conglomerates or in Early Pleistocene beach deposits which cap the mesas.

...../2

April 25, 1977

The following diagram may help clarify the relationships.



The higher terraces or mesas on which the sites lie date from earlier interglacials from ca 240,000 for the terraces to 1.2 my Early Pleistocene for the Linda Vista Meas on which the city stands today.

Geologically the terraces/mesas consist of weathered conglomerates or marine sands/beach deposits capped by a soil ca 50 cm thick. This profile is typical of the arid mediterranean regions characterized by a thin A horizon. The primary sites occur in the B horizon and may be buried by 10-20 cm or directly on the surface, depending on the thickness of soil in a particular location.

In addition to the primary locales, only a few of which still exist in Mission Valley, I have sites on the high marine terraces fronting the 120,000 year wave cut platforms. There are also some important colluvial sections, where the materials washing downslope off the high terraces/mesas are deposited in profiles up to 3-4 m thick directly below the primary site. These sections occur directly above marine deposits of the last Interglacial and the soil profiles are very well developed, indicating considerable antiquity.

Technologically the artifacts predate the known dated cultures and are older than 10-12,000 years. Geological relationships suggest to me considerable antiquity on the order of 50,000+ years perhaps back to the Sangoman.

The few remaining sites will not last long and I hope, if I can receive funding, to return to San Diego next winter to begin a program of excavation in the primary sites on the mesa tops and major sections and various geological studies. The principal problem we face is the dating of the materials as without very tight chronological control those who reject the evidence for Early Man in New World will also reject these sites. Given the context of the primary sites and shallow soil profiles, 240,000+ years in age and the stable surfaces, I would not trust any radiocarbon determinations on the sites unless charcoal recovered was in tight association in a fire pit. Even then there would be many potential sources of contamination to consider.

Dr. Elizabeth Ralph

- 3 -

April 25, 1977

Given the above and the potential ages of the sites I would hope that other methods of dating, i.e. Thermoluminescence and paleomagnetism could be applied to the firebroken rock in the primary sites. However, I have no experience at all in this area. I would appreciate any assistance you might be able to provide me with, regarding potentially applicable techniques and experts in the field who might be interested in consulting on these matters for the project. I hope to begin next winter and plan to make grant applications within the next few months.

Yours sincerely,



Brian Reeves, Ph.D  
Associate Professor

BR/nah

Techniques

December 2, 1965

Dear Dr. Reitz:

The instrument we used on the Crati plain is a cesium magnetometer which was made by Varian Associates in Palo Alto, California, (Attention: Mr. Lee Langan). There is at the moment only one instrument of this kind which can be used for archaeology, but we are hoping its success will be putting it into production, and I suggest you write to Mr. Langan.

We would be happy to have you stop here when you are coming or going from Texas, but our field party will be in Italy again in May with the instrument, and it really would be better for you to see it in operation, there.

Most sincerely yours,

Froelich Rainey  
Director

✓  
Dr. Hjalmar Reitz  
1 Copenhagen Court  
Cor. Kotze & King George Sts.  
Hillbrow, Johannesburg,  
South Africa

FGR/vg

HJALMAR REITZ

CH. M. (ORTH.)

ORTHOPAEDIC SURGEON  
ORTOPEDIESE SJIRURG  
TELEPHONE 724-3311

1, COPENHAGEN COURT,  
Cor. KOTZE & KING GEORGE STS.,  
HILLBROW,  
JOHANNESBURG.

23rd November, 1965.

Dr. Froelich G. Rainey,  
Director,  
University Museum of the University of Pennsylvania,  
PENNSYLVANIA, U.S.A.

Dear Dr. Rainey,

I was very interested to read in Science News Letter (Page 358, December 5th, 1964) about the rubidium magnetometer which you have used to trace out the site of a city on the Crati plain near the Ionian Sea.

Could you possibly send me some details about this instrument, or refer me to the manufacturer for more information.

In our desert area of South West Africa, we have a legendary "Lost City" and some years ago I took an expedition into this desert to try and locate these ruins, but without success. The ruins were described in a book entitled "A Journey to Lake Ngami and back" written in 1885 by G.A. Farini.

At least half a dozen serious expeditions have set forth during the past ten years, to try and locate these ruins from Farini's description of his travels, but none has been successful.

I will be visiting Houston, Texas, early in April next year to deliver a paper on cervical surgery for chronic migrainous headache and brachialgia. If it is at all possible for me to see the rubidium magnetometer, I would make every effort to do so.

Yours sincerely,



December 7, 1978

Relco Dept. D-202  
Box 10839  
Houston, Texas 77018

Ref. Transistorized Treasure Probes

Dear Sirs:

Will you please send us a catalog of your Relco Treasure Probes or Metal Detectors.

Previously, we have purchased several inexpensive ones from Taylor Gifts (their No. 382), but I understand that they no longer stock them. We have found them useful in detecting deposits of coins in the course of archaeological excavations.

Please include information about weights and costs of your various models.

Sincerely yours,

Elizabeth K. Ralph

EKR/ek

*Handwritten initials in red ink at top left.*

# RESEARCH EQUIPMENT & SERVICE

6054 Woodlawn Avenue

Chicago 37, Illinois

14 September 1951

Professor G. P. Harnwell  
Chairman, Department of Physics  
University of Pennsylvania  
Philadelphia, Pennsylvania

Dear Professor Harnwell:

I understand from Dr. Willard F. Libby that you are planning to set up equipment for Carbon-14 dating work.

We have been working to design a complete apparatus for the counting phase of this type of work. It will include the screen-wall counter, anticoincidence counters, suitable supports, associated electronic equipment, and shield. All of the equipment will be assembled in the most compact and efficient way possible, and probably will be mounted on a sturdy steel table with heavy duty casters. This is similar to the most recent design that Dr. Libby is now using in his own laboratory.

If you would like to have me prepare specifications and a quotation for your consideration, I will be very happy to do so. There are, of course, certain pertinent factors which we must take into consideration, such as your floor loading capacity, elevator capacity, space available, etc. I will go into this in greater detail if you will let me know that you are interested.

Very truly yours,



Lyle E. Packard

November 22, 1961

C  
Mrs. Althea Revere  
7 Gates Farm  
Vineyard Haven  
Martha's Vineyard, Mass.

Dear Mrs. Revere:

O  
The gold technique described in the enclosed Bulletin is different from that in the Near East, but I thought that you might like to read about it.

P  
I hope that all goes well with you and that you have now received the gold samples.

Sincerely yours,

Elizabeth K. Ralph

Y  
EKR/ic

October 18, 1962

Mrs. Althea Revere  
7 Gates Farm  
Vineyard Haven  
Martha's Vineyard, Mass.

Dear Mrs. Revere:

I am planning to attend a meeting in Boston on October 31st, and I am wondering if I could come to see you on Tuesday, October 30th. If my information about boats is correct, I could arrive in Vineyard Haven at 11:30 A.M. and depart at 4:45 P.M. EST.

If Tuesday is not convenient for you, I could possibly arrange to come on Thursday.

With best regards,

Elizabeth K. Ralph

EKR:pc

November 20, 1962

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Y

Mrs. Althea Revere  
7 Gates Farm  
Vineyard Haven  
Martha's Vineyard, Mass.

Dear Mrs. Revere:

Prof. Cyril Smith (History of Science Dept., MIT) was here yesterday, and he looked carefully at your gold photographs. He would like to ask you a few questions and asked if you would mind telephoning him when you happen to be in Boston. His number is UNiversity 4-6900, ext.3722.

Prof. Smith is a fine person with an open mind, and I am sure that you will enjoy talking to him.

It was good to see you in the airport, even though slightly crowded and hectic.

With best regards,

E. K. Ralph

EKR/deh

February 7, 1963

C  
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Y

Mrs. Althea Revere  
7 Gates Farm  
Vineyard Haven  
Martha's Vineyard, Mass.

Dear Mrs. Revere:

The report of our spectrographic analyses is enclosed.

Professor Smith has suggested, instead of trying to oxidize a surface which you have examined, that we make some gold oxide and send it to you. We hope to accomplish this in the near future.

With best regards,

Elizabeth K. Ralph

EKR:pc

Dr. Froelich Rainey, Director  
The University Museum  
33rd and Spruce Streets  
University of Pennsylvania  
Philadelphia, Pennsylvania 19104

*Ralph  
Beth - in line  
possibility for  
April 2, 1969  
Have instrument  
book  
Fro*

Dear Sir:

Your name has been referred to me by David G. Mitten, Assistant Director of the Sardis Expedition at Harvard University concerning the possibility of participating in one of your excavation programs this summer.

I am single, twenty-five years old and I am presently employed as a research scientist at the Sinclair Oil Corporation Research Center in Tulsa, Oklahoma. I graduated from the University of Utah with a B.S. degree in geology and I am currently engaged in micropaleontological research. However, I have always planned to earn a graduate degree in archaeology and will do so in the near future. I am especially interested in the application of geological techniques to a given archaeological endeavor.

My interest lies in prehistoric archaeology and physical anthropology, especially that of Africa and the Near East. Although I have not received a formal education in archaeology, I have done extensive reading and research on the subject. In my geological studies I have had courses in vertebrate, invertebrate, and micropaleontology, zoology, palynology, sedimentation mechanics, geomorphology, photogeology, field surveying and mapping, geophysics and several other subjects which may be applicable to an archaeological investigation.

I feel that the experience of working at a summer dig would be advantageous to furthering my own ambitions and my talents would be of benefit to an archaeological team. I will be terminating employment at the Research Center this spring and will be available by late May or early June. I shall be glad to submit any additional information upon your request. Your interest and cooperation will be greatly appreciated.

Sincerely yours,

*Woodrow W. Rhea, Jr.*

Woodrow W. Rhea, Jr.  
5539 E. 47th Place, #218  
Tulsa, Oklahoma 74135

April 15, 1969

Mr. Woodrow W. Rhea, Jr.  
5539 East 47th Place, #218  
Tulsa, Oklahoma 74135

Dear Mr. Rhea:

Dr. Rainey has asked me to reply to your letter of April 2nd. I think that with your background and interest, there should be some way in which you could participate in our activities. However, one big problem is that you are not enrolled here for graduate studies, at least, as far as I know. This fact makes it almost impossible for us to offer you anything in particular nor would you qualify for travel funds and living costs at an archaeological excavation.

Just in case there is an opening of which I am unaware, I am forwarding your letter to Dr. Bernard Wailes, Department of Anthropology. If you don't hear from him, I suspect there is nothing.

Sincerely yours,

Elizabeth K. Ralph

EKR/mrb

March 9, 1971

Dear Miss Rinckenberger:

Thanks for sending me the article on dating pottery with the Thermoluminescence method and for your very nice comments on the accomplishments of The University Museum. All of which reminds me that our Laboratory here at the Museum announced perfecting the Thermoluminescence method 506 years ago and we are all a bit amused to see Ted Hall announcing it at this late date. Anyway, it works and we are glad to see Oxford involved in the method also.

All best wishes,

Froelbth Rainey  
Director

Miss A. Rinckenberger  
6 Patriot Circle  
Devon, Pennsylvania  
19333

## Fakes sifted out

# Ancient pottery can be dated now

By Michel H. Mathis

Staff writer of *The Christian Science Monitor*

### Boston

Four years ago, Dr. E. T. Hall bought a vase for \$1,200 at an auction. Experts there identified it as a 3,000-year-old Amlash pot made in ancient Persia.

A year later, as director of the Research Laboratory for Archaeology and the History of Art at Oxford, England, Dr. Hall helped perfect a method for measuring the ages of ceramic objects. Then, unfortunately, he tested it on his \$1,200 vase.

It was a fake—only 20 years old—and worthless.

Dr. Hall's dismay was brief, however. He got his money back. And his new device soon proved itself as the first instrument to reliably measure the ages of ancient pottery. It has been weeding scores of fakes out of museum collections ever since. And it may soon make a powerful contribution to archaeology.

### Ceramic finds common

"You nearly always find ceramics when you dig at a historically important site," said Dr. Hall in an interview here. "If the archaeologist can't find pottery, he often goes home." But pieces of pottery are often impossible to date, especially when they're mixed up and strewn about the site.

Now Dr. Hall's device can physically date any such pieces of fired clay within an accuracy of 10 percent.

He does it with a tiny sample of the find. He drills a small hole in the object about

the size of a quarter of an inch of pencil lead," he says. The hole can be drilled in any hidden or unobtrusive part of the object.

"Then," he says, "we spread the drilled clay powder on a plate and heat it up to about 500 degrees C." The heat makes the powder glow very faintly, and sensitive instruments can then measure the brightness of the glow.

### Old clay brighter

Old clay glows brighter than young clay — thanks to a phenomenon known to scientists as "thermoluminescence." Dr. Hall can actually measure the age of such clay by carefully measuring its glow.

He and his colleague, Dr. M. J. Aitken, perfected this technique and then tried it out on objects like Dr. Hall's pot. These specimens had already been carefully dated by other, less direct means.

"Our method worked to within better than 10 percent," says Dr. Hall. "We're trying to improve it even further, perhaps down to about 5 percent. But I don't think it will ever get better than that."

Identification of his own pot as a fake was only the first of a long series of surprise disclosures resulting from the last two or three years of work in his laboratory. "We have looked at several hundred specimens," he says, "and so far we've found three main areas of fakes:

- "Etruscan terra cottas. I think we've found about 8 or 10 fakes among all the specimens we checked from Europe and America. And some of these fetched very large prices—around \$40,000 for example.

- "Chinese Tang figures. We've found

scores of fakes there. They're made largely in Hong Kong and Europe.

- "Amlash Persian pottery. There's a factory in Tehran somewhere turning out a large number of beautifully made Amlash fakes. We've discovered probably a score of them.

### Most fakes recent

"These authenticity checks have certainly been the most fruitful application of our instruments to date," Dr. Hall continues. "They're easy, because few fakes were made more than 50 years ago. An age discrepancy between 1,000 years and 50 years, for example, is so obvious, we never make a mistake."

These new checks even help the well-established experts improve their expertise. Take the Amlash pottery, for example. "It was first discovered around 1934," says Dr. Hall.

"Since then, over 100 genuine specimens have been excavated. But when they appeared at auctions, you could only tell if they were genuine on stylistic grounds. I found it extremely difficult to distinguish between a genuine and a fake."

Now, with his new instruments, he can identify fakes, compare them with originals, and thus spot telltale stylistic clues that characterize the fakes. "I think I've learned enough now," says Dr. Hall, "to spot new Amlash fakes just by their style."

### Dating biggest importance

Dr. Hall hopes that his techniques will prove similarly helpful to experts on other types of ancient ceramics. But he thinks the most important applications of his instruments will eventually lie in the field of general archaeology.

"Before long," he says, "we should be able to make a reasonably good estimate of the ages of important new ceramic finds that would otherwise be difficult or impossible to date. I think this method will become as important as carbon 14 dating for archaeological material."

What about the future fakemaker?

"You would have to be a very astute physicist to outwit our test," says Dr. Hall. "In fact, I don't think it would be possible even then. I think we've thought of nearly every avenue you might try. And none of them will work."

# THE CHRISTIAN SCIENCE

BOSTON, THURSDAY, OCTOBER 22, 1970

An International Daily Newspaper



TFQ  
MRS. A. E. RINCKENBERGER  
6 PATRIOT CIRCLE  
DEVON  
MA 01933

## CUS Africa™

### ⊕ More stable, but...

Coup-prone black Africa has been remarkably stable throughout 1970.

It was way back in January that the last power play occurred, when Lesotho's governing party canceled unfavorable election results.

But the quiet does not mean that Africa's new states have gained maturity.

Political violence has once again rocked Sierra Leone, for instance. The newly formed opposition National Democratic Party has been banned and its leading members arrested. Junior Army officers also have been taken into custody following suspicion of a coup.

Meanwhile, portfolio reshuffling within Mali's Military Committee of National Liberation suggests a power struggle there. Little progress in solving basic postcoup problems may underlie the changes.

And attempts by Uganda's President Obote to force a social revolution have caused political tensions both in the Cabinet and the nation at large. In addition, persistent rumors from Kampala report Army commander-in-chief, Gen. Idi Amin, under house arrest.

### ⊕ Hurdles ahead

Nigeria, however, is furthering a trend endorsed by Ghana and Upper Volta—orderly postcoup return to civilian rule.

At recent anniversary celebrations, Head of State Yakubu Gowon announced a timetable for restoring Nigeria to normal constitutional government. Target date is 1976 or earlier if possible.

The prospect of another six years of military rule is not universally popular to



February 14, 1971

University Museum

Dear Lisa —

I found this article in an issue of The Christian Science Monitor, and I thought you might be interested in it. I was fascinated by Dr. Hall's techniques, and although I know this subject is not unknown to you, and hoped you would enjoy this article.

I, as a Philadelphian, am so proud of your accomplishments and what you give this city.

Good wishes;

Mrs. A. Rinckenberger

6 Patriot Circle  
Devon, Pa.

19333

February 18, 1971

Dear Mrs. Rinckenberger:

Thank you so much for sending us the article  
from the CHRISTIAN SCIENCE MONITOR.

As you know, we do some thermoluminescence  
dating here and it is good to have this reference  
for our files.

Thank you for your interest.

Sincerely,

David Crowner  
Executive Secretary

Mrs. A. Rinckenberger  
6 Patriot Circle  
Devon, Pennsylvania  
19333

Maris Ring  
114 W. Laguna - E#9  
Tucson, Ariz. 85705

Jan. 11, 1973

Mrs. Ralph,

I just spoke with a gentleman in the geochronology dept. at the U. of A. in Tucson. He referred me to you, because they don't do "thermo-luminescence" (?).

I have a shabti, a funerary figure, which is from the tomb of Tutankamon. It has been authenticated by the British Museum. However, I would like to find out how old it really is - if it's older than approx. 1365 B.C.

The figure is almost 4 1/2" long with a green France glaze. There are several pits in the glaze, and chips. It was broken and mended by Lord Carnavan.

Please could you describe what kinds of dating processes you can do and general costs. I don't know what more to tell you...

Thank you very much, Maris Ring



January 24, 1973

Mr. Maris Ring  
114 W. Laguna, E-19  
Tucson, Arizona 85705

Dear Mr. Ring:

In our MASCA laboratories, we do thermoluminescent dating, but our precision, at best, is  $\pm$  100 years. Also, it costs about \$500.00 per analysis.

If you are certain that your funerary figure came from the tomb of Tutankhamun, I think that it would be best to accept the Egyptologist's dating of the tomb. According to Zaki Iskander (Dept. of Antiquities, Cairo) the embalming cache of the Tutankhamun is dated from 1347 to 1339 B.C. According to Wm. C. Hayes, The Cambridge Ancient History, fac. No. 10, parts 1 & 2 (Cambridge Univ. Press, 1962b), the range is: 1361-1352 B.C.

Sincerely,

Elizabeth K. Ralph

ER/sa

RESEARCH LABORATORY FOR ARCHAEOLOGY  
AND THE HISTORY OF ART

TEL. 55211

6 KEBLE ROAD  
OXFORD

GR/ES

12th January, 1962.

Dr. F. Rainey,  
University Museum,  
33rd & Spruce Street,  
Philadelphia 4,  
Pennsylvania,  
U.S.A.

*Ralph*

Dear Dr. Rainey,

During your visit to our laboratory some time ago, I believe you mentioned that you were using a transistorised resistivity meter.

If you could forward details of this commercial instrument, together with your field experiences with the machine, it would be most helpful.

Yours sincerely,



G. ROBERTS.

*replied 1/62  
EAR*

# WASHINGTON STATE UNIVERSITY

PULLMAN, WASHINGTON 99163

EKR  
Personnel  
file

DEPARTMENT OF ANTHROPOLOGY

LABORATORY OF ANTHROPOLOGY

April 23, 1969

Dr. E.K. Ralph  
Associate Director  
MASCA  
The University Museum  
University of Pennsylvania  
33rd & Spruce  
Philadelphia, Penna.

Dear Dr. Ralph:

I am in the process of exploring the means by which I hope to initiate a series of research projects in the field of archaeological physics. I am particularly interested in doing work on the thermoluminescence dating of archaeological materials and in the application of TL dating to the study of Quaternary environments. I feel that I am uniquely qualified to undertake such research, having a Ph.D. in nuclear physics (Indiana 1967) and extensive experience in archaeological fieldwork (8 field seasons).

I have contacted you in order to learn whether there is a possibility of a post-doctoral appointment with your group at Pennsylvania in the near future. If you can offer me any significant encouragement in this direction I will be happy to furnish you with further data on my background, references, and to discuss some of the projects I would hope to work on. Since I do not have a thermoluminescence laboratory at my disposal I hope you will understand my reluctance to discuss my proposed research in great detail.

I have almost completed the arrangements for obtaining the specimens necessary for my studies. The several projects have been selected such that the validity of the results may be adequately demonstrated and such that archaeological problems will be studied which are not readily accessible to other methods of dating. I will primarily work on problems concerning North America.

I am also assembling specimens for two studies in neutron activation analysis. Are such projects feasible within the framework of your laboratory?

I hope to hear from you on the situation at Pennsylvania as soon as possible.

Sincerely Yours,



Stephen W. Robinson

April 29, 1969

Stephen W. Robinson  
Laboratory of Anthropology  
Department of Anthropology  
Washington State University  
Pullman, Washington 99163

Dear Dr. Robinson:

It was good to hear that you are planning to apply a knowledge of physics to archaeological research. There are too few workers in this field.

Unfortunately, the next fiscal year will be a bad one for us because of the scarcity of funds. We are even having difficulty in getting our NSF grant renewed which supports our thermoluminescence project. Therefore, we cannot offer you a post-doctoral appointment this year.

Our thermoluminescence dating of pottery is working out reasonable well, but for geological and environmental studies, there are a good many problems. These are summarized by G. Kennedy (xerox copy enclosed).

If you want to apply to Martin Aitken, the address is Research Laboratory for Archaeology and the History of Art, Oxford University, 6 Keble Road, Oxford, England.

We are not working here with neutron activation analysis. The authority on this subject is Edward V. Sayre, Dept. of Chemistry, Brookhaven National Laboratory, Upton, N.Y.

We should be glad to have you visit your laboratory,

Sincerely yours,

Elizabeth K. Ralph

Enc. (1)  
EKR/mrb

POST DOC.  
APPLICATIONS

*UNIVERSITY of PENNSYLVANIA*  
PHILADELPHIA 19104

*The Faculty of Arts and Sciences*

DEPARTMENT OF PHYSICS

May 10, 1978

Mr. Howard Robkoff  
Department of Physics and Astronomy  
Hasbrouck Laboratory  
University of Massachusetts  
Amherst, Mass. 01002

Dear Mr. Robkoff:

Thank you for your letter of April 16, 1978. In our MASCA laboratories, University Museum, where we do TL dating of pottery, geophysical prospecting, & some analytical work, there is a slight possibility that we shall have a position, but we shall not be sure before mid-May.

If we do have a position, we should like you to come for an interview, probably in mid-May.

Sincerely yours,

EKR:emd

Elizabeth K. Ralph

January 23, 1962.

Mr. G. Roberts,  
Research Laboratory for Archaeology and  
The History of Art,  
6 Keble Road,  
Oxford, England.

Dear Mr. Roberts:

Dr. Rainey has asked me to reply to your inquiry about our "transistorized" resistivity meter.

The instrument which we have found to be very satisfactory, called "Geohm" is pictured and described briefly on the enclosed leaflet. The sales representative in the U.S.A. is National Electronics, Sheridan, Wyoming, but I imagine that you could purchase it directly from Gossen. The cost here in 1961 was \$95.00 per unit.

As far as I know, it doesn't contain any transistors, but only a chopper for the conversion of D.C. to A.C. current. It is small, light in weight, and the three which we have purchased have, so far, withstood the rigors of field use.

The rods and leads (which we have made here) continue to present small problems. We have tried  $\frac{1}{2}$  in. diameter aluminum and stainless steel, and heavy 1 in. dia. plain steel rods, all approximately 3 ft. long. The last were best in Italy where the ground was hard and rocky. We tried both rubber and plastic covered stranded wires for leads various terminal arrangements, which all broke quite easily. Lead battery clips, which can be attached to the leads in the field (when broken) seem to have worked best for connection to the rods. The leads are connected to the instrument with banana plugs which are reasonably satisfactory. For leads, we are next going to try flexible coiled wire which will, we hope, expand when tripped over rather than break the terminal connections.

The "Geohm" is a fine little instrument, but, as you probably know, the resistivity survey method has its limitations. Perhaps, the worst drawback is the slowness of the technique due to the necessity of placing four rods in the ground, carefully spaced, for each measurement.

At Tikal, Guatemala last spring R. Linington made a thorough survey of part of an area called the West Group Plaza. There he found and plotted variations in resistivity readings which may represent depressions or elevations (due to structures below the floors). This

Mr. G. Roberts

Page 2

area is scheduled to be excavated this year so that the evaluation of the survey is pending until this is completed.

In the course of field work last year in Italy, both the Geohm and proton magnetometer were tested extensively on known features. The Geohm was especially, suitable for the location of tombs at Targuinia and other sites. The main conclusion based on these tests was that surveys could be made much more rapidly (and more accurately for small features) with the proton magnetometer at shallow depths. (The region was one in which the magnetic field of the soil was high so that walls, etc. were detected as minimum areas of magnetic intensity). However, for greater depths and for some anomalies, the resistivity method was more appropriate.

When the reports of these field trials are completed, I shall be glad to forward more precise information about the use of the "Geohm" to you.

Sincerely yours,

Elizabeth K. Ralph  
Dept. of Physics and  
University of Pennsylvania  
Museum

EKR:LF

C  
O  
P  
Y

THE SANGER CLINIC, P. A.

1929 RANDOLPH ROAD

CHARLOTTE, N. C. 28207

TELEPHONE 376-6511

FRANCIS ROBICSEK, M. D.  
HARRY K. DAUGHERTY, M. D.  
DONALD C. MULLEN, M. D.  
THORACIC & CARDIOVASCULAR SURGERY

NORRIS B. HARBOLD, JR., M. D.  
DONALD G. HALL, M. D.  
DIAGNOSTIC CARDIOLOGY & HEMODYNAMICS

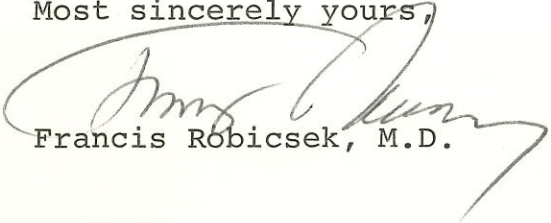
November 27, 1972

Mr. Henry N. Michael  
Museum of Applied Science Center for  
Archeology  
University Museum  
UNIVERSITY OF PENNSYLVANIA  
Philadelphia, Pennsylvania

Dear Mr. Michael:

Being an amateur archeologist and also a great admirer of girls,  
I have recently purchased your book "The Dating Techniques for the  
Archeologists." Unfortunately, it did not contain the information  
I was looking for.

Most sincerely yours,

  
Francis Robicsek, M.D.

FR/ndf

P.S. I read it with great interest and delight anyhow!

UNIVERSITY COLLEGE OF RHODESIA & NYASALAND  
DEPARTMENT OF CHEMISTRY

Telephone 35895  
Telegrams: UNICOLL

P. Bag 167H  
SALISBURY  
Southern Rhodesia

14th March, 1961

Dr. E.K. Ralph,  
Department of Physics,  
University of Pennsylvania,  
Philadelphia, 4, Pa.,  
U.S.A.

Dear Miss Ralph,

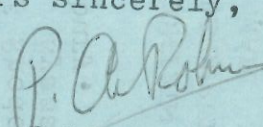
Many thanks for your recent reprint from Nature on Carbon-14 measurements of known age samples. We have been following your published work with continued interest.

You will be pleased to hear, I am sure, that our plans for the establishment of a Carbon 14 laboratory in Southern Africa are at last approaching fruition. With the help of a generous grant from the Gulbenkian Foundation, we have purchased ( and received ) the complete electronic equipment and gas counter now manufactured by the Belgian firm M.B.L.E. (a subsidiary of Philips) to the design of Dr. Oeschger. We are now only awaiting the long delayed completion of the specially designed laboratory to commence installation and building the vacuum train.

My colleague, Dr. Swart, has spent a period working with Mr. Barker at the British Museum and I have myself spent some time in Sweden in Dr. Ostlund's laboratory so I think we should be able to develop the technique satisfactorily, and I hope with good luck to be in operation before the end of the year.

We shall always remember the great help that you gave us during the early exploratory period and would like to repay this if ever we are able to do so. Please do not hesitate to let us know if there is anything we can do to help you.

Yours sincerely,

  
P.A. Robins.

BY AIR MAIL  
PAR AVION  
AIR LETTER  
AEROGRAMME



VISIT

RHODESIA & NYASALAND



Dr. E.K. Ralph,

Department of Physics,

University of Pennsylvania

PHILADELPHIA, 4.

Pa.,

U.S.A.

First fold here

Second fold here

Sender's name and address: Dr. P.A. Robins,

Department of Chemistry,

University College of Rhodesia and  
Nyasaland,

P. Bag, 167H, Salisbury, S.R.

AN AIR LETTER SHOULD NOT CONTAIN ANY  
ENCLOSURE; IF IT DOES IT WILL BE SURCHARGED  
OR SENT BY ORDINARY MAIL

To open cut here



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

STEPHEN W. ROBINSON  
U.S. GEOLOGICAL SURVEY  
345 MIDDLEFIELD RD.  
MENLO PARK, CA 94025

9 April 1975

Prof. Elizabeth K. Ralph  
Dept of Physics  
University of Pennsylvania  
Philadelphia, Pennsylvania 19174

Dear Dr. Ralph:

What is the current status of ~~the~~ plans for the 1976 Conference on Radiocarbon Dating? ~~Will~~ Will it be in Philadelphia?

After several years as post-doc for Minze Stuiver in Seattle I am now setting up a laboratory of my own at the USGS in Menlo Park. The level of funding as well as interest in the project is high here, but implementation may be a problem due to a shortage of space. It is not clear whether I will be able to obtain ~~any~~ temporary location prior to the completion of my laboratory building which is about 12 months away.

I will be visiting Meyer Rubin in Reston in the late summer or fall and perhaps I can visit your laboratory at that time.

Sincerely,

Stephen W. Robinson

April 15, 1975

Dr. Stephen W. Robinson  
U.S. Geological Survey  
345 Middlefield Road  
Menlo Park, Calif. 94025

Dear Dr. Robinson:

Unfortunately, we had to cancel the 1976 Radiocarbon Conference in Philadelphia. Since it is the Bicentennial Year, we were required to obtain special permissions. We waited two years for these and then it was too late to raise the necessary funds. Also, 1976 may be disastrous here because the City of Philadelphia is also unprepared. We are thinking vaguely of holding a conference in 1978 unless some other lab decides to initiate one.

We should be glad to have you visit us when you come to Reston. We have been doing proportional counting of  $\text{CO}_2$  since 1956 (very old equipment), but we have also a liquid scintillation spectrometer and a chemical train for the conversion of  $\text{CO}_2$  to benzene. However, we are not yet making benzene on a routine basis.

Sincerely yours,

Elizabeth K. Ralph

EKR/mes

895-2214  
Oleh Tretick

UNIVERSITY OF CALIFORNIA  
LOS ALAMOS SCIENTIFIC LABORATORY  
(CONTRACT W-7405-ENG-36)  
P. O. Box 1663  
LOS ALAMOS, NEW MEXICO 87544

IN REPLY

REFER TO: L-8  
MAIL STOP: 574

JA

January 28, 1975

Elizabeth K. Ralph, Assoc. Director  
Museum Applied Science Center for Archaeology  
33rd and Spruce Streets  
Philadelphia, Pennsylvania 19104

Dear Mrs. Ralph:

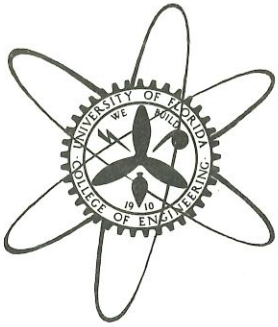
Enclosed is the reprint "The Status of Laser Separation of Boron Isotopes - June 1974" that you inquired about. I also want to thank you for the reprint from American Scientist.

Sincerely yours,

*Stephen Rockwood*  
Stephen Rockwood

SR:bs

Enc: As stated  
xc : L-8 file  
ISD-5 (2)



COLLEGE  
OF  
ENGINEERING

DEPARTMENT OF NUCLEAR ENGINEERING SCIENCES

REPLY TO

UNIVERSITY OF FLORIDA

DEPARTMENT OF NUCLEAR ENGINEERING SCIENCES  
202 NUCLEAR SCIENCES CENTER  
GAINESVILLE, FLORIDA 32611  
AREA CODE 904 PHONE 392-1401

March 3, 1975

Dr. Elizabeth K. Ralph  
University of Pennsylvania Museum  
33rd & Spruce Streets  
Philadelphia, Pennsylvania 19174

Dear Elizabeth:

Barbara Purdy has told me she had a most interesting meeting with you on her recent visit to the museum. She said you indicated some serious reservations about whether we'd ever get the TL method to work with Florida chert. As I understand her interpretation, your reservation primarily is concerned with the possible absence of natural radioactivity in the sample itself. Actually, I'd appreciate it if you or Mark had a few minutes and would drop me a note outlining your analysis of the potential (or non-potential) of our samples.

Also, you will be receiving a letter from James Watson, an archaeology student who is working on our project. We are very disappointed to hear that you had a cut in funds. It seems to be a prevailing trend nationwide. However, we're hoping you'll reconsider the request to allow Jim to visit you for a month. As he states in the letter, he would be willing and certainly would benefit himself if he could actually work for you in whatever capacity you might need. He is a very diligent fellow, picked up the nuclear and TL concepts very quickly and I'm sure would be of help to you. He has envisioned spending a regular length day working in return for an hour or so of your's or Mark's time.

Thank you for your time.

Sincerely,

Genevieve S. Roessler  
Assistant Professor

GSR:lmc

February 1, 1975

Dear Harold:

Here are the thermoluminescence results. The Lab usually charges - a \$500 fee for samples like this and you may want to make a contribution to the Museum, tax deductible naturally.

How are things going on the new musical? Keep in touch, I'll call you when I am in New York. Margaret sends warm regards.

As ever,

David Crowover  
Executive Secretary

Mr. Harold Rome  
1035 Fifth Avenue  
New York, New York



**Museum Applied Science Center for Archaeology**

Froelich Rainey, Director

Elizabeth K. Ralph, Associate Director

THE UNIVERSITY MUSEUM F1 • UNIVERSITY OF PENNSYLVANIA  
33rd & SPRUCE STREETS • PHILADELPHIA, PENNSYLVANIA 19174  
386-7400 (Area Code 215) Cable Address "Antique"

January 28th, 1975

TO: Mr. D. Crownover

FROM: M. Han, MASCA

Re: Ceramic abjects from Mr. H. Rome dated by thermoluminescence.

Djene Head DT-403-A A.D. 1720  $\pm$  120

Dogan clay vessel  
(ceramic bowl) P-T-403-B A.D. 1825  $\pm$  100

*Mark Jan*

Dr. Elisabeth Ralph  
Museum Applied Science Center  
for Archaeology  
The University Museum  
33rd and Spruce Streets  
Philadelphia, Pennsylvania 19104  
U.S.A.

Dear Miss Ralph,

since you have long been engaged in applying methods of natural science to archaeological research, it might be of some interest to you to know that our museum will commence within the current year to edit a periodical - "Archäologie und Naturwissenschaften" - dealing with this very field. We cordially invite you to submit articles.

This periodical will be open to papers dealing with all branches of natural science applied to archaeological research, but also to purely scientific publications capable of promoting applied science. I am confident that you will be able to communicate news well fitting to "Archäologie und Naturwissenschaften". Since the periodical will certainly find wider circulation among archaeologists than the special papers of the natural sciences, you will be welcome to re-publish (or even reprint) here, things already published in special papers of your discipline.

Complete publications with firm results will, of course, be bound to find especial interest among archaeologists. But this by no means excludes publication of contributions to current discussion; we even contemplate editing two numbers per year simply in order to get such contributions in press as soon as possible, and should be pleased to know your opinion in this respect.

- 2 -

There will be no upper or lower limit for contributions, but as a rule the manuscript should not exceed 50 pages. In special cases exceptions will be possible. Naturally, illustrations and graphs will be accepted. The size of the periodical will be A 4 (cf. this sheet). Authors will be granted 100 offprints free of charge, but in this respect, also, special arrangements ought to be possible.

Yours sincerely,

i.A.

A handwritten signature in blue ink, appearing to read "Max Horkheimer", written over a horizontal line.

November 7, 1973  
4400 Spruce St. C-4  
Philadelphia, Pa.  
19104

Dr. Gary Carriveau  
Applied Science Center  
for Archaeology  
The University Museum  
Philadelphia, Pa.

Gentlemen;

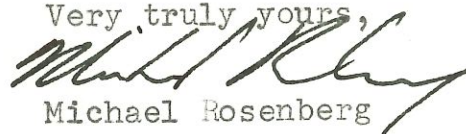
As per our conversation, this letter represents my application for one of the two openings in the Applied Science Center for Archaeology for the coming year. I have, since our conversation, considered the time requirements in the light of my current and projected work load, as well as my summer schedule and I now feel I can fulfill those time requirements.

With respect to my background; I am a first year graduate student in the Department of Anthropology here at U. of P. and as I plan to go into Archaeology, the opportunity to work at the Applied Science Center was no small factor in my decision to apply. My B.A. is in Anthropology and it was received from C.C.N.Y. in June of 1972. My science and Math background while limited, does include High School Physics and Chemistry, as well as general courses in Physics, Biology, and Geology at the college level. While I can't think of a convenient label for my level of learning in Mathematics, I have had some advanced algebra and calculus but without credit.

With regard to references; Dr. Warren G. Kinzey, of the Anthropology Department at C.C.N.Y., should be able to answer any questions concerning my academic abilities and Drs. J. Bordaz, of the U. of P. Anthropology Department, for whom I have been working this term, as well as David H. Thomas, Asst. Curator of North American Indians at the American Museum of Natural History, for whom I worked this summer, should be able to supply you with information concerning my ability to work.

I would be more than happy to supplement this application with any detailed information you require and I can be reached either through the Anthropology Department or at my home address. I look forward to hearing from you.

Very truly yours,

  
Michael Rosenberg

start at end of term

J. G. ROUNTREE  
CONSULTING ENGINEER  
P. O. BOX 9044  
AUSTIN, TEXAS 78757

October 7, 1971

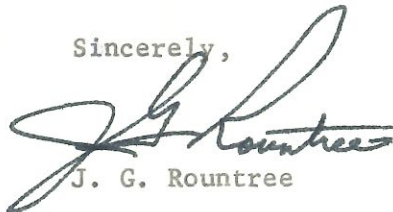
Dr. Froelich Rainey, Director  
University of Pennsylvania Museum  
Thirty-third and Spruce Streets  
Philadelphia, Pa. 19104

Dear Dr. Rainey:

An article in the Summer 1971 issue of RCA's ELECTRONIC AGE refers to work done by you and your team in searching for Sybaris and indicates that a portable cesium magnetometer was found to be of considerable help in carrying out the work.

I am interested in learning more about this device. If you can conveniently do so, please let me know the name of the manufacturer and/or any references in the technical literature. Thank you.

Sincerely,

  
J. G. Rountree

Encl. SASE

JGR/rh

*ASCA  
please reply*

13 October 1971

Mr. J. G. Rountree  
P. O. Box 9044  
Austin Texas 78757

Dear Mr. Rountree:

In answer to your request for information about cesium magnetometers, I have enclosed a reprint from Geoexploration and a xerox copy of a summary that I include in reports of magnetometer surveys.

Unfortunately Varian Associates has not continued to manufacture the Model 4920 Precision Magnetometer, but I believe that they do have some of the V-4971 Audio Types and Sensors for sale - price for the whole assembly a few years ago was \$5750.

Sincerely yours,

Elizabeth K. Ralph

EKR/dlk

LEOPOLD ROVNER  
CONSULTING PHYSICIST  
CLEVELAND, OHIO  
44124

2201 ACACIA PARK DRIVE


September 10, 1974

Dr. Elizabeth K. Ralph  
Center for Archeology  
The University Museum  
33rd and Spruce Streets Fl.  
Philadelphia, Pennsylvania 19174

Dear Dr. Ralph:

Thank you for sending the reprint  
from "Geoexploration" on your interesting use of  
the cesium vapor magnetometer. I enjoyed reading  
about the project and your survey meter technology.

Please convey my thanks, as well, to  
Dr. Froelich Rainey for helping in your reply.

Sincerely yours,  
  
Leopold Rovner

April 1, 1964

Dear Mr. Rowsome:

I am pleased to know that you are becoming interested in paleomagnetism and that you would like to experiment with this in the Maya area. We will have a small group at Tikal in Guatemala this summer, and if you are to be at Saibal anyway it would not be difficult to visit Tikal also to see what the possibilities are there. We could quite certainly put you up and the cost would be very little.

Also you should know that in the Applied Science Center here at the Museum we are contemplating a collaboration with the Oxford Laboratory in paleomagnetism, and hence you might find it useful to talk with Miss Elizabeth Ralph who is the physicist in charge of that work. She is now in England but will be back at the end of April.

Most sincerely yours,

Froelich Rainey  
Director

Mr. Frank H. Rowsome, III  
Cornell University  
Ithaca, New York

*Rockefeller Hall  
Dept. of Physics*

*Techniques*

Rockefeller Hall  
Department of Physics  
Cornell University  
Ithaca, New York  
March 26, 1964

Professor Froelich G. Rainey  
Department of Anthropology  
The University Museum  
University of Pennsylvania  
33 and Spruce Streets  
Philadelphia, Pennsylvania

Dear Sir:

I am planning to spend at least a part of the coming summer in the Mayan Indian area. Rather than simply sight-see (or even site-see) I would prefer to do some constructive archeology, as I am one who has long been very interested in archeology, and Mayan archeology in particular. I have several tentative ideas for a project, and I would like your advice to help crystalize a workable plan.

I am now a graduate student at Cornell majoring in physics and minoring in archeology under Professor Robert Ascher. I did my undergraduate work at Harvard (class of 1962). In the fall of 1961 I took the course which Professors Gordon Willey and Evon Vogt gave on the Indians of North and Central America (Anthro 110a, Olga Linares' section). I am now taking a graduate seminar on archeological methodology and interpretation given by Professor Ascher. This course will entail about six weekends of digging experience. I am planning on taking my general exams in June, and I would like to devote the summer to archeology before plunging into my thesis project in the fall.

I will probably be joined in August by Sheila Hennessey, a graduate student in ethnology at Cornell. She will be leading a group of undergraduates in the Cornell-in-Honduras program in the early part of the summer. Miss Hennessey did her undergraduate work at Barnard, in Latin American studies. She is fluent in Spanish, as I am not. She has spent the last three summers working in Latin America, the last in Ecuador with the Columbia-Cornell-Harvard-Illinois Summer Field Study Program, under the supervision of Dr. Casagrande from Illinois.

One of my ideas for a summer project is to apply thermoremanent magnetization studies to Mayan ceramics. I remember that Robert Wauchope found clay plaza floors that were baked in situ in Zacualpa, a minor highland Maya site. Such floors

would be almost ideal for making TRM studies. However, in the course of my readings (mostly in books such as J.E.S. Thompson's, rather than site reports) I do not recall any other references to clay baked in situ found in Maya sites. My impression is that most plaza floors were of cold poured mortar or cement, and I do not recall any references to Maya kiln finds. Thus the immediate and crucial question is whether or not there are enough examples of clay baked in situ to make TRM studies worth while. In order for TRM to make a significant contribution to dating there should be a number of fairly accurately dated (to within a katun or better) samples, and the set of samples should have a time spread of at least ten times that. Even if samples are numerous, there may be problems if the custom of baking clay plaza floors is restricted to the highlands where calendric inscriptions are rare, for the dating of the sample according to some calendar is necessary for the magnetic data to have any value.

I have decided to check with you before investing the time in a thorough literature search for possible samples. If you think there may be enough suitable ceramic finds I will try to track them down in the literature, and perhaps apply to the National Science Foundation for a small grant to support a sample-collecting trip this summer. In the event that such a trip seems to be feasible I would like your recommendations and advice on the problems of transportation, shelter, etc. that I would be likely to face.

An equally attractive, and perhaps more practical plan is to join an American archeological expedition such as your own or Professor Willey's at Seibal. I gather that you are going to be digging at Tikal this summer. I would be very pleased either to be put to work on the expedition's project, or possibly to tackle a small project of my own, such as the excavation of a house mound, in the immediate vicinity of your expedition's site. In either case I would like to be under your guidance in the conduct of the dig and I would like, if possible, to join with the main group in planning for housing and food. I realize that you will not be in a position to make a definite invitation, but I would like to know if there is any possibility that I might be able to join your expedition, and if so, what it would cost, what the housing and food situation would be, etc.

Professor Ascher has agreed to recommend me for either of the projects I have outlined. If you decide to consider my joining your group, I will ask him to send you a reference, and I might also be able to arrange a trip to Philadelphia to discuss the prospect with you in person.

I am sending a similar letter to Professor Willey at Harvard University.

I appreciate your taking the time to consider my plans and offering your advice.

Sincerely yours,

*Frank Rowsome*

Frank H. Rowsome, III.

Rockefeller Hall  
Department of Physics  
Cornell University  
Ithaca, New York

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all are  
✓*

Mar. 28th, 1966

The University Museum  
33rd & Spruce Sts.  
Phila., Pa.. 19104

Attn: Mrs. John C. Gwinn  
Secretary to the Director

Following your letter of March 24th, 1966, would you please see if you can locate an Abstract of Bids on Foundation Grouting of LC 36 B, Tower Tracks at the Cape Kennedy, Florida.

Return them at your convenience. They should have been with drawing you so kindly returned.

Sincerely yours,  
ROYAL CONTRACTING CORPORATION

*Henry A. Backe*  
Henry A. Backe

*returned  
vs 3/29  
19/66*

✓ Royal Commission on Historical Monuments (England),  
National Monuments Record,  
Fielden House,  
10 Great College Street,  
LONDON S.W.1

JNH/JGB

18th September 1967

Dear Dr. Rainey,

I have been advised by Dr. H. O. Thompson to write to you for information regarding your use of a 'multi band' camera.

I should perhaps explain that, under the aegis of the Royal Commission, I am responsible for building up an air photograph library recording archaeological and other sites in England. As a facet of this recent development we have undertaken limited air reconnaissance which has convinced me of the inadequacy of the present conventional recording equipment.

With this in mind I wonder if you could advise me on the technical aspects of the multi band camera in its archaeological usage. I should be most grateful for any help you may be able to give me.

Yours sincerely,



John N. Hampton.

← To open cut here →

Sender's name and address: John N. Hampton,

National Monuments Record, Fielden House,

10 Great College Street, London S.W.1

England.

AN AIR LETTER SHOULD NOT CONTAIN ANY  
ENCLOSURE; IF IT DOES IT WILL BE SURCHARGED  
OR SENT BY ORDINARY MAIL.

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Dr. Froelich Rainey,  
The University Museum,  
33rd and Spruce Streets,  
PHILADELPHIA,  
Pa. 19104,  
U.S.A.

September 22, 1967

*Archaeological  
Techniques*

Dear Dr. Hampton:

We used the multiband aerial camera on the plain of the Crati in southern Italy, last year, in our search for Sybaris. This camera is made by ITEK Corporation, Lexington, Massachusetts. It photographs on 9 different wave lengths of the electro-magnetic band; i. e. 2,000 to 9,000 engstroms. We have found by far the best results on the 7,000-8,000 engstrom band, and very little on anything else. The U. S. Air Force who made these photographs for us concludes that the multiband camera is no more useful than a straight infrared film made with a standard aerial camera.

We are now about to make another run of the Sybaris plain at 5,000 ft. with infrared film made by Eastman Kodak. Many archaeological anomalies noted by our film interpreter on the 7,000 engstrom band are now being tested with drills; so I cannot yet tell you how successful it is.

We also tried infrared scanning at Sybaris, without much success. But we are also making another experiment in the southwest U. S. with the scanner, and will certainly let you know the results. Personally, I feel that the several remote sensors being developed by our various Air Forces will be extremely useful in archaeology and we are trying, here, to develop these as rapidly as possible in collaboration with the U. S. Air Force.

All best wishes,

Froelich Rainey  
Director

Dr. John N. Hampton  
Royal Commission on Historical  
Monuments  
Fielden House  
10 Great College Street  
London, S. W. 1, England

FGR/vg

✓ Royal Commission on Historical Monuments (England),  
National Monuments Record,  
Fielden House,  
10 Great College Street,  
London S.W.1

JNH/JGB

5th October 1967

*JNH*  
*Rechnung*

Dear Dr. Rainey,

Thank you for your letter. I was most interested in the comment on the multiband camera vis à vis infra-red film, and in view of this your experiments on the Sybaris plain are most important. Yes, I agree with you that an enormous potential exists in the various techniques now being developed. The main problem, certainly as far as we are concerned, is applying these to archaeological situations.

Would it be possible for us to in due course obtain a copy of representative infra-red prints? It would be extremely useful to have an infra-red record of the archaeology of a particular geological setting.

Thank you for your help.

Yours sincerely,

*J. N. Hampton*

John N. Hampton.

P.S. I am 'Mr' not 'Dr.'  
*JNH*

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SHOULD BE FORWARDED  
BY AIR MAIL

To

Sender's name and address: John N. Hampton,

National Monuments Record, Fielden House,

10 Great College Street, LONDON S.W.1

England.

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OR SENT BY ORDINARY MAIL.

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BY AIR MAIL  
PAR AVION  
AIR LETTER  
AEROGARME



Dr. Froelich Rainey,  
The University Museum,  
University of Pennsylvania,  
Thirty-third and Spruce Streets,  
PHILADELPHIA, PA 19104,  
U.S.A.

← cut here →

December 24, 1969

Dear Mr. Hampton:

I have yours of November 6 which just now arrived with the air photographs, and I am most pleased to have them. They will be useful, and our decision here is to how to best carry out the experiment which we have been discussing.

I wonder if you have received my letter of November 21 asking for your thoughts on how we should organize this experiment. When I have your reply I will then get together with Fischer and Williams to work out a schedule and the procedure. Presumably, we could not reasonably begin this before spring, but if it would serve any purpose I could drop in to see you late in the winter enroute to Italy.

All best wishes for the season.

Sincerely,

Froelich Rainey  
Director

Mr. J. N. Hampton  
✓ Air Photographs Officer  
Royal Commission on Historical Monuments  
Fielden House, 10 Great College Street  
Westminster, London S. W. 1  
England

FR/c



*George*, Shall I tell the "Brother"  
that we cannot accept these  
samples, or are you interested  
in them?  
Both

## Saint Mary's College

SAINT MARY'S COLLEGE, CALIFORNIA

Sept. 28, 1971

Elizabeth Ralph, Ph.D.  
Department of Physics  
University of Pennsylvania  
Philadelphia, Pa.

Dear Miss Ralph:

During the summer I conducted the second season of an underwater archaeological investigation of the Garigliano River in Italy.

About 60 remains of wooden piles were found and I think that these may be the remains of a Roman bridge because they occur at the point where the Via Appia can be projected across the river. I have 4 samples from these piles. The samples were taken with gloves and placed in small film cans.

In August I discussed with Miss Anna Marguerite McCann the results of my expedition and she suggested that I write to you for information as to where I can get these samples analyzed (C 14).

Another question: where can I get a sample of a bronze plate analyzed? This comes from one of series of wrecks that I investigated in the summer of 1970 at the Tremiti Islands in Italy. I thought at that time that these plates were machine rolled and cut with a saw; but this summer I had the opportunity of studying one of these plates with some care and it did not look machine rolled or cut with a saw. So now I suspect that it may be ancient.

Thank you for any help you can give.

Sincerely,

*Bro. S. Dominic Ruegg, F.S.C.*  
Brother S. Dominic Ruegg, F.S.C.  
Professor of Classics and Archaeology

*Cyml*

August 28, 1970

Dr. Edward S. Rutsch  
Dept. of Anthropology  
Florham-Madison Campus  
285 Madison Avenue  
Madison, New Jersey

Dear Dr. Rutsch:

The proton magnetometer that we used some years ago was called "Elsec", made by Littlemore Scientific Engineering Company, Railway Lane, Littlemore, Oxford. The cost (as of a year or two ago) was 970 plus 10% in U.S.A. The instrument is still working, but since then we have been using cesium magnetometers made by Varian Associates. Unfortunately, they have not manufactured the one described in the enclosed reprint for sale -- they built only two prototypes for us. However, they may have available a simplified cesium magnetometer that has a sensitivity comparable to proton magnetometers, but is much more rapid to use. This is the Model V-4971 Portable Search Magnetometer and it costs \$5,750. Varian Associates manufactures also a portable magnetometer -- the M-49 which costs \$5,355 (Oct. 1969).

Both the M-49 and the V-4971 can usually be rented on a monthly basis. If you are interested in these, I suggest that you contact Peter Gotla, Analytical Instruments Division, Varian Associates, 611 Hansen Way, Palo Alto, California 94303.

Sincerely yours,

Elizabeth K. Ralph

EKR/ek

1 July 1974

Dear Beth,

Thank you very much for your letter.

Yes, I suppose I really should try to do Rick's job though I shall by no means be as good as he was at it. If however you come across someone you like and would be better than I, I shall not be offended, but just quite happily stay in my own little niche! Thank you for asking me first. I have very mixed feelings about Rick going - I don't want him not to get a good job in his own field but I don't want him to go either! It's good news that he has landed a good job, but so far away. I can't help feeling very depressed about him leaving.

To get back to his job. I should indeed like to try it. If I really can't cope you can fire me again!

The lorry arrived safely but they wouldn't release it until the carriage fees and tariffs had been paid. I may be able to recoup the tariffs if I could ever get hold of anyone in any of these offices who knew anything about anything. As soon as the machine arrived, it started to rain - we had been crying out for some rain - the ground is like concrete

The excavation van is once again in 'hospital' so I am again stranded on the site in a caravan. I was stuck here for 2 weeks at the beginning, before the house in Dublin was ready. Now I'm paying rent for a house and not being able to use it.

The workmen are all fed up today. It's the first day they have had to sit in their huts because of rain

An chéad fhilleadh anseo First fold here

aerlitir  
par avion

aérogramme



DR. ELIZABETH K. RALPH

MASCA, University Museum

33rd & Spruce Streets

PHILADELPHIA, Pa. 19174, U.S.A.

Má bhíonn aon ní istigh leis an aerlitir seo is leis an ngnáthphost a sheoltar i  
If anything is enclosed this letter will be sent by ordinary mail

Ainm agus seoladh an tseoltóra  
Sender's name and address

Ryan

68 HEYTESBURY LANE

BALLSBRIDGE, DUBLIN 4

IRELAND

An dara fhilleadh anseo Second fold here

and the wind is blowing in on them.



RALPH

By Museum

Streets

Pa. 19174, U.S.A.

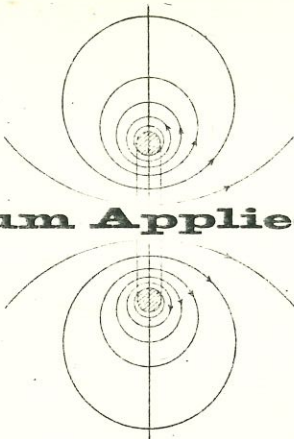
Postage will be sent by ordinary mail

LANE  
DUBLIN 4

An dara fillleadh anseo Second fold here

and the wind is blowing in on them.  
One of our workmen gave us a 'tip' for the  
Derby which came in to win at 8/1 so that had  
a clearing effect.  
I'll have to get them out to cut some turf before they  
go crazy.

Best regards to all in MASCA  
Sathleen



# Museum Applied Science Center for Archaeology

Freelich Rainey, Director

Elizabeth K. Ralph, Associate Director

THE UNIVERSITY MUSEUM • UNIVERSITY OF PENNSYLVANIA  
33rd & SPRUCE STREETS • PHILADELPHIA, PENNSYLVANIA 19104  
386-7400 (Area Code 215) Cable Address "Antique"

May 19th, 1977

TO: Dr. Elizabeth K. Ralph  
Associate Director, MASCA

FROM: Kathleen Ryan, MASCA

I wish to apply for unpaid leave of absence from May 29 - July 31 1977,  
9 weeks.

Approved:

*Elizabeth K. Ralph*

C.C. Dr. Froelich Rainey ✓  
" Mr. Martin Biddle

C.C. Mrs. Gloria Swift

cc. Dr. Pritchard