

EXPEDITIONS OF THE MUSEUM APPLIED SCIENCE CENTER

FOR ARCHAEOLOGY 1960-1976

ARIZONA

- 1961, 65 Buttes Dam site, north of Tucson. E.K. Ralph and Varian Associates. Instrument survey. Elizabeth K. Ralph, "Archaeological Prospecting," Expedition vol. 11, no. 2, Winter 1969.
- 1965 Snaketown. H. Bergh. Instrument survey. Ibid.
- 1972 Flagstaff, study of magnetic pole reversals. E.K. Ralph. Part of E.K. Ralph Ph.D thesis (unpublished).

ARKANSAS

- 1974 Arkansas State Prison. Magnetic survey. Bruce Bevan. Field report in MASCA files.

BRITAIN

- 1970 Southern England. Aerial survey. MASCA and Royal Commission on Historical Monuments (England).
- 1971 Kingscote. Magnetic survey. (Follow-up to aerial survey) E.K. Ralph. J.N. Hampton, "An experiment in multispectral air photography for archaeological research," and Elizabeth K. Ralph, "Cesium Magnetometer survey at Kingscote, Gloucestershire, England," Appendix D. In Photography in Archaeological Research, Elmer Harp, Jr. Editor, School of American Research Advanced Seminar Series, University of New Mexico Press, Albuquerque, pp. 157-202.
- 1975 Dorchester. Satellite photographic experiment. F.G. Rainey, J.N. Hampton, B.W. Bevan, "Detection of crop mark contrast for archaeological surveys," final report for Goddard Space Flight Center, April 1976.

CALIFORNIA

- 1975 White Mountains. Search for buried bristlecone pines. H.N. Michael with L. Dolphin and R. Vickers of SRI. Ground penetrating radar equipment. H.N. Michael and R.S. Vickers, "Subsurface radar probing for detection of buried bristlecone pine wood." Paper presented at the 9th International Radiocarbon Conference held in Los Angeles, California, and San Diego, California, June 20-26, 1976. (To be published in the Proceedings of the Conference). NSF film for television "How old is old?".

CANADA

- 1963 Louisbourg Fortress, Nova Scotia. Instrument surveys. E.K. Ralph, "Archaeological Prospecting," Expedition vol. 11, no. 2, Winter 1969.
- 1964 Fort Lennox, Ile-aux-Noix. Instrument surveys. E.K. Ralph and MASCA staff. MASCA Newsletter vol. 1, no. 1, February 1965, and Expedition vol. 11, no. Winter 1969.
- Cambellton, New Brunswick. Magnetometer trial survey on ice. E. K. Ralph. I

CANADA (contd.)

- 1975 Les Forges du Saint-Maurice, Trois Rivieres. Magnetic survey. Bruce Bevan. "A magnetic survey at les Forges du Saint-Maurice," MASCA Newsletter vol. 11, no. 2, December 1975.

CORSICA

- 1971 Aleria, Magnetometer survey. F.G. Rainey and E.K. Ralph. Report in MASCA files.

DELAWARE

- 1963-64 Hagley Museum, Du Pont Black Powder Works. E.K. Ralph, "Archaeological Prospecting," Expedition vol. 11, no. 2, Winter 1969.
- 1968 Wilmington, Eleutherian Mills. Magnetic survey. E.K. Ralph. Ibid.
- 1974 Odessa, Wilson-Warner House. Two instrument surveys. MASCA staff. Report in MASCA files. Published in local Odessa newsletter.

EGYPT

- 1973 Malkata, site near Luxor. Cesium magnetometer survey. E.K. Ralph. MASCA Newsletter vol. 9, no. 2, December 1973.

FRANCE

- 1969 St. Gilles (Languedoc). Magnetometer survey. John Winter. MASCA Newsletter vol. 5, no. 2, November 1969.
- 1969 Vix. Magnetometer survey. John Winter. Ibid.
- 1971 Camp de Cesar, Wissant. Instrument survey. F.G. Rainey and E.K. Ralph. Field report in MASCA files.

GREECE

- 1966 Helice. Instrument survey. E.K. Ralph. "Archaeological Prospecting," Expedition, vol. 11, no. 2, Winter 1969.
- 1966 Porto Cheli. Instrument survey. E.K. Ralph. Ibid. MASCA Newsletter vol. 2, no. 2, December 1966.
- 1967-68 Eilis and Island of Thera. E.K. Ralph. Instrument survey. MASCA Newsletter vol. 3, no. 2, Nov. 1967 and vol. 4, no. 2, Nov. 1968, Expedition vol. 11, no. 2, Winter 1969, pp. 14-21
- 1967 Porto Cheli. Balloon photography and photogrammetry. J. Whittlesey. MASCA Newsletter, vol. 3, no. 2, Nov. 1967.
- 1971,72 Greek ports (Porto Cheli). Balloon photography. J. Whittlesey. MASCA Newsletter vol. 7, no. 2, Dec. 1971.

GUATAMALA

- 1962 Tikal. Instrument survey. R.E. Linington. E.K. Ralph, "Archaeological Prospecting," Expedition vol. 11, no. 2, Winter 1969.
- 1976 Quirigua. Magnetic survey. Bruce Bevan. To be published.

ILLINOIS

- 1975 Fort de Chartres. Magnetic survey. Bruce Bevan. Report in MASCA files.
- 1976 Cahokia Mounds. Magnetic survey. Bruce Bevan and Jeff Klein. Report in MASCA files.

IRAN

- 1965-70 Hasanlu. MASCA conservation experiments. D. Butterbaugh. Progress reports in MASCA files.
- 1972 Tepe Malyan. E.K. Ralph. Report in MASCA files.

IRELAND

- 1963 Navan Fort. Magnetic survey. E.K. Ralph, "Archaeological Prospecting" Expedition vol. 11, no. 2, Winter 1969, pp. 14-21.
- 1968 Dun Ailinne. Instrument surveys. E.K. Ralph, B. Wailes, K. Ryan. Ibid. MASCA Newsletter vol. 4, no. 2, Nov. 1968.
- 1974-75 Dun Ailinne. Resistivity surveys of entrance-way. K. Ryan. Report in MASCA files.

ITALY

- 1961 Cerveteri. Instrument survey. F.G. Rainey and R.E. Linington. R.E. Linington, "Test use of a gravimeter on etruscan chamber tombs at Cerveteri," Prospezioni Archeologiche vol. 1, 1966, pp. 37-41.
- 1961 Tarquinia. Instrument surveys. F.G. Rainey and R.E. Linington. E.K. Ralph, "Archaeological Prospecting," Expedition, vol. 11, no. 2, Winter 1969, pp. 14-21.
- 1961-68 Sybaris. Instrument surveys. F.G. Rainey and E.K. Ralph. F. Rainey, C. Lerici et al. The Search for Sybaris 1960-1965, 2 vols. (text plus map supplement) 1967, Lerici Editori, Roma. F. Rainey, "Electronics to the rescue in the search for the lost city of Sybaris: Discoveries by a joint U.S.-Italian Expedition-Parts 1 and 2. Illustrated London News Dec. 8, 1962 and Dec. 15, 1962. E.K. Ralph, "Prospezioni Geofisiche," In: Relazione sulla Esplorazione Geofisica eseguita a Sibari, 1962, Fondazione Ing. C.M. Lerici del Politecnico- Milan. O. Bulitt, "Search for Sybaris," 1969, J.B. Lippincott Company, Philadelphia and New York. C.M. Lerici, "Avventura a Sibari," Conversazione Tenuta nella Riunione del 5 maggio 1964 al Rotary Club di Roma.

ITALY (contd.)

- 1965 Metaponto. Magnetic survey (follow-up to aerial survey). E.K. Ralph, MASCA Newsletter, vol. 1, no. 2 Dec. 1965 and Expedition vol. 11, no. 2, Winter 1969.
- 1966 Artena. Resistivity survey. E.K. Ralph. MASCA Newsletter vol 1, no. 2, Dec. 1969 and vol. 2, no. 2, Dec. 1966. E.K. Ralph, "Archaeological Prospecting," Expedition vol. 11, no. 2, Winter 1969, pp. 14-21.
- 1966 Sele. Magnetic survey. E.K. Ralph. Ibid.
- 1966 Veii. Instrument surveys. E.K. Ralph. Ibid.
- 1967 Siris. Magnetic survey. E.K. Ralph. Ibid.
- 1969 Ciro. Instrument survey. E.K. Ralph. Field report in MASCA files.
- 1971 Gravina. Magnetic survey. E.K. Ralph. Expedition vol. 11, no. 2, 1969, MASCA Newsletter vol. 8, no. 1, Dec. 1972.

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LEBANON

- 1972 Sarepta. Balloon photography. J. Whittlesey. Report in MASCA files.

MARYLAND

- 1973 Baltimore. Resistivity survey. E.K. Ralph and B. Bevan. Field report in MASCA files.
- 1974 Fort McHenry. Aerial survey. Bruce Bevan. To be published.
- 1977 Mont Clare House, Baltimore. Resistivity survey.

MASSACHUSETTS

- 1966 Harvard, Forest, Petersham. Attempt to measure soil variation with cesium magnetometer. MASCA Newsletter vol. 2, no. 2, Dec. 1966.

MEXICO

- 1960 Cerro de las Mesas near Vera Cruz. Resistivity survey. F. Rainey.
- 1968-69 San Lorenzo, Vera Cruz. Olmec site. Cesium magnetometer survey and aerial survey. F. Rainey and E.K. Ralph. MASCA Newsletter vol. 5, no.1, May 1969 and vol. 6, no. 1, May 1970. Sheldon Breiner and Michael D. Coe, "Magnetic Exploration of the Olmec Civilization," American Scientist vol. 60, no. 5, Sept.-Oct. 1972, pp. 566-575.
- 1971-72 Etzatlán. Cesium magnetometer survey and aerial survey. F. Rainey, E.K. Ralph B. Bevan. MASCA Newsletter vol. 7, no. 1, June 1971.

Yugoslavia

- * 1969 Cesium magnetometer survey. Neolithic houses. Expedition Vol 12 no.2 Winter 1970.

NEW JERSEY

- 1970 Marlton, Savich Farm. Magnetic survey. MASCA staff. Field report in MASCA files.
- 1970 Parsippany-Troy Hills, Beverwyck Manor site. Magnetic survey. MASCA staff. Report in MASCA files.

NEW MEXICO

- 1972 Chaco Canyon. Aerial survey. B. Bevan. T.R. Lyons, R.K. Hitchcock, J.I. Egbert, "Aerospace Archaeology: Progress Report and Proposal." New Mexico Archeological Center Remote Sensing Project, 14 March 1973.
- 1973 Chaco Canyon. Magnetic survey. B. Bevan.
- 1974-75 Chaco Canyon. Radar survey. SRI and B. Bevan. Roger S. Vickers and Lambert T. Dolphin, "A communication on an archaeological radar experiment at Chaco Canyon, New Mexico," MASCA Newsletter vol. 11, no. 1, May 1975.

PENNSYLVANIA

- 1963 Chester, Caleb Pusey House. E.K. Ralph. Expedition vol. 11, no. 2, 1969, MASCA Newsletter vol. 2, no. 2, Dec. 1966.
- 1963 Hopewell village. Instrument survey. E.K. Ralph and O. Colburn. Not published.
- 1965 Graeme Park, and Hope Lodge, Ephrata Cloister. Resistivity survey. H. Borstling. Expedition vol. 11, no. 2, 1969 and MASCA Newsletter vol. 1, no. 2, Dec. 1965.
- 1968 Norwood, Morton Mortonsen House. Instrument surveys. E.K. Ralph. Field report in MASCA files.
- 1972 West Chester, Brinton, Cabin. Resistivity survey. B. Bevan and M. Becker. Report in MASCA files.
- 1974-75 Philadelphia, Independence Hall. Resistivity survey. B. Bevan, J. Kenyon. Field report in MASCA files.
- 1975 Stenton Mansion. Radar survey. J. Kenyon and B. Bevan, "Ground-penetrating radar for historical archaeology," MASCA Newsletter vol. 11, no. 2, Dec. 1975, pp. 2-6.
- 1975 Schaefferstown. Instrument survey. B. Bevan. Report in MASCA files.

PUERTO RICO

- 1975 Las Flores. Aerial photography. B. Bevan. Report in MASCA files.

SOUTH CAROLINA

- 1965 Camden. Instrument surveys. E.K. Ralph. MASCA Newsletter vol. 1, no. 2, Dec. 1965. Expedition vol. 11, no. 2, 1969, pp. 14-21.

January 2, 1964

FIELD SONIC ARCHAEOLOGICAL PROBE
TENTATIVE MINIMUM BUDGET*Teclunys*
[Signature]

Quantity	Item	Estimated Cost
1	Truck- 2 wheel drive 3/4 ton with light weight cab	\$ 3,400
2	Augur lengths larger than 3 1/4 dia. for use with University Museum Soiltest drill	100
8	Audio amplifiers-variable filters in 250 to 1000 cps range, 80 db calibrated attenuators, no AOC	5,200
1	Photo-paper recorder-minimum chart speed 50 in./sec.	4,050
1	3 kw Zeus 115 VAC Portable Power Plant	431
23	Acceleration detectors -- part of present project	
1	Switching control unit for detectors	
1	Shooting box for dynamite caps	200
Asstd.	Wire and cables	200
Asstd.	Small hand tools, soldering iron, and digging tools	50
	Mechanical Parts Total	<u>\$13,631</u>
	Labor for engineering, assembling, testing, etc. of above (less magnetic recorder -- EKR guess, only)	10,000
	Salary for technician for three months in Italy	3,000
	Labor Total	<u>\$13,000</u>
	Basic Parts and Labor Total	\$26,631
1	Edgerton, Garmeshausen and Gerier 100 watt-second "Boomer"	3,500
	TOTAL PLUS BOOMER	\$30,131
1	Magnetic recorder system-custom designed with 6 channel multitrack 100 multiplicity capabilities	15,890
	Labor for above	5,870
	Total Magnetic Recorder	<u>\$21,760</u>
	TOTAL PLUS BOOMER PLUS MAGNETIC RECORDER	\$51,891

Sent to J. Talk, Petty Labs.
cc. Dr. Rainey

ASCA
[Handwritten signature]

Salaries

Research Physicist (or Chemist)	\$ 8000
Two Research Assistants, part-time	7200
Student Assistants, part-time	2400
Total Salaries	<u>17600</u>

~~Employee Benefits (9.0% of salaries) 1584~~

Equipment

Development of Archaeological Prospecting Instruments	
Instruments Based on Wave Propagation --	5000
Sonic-Seismic Devices	
Instruments for the Detection of Magnetic	3000
and/or Metallic Materials	
Apparatus for Miscellaneous Experiments, such	1000
as the detection of telluric currents in	
combination with the monitoring of magnetic	
intensity	
Thermoluminescent Dating of Pottery	
X-Y Recorder	2000
Two D.C. Amplifiers	1000
Direct Reading Semi-Micro Balance	900
Books and Periodicals for Information Center	500
Expendable Supplies and Materials	2500
Total Equipment	<u>15900</u>

1
 17,600
 15,900
 2,000

Travel

~~Instruments tests in Italy, Texas, etc. and local~~ 8000
~~trips, including conferences.~~

Field Testing of Experimental Instruments -
in collaboration with Museum of Specimens

Total Direct Costs \$37,084

35,500
 3,000

~~University of Pennsylvania Overhead (28% of direct costs) 10384~~

TOTAL \$47,468

38,500

2
 38,500 3 years
115,500

ASCA BUDGET EXPLANATION

3/3/64

The present projects for which financial support is sought are outlined under "Equipment". During the past three years, manufactured instruments designed for archaeological prospecting—the Oxford Proton Magnetometer, the Gossen Geohm, and other small ones, have been purchased. Our experiments are therefore, directed toward filling the "gap" in underground detection, that is, to serve in the detection of features and objects that are not readily located with existing instruments. Since most major efforts in the past have been devoted to geophysical rather than archaeological prospecting, this gap is large. Our first major project (not yet completed) has been the development of a workable sonic device, that is, an instrument which detects frequencies higher than the geophysical seismic ones and consequently, because of the shorter wavelengths, will "see" the smaller archaeological features at the comparatively shallow depths.

There is a need also for a variety of specialized instruments such as improved metal detectors. Also, it may be that a combination of two techniques such as the monitoring of telluric waves, both natural and artificial, and changes in magnetic intensity simultaneously may provide a new means of detection of certain features.

The technique of dating pottery by thermoluminescence, if proved to be workable, will be an invaluable aid in the dating of many archaeological sites, especially, ones at which no carbon is associated with the potsherds. With equipment borrowed from the

Department of Physics, experiments have progressed sufficiently so that it will soon be known if age correspondence may be obtained with this technique.

The small information center in ASCA, for which funds for books and periodicals and a part-time research assistant, are requested, is becoming more useful to students, faculty, and visiting scholars as more references and articles are compiled.

In regard to the other salaries requested, the main task of physicist is the development of thermoluminescent dating with the possible addition of instrument field trips and testing. The second research assistant should be a graduate student in physics or engineering to assist with instrument surveys and tests. The student assistants (ones studying anthropology are usually available) are helpful with various minor projects and with instrument surveys.

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A. Funds Requested for Current Program

1. Personnel

Research Physicist or Geophysicist	\$10,000
Two Research Assistants, part-time	7,200
Student Assistants, part-time	<u>2,400</u>
Total Salary funds requested:	\$19,600

Personnel financed by the University:

Froelich Rainey, Director, University Museum & ASCA
Elizabeth Ralph, Associate Director, ASCA
Eric Parkinson, Chemist, University Museum
Robert Stückenrath, Research Assistant, Radiocarbon Laboratory

Personnel financed by other grants:

Mark Han, Research Chemist, ASCA (NSF)
Henry Michael, Research Associate, Radiocarbon Laboratory (NSF)
Daria Nowakowsky, Student Assistant, Radiocarbon Laboratory (NSF)

In addition to the salaries of the personnel listed above, the University supports the archaeological dating program of the Radiocarbon Laboratory (\$6,000 annually for Equipment and Current Expenses); and the NSF has supported the methodological project -- the dating of samples of known age -- of the Radiocarbon Laboratory, (approximately \$7,000 annually, E. Ralph, Principal Investigator).

It is anticipated also that the NSF will support the thermoluminescent dating experiments for one more year (\$10,000 for equipment and other expenses, F. Rainey, Principal Investigator).

2. Development of Exploration Instruments

Development of workable sonic device	\$10,000
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In collaboration with Varian Associates and other organizations, experimentation with Rubidium magnetometers and other instruments and corollary experiments with the detection of natural and artificial telluric currents \$ 3,000

Travel and expense funds for surveys and tests at various sites; mostly in North America 3,000

Development of metal detection with greater penetration power -- tests of circuit suggested by Ing. Colani + 5,000

Total: \$21,000

3. Experimentation and Analysis of Materials:

Investigation of flame photometry and other methods of potassium analysis; use and adaptation of other instruments available in departments of the University for various analyses of artifacts. \$ 2,500

4. Information Center

Compilation of references to techniques applicable to archaeological research. Books and periodicals \$ 1,000

5. U-2 Camera

Experimentation with new camera designed for U-2 ; adaptation for improved aerial photography of possible archaeological sites \$10,000

6. Thermoluminescence

Continuation of thermoluminescence dating of pottery (2nd and 3rd years.) \$10,000

Total annual funds requested for current program: \$64,100

B. Funds for Accelerated Program, if possible

1. Thermoluminescence

Acceleration of present program by addition of a physicist:	\$10,000
Experimentation with thermoluminescent dating of volcanic and crystallized salt deposits (funds needed mostly for collection of samples.)	3,000

2. Tree-Ring Chronology in Near East

Additional staff member	10,000
Additional student assistants	5,000
Travel, supplies, computer time & other costs	10,000

The success of tree-ring dating in the southwestern region of the U. S. A. is well known but a similar major effort has not been made for other part of the world. A pilot study made at Gordion, Turkey, indicates that climatic conditions may have been suitable for the establishment of master tree-ring logs for Anatolia and surrounding regions. The cedars of Lebanon and other woods imported into Egypt, may provide materials for the extension of a tree-ring chronology into the period of the early Egyptian Dynasties.

This program would be conducted in conjunction with carbon-14 dating. C-14 dates would define the range of the various samples, and thus speed up the tedious process of cross-dating and the building of a master chronology. When completed, however, the tree-ring dated samples would afford samples of known age, possibly going back 5000 years and help to determine the magnitude and causes of the changes in atmospheric C14 inventory in the periods of 4000 to 5000 years ago.

3. Metallurgical and related Techniques:

Metallurgist	\$10,000
Additional student assistants	5,000
Equipment and supplies	8,000

Studies to be undertaken to contribute to the knowledge of metal fabrication from the archaeological point of view as well as to the

history of metallurgy; and for the development of laboratory methods for the study of metal artifacts which will enable better analysis of cultural contacts and the spread of technology.

It is anticipated that these techniques would be applicable to other materials, One specific suggestion is the study of patination on stone artifacts such as these found on the Egyptian deserts as a means of comparative dating.

4. Magnetic Dating

In collaboration with Princeton University, collection of samples for archaeomagnetism, a possible means of dating of historical sites in North America; also, intensity changes in earlier periods may be related to changes in atmospheric C-14 inventory.

Total Annual Funds for Accelerated Program	\$ 64,000
Total Annual Funds	\$128,100
Total sum for three (3) years	\$384,300

9/24/68

National Science Foundation Grants
MASCA
(Applied Science Center for Archaeology)
Froelich Rainey, Principal Investigator

MASCA

✓ G-13256	9/1/60 - 9/1/61	\$27,000
	Research and Development in New Techniques for Archaeology	
✓ G-18571	9/1/61 - 9/1/62	\$30,900
	Research and Development in New Techniques for Archaeology	
✓ GS-294 16	9/1/62 - 9/1/63	58,800 \$55,774
	Applied Science Center for Archaeology	
✓ GS-294	9/1/63 - 9/1/64	\$64,000 55,774
	Applied Science Center for Archaeology	

After this grant, the NSF discontinued awarding "broad based" grants to MASCA and supported only the following specific projects:

THERMOLUMINESCENCE

GS-566	8/1/64 - 7/31/65	\$20,000
	Dating of Archaeological Evidence by Thermoluminescence	
GS-1028	1/1/66 - 1/1/67	\$16,200
	Continuation of Dating Pottery by Thermoluminescence	
GS-1568	4/1/67 - 4/1/69	\$40,700
	Thermoluminescent Dating of Pottery	

ARCHAEOLOGICAL PROSPECTING

GS-1040	1/1/66 - 12/31/66	\$17,000
	Development of the Cesium Magnetometer	

TOTAL MASCA NSF GRANTS \$271,574
A ~~286,374~~ 266,374

An associated NSF grant in the Dept. of Metallurgy (R. Maddin, Principal Investigator) is as follows:

GP-4766	1966 - 1968	\$23,600
	Metallurgy of Archaeological Specimens	

National Science Foundation Grants
Radiocarbon Laboratory

Elizabeth K. Ralph, Principal Investigator

G-3281	1/1/57 - 12/31/58 Half-life of Carbon 14	\$20,000
G-5608	Supplemental to G-3281	\$2,500
G-14094	8/1/60 - 8/1/62 C-14 Measurements of Known Age Samples	\$22,200
GP-405	9/15/62 - 9/15/64 Carbon-14 Measurements of Known Age Samples	\$30,000
GP-3778	12/1/64 - 11/30/66 C-14 Measurements of Known Age Samples	\$49,900
GA-993	5/15/67 - 5/15/69 C-14 Measurements of Known Age Samples and Experiments with Thermoluminescence and Electron Spin Resonance for C-14 Detection	\$56,700
TOTAL C-14 NSF GRANTS		<u>\$181,300</u>
TOTAL - MASCA AND C-14		\$452,874

5200
447 674

MASCA BUDGET

9/23/69

1 Year

	<u>Present Support</u>	<u>New Funds Required</u> (From Museum Accounts)
<u>Radiocarbon Laboratory</u>		
University of Pennsylvania (Physics-Radiocarbon)	\$28,750	
University Museum	3,100	\$ 3,100
NSF-GA-12572 (7/69 - 7/71)	56,900	
Foundation for Studies of Modern Science (9/69 - 9/71)	10,850	
<u>Thermoluminescence</u>		
NSF-GS-2716 (9/69 - 9/71)	61,200	
<u>Information Center - Harrison Fund</u>		
Salaries (2 part-time)	4,000	5,000
Supplies	1,000	1,500
<u>Chemistry Laboratory - Museum Budget</u>		
Salary (1 full-time)	7,875	8,000
Supplies	500	500
<u>Conservation</u>		
1 Full-time salary - Discretionary Fund	6,250	6,500
Part-time salaries - Women's Committee	4,500	5,000 or more
Equipment and supplies - Women's Committee	4,300 (2,900 remains)	
<u>Instrument Surveys - Archaeological Prospecting</u>		
Italian-French Fund	15,000	(3,000 or 10,000 remains)
Seismic Fund	5,000	(2,600 remains)
TOTALS	\$209,225	\$29,600

THE UNIVERSITY MUSEUM



UNIVERSITY OF PENNSYLVANIA

THIRTY-THIRD AND SPRUCE STREETS
PHILADELPHIA, PA. 19104

CABLE ADDRESS "ANTIQUE"
TELEPHONE: EVERGREEN 6-7400
(AREA CODE 215)

March 12, 1970

Beth
Dear Miss Ralph:

At the last meeting of the Board of Directors of The University Museum, \$5,000.00 was appropriated for the MASCA Information Center.

\$1,000.00 is allocated for current expenses and \$4,000.00 has been allocated for salaries for next year.

Sincerely,

[Signature]
David Crownover
Executive Secretary

Miss Elizabeth Ralph
Associate Director
MASCA
The University Museum

September 15, 1970

TENTATIVE BUDGET

Liquid Scintillation Counting of C^{14}

Equipment

Packard Tri-Carb Liquid Scintillation Spectrometer, Semi-Automatic, Model 314S		\$~8,000
Additional shielding - Fe or Pb		1,000
Additions to chemical train to convert CO_2 to C_6H_6 , including glassblower's time		2,000
Machine shop time		600
Isolation transformer, 1:1, 115v, 5kva, 60cps		115
Mettler Analytical Balance		1,175
Expendable Equipment and Supplies (per year)		4,000
Liquid nitrogen and carbon dioxide	1700	
Glassware and chemicals	2000	
Electronic components and repairs	300	
Mass Spectrometer time \$7/hr		100
	Total Equipment and Supplies	<u>\$16,990</u>

Salaries

Research Assistant*		\$ 3,600
*plus free tuition		
Subtotal		<u>\$20,590</u>
Employee Benefits (10.2%)		370
Overhead (34%)		1,224
	TOTAL	<u>\$22,184</u>

May 20, 1970

Dear Mr. Scurlock:

In our Applied Science Center for Archaeology at The University Museum, we will soon be employing two more graduate students to work on our current research projects. One of these students will be in geology and another in anthropology. In both cases, the research is being done under grants which assume that these graduate students will receive free tuition as Research Assistants in the University. But under the grave budget problems which we are all now discussing, I hope that you can re-assure me that these two students will have free tuition during the coming year as Research Assistants. Since we must make a selection of students within the next month or so, I hope you can confirm this so that I can be clear on this point when employing the students.

Most sincerely yours,

Froelich Rainey
Director

Mr. Reagan A. Scurlock
Director of Research Administration
Fourth Floor, Franklin Building

Mr. Reagan A. Scurlock
Director of Research Administration
Franklin Building

Dear Mr. Scurlock: A-2 as Research Assistants

We are offering ¹ positions ¹ to two graduate students, & we should like to request free tuition for them. The positions require half-time work during the academic year & full-time during the summer months, & we are offering salaries of \$3600 each.

This financial support will come from two separate grants - namely:

1) Museum Aerial Photographic Project

This will be a grant of \$12,000 ~~starting in July~~ from the Park Service starting July 1, 1970.

The Park Service has requested the University to supply matching funds for the salary part of the grant & this requirement could be met by offering free tuition.

2) NSF Grant GS-2716 Thermoluminescence
Dating of Pottery

This is a two-year grant from Sept. 1969 to Sept. 1971. Funds are budgeted in this grant ~~for a~~ ^{to finance a} Research Assistant, but the position has not been filled ~~up~~ because of the difficulty of finding a suitable applicant without offering free tuition. With free tuition, this position can be filled by a qualified applicant starting on June 1, 1970.

We hope that it will be possible for you to approve of this request.

Sincerely yours,

1970-71

Private Funds - Museum

Annual
20 Expeditions

4 Bldg
6 Library

Am. Sec. Spec.	300
MASCA	3865
Argolid	9425
Bldg	169,732
Butler	1895
Disc. Fund	99,600
Eg. E	1,200
El Tib	30,000
Fellows	55,000
Ford Junology	6500
Ford Trainers	62,000
Gordon	7300
Steffel	5000
Ital.	4000

Publications Fund ~~2~~ 46,000

South Asia 700

Spain-Latin 1600

Special Gifts 15,500

Tikal 2500

Underwater 1000

Vaillant 400

Wom: Con. 6000

Garden 100

\$529,617

+ From Museum

Endowment for Research 70,000

Government Grants) ~~2~~ = 600,000 est.

BUDGET

Revised 10/14/70

SUPPORT FOR FISCAL YEAR 1969-70	FUNDS AVAILABLE FOR NEXT FISCAL YEAR 1970-71	FUNDS NEEDED FOR FISCAL YEAR 1970-71
\$ 28,750 3,100 23,680 3,620	29,750 (expected to be approved) \$ 3,100 (to be approved) 33,220 3,615	 28,750 3,100 23,680 3,620
\$ 25,945	\$ 29,175 (less 20%?)	 25,945
\$ 5000	\$ 4000	\$ 2500
5000 7500	10,000 ?	\$ 7000 minimum
	12,000	Matching Funds
	500	\$ 2000 (first year only) 1000 40,000 (to be requested) 15,000 (to be requested)
\$ 102,595	\$ 125,471	\$ 40,000

PROJECTS

A. RADIOCARBON LABORATORY

University of Pennsylvania
(Physics - Museum - Radiocarbon Budget)

University Museum

NSF Grant GA-12572, E. Ralph, Principal Investigator

Foundation for Studies of Modern Science

B. THERMOLUMINESCENCE

NSF Grant GS-2716, F. Rainey, Principal Investigator

C. INFORMATION CENTER - Harrison Fund?

D. ARCHAEOLOGICAL PROSPECTING INSTRUMENTS AND SURVEYS

Seismic + other funds

Italian Account

E. AERIAL PHOTOGRAPHY

F. NEW PROJECTS

1. Chemical Studies of Organic Compounds

2. Fission Track Dating

3. Expansion of Radiocarbon Laboratory

a. Equipment, Salaries, + Supplies

b. Additional Space + Facilities incl. sealing from contamination

TOTAL

10/14/70

THE UNIVERSITY MUSEUM



UNIVERSITY OF PENNSYLVANIA

THIRTY-THIRD AND SPRUCE STREETS
PHILADELPHIA, PA. 19104

CABLE ADDRESS "ANTIQUE"
TELEPHONE: EVERGREEN 6-7400
(AREA CODE 215)

March 17, 1971

BRH
Dear Miss ~~Ralph~~:

At the Board meeting on March 16, \$3,000.
was approved for the Applied Science Center
for Archaeology Information Center.

Sincerely,

David Crownover
David Crownover
Executive Secretary

Miss Elizabeth K. Ralph
Applied Science Center for
Archaeology
The University Museum

(Prepared for Dr. Rainey)

[8/25/1971]

Request for Funds for Radiocarbon Laboratory

Due to lack of government funds, the National Science Foundation asked us in May to extend our "old" grant (GA 12,572 for the Dating of Bristlecone Pine Samples of Known Age) from its expiration date in June to September. At that time the NSF "promised" (by telephone) that it would renew the grant for the same amount -- namely, \$57,000 for 2 years. Now, in August, the NSF has reduced this budget (copy attached) to \$46,100, and we expect to receive this amount by the end of September. However, with this drastic 20% reduction, we are facing a deficit before the new grant begins.

Under ordinary circumstances, to operate two CO₂ proportional counters we need \$4,000 for each for Supplies (glassware, chemicals, liquid nitrogen, dry ice, etc.) and Services (machine shop, glassblower, etc.). The University (\$900) and the University Museum (\$3100) support Counter I for the dating of archaeological samples and the University pays the salaries (\$29,850) for E. Ralph, B. Lawn, and J. Hedrick (student assistant). In previous years, the NSF grants have been sufficient to support Counter II and some additional salaries.

In the new NSF grant proposal, in order to keep our request within the previous \$57,000 budget, we deleted J. Winter's position and added a much-needed Research Assistant -- at a much lower salary. (The amount for H. Michael for the first year was increased from the usual four summer months to seven because of his taking a sabbatical leave from Temple University during the fall term.) In anticipation of the new NSF grant, we hired the graduate student (R. Costa) in June and are now committed to paying his salary for, at least, the first year.

Because of these salary commitments and the increases in Benefits and Overhead rates and the cut-back to \$46,100, we are left with only \$1600 for Supplies and Services in the first year and \$1650 in the second.

To make matters worse, because of having had to extend the old grant from June to September, we shall be starting the new one with a deficit of \$1500 which wipes out the \$1600 left for Supplies and Services in the first year.

With very frugal spending of our Radiocarbon budget, this situation might not be hopeless, but there is another problem. In the 1970-71 fiscal year, the University appropriated us \$3000 for the purchase of new equipment and the Department of Geology transferred to us an additional \$2000 in equipment funds. With the \$5000, we purchased a Liquid Scintillation Spectrometer. (The reasons for this and an estimated budget as of December 1970 are explained in the attached letter to Dr. Alvin Van Valkenburg). For the other items (about \$4500) we expected to use the new NSF grant funds. Therefore, we now have a beautiful new Scintillation Spectrometer, but without a minimum of \$4000, we cannot complete the conversion of the chemical train, etc., for the making of benzene.

The gist of this long tale is that we need \$4000 for this academic year. We have already spent \$1500 of this for machine shop time to build the Lithium-Carbon Dioxide reaction chamber.

Elizabeth K. Ralph
August 25, 1971

Table IV, MASCA BUDGET AT PRESENT

Revised 10/19/71

PROJECTS	SUPPORT FOR FISCAL YEAR 1971 - 72	FUNDS EXPECTED TO BE AVAILABLE FOR NEXT FISCAL YEAR 1972 - 73
A. RADIOCARBON LABORATORY University of Pennsylvania (Physics-Museum-Radiocarbon Budget) University Museum NSF Grant, GA-12572, E. Ralph, Principal Investigator Foundation for Studies of Modern Science	\$32,850 7,100 23,050 3,620	\$33,000 3,100 23,050
B. THERMOLUMINESCENCE Continuation of NSF Grant, GS-2716, F. Rainey, Principal Investigator	34,000	
C. INFORMATION CENTER Harrison Fund	3,000	
D. ARCHAEOLOGICAL PROSPECTING INSTRUMENTS AND SURVEYS Italian Expedition Fund and Others	5,000	
E. AERIAL PHOTOGRAPHY - NATIONAL PARK SERVICE	1,500	
TOTAL	<u>\$110,120</u>	<u>\$59,150</u>

TABLE I

Summary of MASCA Instrument Surveys

Site	Buried Features Sought	Magnetometers	Resistivity Instruments	Supplementary Instruments
<u>THE NEW WORLD</u> <u>U. S. A.</u>				
Independence Square Philadelphia, Pa.	house foundations	excessive magnetic disturbances due to city location	good detection	
Rifle Works, Harpers Ferry, W. Virginia	structure of Rifle Works	excessive disturbances from modern iron	located turbine pit	seismograph provided some indication of turbine pit
Isle Royal, Lake Superior, Michigan	copper ore deposits	not suitable	not suitable	some hot spots were found with metal detectors
Fort Loudon, near Chambersburg, Pa.	trenches and embankments of fort	indications of location of trenches and embankments	not suitable	
Caleb Pusey House, Chester, Pa.	house and other building foundations	excessive magnetic disturbances due to location near town	excellent detection of eastern extension of house - later confirmed by excavation	
Hagley Mills, Wilmington, Del.	structures of powder works	located large conduit and many large iron fragments	some indication of location of conduit	metal detector confirmed presence of many large iron fragments and metal pipes

Site	Buried Features Sought	Magnetometers	Resistivity Instruments	Supplementary Instruments
Eleutherian Mills, near Wilmington, Del.	features of the garden of former residence of E. I. duPont	pieces of modern iron caused confusion	good detection of well, drain, and other features	
Hope Lodge, Whitemarsh, Pa.	foundations of mansion and out-buildings	not tested	good detection of foundations	
Snaketown, near Chandler, Arizona	features from period of A.D. 1 to 1400	excellent detection of large firepits - confirmed by excavation	not suitable	
Salvage site, near San Xavier, Arizona	small features representative of Indian occupation	test site for new cesium magnetometer; site was not especially suitable for magnetometers	not suitable	
Buttes Dam Site, no. of Tucson, Arizona	Indian occupation site	presence of magnetic volcanic rocks negated usefulness of magnetometer	not suitable	
Camden, South Carolina	wooden structures of Revolutionary Fort Camden	remains of structures sought did not offer magnetic contrast; located unsuspected gas pipeline	sandy soil and hence poor coupling to ground provided false anomalies	standard aerial photograph showed small variations in vegetation which may correlate with structures sought
✓ Harvard Forest, Petersham, Mass.	collaboration with soil scientists to find out if different types of soil in this region differed in magnetism	magnetic bedrock at variable depths negated usefulness of magnetometer	not suitable	

Site	Buried Features Sought	Magnetometers	Resistivity Instruments	Supplementary Instruments
✓ St. Croix Island, near Calais, Maine	former structures of early French settlement, A.D. 1604	detected a number of anomalies, probably representative of structures and graves	numerous ant hills and looseness of the soil due to the activity of ants or other causes, such as excess sand, caused false anomalies.	
<u>CANADA</u>				
✓ Fort Louisbourg, Nova Scotia	graves and tunnels under embankments	excellent detection of graves; vague indications of tunnels	grave detection confused by proximity of bedrock; some indication of tunnel locations	seismograph confirmed that bedrock was only 4 ft. deep; many iron objects detected with metal detector
Fort Lennox, Ile-aux-Noix, Quebec	many structures and graves	good indication of region of structures, but not so precise as resistivity; good detection of graves	excellent pinpointing of structures-confirmed by excavation	metal detector located various metal objects at shallow depths; seismograph gave vague indication of bedrock
Campbellton, New Brunswick	Sunken ships	trial survey made on ice; good anomalies over known locations of two ships; to be continued this winter over unknown ships	not suitable	

Site	Buried Features Sought	Magnetometers	Resistivity Instruments	Supplementary Instruments
<u>CENTRAL AMERICA</u>				
✓ Tikal, Guatemala	buried structure in N. Acropolis, W. Plaza, and Temple I	unable to tune proton magnetometer for magnetic field in this region	anomalies confused by structures too complex; could not distinguish structures from pits	
San Lorenzo, Veracruz, Mexico	Olmec monuments 1200-900 B.C.	excellent detection of monuments due to the fact that they were made of magnetic basaltic rock	not needed	
<u>THE OLD WORLD</u> <u>IRELAND</u>				
Novan Fort, near Armagh, N. Ireland	mound site	indecisive results	not suitable	
✓ Dun Ailinne, near Kilcullen, County, Kildare.	traditional royal site; possible seat of the "High Kings"	detected large anomaly representative of center of Iron Age occupation	anomalies confused by proximity of bedrock and boulders	
<u>TURKEY</u>				
Gordion	location of tombs under tumuli; structures on city mound; Persian road	variable magnetic earth caused anomalies much larger than ones anticipated from archaeological features	located Persian road where it existed; and structures on city mound to depth of 2-3 meters	

Site	Buried Features Sought	Magnetometers	Resistivity Instruments	Supplementary Instruments
<u>ITALY</u>				
Sybaris	the 7th - 6th century B.C. city	See Rainey, F. and Lerici, C. <u>The Search for Sybaris</u> , 1967		
Tarquinia and Cervetri	Etruscan tombs	reasonably good detection of tombs	approximately 50% detection of tombs, but very slow	seismograph not useful
Artena	city walls and structures	magnetic earth negated usefulness of magnetometer	good detection of foundation walls of structures	
Foce del Sele, near Paestum	6th century, B.C. Greek sanctuary	no archaeological features were detected although most of the zone of interest was surveyed	not suitable on alluvial plain	
Metapontum	6th century, B.C. and later Greek city	excellent detection of walls and structures	not suitable	magnetometer anomalies helped to confirm and to clarify anomalies detected in aerial photographs
✓ Gravina	structures from many periods	many anomalies, but correspondence was confused because of presence of structures almost everywhere	not tested	

site	Buried Features Sought	Magnetometers	Resistivity Instruments	Supplementary Instruments
Veii	city site	erroneous anomalies, due to magnetic earth	ground was too dry in summer	
Siris	6th century B.C. Greek city	no true anomalies found; confirmed by drilling	not suitable	anomalies seen in infrared aerial photographs proved to be erroneous
<u>GREECE</u>				
✓ Helice	7th - 6th century B.C. city	whole area covered with modern iron	not suitable	
Porto Cheli	4th century B.C. harbor walls	structures not detected due to lack of contrast in magnetism	ground was too dry in August; should be tried in wetter season	
✓ Thera	Bronze Age structures	presence of magnetic volcanic gravel negated usefulness of magnetometer	not suitable due to loose pumice and great depth of structures	seismograph provided some indication of depth of bedrock and, hence, thickness of pumice layer
✓ Elis	5th and 4th century B.C. city	excellent detection of walls which will enable reconstruction of part of the city plan	not suitable	

Beth - here is a little budgetry upon which you can meditate, cogitate, vacillate etc, etc.

\$ 2.75 / hr \$ 55.00 / week } my present pay

April	5 wks	275	} I can work fewer hrs. or quit earlier if. new person is on the scene
May	2 wks	<u>110</u>	
		\$ 385	

\$ 2000 - \$ 385 = \$ 1615 left for next person

55 $\overline{)1615}$ 29

45 $\overline{)1615}$ 35

we can afford 29-30 twenty hour weeks paying 2.75/hr. This would carry you to late Nov. (from mid-May)

or

35-36 twenty hour weeks paying 2.25/hr i.e. early Jan.

Is that \$3000 supposed to support the Info Center 'till March '72 or Dec '71 ??

[when]

527-2573

Beth

11/18/71

Memo from E Ralph to G. Albany

Raises for Personnel on NSF
that were due Sept. 1, 1971

Mark Han # #
Raise from 10,000 to 11,000 per year
= 83.33 per month increase.

For Sept., Oct., Nov., $83.33 \times 3 = \$250$
 $\$250/9 = \27.78 per month for
12/71 thru 8/72.

$\$27.78 + 83.33 = \111 per month
 $\$11,000/12 = 916.67$ per month
Add $\$27.78 = \944.45 total per month.

OR, if this is too complicated, raise
him now to 2nd yr. figure
of $\$12,000$ per year
= $\$1000$ per month.

Doug Hancock + Bruce Egan

Salaries to be increased from $\$3600$ to $\$4250$
(300 to 345.83 per month)

∴ raise them in Dec. + give them
 ~~$\$162/9 = \18 per month for back pay
for Sept., Oct., + Nov. 1971~~

∴ total monthly rate should be $\$372$
until Sept. 1972.

$3 \times 45.83 = \$137.49$ in back pay
for Sept., Oct., Nov.

MASCA

File

January 1 - June 30, 1975

ESSENTIAL SALARIES FOR NEXT 6 MONTHS

<u>Name</u>	<u>Yearly Salary</u>	<u>Employee Benefits</u>	<u>Total</u>	<u>For 6 Months</u>
Mark Han	13,300	1130	14,430	7215
<u>Students</u>				
Bruce Bevan	4,800	744	5,544	2772
John Carpenter	4,800	744	5,544	2772
<u>Information Center and Newsletter</u>				
Kathleen Ryan	8,375	662	9,037	4518
Gail Weinstein	4,000	316	4,316	2158
Total salaries for 6 months				\$19,435

ESSENTIAL SUPPLIES

(nitrogen, films, etc. air-conditioner maintenance, limited domestic travel and flights for aerial photography)	1,000
Subscriptions to Periodicals, ASCA Service, Books	600
Publication 2 MASCA Newsletters	<u>2,000</u>
sub-total	<u>\$3,600</u>

BAD DEBTS AND PROBLEMS

Excess cost of cesium magnetometers promised to Consulting Engineers	8,000
Excess cost (above \$20,000 to be raised by Bob Maddin) of X-ray Fluorescent Equipment. This includes	7,250
\$4,000 for a computer terminal	
\$2,000 for an X-ray generator (second hand from Physics)	
\$500 for sources	
\$750 for liquid nitrogen for a half-year	

(In the opinion of EKR, this last item could be postponed) sub-total \$15,250

TOTAL \$38,285

NSF-GS-36308X-1

1974

<u>Name</u>	<u>Salary</u>	<u>Employee Benefits</u>	<u>Overhead (37% of salaries)</u>	<u>Total</u>	<u>Per Month</u>
Mark Han	13,300	1130	4921	19,352	1613
<u>Students</u>					
Bruce Bevan	4,800	744	1776	7,320	610
John Carpenter	4,800	744	1776	7,320	610
Julia Handy	4,800	744	1776	7,320	610
Michael Rosenberg	4,800	744	1776	7,320	610
<u>Information Center</u>					
Kathleen Ryan	8,375	662	3099	12,135	1011
Gail Weinstein	4,000	316	1480	5,796	483
Total per month					\$5,547
(November and December 1974)					\$11,094

rec'd 1/14/77

UNIVERSITY INTRAMURAL CORRESPONDENCE

OFFICE OF RESEARCH ADMINISTRATION

MEMO FOR: Deans, Department Chairmen, Principal Investigators and Business Administrators
FROM: Anthony Merritt
DATE: December 10, 1976
SUBJECT: Forecast Rates for the Preparation of Grant Applications and Contract Proposals

This memorandum supersedes ORA memo of February 20, 1976.

Employee Benefits

The following forecast for employee benefits are provided for your use in preparing applications and proposals for grants and contracts (the rates for FY 1977 and 1978 are fixed rates while the rates for Fy 1979 and 1980 are estimated)

Table with 4 columns: Fiscal Year, A-1, A-2, A-3&4. Rows for 1977, 1978, 1979, 1980.

Indirect Costs

The indirect cost rate for the fiscal year ending June 30, 1978 will be 51% of modified total direct cost. This rate has been approved by DHEW. Use the following forecast indirect cost rates until amended:

Table with 2 columns: Fiscal Year, Indirect Cost Rate. Rows for 1979 (51.0%) and 1980 (49.0%).

Personnel Costs

When the term of the proposed grant or contract exceeds one year, increase the salary factor by 6% for each succeeding year.

NOTE: The above rates will be revised from time to time as cost experience data becomes available. If the proposed performance period extends beyond June 30, 1980, contact ORA for rates applicable to such extended period.

004
RAINEY, FROELICH
241 MUSEUM F1

THE UNIVERSITY MUSEUM



UNIVERSITY OF PENNSYLVANIA

THIRTY-THIRD AND SPRUCE STREETS
PHILADELPHIA, PA. 19174

CABLE ADDRESS "ANTICUP"
TELEPHONE: EVERGREEN 6-7400
(AREA CODE 215)

December 11, 1976

Dear Murray:

At this stage in the operations of MASCA during the 1976-1977 period we have been reviewing the budget and now believe it is desirable to transfer funds from certain categories to the salaries category in order to meet salary payments until March 1977. Attached is the list of monies to be transferred from one category to the other. As the grant specifies, we are to get the authorization of the National Science Foundation to get such transfers. I hope you will let me know as soon as possible if you agree.

All best wishes,

710

Froelich Rainey
Director - MASCA

Dr. Murray Aborn
Program Director for
Special Projects
National Science Foundation
1800 G Street
Washington, D.C. 20550

MASCA ACCOUNTS - January 13th 1977

Permission has been granted from NSF to transfer funds from 'current expense' (including equipment funds) to salaries. (See details on attached sheet B). Some funds have been left in 'current expense' to cover running costs until end of February (see attached sheet C)

Projected salary deficit up to end of February 1977 (see Sheet A attached)	- \$7362.00
Funds to be transferred from 'current expense' on NSF SOC 75-04203 Grant (sheet B)	\$6121.00
Funds available in SDUS account (6-29390) (retrieval of 7% of overhead on NSF Grant)	\$1064.00
Funds available in MASCA General a/c (6-28033)	<u>203.00</u>
TOTAL AVAILABLE	+ \$7388.00

Overhead in the amount \$50,146 comprising 44.5% of everything except equipment has been charged on NSF SOC 75-04203. However, 7.5% of this overhead charge has been refunded (\$8,100 - the difference between the old overhead charge of 37% and the new charge of 44.5%). See attached letter from the Office of Research Administration.

Kathleen Ryan

c.c. E.K. Ralph
G. Swift
W. Stephens
F. Rainey

end of	A 1			A 2			A 3		
	Salary	Employee Benefits	Balance available	Salary	Employee Benefits	Balance available	Salary	Employee Benefits	Balance available
October			+2760.00			+4268.00			+2522.00
November	1339.00	208.00	+1214.00	996.00	210	+3062.00	1367.00	273.00	+882.00
December	1339.00	208.00	-333.00	876.00	185.00	+2001.00	1709.00	342.00	-1169.00
Projected January	1339.00	208.00	-1880.00	438.00	100.00	+1463.00	1709.00	342.00	-3220.00
Projected February	1339.00	208.00	-3427.00	435.00	100.00	+925.00	1367.00	273.00	-4860.00
			-3427.00			+925.00			-4860.00
SDUS			+1064.00						
MASCA Gen.			203.00						
			1267.00						
						Projected Deficit = \$7362.00			
						less	1267.00		
							<u>6095.00</u>		

	Bal. available	Amount to be transferred	
DOMESTIC TRAVEL	1,883	1,883	
FOREIGN TRAVEL	136	136	
RESEARCH SUPPLIES	1,045	900	
EQUIPMENT RENTAL	808	808	
AIRCRAFT RENTAL	688	688	
		<u>688</u>	\$ 4415.00
EQUIPMENT	3,073		
Less 44.5% overhead	<u>-1,367</u>	1,706	
		1,706	
		TOTAL	\$ 6121.00

FUNDS REMAINING IN CURRENT EXPENSE for Dec. '76 thru Feb. 28 1977

210	Office Supplies	- 35
211	U of P Printing	+ 526 (for December Newsletter)
213	Research Supplies	+ 145
230	Outside Printing	- 388
235	Special services	+ 853
288	Books	+ 241
289	Dues and subscriptions	- 189
290	Miscellaneous	- 224
310	Shop Services	+ 250

213	Reg.	<u>26.00</u>	211		<u>288</u>
		55.00	Newsletter		28.00 Science
60.00	915		\$496.75		
9.50	914				
23.62					
10.50					
9.00	trans. photos				
26.90					
<u>139.52</u>					

June 6, 1977

Attn Business Office:

Please transfer ¹⁹⁵⁰ # ~~1200~~ from Physics -
Radiocarbon General Fund Acct. 8-75422 to
MASCA General Fund Acct. 6-28033,
University Museum.

It is to be used to pay salaries
in MASCA.

Salaries for June were paid
from a/c 6-28033 - not
from NSF a/c

Elizabeth K. Ralph

UNIVERSITY of PENNSYLVANIA

JOURNAL ENTRY

MASCA General
DO NOT KEY PUNCI.

ENTER THE FOLLOWING DATA, FROM YOUR MONTHLY TRANSACTION REPORT, FOR EACH LINE WHICH IS CORRECTING A PREVIOUS POSTING.

SECTION A						SECTION B				
ITEM	DEBIT ACCOUNT NUMBER	DESCRIPTION	AMOUNT	P / F	ADDITIONAL NUMERIC REFERENCE	CREDIT ACCOUNT NUMBER	ACCOUNT NUMBER	TRANSACTION IDENTIFICATION		AMOUNT
								NUMBER	DATE	
	9:22		41:42	51:52	53	58:59	67			
1	6-28197-290	Contribution	3,800.00		2287	<u>628033-0911</u>				
2		To make Contribution								
3		from Fellows Fund,								
4		for work of applied								
5		Science Center								
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										

Documents on File
For May Sales

SUMMARY CHECKED
 JUN 30 1977

PREPARED BY
 NAME SIGN: Gloria Swift
 NAME TYPE OR PRINT: Gloria Swift
 ADDRESS: MUSEUM F1
 EXTENSION: 224-200 DATE: 6/22/77

APPROVED _____
 POSTED _____

COMPTROLLER'S DEPARTMENT USE ONLY

ENTRY REFERENCE NUMBER			DATE	
10	11	12	17	18
				21

pending by Journal
May 8 Sals.
+ E.B.

161.07
180.78
\$ 68.37

May Salaries

Sals. May Summary

Han	1338.92
E.B.	207.53
Bevan	437.50
E.B.	92.31
Weinstein	322.14
Ryan	361.56
E.B.	136.72

Bal. Sals May wein. + Ryan 5/29

	161.07
	180.78
E.B.	68.37

+ 2 days 5/30+31	64.00
E.B.	13.00
	<u>\$ 3794.00</u>

Total for Fellows
Rounded out to
\$ 3800

for May
Salaries were
paid from
a/c 6-28033 -
not from NSF a/c

June Salaries MASCA

From Physics	\$ 1950
Deposit	500
	<hr/>
	2450

Spending June

~~May~~

Han	1338.92
EB	207.53

<u>Weinstein</u>	96.63
------------------	-------

3 days June
begin

weeks endg	
6/12	483.21
19	
26	

4 days end June	128.84
--------------------	--------

EB	<hr/> 141.74
----	--------------

2396.87 -

Bal \$ 53

Budget Proposal - First Year March 1, 1977 - February 28, 1978

2nd Year

1

1. Salaries & Wages

March 1, 1978 - February 28, 1979

a. Mark C. Han, Research Chemist (A-1) \$17,030
 Full-time - 12 months
 FTE - 12 months

\$ 18,050

b. Bruce Bevan, Research Specialist (A-1) 13,000
 Full-time - 12 months
 FTE - 12 months

13,780

c. Two Research Fellows (A-2) 11,130

11,800

1) James Watson
 2) To be selected
 3 summer months - full-time
 Academic year - 1/2 time
 FTE - 8 man-months each

d. Kathleen Ryan, Research Bibliographer (A-3) 9,965
 Full-time - 12 months
 FTE - 12 months

10,560

e. Gail Weinstein, Administrative Assistant (A-3) 8,878
 Full-time - 12 months
 FTE - 12 months

9,410

Total Salaries = 60,003

\$ 63,600

2. Employee Benefits

A-1 - 30,030 x 18.0% = 5,405

\$ 31,830 x 18.0% = 5729

A-2 11,130 x 24.3% = 2,705

11,800 x 24.3% = 2867

A-3 18,843 x 23.0% = 4,334

19,970 x 23.0% = 4593

Total Employee Benefits = 12,444

\$ 13,189

3. Expendable Equipment and Supplies

a. For Thermoluminescence		\$ 1200
Nitrogen and other chemical supplies	\$ 1000	
Expendable electronic components, including replacement photomultiplier tubes	1500	1000
b. For Archaeological Prospecting		
Spare parts, tools, cables, and replacement batteries	1500	500
c. For Aerial Photography		
Kites, filters, balloons, films, etc.	1000	500
d. Information Center		
Book purchases	750	1000
Journal subscriptions	700	800
Supplies and Duplicating	600	400
Publication of MASCA Newsletter 2 volumes per year.	3000	3000
Total Expendable Equipment and Supplies	\$ 10,050	\$ 8400

4. Services

Machine shop, for assembly of experimental TL components	1000	400
Rental of experimental prospecting instruments for field trials	2000	2000
Aircraft rental (for aerial photography)	500	500
Film processing	500	300
Total Services	\$ 4000	\$ 3200

5. Travel

For mud-brick preservation, archaeological prospecting, aerial surveys, and collection of samples for ¹⁴ C and TL dating		
Domestic	2000	2000
Foreign	4000	3000
Total Travel	6000	\$ 5000

6. Sub-Total for Calculation of Overhead

\$92,497

\$ 2nd Yr.
93,399

7. Overhead at 51%

47,173

47,628

8. Sub-Total Plus Overhead

139,670

141,017

9. Equipment

a. Thermo Gravimetric Analysis (TGA) Accessory
for DuPont 990 Thermal Analysis System

8,000

Prototype of Inexpensive Prospecting
Instrument

(The DuPont 990 temperature programmer, controller,
and recorder are currently available in
LRSM (Laboratory for Research on the Structure
of Matter, University of Pennsylvania)

9,000

b. X-ray Generator - used dental apparatus
or equivalent - to produce
1000 rads in 10 seconds, for the
precise irradiation of pottery

2,330

TOTAL - FIRST YEAR

150,000

150,017

Total - 2 Yrs = 300,017

7/27/78

Mrs. Swift

Dear Gloria,

The Radiocarbon Laboratory is in need of the annual \$3100 from the University Museum. This amount is required for Materials & Supplies ~~for~~ in dating samples submitted by the staff of the University Museum.

I shall appreciate it if you can arrange for the transfer of \$3100 to Physics - Radiocarbon, Account No. 2-11039

With best regards,

EKR

Radiocarbon

	Sal.	Em. Ben.	
EKR	19,100	3916	→ 23,016
B.L.	12,000	1464	13,464
R.C.	4800	984	<u>5,784</u>
		Sals.	42,264

Equip.	3000
Supplies	<u>6100</u>

Total Radiocarbon 51,364

Avg. 200 unk samples/yr \$257 per sample