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FY 73 to Congress

SMITHSONIAN INSTITUTION  
MUSEUM PROGRAMS AND RELATED RESEARCH  
(SPECIAL FOREIGN CURRENCY PROGRAM)

LIST OF PROJECTS

Submitted as a supplement to the  
fiscal year 1973 budget.

January 1972



MUSEUM PROGRAMS AND RELATED RESEARCH  
(SPECIAL FOREIGN CURRENCY PROGRAM)

LIST OF PROJECTS

This list of illustrative projects submitted in support of the appropriation request for FY 1973 is based upon 1) the on-going research projects of American institutions already being supported by the Smithsonian in countries where the United States has accumulated local currencies in "excess" to its needs; and 2) upon similar pending research projects being developed which have either been approved in principle or are in the process of review both by the Smithsonian and by the government of the appropriate "excess-currency" country; 3) new research projects which represent the Institution's selection of those illustrative projects which appear most promising for development and possible funding during FY 1973; these "new" projects listed are based on firm indications of interest from American institutions interested in research abroad.

Actual funding of all new projects, and of those pending projects not yet finally approved, remains contingent upon: a) favorable competitive review on the basis of scientific merit by scientists most competent to judge the worth of each proposal (regularly constituted scientific Advisory Councils assist the Smithsonian in making this competitive review of proposals); b) review and approval of each project as not contrary to the United States national interest by the Department of State and American embassies abroad; c) review and approval of each project by the appropriate agency of the host country; d) where required, conclusion of a satisfactory agreement between the American grantee of the Smithsonian and an appropriate collaborating institution in the host country.

In the same fashion, on-going projects are subject to continuing competitive review, if funding is to be continued.

This means that Smithsonian Foreign Currency funds are committed both by discipline and by country in accordance with the best scientific judgment as to the competitive merit of each project. The following "List of Projects" represents the Institution's best judgment as to how funds, available and requested, will be committed. However, some of the projects listed could be eliminated by an unfavorable scientific review; a finding that the project was not in the U. S. interest; a failure of the host country to approve the project; or, in the case of joint projects, a failure of the American and host country collaborators to agree on the conduct of the project.

On the other hand, projects not anticipated in this illustrative list but submitted to the Smithsonian Foreign Currency Program by American institutions of higher learning could prove to have greater



acceptance, both here and abroad, and hence be funded ahead of or in place of some of the projects listed here.

As explained in the Special Foreign Currency Program portion of the Institution's Budget Justifications for FY 1973, Israel is to be removed from the Treasury Department's list of "excess currency" countries at the end of FY 1972. Hence, no further appropriations are requested for the projects listed herein under Israel; but it is necessary to enumerate these projects in order to give an accurate picture of the total activities of the Institution's Special Foreign Currency Program.



MUSEUM PROGRAMS AND RELATED RESEARCH  
(SPECIAL FOREIGN CURRENCY PROGRAM)

- SUMMARY OF PROGRAM  
COMMITMENTS BY COUNTRY

Country	FY-1971 Actual	FY-1972 Estimate	FY-1973 Estimate
Burma .....	\$ 1,000	\$ 2,000	\$ 5,000
Egypt .....	388,253	420,000	780,000
Guinea .....	--	--	10,000
India .....	885,340	1,085,000	2,278,000
Israel .....	856,736	665,000	--
Morocco .....	100,521	105,000	180,000
Pakistan .....	88,861	103,000	232,000
Poland .....	76,859	140,000	425,000
Tunisia .....	114,615	385,000	960,000
Yugoslavia .....	348,253	595,000	1,130,000
	<u>\$2,860,438</u>	<u>\$3,500,000</u>	<u>\$6,000,000</u>

SUMMARY OF PROGRAM  
COMMITMENTS BY DISCIPLINE

	FY-1971 Actual	FY-1972 Estimate	FY-1973 Estimate
Archeology and Related Disciplines	\$1,702,593	\$1,823,575	\$2,220,807
Systematic and Environmental Biology .....	927,597	1,399,940	2,993,090
Astrophysics and Earth Sciences ...	216,574	192,485	497,103
Museum Programs .	3,554	60,000	265,000
Grant Administration	10,120	24,000	24,000
	<u>\$2,860,438</u>	<u>\$3,500,000</u>	<u>\$6,000,000</u>





MUSEUM PROGRAMS AND RELATED RESEARCH  
(SPECIAL FOREIGN CURRENCY PROGRAM)

Fiscal Year 1973

LIST OF PROJECTS

A. ARCHEOLOGY AND RELATED DISCIPLINES

1. BURMA

a. On-Going and Pending Archeology Projects in Burma

<u>1. Institution</u>	<u>Title of Project</u>
University of Hawaii, Honolulu, Hawaii	"The Late Pleistocene and Early Holocene Prehistoric Culture of the Dry Zone of the Irrawaddy River Valley, Burma. "

This developmental work for a study of the material culture of the peoples who inhabited what is today Burma in the middle and new "stone age" is proposed by the same American scholar who has recently demonstrated that Southeast Asia may be a "cradle of civilization" to vie with Mesopotamia. The project is particularly important in that it would constitute a "first" in cooperation between an American university and the Ministry of Union Culture in Rangoon.

<u>U. S. Dollar Equivalent in Burmese Kyats</u>	FY 1973 est.    5,000
	FY 1972 est.    2,000
	FY 1971            1,000

II. EGYPT

a. On-Going and Pending Archeology Projects in Egypt

<u>2. Institution</u>	<u>Title of Project</u>
American Research Center in Egypt Princeton, New Jersey	"Research Activities of the American Research Center in Egypt (ARCE). "

The Center, a consortium of 15 U. S. universities and museums, serves as an indispensable liaison with the Government of Egypt for all American scholars attempting to work in the country. The research projects of practically all the Americans working in Egypt are carried out, directly or indirectly, under its auspices. In the absence of official diplomatic relations between Egypt and the United States the Center continues to maintain an American cultural presence in the country which is much appreciated especially by those Egyptians who still look to America and the West. ARCE projects active in FY-71 include excavations at the



pharaonic site at Memphis and the Islamic site at Fustat, the continuing work of the University of Chicago's Epigraphic Survey at Luxor, studies of the Temple of Osiris and of Old Kingdom mummies. In addition, excavations at near the Saqqara "step pyramid" and the great pyramid of Cheops near Giza are projected for Fiscal Years 1972 and 1973.

<u>U. S. Dollar Equivalent in Egyptian Pounds</u>	FY 1973 est.	200,000
	FY 1972 est.	116,257
	FY 1971	189,214
	FY 1970	25,955
	FY 1969	109,415
	FY 1968	202,071
	FY 1967	176,777
	FY 1966	259,200

3. <u>Institution</u>	<u>Title of Project</u>
University Museum University of Pennsylvania Philadelphia, Pennsylvania	"The Akhnaten Temple Project."

This project has been written up in Life, the National Geographic Magazine and other magazines and newspapers. It involves the reconstruction by computer methods of the facade of a temple which was destroyed in antiquity and of which only the scattered stones remained. By coding information on individual stones computer technology allowed photographs of the stones to be rematched so that the appearance of this famous temple is visible to human eyes for the first time since antiquity. A complete book about this project will soon be published. Remaining costs are for phase-out of the project and preparation of the publication.

<u>U. S. Dollar Equivalent in Egyptian Pounds</u>	FY 1973	--
	FY 1972 est.	50,000
	FY 1971	66,150
	FY 1970	67,000
	FY 1969	60,000
	FY 1968	9,730
	FY 1967	65,070

4. <u>Institution</u>	<u>Title of Project</u>
University Museum University of Pennsylvania Philadelphia, Pennsylvania	"The Dra Abu El Naga Project"

The study of tomb at Dra Abu El Naga inscriptions was begun over fifty years ago by American scholars working in Egypt, but was unable to be carried to completion. The intention of the University Museum is to complete the work and publish the results at long last. When it is completed, the tombs will probably be opened to tourists and other interested viewers.



<u>U. S. Dollar Equivalent in Egyptian Pounds</u>	FY 1973 est.	25,000
	FY 1972 est.	25,000
	FY 1971	26,475
	FY 1970	17,000
	FY 1969	17,300
	FY 1968	9,750

5. <u>Institution</u>	<u>Title of Project</u>
Smithsonian Astrophysical Observatory Cambridge, Massachusetts	"The Stellar Alignment of the Egyptian Temples at Karnak"

The same astronomer who demonstrated that the massive megaliths at Stonehenge in England were erected by a prehistoric people who nevertheless demonstrated a considerable and surprising knowledge of astronomy believes that the ancient Egyptians too lined up the temples they built with the sun and the stars. This view has often been put forward as a theory, but nobody has ever adequately tested it, primarily because astronomers have little knowledge of archeology and archeologists have little knowledge of astronomy. In this project an astronomer proposes to team up with an Egyptologist and try to answer the question of the heavenly orientation of the massive Egyptian temples at Karnak once and for all.

<u>U.S. Dollar Equivalent in Egyptian Pounds</u>	FY 1973 est.	5,000
	FY 1972 est.	3,000
	FY 1971	1,000

6. <u>Institution</u>	<u>Title of Project</u>
American University in Cairo Cairo, Egypt and New York, N. Y.	"Four Old Kingdom Mastabas in the Great Western Cemetary of the Giza Necropolis."

This project will bring to completion a project begun by an American expedition nearly fifty years ago but never completed. It will bring recent, interdisciplinary methods to the comprehensive study of the tombs of some three generations of the same family in Old Kingdom Egypt, thus throwing definitive light upon the important question of the life and culture of the people in this most fascinating period of ancient history. The project will be a cooperative effort with Egyptian scholars and will constitute an important training ground for a new generation of American Egyptologists.

<u>U.S. Dollar Equivalent in Egyptian Pounds</u>	FY 1973 est.	45,000
	FY 1972 est.	45,000

7. <u>Institution</u>	<u>Title of Project</u>
University Museum University of Pennsylvania	"Excavation within the Town and Harbor Site of Malkata, Western Thebes."

This project proposes excavation of selected areas within the palace town of King Amenhotep III (1417-1379 B. C.), and will concentrate upon the harbor of the town, showing in detail how the civilization of ancient Egypt



depended upon the Nile to hold itself together. The important period involved is the New Kingdom period in ancient Egyptian history (ca. 1570-730 B. C.).

<u>U. S. Dollar Equivalent in Egyptian Pounds</u>	FY 1973 est.	30,000
	FY 1972	26,893
	FY 1971	28,094

8. <u>Institution</u>	<u>Title of Project</u>
University of Michigan Ann Arbor, Michigan	"Art and Technology of Graeco-Roman Lamps in Ancient Egypt."

Although the people of Egypt are related to the Semitic peoples who live around them the country was for centuries a center of Greek culture and was famous as the "granary" of the Roman Empire. One of the aims of this study is to fit this period of Egyptian history into the wider context of Graeco-Roman Mediterranean civilization in which American scholars have been pre-eminent for generations. A major gap in our knowledge of these times can be filled by this relatively modest study.

<u>U. S. Dollar Equivalent in Egyptian Pounds</u>	FY 1973 est.	2,000
	FY 1972 est.	2,000

9. <u>Institution</u>	<u>Title of Project</u>
Brooklyn Museum Brooklyn, New York	"Scale Models of Egyptian Monuments"

The construction of scale models in Egypt of major Egyptian temples is related to the programs of study and research in the Brooklyn museum. The models contemplated include the Pavilion of King Sesostris I at Karnak and the Giza Cemeteries adjoining the Pyramids near Cairo. These models will be available in Brooklyn for study by scholars and also for the public educational projects of the Brooklyn Museum.

<u>U. S. Dollar Equivalent in Egyptian Pounds</u>	FY 1971	8,756
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b. New Archeology Projects in Egypt

10. <u>Institution</u>	<u>Title of Project</u>
National Museum of Natural History, Smithsonian Institution, Washington, D. C.	"Infectious Diseases in Ancient Egyptian Populations."

Primarily through studies of mummies, but also through studies of human remains preserved in burial jars, this investigation is applying the techniques of physical anthropology and medicine to the study of the origin and spread of infectious diseases in antiquity. Disease germs too have undergone an "evolution," and this study will tell us a great deal about the problem of infectious disease and epidemiology today. The Principal Investigator is qualified both as an anthropologist and a doctor of medicine. (Continued).





<u>11. Institution</u>	<u>Title of Project</u>
University of Texas at Arlington, Arlington, Texas	"Predynastic Museum Research in Egypt."

This study is an exploratory study of materials existing in Egyptian museums which predate the founding of civilization in Egypt. Through this study the Principal Investigator hopes to identify the location of sites which can be excavated to throw light on how civilization developed in Egypt out of prehistoric beginnings now lost to our knowledge.

U. S. Dollar Equivalent in Egyptian Pounds                      FY 1973                      1,607

<u>12. Institution</u>	<u>Title of Project</u>
Center for the Study of Man Smithsonian Institution Washington, D. C.	"Conference on African Anthropology."

Through contacts between international scholars specializing in the study of the traditional and contemporary study of culture in rapidly changing and developing Africa, this conference aims to bring together in the form of publishable proceedings what has been learned to date in this field; and to chart the course of further scholarly study which will contribute to the solution of the problems of modernization in the African continent.

U. S. Dollar Equivalent in Egyptian Pounds                      FY 1973 est.    50,000

### III. INDIA

#### a. On-Going and Pending Archeology Projects in India

<u>13. Institution</u>	<u>Title of Project</u>
American Institute of Indian Studies, Philadelphia, Pennsylvania. (A consortium of 24 U. S. universities and colleges)	"Support for the Center for Art and Archeology."

Of all the civilizations of the world India's is the least known. The Center aims to document and photograph key parts of India's vast art treasures in an effort to determine even what is there. The results of this inventory are of great benefit and interest to the American scholars and institutions attempting to study the unique civilization of one of the most important countries in the world today. Hard dollar support to supplement the rupees being provided by the Smithsonian comes from the JDR III Fund.



U. S. Dollar Equivalent in Indian Rupees

FY 1973 est.	120,000
FY 1972 est.	100,000
FY 1971	121,012
FY 1970	150,000
FY 1969	139,230
FY 1968	144,500
FY 1967	130,750
FY 1966	76,850

14. Institution

Title of Project

American Institute of Indian Studies, Philadelphia, Pennsylvania. (A consortium of 24 U. S. universities and colleges)

"Support for the AIIS Center in Poona, India, and for Research Fellowships for American Scholars Working in India."

It would be virtually impossible for any American attempting to perform research in the social sciences and humanities in India to attempt to do so without the facilities provided by the Center--they would not be able to get housing, visas, transportation, permits to work, and so on, without the support of the Center. Since the Center enjoys the highest reputation with the Government of India, the increasing number of Americans who are turning their attention to the study of this vast subcontinent are the beneficiaries of the indispensable services rendered by the Center.

U. S. Dollar Equivalent in Indian Rupees

FY 1973 est.	250,000
FY 1972 est.	200,000
FY 1971	478,660
FY 1970	133,920
FY 1969	147,930

15. Institution

Title of Project

University of Michigan  
Ann Arbor, Michigan

"Photographic Documentation of Painting and Sculpture During India's Golden Age from the Fifth to Eighth Centuries, A. D. "

Although Indian art commands a higher and higher price on the commercial market today, almost nothing is really known in this country about the rich Indian tradition. The University of Michigan is taking the lead in locating, photographing, and studying important works of art; other American institutions will also have access to the material documented for study purposes.

U. S. Dollar Equivalent in Indian Rupees

FY 1973 est.	5,000
FY 1972 est.	5,000
FY 1971	3,500



16. Institution

Title of Project

University of Hawaii,  
Honolulu, Hawaii

"To Initiate Excavations in Northern India in Conjunction with the Archeological Survey of India. "

The nature of early man's culture in Northern India is almost completely unknown and represents a considerable gap in our knowledge, especially when compared to what we know about early man in surrounding areas of South Asia such as the Indus Valley, Ceylon, Thailand. The University of Hawaii has gained considerable experience in working in Asia through its well-known East-West Center, and would be able to apply techniques and compare materials based on its existing background in Asia and the Pacific.

U. S. Dollar Equivalent in Indian Rupees

FY 1973 est. 50,000  
FY 1971 2,500

17. Institution

Title of Project

Colgate University  
Hamilton, New York

"Raksha: Documentation on Film, Tape and through Anthropological Methods of India's Disappearing Traditional Performing Arts. "

As is true of so many facets of traditional cultures faced with rapid modernization, India's extremely rich tradition of song and dance, both of the "folk" variety and of a highly sophisticated professional type, is in danger of dying out. This project aims both to preserve and document performing art forms still exemplified by living performers and to the extent possible encourage the continuation of these forms. It has been only in the past few years that the music and dance of India have gained some popularity in America through Indian films and performances. At precisely the moment these Indian performing arts are gaining new audiences they are in danger of disappearing.

U. S. Dollar Equivalent in Indian Rupees

FY 1973 est. 135,000  
FY 1972 135,000

18. Institution

Title of Project

University of Michigan  
Ann Arbor, Michigan

"Genetic Effects of Inbreeding on Indian Children. "

Intermarriage within near degrees of consanguinity has long been known to have marked effects upon the genetic inheritance of the children of such unions. In many cases the children are born with genetic defects. This project thus represents a dimension of Anthropology which could have important implications for human health. The Principal Investigators conducted a classic genetic study at Hiroshima. The marriage habits of the particular subgroup they wish to study in India constitute almost an ideal control group for this study.



<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	34,200
	FY 1972	34,200

19. <u>Institution</u>	<u>Title of Project</u>
Vassar College, Poughkeepsie, New York, and American Museum of Natural History, New York, New York	"Compendium and Publication of All Indus Inscriptions in India."

This project aims to compile and publish all the inscriptions of from the ancient civilization of the Indus Valley. The script used by this civilization has never been deciphered. As was true with hieroglyphics, cuneiform, and other ancient writing systems, a compendium of existing inscriptions is necessary to enable scholars to proceed with the work of deciphering the script.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	33,000
	FY 1972	33,000

20. <u>Institution</u>	<u>Title of Project</u>
University of Nevada Reno, Nevada	"Excavation of the Prehistoric Site of Kausambi in Northern India."

As already noted (Item #14, above), Northern India represents an unknown territory on the map of human prehistory. The importance of filling the present gaps in our knowledge and of learning about the culture of early man in this area would be supplemented by the opportunity of applying in a new setting ecological methods and techniques developed by the University of Nevada Desert Research Institute in a comparable, but not identical, desert area in Nevada.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	82,500
	FY 1972 est.	82,500
	FY 1971	3,500

21. <u>Institution</u>	<u>Title of Project</u>
National Museum of Natural History, Smithsonian Institution, Washington, D. C.	"Ethnographic Research on Tibetan Artifacts."

This project represented a unique one-time opportunity to acquire Tibetan cultural artifacts brought by Tibetan refugees to India which will be used for ethnographic study at the Museum of Natural History as well as for public museum display. The acquisition of these artifacts is particularly important in view of the rapid disappearance of traditional Tibetan culture since the country was taken over by China.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1971	10,181
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b. New Archeology Projects in India

<u>22. Institution</u>	<u>Title of Project</u>
Association for Asian Studies Ann Arbor, Michigan	"Linguistic Research in India."

The modern science of linguistics in America has led the world in the variety and sophistication of its techniques. The study of man's culture through his language can nowhere be more fruitfully studied than through analysis of man's languages. Techniques which are commonplace in this hemisphere, however, have yet to be widely applied in South Asia where it is proposed that this study be conducted.

U. S. Dollar Equivalent in Indian Rupees                      FY 1973 est. 28,300

<u>23. Institution</u>	<u>Title of Project</u>
National Museum of Natural History, Smithsonian Institution, Washington, D. C.	"Studies of the Rapidly Disappearing Crafts at the Village Level in India."

As urbanization and industrialization spread in India, crafts which have been passed down in families for generations may be lost. This project will attempt to carry out in India what on-going projects have already been doing in Pakistan and Ceylon; document, photograph and salvage what can be saved of these crafts before the techniques and materials involved are lost to the world through the deaths of the last artisans.

U. S. Dollar Equivalent in Indian Rupees                      FY 1973 est. 25,000

<u>24. Institution</u>	<u>Title of Project</u>
Temple University Philadelphia, Pennsylvania	"Upper Pleistocene and Holocene Ecology, and Archeology of Peninsular India in Contexts of Human Adaptations."

This project aims to reconstruct a picture of human settlements in pre-historic times in what is today East India. At present only sketchy details are available about the pattern of human occupation in this area. The results of the study will throw light upon the later development of civilization out of prehistoric culture. Expenses are to be shared with the Archeological Survey of India.

U. S. Dollar Equivalent in Indian Rupees                      FY 1973 est. 17,880

<u>25. Institution</u>	<u>Title of Project</u>
American Institute of Indian Studies Philadelphia, Pennsylvania	"Documentation of Ritual Art Forms as Communication Systems of Traditional Cultures."







archeological methods throws light on the narratives related in the Bible. Hundreds of divinity students of all denominations from dozens of American colleges and seminaries have been introduced to Biblical archeology at first hand through the Summer Institute connected with this site.

<u>U.S. Dollar Equivalent in Israeli Pounds</u>	FY 1972 est.	136,000
	FY 1971	300,400
	FY 1970	248,340
	FY 1969	68,500
	FY 1968	216,200
	FY 1967	300,000
	FY 1966	150,000

29. <u>Institution</u>	<u>Title of Project</u>
University of Missouri Columbia, Missouri	"Excavations at a Greek-Trading Site at Tel Anafa, Israel."

The expansion of Greek civilization in the ancient world following the conquests of Alexander the Great have been better understood as a result of this excavation. A number of American graduate students have been trained on this site under complementary grants from the Ford Foundation.

<u>U.S. Dollar Equivalent in Israeli Pounds</u>	FY 1972	36,000
	FY 1970	35,500
	FY 1969	40,000
	FY 1968	60,500

30. <u>Institution</u>	<u>Title of Project</u>
American Schools of Oriental Research Cambridge, Massachusetts	"Archeological Investigations of the American Schools of Oriental Research at Tel El Hesi, Khirbet Shema, and Other Sites."

Palestine is of major interest for students of the past not only for its importance in understanding the Bible but also because it was a crossroads of ancient civilizations. These excavations of the American Schools of Oriental Research help to fill in the total picture of the ancient orient on which several generations of American scholars have been working. Organized as a consortium, this institution has enabled small denominational colleges in the United States to participate in Biblical studies which they would be unable to conduct using their own limited resources.

<u>U.S. Dollar Equivalent in Israeli Pounds</u>	FY 1972 est.	140,000
	FY 1971	117,492
	FY 1970	166,713
	FY 1969	50,000
	FY 1968	80,000



31. <u>Institution</u>	<u>Title of Projects</u>
National Museum of Natural History Smithsonian Institution Washington, D. C.	"Excavations at Tel Jemmah, Southern Israel."

The site at Tell Jemmeh provides us with an understanding of how man adapted to the desert environment Southern Palestine over some 1200 years--in an area which is now being opened for resettlement for the first time in almost 2000 years. For the first time in Israel, new archeological methods are being applied on this site which will enable us to reconstruct the environment as well as the culture of the men who lived on the edge of the desert wilderness. Important knowledge of international trade in ancient times will be brought to light. The site includes Phoenician, Cypriot, Egyptian, and Arabian cultures from the Middle Bronze Age Through the Persian period.

<u>U. S. Dollar Equivalent in Israeli Pounds</u>	FY 1972 est.	90,000
	FY 1971	63,536
	FY 1970	63,272

32. <u>Institution</u>	<u>Title of Project</u>
University of Illinois Urbana, Illinois	"Comparative Studies of the Effects of Cultural Change On Folk Music in Israel."

Israel provides a unique "melting pot" in which to study the cultures of the immigrants who came to Israel from a variety of countries and cultures. However, the traditions brought by these immigrants will disappear within a single generation. It is important that living traditions such as those being studied by this project be studied while they can be studied. These studies in Israel are being correlated with similar studies by University of Illinois scholars in Iran, Tunisia, and Turkey.

<u>U. S. Dollar Equivalent in Israeli Pounds</u>	FY 1972 est.	30,000
	FY 1971	19,860
	FY 1970	31,575

## V. MOROCCO

### a. On-Going and Pending Archeology Projects in Morocco

33. <u>Institution</u>	<u>Title of Project</u>
National Museum of Natural History Smithsonian Institution Washington, D. C.	"To Excavate the Moroccan Islamic City of Sijilmassa."

This site has been called "the most important archeological site in North Africa". Situated on the edge of the Sahara it was an important center of the virtually unstudied yet flourishing trade with West Africa in the period before the European explorations of the African coast. The city





was the original seat of the present ruling dynasty of Morocco and the Moroccan Government has officially asked the Smithsonian to assist in development of an excavation of one of its richest historical sites. While United States relations with Morocco have traditionally been excellent, the cultural influence of the United States in that North African country has hardly been proportionate. This project would initiate a whole new era in American-Moroccan cultural cooperation.

<u>U. S. Dollar Equivalent in Moroccan Dirhams</u>	FY 1973 est.	150,000
	FY 1972 est.	75,000

b. New Projects in Morocco

<u>34. Institution</u>	<u>Title of Project</u>
New York University New York, New York	"The Social History of Urban Planning and Urbanization in Morocco."

Rapid urbanization--the movement to the cities is a worldwide phenomenon. The use of modern anthropological techniques to study this phenomenon as an aspect of culture may help a developing country such as Morocco avoid some of the mistakes which more developed countries have made in the process of urbanization.

<u>U. S. Dollar Equivalent in Moroccan Dirhams</u>	FY 1973 est.	10,000
	FY 1972 est.	4,822

VI. PAKISTAN

a. On-Going and Pending Archeology Projects in Pakistan

<u>35. Institution</u>	<u>Title of Project</u>
National Museum of Natural History Smithsonian Institution Washington, D. C.	"Disappearing Ancient Technologies of Pakistan."

With the spread of industrialization around the world crafts and techniques which have been carried on for millenia are in the process of disappearing in our lifetime. The aim of this project is to document and salvage what can be saved of these crafts and techniques--as well as the materials used, many of which can find uses even in the modern world. It is expected that a small scale crafts industry can be maintained as a result of this study which will not only provide saleable hand-made objects to tourists but will help Pakistan's difficult foreign exchange situation and employment situation by providing a saleable craft product.

<u>U. S. Dollar Equivalent in Pakistani Rupees</u>	FY 1973 est.	50,000
	FY 1972 est.	50,000
	FY 1971	51,533
	FY 1970	76,133

(Continued)



FY 1969	43,742
FY 1968	25,128
FY 1967	6,739

36. Institution

Title of Project

University of California  
Los Angeles, California

"To Excavate Islamic Archeological Sites in Pakistan."

Western archeologists working in South Asia have traditionally been most interested in pre-history. Since the Pakistanis are extremely proud of their Islamic heritage, this project would be considered a priority undertaking as one of the first major excavations of an Islamic site by a Western team. UCLA's famed Near Eastern Center would be ideally suited to perform this work.

U. S. Dollar Equivalent in Pakistani Rupees

FY 1973 est.	30,000
FY 1972 est.	30,000

VII. POLAND

a. On-Going and Pending Archeology Projects in Poland

37. Institution

Title of Project

State University of New York  
Buffalo, New York  
(Formerly a University of  
Michigan project)

"The Earliest Neolithic Settlements in Poland."

Much of what is known about early man has been uncovered on the continent of Europe, but the opportunities of American scholars to participate in this work has been limited by the extra funds required to work abroad and limited access to the best site. This is the only American excavation which has been allowed in Poland in recent years, and provides cultural links between Polish and American scholars which have been difficult to establish and maintain during the era of the Cold War.

U. S. Dollar Equivalent in Polish Zloties

FY 1973 est.	43,680
FY 1972 est.	43,680
FY 1971	43,516
FY 1969	37,251
FY 1968	36,107
FY 1967	21,684

38. Institution

Title of Project

University of Kentucky  
Lexington, Kentucky

"A Metric and Morphological Study of the Evolution of the Chin in Polish Skeletal Populations Between 2000 B. C. and 1800 A. D."



The existence in Polish museums of human skulls from resident populations over the very long period of 4000 years makes possible a study of the evolution over that period of an important human anatomical feature. The Principal Investigator is qualified both as a physical anthropologist and a doctor of dentistry.

<u>U. S. Dollar Equivalent in Polish Zloties</u>	FY 1973 est.	1,860
	FY 1972 est.	1,860
	FY 1971	1,349

39. <u>Institution</u>	<u>Title of Project</u>
Washington State University Pullman, Washington	"To Excavate a Prehistoric Flint Mining Complex on the Kamienna River in Poland."

This study proposes to bring to bear the skills of geologists, paleobotanists, archeologists and anthropologists to study the early technology of flint mining and flint artifact manufacture during the New Stone Age and at the beginning of the Iron Age. A study such as this provides information about the movement of peoples from place to place in Europe in very early times, and about the rise and fall of successive centers of culture.

<u>U. S. Dollar Equivalent in Polish Zloties</u>	FY 1973 est.	25,000
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40. <u>Institution</u>	<u>Title of Proposal</u>
Washington State University Pullman, Washington	"To Study Pre-Mesolithic Fossils in Poland."

"Pre-Mesolithic" refers to the Middle Stone Age. The fossils in question are collections of human skeletons. No comprehensive study of the fragments of fossil remains of man and his primate ancestors has been undertaken. Measurements of whole skulls provide the basis for most of what is known of early man. The consequent sketchy picture of his evolution could be more fully painted if a system for the measurement and analysis of the many fossil fragments of early Stone Age man in the museums of Europe, and particularly of Poland, could be developed to employ computers to speed the analysis.

<u>U. S. Dollar Equivalent in Polish Zloties</u>	FY 1973 est.	10,000
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## VIII. TUNISIA

### a. On-Going and Pending Archeology Projects in Tunisia

41. <u>Institution</u>	<u>Title of Project</u>
Dumbarton Oaks Center for Byzantine Studies Washington, D. C. and University of Iowa, Iowa City, Iowa	"A Corpus of the Ancient Mosaics of Tunisia."



The Tunisian mosaics are among the most distinctive of the mosaics which the ancient Romans left everywhere they lived. Some unique ones of the Christian period remain in Tunisia. These priceless treasures are being exposed one by one because of rapid urban development and unless taken up, and transported to safety in a museum, or preserved in some other fashion, they will be lost to humanity. The "corpus" of Tunisian mosaics being prepared by this project includes a complete, detailed description of each mosaic unearthed; all this data will henceforth be available generally in university and museum libraries.

<u>U. S. Dollar Equivalent in Tunisian Dinars</u>	FY 1973 est.	120,000
	FY 1972 est.	61,068
	FY 1971	58,112
	FY 1970	58,691
	FY 1969	28,628

42. <u>Institution</u>	<u>Title of Project</u>
University of Illinois Urbana, Illinois	"Comparative Studies of the Effects of Cultural Change on Folk Music in Tunisia."

Traditional communities on the Tunisian Island of Djerba represent one of the original sources of musical traditions which have since become widely diffused in the Mediterranean area. With rapid development and changes in Tunisia, the time is coming when these musical traditions may be lost. This project, which is coordinated with University of Illinois studies in ethnomusicology in Iran, Turkey, and Israel (See Item #30 above), aims to document and explain the significance of this important musical tradition.

<u>U. S. Dollar Equivalent in Tunisian Dinars</u>	FY 1973 est.	25,000
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b. New Archeology Projects in Tunisia

43. <u>Institution</u>	<u>Title of Project</u>
New York University New York, New York	"Modernization in Rural Tunisia."

This is a joint project in which an experienced American investigator will team up with an experienced Tunisian investigator to examine the social and cultural changes which are coming about in rapidly developing Tunisia; and the implications of these social and cultural changes for further development. The study will focus on two communities in the Mejerda Valley of Central Tunisia which have been traditionally rich agricultural centers but which are now faced with the crisis of adjustment to modern ways and to a modern agricultural marketing system.

<u>U. S. Dollar Equivalent in Tunisian Dinars</u>	FY 1973 est.	68,000
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IX. YUGOSLAVIA

a. On-Going and Pending Archeology Projects in Yugoslavia

<u>44. Institution</u>	<u>Title of Project</u>
University of Minnesota Minneapolis, Minnesota	"Excavations at the Palace of the Roman Emperor Diocletian at Split, Yugoslavia."

After the Barbarian invasions overran the Roman Empire the huge palace of the Roman Emperor Diocletian at what is today Split was abandoned, and an entire medieval city later grew up within the palace walls. This excavation represents a unique opportunity to learn more about Roman times since it is being conducted in conjunction with the urban renewal program of the modern Yugoslav city of Split. Since people live or will live in new houses on the sites, they can only be excavated in connection with the urban renewal project now going on.

<u>U.S. Dollar Equivalent in Yugoslav Dinars</u>	FY 1973 est.	75,000
	FY 1972	77,381
	FY 1971	12,553
	FY 1970	60,288
	FY 1969	78,184
	FY 1968	32,505

<u>45. Institution</u>	<u>Title of Project</u>
Denison University Granville, Ohio	"Excavations at Sirmium, a Roman Provincial Capital."

Among other things, this project serves to support the training program in archeology of one of America's smaller universities, drawing American students from a number of universities, primarily in the midwest. The site was one of the important provincial capitals of the Roman Empire and its excavation provides new information about community life, and civil and military organization in Roman times not available from the "classical" sites in countries such as Italy. This project is being completed, and the publication of the results of this research is in preparation.

<u>U.S. Dollar Equivalent in Yugoslav Dinars</u>	FY 1972 est.	16,844
	FY 1971	61,000
	FY 1970	61,599
	FY 1969	65,223
	FY 1968	34,285

<u>46. Institution</u>	<u>Title of Project</u>
University of California Los Angeles, California	"Excavation of an Early Neolithic Settlement at Anza, Macedonia, Yugoslavia."



The site at Anza has through history been a crossroads of the cultures and civilizations, all formative in the development of Western Civilization. This excavation has broken new ground in European archeology since Americans and Yugoslavs working together have been able to combine techniques and traditions. This is the first American excavation, and perhaps one of the first American cultural enterprises of any kind to be mounted in historic Macedonia. An entirely distinct culture in Eastern Europe has been uncovered as a result of this work, and the results are already beginning to appear in published form for the benefit of the scholarly community.

<u>U. S. Dollar Equivalent in Yugoslav Dinars</u>	FY 1973 est.	15,000
	FY 1972	11,070
	FY 1970	50,487
	FY 1969	30,900

47. <u>Institution</u>	<u>Title of Project</u>
University of Michigan Ann Arbor, Michigan	"Excavations of Middle Paleolithic Remains in Northern Bosnia. "

Techniques developed in the study of American Indian mounds are being applied to the remains of the peoples who inhabited Europe in the old Stone Age. The old Stone Age sites are much rarer than the sites inhabited in later times, and hence this excavation will provide much valuable information and material to be compared with that uncovered elsewhere dating from a similar time period

<u>U. S. Dollar Equivalent in Yugoslav Dinars</u>	FY 1973 est.	20,000
	FY 1971	33,200
	FY 1969	15,220

48. <u>Institution</u>	<u>Title of Project</u>
University of Texas Austin, Texas	"Archeological Excavations at Stobi. "

Macedonia was a crossroads in ancient times and the excavation of this classical site will provide us with considerable knowledge about the interaction between the East and the West.

<u>U. S. Dollar Equivalent in Yugoslav Dinars</u>	FY 1973 est.	80,000
	FY 1972 est.	79,157
	FY 1970	40,000

49. <u>Institution</u>	<u>Title of Project</u>
Southern Illinois University Carbondale, Illinois	"The Cultural, Economic, and Social Impact of Rural Road Construction. "



With so many areas around the world rapidly modernizing, the results of this study could prove extremely valuable in many parts of the world. The basic question posed is: what happens when a road is built into a village or rural area previously isolated from the outside world. What happens to the people, their culture, their families, patterns of trade, immigration and emigration, and soon. The Principal Investigator is an American whose parents immigrated to this country from Yugoslavia, has spent time in Yugoslavia on scholarships, speaks several Slavic languages, and is thus admirably suited to conduct a study such as this in conjunction with Yugoslav colleagues.

<u>U. S. Dollar Equivalent in Yugoslav Dinars</u>	FY 1973 est.	30,000
	FY 1972 est.	28,000

b. New Archeology Projects in Yugoslavia

<u>50. Institution</u>	<u>Title of Project</u>
University of Kansas Lawrence, Kansas	"Palaeoecology and Prehistory of Lake Ludas, Yugoslavia."

This will be one of the most sophisticated studies of ancient cultural remains ever attempted in Eastern Europe, performed by a scholar who has mastered the new American techniques which aim to reconstruct not only the culture of prehistoric peoples but the environment in which they lived as well. At the same time the Principal Investigator has been trained on European sites where American experience has been relatively thin. This study will add important knowledge to a lesser known period of European prehistoric culture, since most of the excavations in Eastern Europe have concentrated on later periods.

<u>U. S. Dollar Equivalent in Yugoslav Dinars</u>	FY 1973 est.	20,000
	FY 1972 est.	22,753

<u>51. Institution</u>	<u>Title of Project</u>
University of Massachusetts Amherst, Massachusetts	"The Changing Structure of the Family in Serbia in the Context of Ecological, Socio-Economic and Related Demographic Changes since the 19th Century."

The main objective of this project is to contribute to greater understanding of the modernization of familial social structure in rapidly developing Yugoslavia. It will be a joint American-Yugoslav project, and will make use of existing material in archives pertaining to traditional family structure and of direct field observations and questionnaires to determine how family structure is changing and what the implications of those changes will be. What happens in an Eastern European country such as Yugoslavia in the area of social and familial change will have value for understanding social change elsewhere.

(Continued)



U.S. Dollar Equivalent in Yugoslav Dinars

FY 1973 est. 40,000

52. Institution

Title of Project

Harvard University  
Cambridge, Massachusetts

"Oral Epic Poetry of  
Avdo Mededovic."

This project aims to make available to American scholars an English translation of the famous oral Serbo-Croatian epic poem by the illiterate Yugoslav poet Avdo Mededovic. Epic poetry delivered orally by bards is a cultural tradition which goes back to the Greek poet Homer and before. What is important in this instance is the work of a contemporary man who functions essentially as Homer functioned among the early Greeks. The transcription and translation of the poem which he sings aloud will throw a great deal of light not only on Yugoslav customs and cultural traditions specifically but upon those of any traditional society where literacy is uncommon and where oral traditions accordingly have to be depended upon.

U.S. Dollar Equivalent in Yugoslav Dinars

FY 1973 est. 13,410

53. Institution

Title of Project

Wesleyan University  
Middletown, Connecticut

"Developmental Cultural Ecology  
in the Neretva-Urvas River  
Basin."

This study aims, through interdisciplinary studies applied to an entire upland zone in Yugoslavia, to answer the questions of why man came to a particular region, what environmental factors shaped his coming and development, and what was the history of his culture in the area. Selection of this relatively limited area in which to work will allow the collection of enough concentration data to allow meaningful conclusions and will also allow the representatives of various disciplines to work closely together-- archeologists, classicists, geologists, anthropologists, and biologists.

U.S. Dollar Equivalent in Yugoslav Dinars

FY 1973 est. 50,000

54. Institution

Title of Project

Rice University  
Houston, Texas

"Archeological and Investigations  
of Bassianae and Its Related  
Environs in Yugoslavia."

Rice University and the Archeological Institute of Belgrade plan to collaborate on the excavation of this ancient Romano-Byzantine town situated between the Sava and Danube rivers, 60 kilometers west of modern Belgrade. Founded during the early Empire, Bassianae survived through six centuries as a strategic stronghold on the Roman road to Constantinople. Excavation would seek to determine the nature of the earliest occupation of the site and the subsequent development of the city.

U.S. Dollar Equivalent in Yugoslav Dinars

FY 1973 est. 62,819





55. InstitutionTitle of Project

University of Missouri  
Columbia, Missouri

"Study of Comparative Material  
for Late Roman Pottery Found  
at Jalame."

The purpose of this project is to enable study of a variety of Roman pottery found on sites in Yugoslavia in comparison with similar materials found on classical sites in Israel by University of Missouri excavations (See, for example, Item #27 above). This modest project will have disproportionate results in helping to fill in our knowledge of the Roman Empire that ringed the entire Mediterranean Sea.

U.S. Dollar Equivalent in Yugoslav Dinars

FY 1973 est. 3,000



## B. SYSTEMATIC AND ENVIRONMENTAL BIOLOGY

### I. EGYPT

#### a. On-Going and Pending Biology Projects in Egypt

<u>56. Institution</u>	<u>Title of Project</u>
National Museum of Natural History, Smithsonian Institution, Washington, D.C.	"A Serological and Ectoparasite Survey of the Migratory Birds of East Africa"

Based in Egypt, this project traps representative birds migrating through Northeastern Africa, collects blood and ectoparasite samples, and then bands the birds before releasing them (reports on the capture of banded birds from other places in Europe will yield significant information about the migration patterns of the birds). Information about the migratory patterns of the birds, plus an analysis of the blood samples and the parasites collected from the birds, has already provided significant information about the role of migrating birds in spreading diseases which can attack crops, animals, and man. The Rockefeller Virus Laboratories are collaborating with the Smithsonian on this project.

<u>U.S. Dollar Equivalent in Egyptian Pounds</u>	FY 1973 est.	45,000
	FY 1972 est.	45,000
	FY 1971	44,930
	FY 1970	24,680
	FY 1969	33,780
	FY 1967	24,593

<u>57. Institution</u>	<u>Title of Project</u>
Union College Schenectedy, N. Y.	"Plankton Communities of the Nile River Delta"

Assessing the impact of man's engineering undertakings upon the total environment is an urgent area for study. It is becoming clear that engineering studies alone cannot provide adequate information to governments for decisions about what will, in fact, increase the well being of the human population. Reduction of the flow of nutrients into the Mediterranean because they are trapped behind the Aswan Dam has all but eliminated the shrimp fisheries of the Nile Delta. This study proposes to monitor the changes in the coast line and in the amount of salt in previously-fished fresh water lakes in the delta resulting from the change in the Nile's flow.

<u>U.S. Dollar Equivalent in Egyptian Pounds</u>	FY 1973 est.	50,000
	FY 1972 est.	50,000



58. <u>Institution</u>	<u>Title of Project</u>
Office of Environmental Sciences, Smithsonian Institution, Washington, D. C.	"Symposium on Biological Control of the Snail, Carrier of the Disease Bilharzia"

At a time when the limitations on the use of chemical pesticides are becoming painfully clear because we are learning about their secondary effects in destroying birds and fish, etc., attention must be paid to nature's own methods of controlling populations of pests. This proposal seeks to control the disease-carrying snail associated with tropical rivers and irrigation systems. The construction of the Aswan Dam caused a dramatic rise in the cases of bilharzia in people working on the dam or on the canal system associated with it. The disease has been an important factor in absenteeism among agricultural workers employing waters diverted from the Nile. The proposed symposium would bring together biologists specializing in the snails and in the use of biological processes to control pests.

U. S. Dollar Equivalent in Egyptian Pounds      Fy 1973 est.    20,000

b. New Biology Projects in Egypt

59. <u>Institution</u>	<u>Title of Project</u>
University of Michigan Ann Arbor, Michigan	"Systematic Studies of the Mollusk Genus <u>Bulinus</u> in Africa and Adjacent Regions"

This project is a "systematic" study of one common genus of African snail, especially abundant in Egypt. As disease carriers snails are animals whose biology and habits it is particularly important to understand. These studies will be coordinated with similar studies done by the University of Michigan's Museum of Zoology in other areas of the world such as India (see Item #64 below). A biologist at the University of Cairo will directly collaborate with his Michigan colleagues on this study.

U. S. Dollar Equivalent in Egyptian Pounds      FY 1973 est.    31,200

60. <u>Institution</u>	<u>Title of Project</u>
Southern Methodist University Dallas, Texas	"Egyptian Geology and Paleontology"

The initial phase of this project enabled American paleontologists to participate in a symposium on Egyptian geology and paleontology sponsored by the Geological Survey of Egypt. This symposium brought together knowledge and expertise which will now be published for the first time in the form of proceedings. As a result of problems identified and contacts made through the symposium, Southern Methodist geologists and paleontologists project field research in Egypt which will be especially significant in view of some of the unique geological features of the Egyptian terrain, mainly desert.



<u>U. S. Dollar Equivalent in Egyptian Pounds</u>	FY 1973 est.	50,000
	FY 1972	15,829

61. <u>Institution</u>	<u>Title of Project</u>
Smithsonian Institution	"Legal Controls on
Washington, D. C.	Environmental Degradation"

World wide concern about the environment has motivated many of the scientific studies of the environment; such scientific studies are represented among the projects for which "excess currencies" are being sought by the Smithsonian. The present project aims to focus on another aspect of the environmental crisis: the way in which laws can contribute to environmental degradation; and, conversely, the way in which laws can help contribute to positive solutions to environmental problems. Scientists, lawyers, and educators would be asked to contribute to this symposium on environmental law.

<u>U. S. Dollar Equivalent in Egyptian Pounds</u>	Fy 1973 est.	60,000
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## II. GUINEA

- a. On-Going and Pending Biology Projects in Guinea  
None.
- b. New Biology Projects in Guinea

62. <u>Institution</u>	<u>Title of Project</u>
Chico State College	"Systematic Studies of Ants and
Chico, California	Parasites Associated with Man"

Eighty percent of the animals on the earth are insects. Two of the most important groups of these from the point of view of their affect on mankind are ants and termites. If we are to understand how to reduce the damage brought about by these insects, we have to know their precise nature and their role in the economies of other animals. This particular study proposes the collection of ants and termites in Guinea and particularly of the beetles (Staphylinidae) associated with them. This study is an extension of others by the same investigators covering the tropics in both this hemisphere and in Africa and Asia.

<u>U. S. Dollar Equivalent in Guinean Francs</u>	Fy 1973 est.	10,000
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## III. INDIA

- a. On-Going and Pending Biology Projects in India

63. <u>Institution</u>	<u>Title of Project</u>
National Museum of Natural	"Indian Migratory Bird Project "
History, Smithsonian	
Institution, Washington, D. C.	

This project aims to continue the study of the patterns of migration of birds of South Asia as well as their possible role in the spread of diseases harmful to animals, crops and man (a continuation of World





Health Organization studies) and to employ the information obtained in the preparation of a Handbook of Indian Birds. The handbook and the studies of migration and of possible disease transfer are essential elements in understanding the basic ecology of India where man and a wide variety of animals live in closer interrelation than any where else on earth.

U. S. Dollar Equivalent in Indian Rupees

FY 1973 est.	35,000
FY 1972 est.	25,000
FY 1971	34,933
FY 1970	17,800
FY 1969	3,417

64. Institution

Title of Project

University of Michigan  
Ann Arbor, Michigan

"Cytological Studies of Indian Mollusks"

To continue studies to better understand and thus control snails (mollusks), animals known to carry diseases which attack man and his domesticated animals. The diseases include shistosomiasis, liver fluke and other worm parasites. These diseases are wide spread in the tropics and they have a way of spreading dramatically in an area where hydroelectric dams and irrigation canals are being built, disturbing the ecological balance. These studies employ the most modern techniques to understand the basic genetic materials of the cells of snails and thus to make it possible to tell one family of snails from another when they are from all outward appearances identical. These studies are being phased out as regards India, but the same team of scientists plans to continue this work elsewhere, notably in Egypt (see Item #59, above).

U. S. Dollar Equivalent in Indian Rupees

FY 1971	24,558
FY 1970	25,562
FY 1969	25,414

65. Institution

Title of Project

University of Michigan  
Ann Arbor, Michigan

"Productivity of Tropical Lakes in South India"

This study of the way things grow in fresh water in the tropics is one of the many studies essential to an understanding of the ways man can prevent the pollution of productive bodies of water and develop them as a source of high protein food.

U. S. Dollar Equivalent in India Rupees

FY 1973 est.	32,000
FY 1972 est.	32,000

66. Institution

Title of Project

Yale University  
New Haven, Connecticut

"Habitat Relationships and Distribution of Wild Ungulates in the Gir Forest of India"



Study of the wilderness has a critical role to play in developing long-range guidelines for management of natural resources. By comparing studies of lands cultivated by man with those left to grow naturally, it is possible to learn what the land is capable of producing as opposed to what man asks the land to produce. Plans for the conservation of wilderness grow out of studies like those in the Gir Forest. This study of wild ungulates (hooved animals) in the Gir Forest is nearing completion, but Yale University plans to undertake studies concerned with other aspects of this important wildlife area in India (see Item #92 below).

<u>U.S. Dollar Equivalent in Indian Rupees</u>	FY 1971	26,255
	FY 1970	35,055

67. <u>Institution</u>	<u>Title of Project</u>
National Museum of Natural History, Smithsonian Institution, Washington, D. C.	"A Flora of the Hassan District, Mysore State, Ghat Mountains Southwest India"

Underlying all environmental studies on land must be thorough studies to identify accurately each form of plant life and the place of each form in the community of living things, the ecosystem, of which it is a part. This study in India is one such carefully controlled study of a limited area with a wide range of plant life resulting from rainfall which varies from less than 30 inches to somewhere between 100 and 300 inches per year. It will provide correctly identified specimens for the National Herbarium at the Smithsonian strengthening these collections with materials from the Eastern Hemisphere. United States scientists, outstanding in the study of the tropics of our own hemisphere, are now undertaking comparative studies in other tropics, the essential next step in understanding the biology of this climatic zone.

<u>U.S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	25,000
	FY 1972 est.	25,000
	FY 1971	26,400

68. <u>Institution</u>	<u>Title of Project</u>
National Museum of Natural History, Smithsonian Institution, Washington, D. C.	"Systematic and Behavioral Studies of Flatfishes and Gobioid Fishes"

Fish to be studied under this project are similar to the sole and the flounder which are common in American diets. The knowledge of the nature, behavior and distribution of these fish in Indian waters will contribute to commercial fisheries there as well as to an understanding of the evolution of marine animals into semi-aquatic animals or those adapting to life on land.

<u>U.S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	25,000
	FY 1972 est.	25,000

69. <u>Institution</u>	<u>Title of Project</u>
University of Georgia Athens, Georgia	"Organic Productivity & Nutrient Cycling in Tropical Ecosystems"



Management of the landscape depends on an understanding of nature's process of growing plants and the circulation of plant food by this process. Research in Europe and North America has provided much information about these processes in temperate climatic regions, but little is known about these processes in tropical regions. This project proposes study of forest, grassland and cultivated land by techniques tested in the Western Hemisphere by scholars from one of the United States' pioneering ecological research institutions.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	42,000
	FY 1972 est.	36,000

70. <u>Institution</u>	<u>Title of Project</u>
Office of Environmental Sciences Smithsonian Institution, Wash- ington, D. C.	"Coral Reefs in India"

It is proposed to study coral reefs in the vicinity of India. Such reefs are best known as geological features and little understood as biological communities with special relationships to the ocean, to the land and to man's activities. This study would investigate seasonal and long term changes in a variety of reefs in different physical locations and climatic zones and with varying forms of associated plants and animals.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	56,000
	FY 1972 est.	6,000

71. <u>Institution</u>	<u>Title of Project</u>
Pennsylvania State University University Park, Pennsylvania and University of Minnesota Minneapolis, Minnesota	"International Spread of Plant Disease by Means of Airborne Organisms"

The air carries much biologically significant material such as the pollen which fertilizes plants and causes hay fever or the exhaust fumes of automobiles and industries which block out the sun's rays over our cities, affecting plants, animals and man. Other living organisms are carried in the atmosphere, such as the spores of fungus, disease microbes, and even minute animals called aphids. This proposal would extend to India studies initiated in the United States under the International Biological Program designed particularly to study plant diseases which are transmitted through the air without respect for international boundaries. The purpose is to understand the evolution of the diseases as well as to record the losses in plant life resulting in the diseases. Such studies are but one element in a detailed program which seeks to promote and coordinate internationally oriented research on critical problems in this field of aerobiology and to ensure the application of standardized techniques and the exchange of comparable data between disciplines and nations.



<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	50, 000
	FY 1972 est.	2, 000

72. <u>Institution</u>	<u>Title of Project</u>
University of Colorado Boulder, Colorado	"Comparative Studies of Human Adaptability at High Altitudes"

Cardio-vascular diseases which are the major causes of death in the United States are less frequent in populations living at high altitudes. Other effects of living at high altitudes limit human fertility and work output. These studies seek to understand the process of life among human populations at these altitudes.

U. S. Dollar Equivalent in Indian Rupees	FY 1973 est.	50, 000
	FY 1972 est.	2, 000

73. <u>Institution</u>	<u>Title of Project</u>
Utah State University Logan, Utah	"Comparative Studies in Arid Climates"

Large areas of Southwestern United States are desert. The study and management of this landscape can be expected to provide specific data to improve the well-being of Americans of that area. Full understanding of the relationships of the plants and animals of this area and of the cycling of nutrients through such an ecosystem requires comparative studies in roughly similar regions elsewhere. The desert areas of India provide excellent comparative study areas. They can be expected also to provide vital data to the Indian Government where the expansion of deserts and the consequent loss of productive land is going forward at an alarming pace.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	75, 000
	FY 1972 est.	5, 000

74. <u>Institution</u>	<u>Title of Project</u>
Utah State University Logan, Utah	"Ecology and Behavior of the One-Horned Rhinoceros, an Endangered Species"

This study of the ecology of the Kaziranga Wildlife Sanctuary along the Bharmaputra River will provide urgently needed data to ensure the conservation of the one horned rhinoceros and the wilderness essential for his survival as well as to guide the Government of Assam in management of similar lands in northeastern India.

U. S. Dollar Equivalent in Indian Rupees	FY 1973 est.	65, 000
	FY 1971	4, 000





<u>75. Institution</u>	<u>Title of Project</u>
University of Texas Austin, Texas	"Ecology of Indian Ungulates in the Wildlife Sanctuaries of Rajasthan"

The University of Texas has intensively studied the biology of hooved animals (ungulates) from different parts of the world to develop commercial herds for man's food. This study proposes the study of the biology of several kinds of hooved mammals namely the blackbuck, the nilgai antelope and the chital which are currently being raised in Texas with varying degrees of success. The studies of these animals on their native ranges is expected to yield information to guide their better management in the United States.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	30,000
	FY 1972 est.	30,000
	FY 1971	2,000

<u>76. Institution</u>	<u>Title of Project</u>
University of California Davis, California	"Ecology and Behavior of Hoolock Gibbons"

The gibbon is unique among man-like apes in that he mates for life. He also has a strict, one-family territorial social organization. It now seems possible that this animal can change his social organization when the necessities of life require it. Specifically, when the trees lose their leaves and cease to provide food, it is believed that the gibbon will form larger groups made up of several families in order to forage for food. If this belief can be verified one of the missing links in the development of social organization from man's early primate ancestors to man's own communities of families will have been supplied.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	25,000
	FY 1972 est.	15,000
	FY 1971	7,000

<u>77. Institution</u>	<u>Title of Project</u>
National Museum of Natural History, Smithsonian Institu- tion, Washington, D. C.	"Ecological and Behavioral Studies of Rhesus Monkeys and Langurs"

These proposed studies will examine two problems of special interest to man's understanding of his own world. The rhesus monkey is the principal animal employed in medical research in the United States. They are cropped for this purpose in India. The study of this monkey will compare their condition in two neighboring states one in which they are being captured constantly for medical research and the other where this has never happened. The outcome should include valuable information on the management of the animal to ensure needed supplies for research. The langur inhabits the same areas that the rhesus monkeys do and their study together is an essential part of the ecology



of these animals. The langur studies will focus on behavior, particularly on infanticide which has been observed periodically. Population and other forms of ecological pressure will be studied in seeking an explanation for this behavior.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	30,000
	FY 1972 est.	30,000
	FY 1971	2,500

78. <u>Institution</u>	<u>Title of Project</u>
University of Idaho Moscow, Idaho	"Survey of the Remaining Indian Tiger Population"

The tiger is almost extinct. Immediate study is essential to determine how many remain, and where and how to provide adequate wilderness to ensure the survival of those remaining.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	20,000
	FY 1972 est.	10,000
	FY 1971	3,500

79. <u>Institution</u>	<u>Title of Project</u>
Office of Environmental Sciences Smithsonian Institution Washington, D. C.	"A Cooperative Program of Environmental Assessment"

As a result of a joint Indo-American Ecology Symposium held in New Delhi in February, 1971, plans for a major program of "environmental assessment" studies are underway. These studies will be carried out jointly by Indian and American scientists and institutions; they will be concerned with the exact quantitative measurement of important aspects of the natural environment. The basic scientific data expected to be developed by this program will not only contribute to the solution of environmental problems in developing India but will add vital data on the environment of use to American scientists and institutions working on U.S. environment problems. The priority problems to be attacked are now in the process of being identified. Budget requests in future years will include descriptions of concrete projects as they emerge under this developing program.

U. S. Dollar Equivalent in Indian Rupees	FY 1973 est.	250,000
	FY 1972 est.	60,000
	FY 1971	30,000

80. <u>Institution</u>	<u>Title of Project</u>
Virginia Commonwealth University Richmond, Virginia	"Comparative Bioenergetics of the House Sparrow"

Because the common house sparrow is not only abundant but is found in most places in the world, this species provides the means to make comparative studies in "bioenergetics"--a basic aspect of ecology, which is concerned with what living things take from their environment



in relation to what they give back to the environment, and the balances resulting when the intake and output of all kinds of living beings in a given environment are considered together.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	15,000
	FY 1972 est.	15,000

<u>81. Institution</u>	<u>Title of Project</u>
Smithsonian Tropical Research Institute, Smithsonian Institution Washington, D. C.	"Convergence at the Community Level: Nilgiri Sholas and California Oak-Madrone Woods"

This project aims to compare two very different--yet "strikingly similar"--types of forests, in India and California respectively. The result of the studies will tell us a great deal about what kinds of plants grow in what kinds of conditions, and about the processes which shape the development of forests. The study will also take into account the animal life dependent on these two particular forests.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	15,000
	FY 1972 est.	15,000

<u>82. Institution</u>	<u>Title of Project</u>
Smithsonian Tropical Research Institute, Smithsonian Institution Washington, D. C.	"Studies in Comparison of Tropical Forest Structures"

This is a prototype study, now virtually complete with a resulting scientific publication in preparation, on which the above project (Item #81) will build. The methodology developed in the course of this study will be applied to other studies which will tell us about the interaction and interdependence of living things.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1971	6,130
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<u>83. Institution</u>	<u>Title of Project</u>
Smithsonian Tropical Research Institute, Smithsonian Institution Washington, D. C.	"To Study the Structure and Function of Tropical Avian Communities"

To study any element of the living environment throws light on the environment as a whole. These studies of birds in tropical environments in India have been coordinated with similar studies in tropics in both Africa and Central America. These studies are completed and a scientific publication is in preparation.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1971	11,505
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<u>84. Institution</u>	<u>Title of Project</u>
National Zoological Park Smithsonian Institution Washington, D. C.	"Comparative Studies of Elephants and Primates"



Smithsonian studies of the elephant and of three related monkeys, each inhabiting different zones of climate and altitude in Ceylon have provided basic information upon which plans to save the threatened elephant and to breed the monkeys for medical research can be based. These studies also provided the initial focus around which studies of the total environment proceeded including the restudy of the plants of Ceylon. The ecological and behavioral studies of the monkeys and the elephants provide a tested model for comparative studies of these animals in India.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	30,000
	FY 1972 est.	20,000
	FY 1971	21,852

85. <u>Institution</u>	<u>Title of Project</u>
Smithsonian Tropical Research Institute, Smithsonian Institution Washington, D. C.	"Comparative Studies in Evolutionary Ecology in India"

One-half of mankind lives in the tropics. An understanding of the biology of the tropics is critical to the livelihood of this population. The Smithsonian Tropical Research Institute leads in the continuous study of this climatic zone and of ways to predict the effects of man's actions on that zone. The objective is to inform the planning of industry and governments in order to reverse the process of destruction of the environment and ensure an improving environment for mankind.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	10,000
	FY 1972 est.	10,000
	FY 1971	3,000

b. New Biology Projects in India

86. <u>Institution</u>	<u>Title of Project</u>
National Museum of Natural History Smithsonian Institution Washington, D. C.	"Systematics and Zoogeography of the Stomatopod Crustaceans of the Eastern Coasts of India"

Study of the seas to improve man's use of the food available there is among the few first priority scientific problems today. This study is an outgrowth of the International Indian Ocean Expedition to which the United States made a significant national contribution. Much of the material obtained in the cruises on the U. S. Research Vessel the ANTON BRUN has been returned to the Smithsonian where it is under study. Comparative studies of earlier collections are essential and this material is located primarily in Calcutta, India with the Indian Zoological Survey.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	20,000
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87. <u>Institution</u>	<u>Title of Project</u>
University of California Riverside, California	"A Program of Desert, Grass - lands, and Forest Ecology" 35





Underlying the management of our landscapes must be a thorough understanding of the entire biological process. We know that use of certain stable pesticides to kill rodents which attack crops is also a way to kill predators like owls and hawks which eat rodents and thus also aid man's efforts to control the pest. Studies of the forests and grasslands would include studies of the rodents and their predators as well as other relationships which must be understood to manage the production of these areas.

U. S. Dollar Equivalent in Indian Rupees                      FY 1973 est.    50,000

88. <u>Institution</u>	<u>Title of Project</u>
Harvard University Cambridge, Massachusetts	"Population Biology of Indian Plants"

This joint project between Harvard and the Association for the Cultivation of Science in Poona, India, will concentrate on population biology studies on Indian plants which can be compared with similar studies on American plants already carried out by Harvard's Gray Herbarium in this country.

U. S. Dollar Equivalent in Indian Rupees                      FY 1973 est.    30,000

89. <u>Institution</u>	<u>Title of Project</u>
Cornell University Ithaca, New York	"Plant Developmental and Anatomical Studies (Pteridophytes and Monocots)"

These studies arise from mutual interests of Cornell University and Sardar Patel University in India. Similar studies on the same types of plants in both America and India suggested the considerable scientific value of coordinating the studies and identifying common techniques and desired data.

U. S. Dollar Equivalent in Indian Rupees                      FY 1973 est.    15,000

90. <u>Institution</u>	<u>Title of Project</u>
University of Michigan Ann Arbor, Michigan	"Observations and Collections of Uropeltid Snakes"

The primary purpose of this project is to gather live uropeltid snakes for transport to the United States for studies which the Principal Investigator has been carrying out for the past twelve years here. Through collaboration with Indian herpetologists observations of the locometer, feeding, prey-catching and mate-recognition behavior of these reptiles will be conducted in their natural habitats in India.

U. S. Dollar Equivalent in Indian Rupees                      FY 1973 est.    35,000



91. Institution Title of Project

University of Chicago  
Chicago, Illinois

"Asiatic Lion and Other Cat  
Species in the Gir Forest"

This project is one of several biological projects undertaken in India's Gir Forest in an effort to stop deterioration of this wildlife sanctuary. Studies such as this play a crucial role in the determination of long-range guidelines for managing natural environments and natural resources generally. This forest is one of the last refuges of the Asiatic Lion and other leopards, and the aim of this study will be to develop data which will enable the proper management of these species and prevent their extinction. The study is related to other studies in the Gir Forest carried out by Yale University (see Item #66 above and #92 below). It is also pertinent to the problems of certain endangered species in this country.

U. S. Dollar Equivalent in Indian Rupees FY 1973 est. 40,000

92. Institution Title of Project

Yale University  
New Haven, Connecticut

"Plant Ecology in the Gir Forest"

This study builds on data from previous Yale University studies which concentrated primarily on the wild ungulates (hooved animals) in the Gir Forest (see Item #66 above). In this instance Yale scientists will concentrate on the plant life of the forest--the basis of all the life in this important but unfortunately deteriorating wildlife sanctuary in Northwest India. More data are needed regarding what plants grow in the forest, when leaves and blooms grow (important as animal foods) and what the productivity of the forest is.

U. S. Dollar Equivalent in Indian Rupees FY 1973 est. 41,890

IV. ISRAEL

a. On-Going and Pending Biology Projects in Israel

93. Institution Title of Project

Office of Environmental Sciences  
Smithsonian Institution  
Washington, D. C.

"Biota of the Red Sea and  
Eastern Mediterranean"

To study in Israel the changes of marine life in the Mediterranean and Red Seas resulting from the movement of fish and other organisms through the sea-level Suez Canal. Such studies help understand changes which might result from construction of a sea-level canal through the isthmus of Panama.

U. S. Dollar Equivalent in Israeli Pounds FY 1972 75,000  
FY 1971 94,724  
FY 1970 119,462  
FY 1969 133,473  
FY 1967 122,000



<u>94. Institution</u>	<u>Title of Project</u>
State University of New York Stony Brook, New York	"A Living Coral Reef at Eilat"

To study coral reefs which are best known as geological features and little understood as biological communities with special relationships to the ocean, to the land and to man's activities. This study at Eilat, Israel is providing a firm data base for computer analyses of the coral species and the related plants and animals, much as forests are studied. The coral are roughly equivalent to the trees in a forest providing a basic biological structure. The fish are roughly equivalent to the birds and so on, with sea animals and plants finding niches in the reef would just as insects, snails, moss and the like thrive in a forest.

<u>U. S. Dollar Equivalent in Israeli Pounds</u>	FY 1972 est.	23,000
	FY 1971	51,114
	FY 1970	7,122
	FY 1968	12,036

<u>95. Institution</u>	<u>Title of Project</u>
Texas A & M University College Station, Texas	"Ecology and Behavior of Gazelles in Israel"

Conservation of gazelles as a human food source is an objective of these studies. The gazelles under study are a special species peculiarly adapted to living in arid regions. They live off sparse vegetation in areas without free water. The species is threatened with extinction. To provide for their survival and indeed their development as a natural resource, it is necessary to undertake these basic studies of their behavior and ecology.

<u>U. S. Dollar Equivalent in Israeli Pounds</u>	FY 1972 est.	35,000
	FY 1971	36,470
	FY 1970	45,070

## V. MOROCCO

### a. On-Going and Pending Biology Projects in Morocco

<u>96. Institution</u>	<u>Title of Project</u>
National Museum of Natural History, Smithsonian Institution Washington, D. C.	"A Geographical and Ecological Study of the Mammals of Morocco"

To continue studies in the arid lands of Morocco of rats, mice and other rodents in order better to understand and control these animals of great importance to man. The animals need study because they befool stored food, consume a substantial part of agricultural crops and serve as a reservoir of disease.

<u>U. S. Dollar Equivalent in Moroccan Dirhams</u>	FY 1973 est.	20,000
	FY 1972 est.	20,000
	FY 1971	92,295
	FY 1970	66,840 [38]



97. <u>Institution</u>	<u>Title of Project</u>
Duke University Durham, North Carolina	"Studies of <u>Ramalina</u> Lichens in Morocco"

The study of the mechanisms employed by plants and animals in adapting to their special places in the ecosystem is an essential part of learning to manage nature's production. This study proposes to identify the different kinds of fungus growing at different altitudes and in different temperature and moisture zones by studying the chemicals produced by fungi in these differing circumstances.

<u>U. S. Dollar Equivalent in Moroccan Dirhams</u>	FY 1972 est.	3, 278
	FY 1971	2, 711

98. <u>Institution</u>	<u>Title of Project</u>
University of California Berkeley, California	"Biosystematic Studies in Moroccan Flora"

Basic to any study of the management of the landscape is a modern identification and description of plant life. Such studies are essential for each national program of resource management. They are greatly needed in Morocco. The results can also be expected to contribute to an understanding of the plant life of all arid regions including those in the United States.

<u>U. S. Dollar Equivalent in Moroccan Dirhams</u>	FY 1972 est.	1, 900
	FY 1971	4, 515

## VI. PAKISTAN

### a. On-Going and Pending Biology Projects in Pakistan

99. <u>Institution</u>	<u>Title of Project</u>
University of Washington Seattle, Washington	"Research on the Biology and Control of the Wild Boar in Pakistan"

The wild boar causes crop damage in Pakistan alone estimated at \$35,000,000 annually. Its control has been of concern to the Pakistani government, as it is to the other countries stretching from India to Europe. In Muslim countries the boar is considered, like the pig, an unclean animal and its numbers are not, therefore, controlled through regular cropping. The proposed study will provide basic biological information and information on the behavior and feeding habits of the boar upon which a program of control can be based. One result might be greater agricultural self-sufficiency in Pakistan.

U. S. Dollar Equivalent in Pakistani Rupees	FY 1973 est.	40, 000
	FY 1972 est.	20, 000
	FY 1971	37, 328





<u>100. Institution</u>	<u>Title of Project</u>
National Museum of Natural History, Smithsonian Institution, Washington, D.C.	"Taxonomic Studies of the Marine Fauna of Pakistan's Continental Shelf"

The Arabian Sea is known from commercial fishing catches to be potentially highly productive. Very little is known about this sea, however, particularly about the northeastern portion off Pakistan and the mouth of the Indus River. This proposal seeks to study the continental shelf, to learn what is there, how it is distributed and in what quantities.

U.S. Dollar Equivalent in Pakistani Rupees      FY 1973 est.    50,000

b. New Biology Projects in Pakistan

<u>101. Institution</u>	<u>Title of Project</u>
Cornell University, Ithaca, New York	"Sensory Studies of the Blind Indus River Dolphin"

This study aims to test the hypotheses, important in the phenomenon of vision generally, that visual sensitivity tends to match the predominant available wave-lengths of light. The Indus-river dolphin, almost but not totally blind, has an eye that serves as a light direction sensor rather than as a full-fledged eye. This species accordingly is ideal to test and confirm or eliminate certain theories about the way in which light is managed in animal vision.

U. S. Dollar Equivalent in Pakistani Rupees      FY 1973 est.    22,000

VII. POLAND

a. On-Going and Pending Biology Projects in Poland

<u>102. Institution</u>	<u>Title of Project</u>
University of Georgia Athens, Georgia	"Bioenergetics of Small Rodents"

To continue studies in the temperate climate of Poland of rats, mice and other rodents in order better to understand and control these animals of great importance to man because they defoul stored food, consume a substantial part of agricultural crops and serve as a reservoir of disease.

U.S. Dollar Equivalent in Polish Zloties      FY 1973 est.    20,000  
FY 1972 est.    20,000  
FY 1971            19,994  
FY 1969            73,468

<u>103. Institution</u>	<u>Title of Project</u>
University of Georgia Athens, Georgia	"Interaction of Small Rodents with Human Beings"







Important traditionally as a "crop" from the sea, sponge communities are equally important in terms of their relationships with other organisms that live in the sea. This study concentrates on a sponge community off the Tunisian coast, and focuses on the organisms involved and the principal physical factors which influence their morphological appearance and their distribution. The field work is substantially complete on this project and a publication is in preparation.

U. S. Dollar Equivalent in Tunisian Dinars                      FY 1971                      43, 530

<u>107. Institution</u>	<u>Title of Project</u>
American University of Beirut, Lebanon (Incorporated in New York State)	"Zoogeography and Community Structure of Sand-Beach Meiofauna of the Mediterranean Region"

Meiofauna are microscopic animals which live in the water. Though minute, they are important as among the ultimate links in the "food chain" upon which all life, including that of man, ultimately depends. Little is known about these animals. This study in the Mediterranean region will have application to other areas.

<u>U. S. Dollar Equivalent in Tunisian Dinars</u>	FY 1973 est.	10, 000
	FY 1972 est.	9, 889
	FY 1971	9, 668

<u>108. Institution</u>	<u>Title of Project</u>
Office of Environmental Sciences, Smithsonian Institution, Washington, D. C.	"Support for the Mediterranean Marine Sorting Center, a Facility for Processing Marine Organisms"

This facility was established, and operates, in cooperation with both the Smithsonian Oceanographic Sorting Center in Washington, D. C., and with the local Tunisian Institute of Oceanography and Fisheries. Its function is to speed the description of the fish and other organisms of the Mediterranean Sea and the accumulation of information about where they occur and their feeding habits through sorting in Tunisia of the scientific collections of the countries of the region and distribution of specimens by species to specialists around the world for study.

<u>U. S. Dollar Equivalent in Tunisian Dinars</u>	FY 1973 est.	250, 000
	FY 1972 est.	205, 000
	FY 1970	478, 736
	FY 1969	216, 962
	FY 1967	150, 000

<u>109. Institution</u>	<u>Title of Project</u>
Utah State University Logan, Utah	"Systems Analysis of the Pre- Saharan Ecosystem of Southern Tunisia"



This project is completely coordinated with the U.S. Desert Biome program of the United States National Committee for the International Biological Program, and aims to accomplish on the edge of the Sahara Desert what the USIBP studies are attempting in our own Western deserts, namely, information about what makes a desert a desert, whether the desert is advancing or contracting, whether its ecology is dynamic or stable, and similar questions. In answering these questions the most sophisticated of modern tools, including computer analysis of models developed, are employed. The present study will have considerable comparative value since it will be done along the same lines and employing the same methodologies as the Desert Biome studies in this country. The Tunisian Department of Agriculture is cooperating with this study, and awaiting its results as bearing upon its management and reclamation of desert lands.

<u>U. S. Dollar Equivalent in Tunisian Dinars</u>	FY 1973 est.	175,000
	FY 1972	97,249
	FY 1971	3,185

<u>110. Institution</u>	<u>Title of Project</u>
Office of Environmental Sciences, Smithsonian Institution, Washington, D. C.	"Pollution Studies in Lake Tunis"

The Lake of Tunis is a unique tropical lagoon which has served as a dump for sewage for some 2000 years ever since the ancient city of Carthage flourished on its shores. It is an extraordinarily productive lake and sustains a substantial commercial fishery. It is at the same time the bane of residents of Tunis. Its stench which persists throughout the year, increases to disturbing proportions in the fall of each year when the oxygen level of the lake drops killing the fish which wash ashore in masses. It drives Tunisians away from the lake and discourages tourism which is one prime source of hard currency for the developing Tunisian economy. A study of the lake will provide information on a unique biological process and the basis for a plan to reduce the stench and the fish kill.

U. S. Dollar Equivalent in Tunisian Dinars	FY 1973 est.	100,000
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b. New Biology Projects in Tunisia

<u>111. Institution</u>	<u>Title of Project</u>
National Museum of Natural History, Smithsonian Institution, Washington, D. C.	"Marine Decapod Crustaceans of North Africa"

The marine decapod crustaceans include shrimps, crabs, and lobsters and comprise more than 8000 species; they are thus commercially important marine animals and a knowledge of their biology and habits is thus useful. The aim of the present study is to produce a reference volume of the decapods of the North African coast which can be used by students, scientists, or fishermen; no such reference









<u>114. Institution</u>	<u>Title of Project</u>
University of Illinois at Chicago Circle, Chicago, Illinois	"Evolutionary Relationships Among Upper Cretaceous Teleostean Fishes"

Most of the fish living today have evolved from fish which appeared first in the Cretaceous period, 120 million years ago. The complex process of identifying today's fish can be simplified by proper identification of their ancestors. This identification is the essential first step toward an understanding of the ecology of the seas and toward ensuring proper management of the resources of the seas.

<u>U. S. Dollar Equivalent in Yugoslav Dinars</u>	FY 1973 est.	15,000
	FY 1972	15,075

<u>115. Institution</u>	<u>Title of Project</u>
College of the Virgin Islands St. Thomas, V. I.	"Comparative Population Dynamics of Competitively Exclusive Lizard Species"

This study aims to show how a more vigorous and adaptable species of lizards can gradually colonize and displace a less hardy species. The study will thus throw a light on the actual mechanisms of evolution.

<u>U. S. Dollar Equivalent in Yugoslav Dinars</u>	FY 1973 est.	15,000
	FY 1972 est.	15,000

<u>116. Institution</u>	<u>Title of Project</u>
Office of Environmental Sciences Smithsonian Institution Washington, D. C.	"Cooperative Marine Research aboard the Smithsonian Research Vessel R/V <u>Phykos</u> "

Fourteen United States institutions have indicated an interest in conducting sampling programs in the Mediterranean Sea aboard the R/V Phykos, which would serve as a United States national vessel open to all United States marine research institutions, as a part of the UNESCO sponsored Cooperative Investigations of the Mediterranean (CIM), and the International Decade of Ocean Exploration (IDOE). Carefully controlled studies of a sea the size of the Mediterranean can provide useful information on the processes of life in all seas and more rapidly than attempts to study the oceans. Studies in the Mediterranean, moreover, can provide information on the process of pollution which has already altered the productivity of Lake Erie and the Baltic Sea to the disadvantage of man.

Oceanographic studies involve geological examination of the basins



holding the seas, as they now are and as they evolved over time. They involve also chemical studies of the waters of the sea and the origins of their chemicals or pollutants through the erosion and leaching of the land, through man's activities and through the decomposition of once-living things. Our limited knowledge of the seas requires that such studies begin with the identification of what lives there, where it is, in what relationships. Studies of changes in these patterns and of the effects of man's actions are dependent on these basic descriptive studies.

The Smithsonian proposes to plan R/V Phykos cruises, each involving scientists as they become available, from many United States research institutions, to provide guidelines which will serve to coordinate individual research projects, and to draw together the results to provide the most meaningful picture of the Mediterranean. The cruises will operate primarily with Yugoslav Dinar support, but Tunisia will also serve as an alternate port of call (see Item #112 above). An initial list of the interests of institutions proposing to participate follows:

--University of Southern California

Dredging, drilling to extract long cores, and grabbing samples from the sea bottom to study microscopic sea life and fossils of such life.

--National Museum of Natural History, Smithsonian Institution

Deep sea dredging to study recent changes in the distribution of life on the bottom of the sea through study of the changing shape of the highly adaptable animal, the ostracod, a microscopic shrimp like animal which has survived throughout most geological eras.

--Duke University, Durham, North Carolina

Bi-monthly cruises to collect samples for the study of the development, distribution and biology of crab larvae.

--Washington State University

Biological sampling for studies of the paleontology of Pteropods, a kind of snail. The study of the fossils of these animals is particularly important because, through geological time, they were carried over wide areas by ocean currents and thus their distribution reveals the changing shape of the ocean floor, the history of ocean currents and atmospheric conditions, and the directions of present-day continental drift.

--University of North Carolina

Isolation and study of pure cultures of marine fungi. Fungus thrives by living off of other living organisms and is of special importance because it attacks commercially useful marine life.



--National Museum of Natural History, Smithsonian Institution

Plankton tows for studies of planktonic foraminifera. The microscopic one-celled animals which float in the ocean are collected in fine nets towed behind research vessels. These animals form part of the broad base of the pyramid of life in the sea.

--Florida State University

Sampling for studies of deep sea biology and geology. The shape and make-up of the sea floor and the special forms of life which survive at great depths are the subject of these studies.

--University of Delaware

Towing plankton samplers to study the vertical distribution of cosomatous pteropods in relation to water masses. These animals are useful as indicators of varying oceanographic conditions like major currents like the Gulf Stream.

--University of California

Sampling deeper than 200 meters to describe and map the distribution of marine mites, scavengers living mostly near the shore.

--Division of Fishes, National Museum of Natural History, Smithsonian Institution

Long line fishing for several hundred specimens for a study of the distribution of the common sharksucker.

--University of North Carolina

Trawling, gill net, and long line collection of samples for systematic and distribution studies of sharks and their relatives.

--Department of Invertebrate Zoology, Smithsonian Institution

Mid-water trawling for studies of the systematics, distribution and ecology of pelagic Cephalopods, squids living in the open sea.

--Department of Paleobiology, Smithsonian Institution

Dredging, drilling to extract long cores and bottom photography to study the history of the ocean floor through study of the shape and composition of sediments and the sea bottom covered by the sediments.

--Massachusetts Institute of Technology

Deep lowerings of coring and grab sampling equipment for study of the deepest Mediterranean geological structures.





--Woods Hole Oceanographic Institution, Massachusetts

Submersible dives to explore the water transport over the Scarpanta sill in the Eastern Mediterranean. Sills limit the interchange of water and the life in it between basins in the sea.

--University of New Hampshire

Ecology of deep sea animals.

--Lamont-Doherty Geological Observatory, Columbia

Ecology of microscopic animals with skeletons.

--University of Georgia

Distribution of organic chemicals and trace elements which foster or limit plant and animal growth in the sea.

<u>U.S. Dollar Equivalent in Yugoslav Dinars</u>	FY 1973 est.	220,000
	FY 1972 est.	220,000
	FY 1971	231,500
	FY 1970	39,200

<u>117. Institution</u>	<u>Title of Project</u>
Dartmouth College Hanover, New Hampshire	"Studies of the Ecology of Lake Ohrid and its Drainage Basin"

This proposed study will examine the complex relationships among the activities of man, the animals, plants and fish as well as the geology of the drainage basin of Lake Ohrid in southern Yugoslavia. The lake has already been the site of basic descriptive studies of the fish and their evolution by the father of Yugoslav ecology Professor S. Stankovic, providing a firm base for studies leading to better management of man's environment.

<u>U.S. Dollar Equivalent in Yugoslav Dinars</u>	FY 1973 est.	100,000
	FY 1972 est.	10,000

<u>118. Institution</u>	<u>Title of Project</u>
Office of Environmental Sciences Smithsonian Institution Washington, D. C.	"A Cooperative Program in Environmental Management at Lake Skadar"

An aluminum plant is planned for construction in the drainage basin of Lake Skadar. A drainage tunnel is proposed to carry waters from the lake to the Adriatic Sea. Tourism is expanding and sport fishing is taking over larger numbers of fish from the lake. Basic studies are proposed of the current biological status of the lake as well as studies to monitor the impact of these man-made "disturbances" on the health of the area.



U. S. Dollar Equivalent in Yugoslav Dinars

FY 1973 est. 200,000

FY 1972 est. 10,000

119. Institution

Title of Project

Duke University  
Durham, North Carolina

"Conference on Larval Forms"

In studying many animals, particularly marine animals, it is not possible to limit investigations to adult forms of the animals owing to the fact that many animals pass through several stages in their life cycles, often markedly different. This conference aims to bring together specialists in larval forms of certain marine animals in order to compare knowledge and techniques. Publishable proceedings are expected to result.

U. S. Dollar Equivalent in Yugoslav Dinars

FY 1972 est. 30,000

120. Institution

Title of Project

National Museum of Natural History,  
Smithsonian Institution  
Washington, D. C.

"Population Dynamics of  
Certain Ducks (Anatidae)  
in Adriatic Nesting Areas"

The great water basins of Yugoslavia are rich with ducks. Up to 35 species are found at appropriate seasons of the year. However, both hunting and the encroachment of human development upon the nesting areas of these ducks is responsible for reduction in their numbers. This project is envisaged as part of an international effort to understand the distribution and behavior of these European ducks in order to suggest more rational means of protecting these economically important species.

U. S. Dollar Equivalent in Yugoslav Dinars

FY 1973 est. 20,000

121. Institution

Title of Project

Clark University  
Worcester, Massachusetts

"Marine Copepods in the Bay  
of Trieste"

Marine copepods are small crustaceans which may prove to be significant, beyond the intrinsic interest of identifying the species and distribution of these animals, as indicators of the degree of pollution in certain waters. Heavily polluted waters have shown a certain density and distribution of these animals; the same holds true in less polluted waters, according to some previous studies, notably one carried out in the Lake of Tunis. This study aims to pursue the hypothesis that these small animals can be studied as one of the important indicators of the degree of pollution.

U. S. Dollar Equivalent in Yugoslav Dinars

FY 1973 est. 6,000



122. <u>Institution</u>	<u>Title of Project</u>
University of Michigan Ann Arbor, Michigan	"Interspecific Competition and Communication in Intertidal Hermit Crabs"

One of the insights of modern biology has been that species often compete for the same food and dwelling space. The species which excels at this sort of competition is likely to displace the species which is less efficient in this respect; this is one of the principal mechanisms of evolution. The study aims to document a particular instance of this competition between species in nature, in this case, two species of hermit crabs in Yugoslav waters. The study has not only theoretical implications for a better understanding of organic evolution, but will document the biology and distribution of the crabs being studied.

U.S. Dollar Equivalent in Yugoslav Dinars          FY 1973 est.    7, 440

123. <u>Institution</u>	<u>Title of Project</u>
University of Maine Farmington, Maine	"A Bat <u>Fauna</u> of Yugoslavia"

Bats have long been understood to be among the most important of species deserving study. Although they fly, they are not birds but mammals. In their adaptation to their environment, their guidance systems seem to be equally important with their unusual (for mammals) methods of locomotion. This study will document the rich Yugoslav fauna of bats which is little known to American investigators working in the field.

U.S. Dollar Equivalent in Yugoslav Dinars          FY 1973 est.    12, 560

## X. MULTI-COUNTRY BIOLOGY PROJECTS

### a. On-Going and Pending Multi-Country Biology Projects

124. <u>Institution</u>	<u>Title of Project</u>
Library, Smithsonian Institution, Washington, D. C.	"Translation and Publications of Reference Works and Mono- graphs Through the National Science Foundation's Translation Program"

The science of other nations is frequently locked out of reach of United States' scholars because research results appear only in a foreign language. Wastful duplication often results and the insights of others are simply not available. Translation on a continuing basis of works appearing in other languages is therefore essential. Particularly important, for example, is the translation of the Flora of the USSR which can be of direct importance to a similar study in North America because the plants of the regions around the North



Pole are similar. The Smithsonian is able to contract for the translation of essential scientific works in one of the "excess currency" countries through a transfer of foreign currencies to the regular National Science Foundation scientific translation program.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	10, 000
	FY 1972 est.	10, 000
	FY 1971	10, 000
	FY 1970	5, 000

<u>U. S. Dollar Equivalent in Polish Zloties</u>	FY 1973 est.	10, 000
	FY 1972 est.	10, 000
	FY 1970	10, 000

<u>U. S. Dollar Equivalent in Yugoslav Dinars</u>	FY 1973 est.	10, 000
	FY 1972 est.	10, 000
	FY 1970	10, 000

<u>125. Institution</u>	<u>Title of Project</u>
U. S. National Committee for the International Biological Program, National Academy of Sciences Washington, D. C.	"USIBP Training, Symposia, and Research Development in the ' Excess Currency' Countries"

The International Biological Program seeks to promote the study of nature's productive process particularly by focussing talent and money on problems which can not readily be studied in any one nation. The U. S. contribution is a series of complex studies of entire climatic regions like temperate forests and grasslands or tropical forests or deserts. Studies initiated in the U. S. are of substantially greater value if they can be compared with carefully prepared parallel studies in other parts of the world. Smithsonian PL-480 funds have contributed to the development of a number of such parallel studies. The first such study is at present under review by the Smithsonian's Foreign Currency Program. It is called "Systems Analysis of the Pre-Saharan Ecosystem of Southern Tunisia" and is comparable to the desert studies being pursued in the U. S.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	20, 000
	FY 1972 est.	20, 000
	FY 1971	10, 000

<u>U. S. Dollar Equivalent in Polish Zloties</u>	FY 1973 est.	20, 000
	FY 1972 est.	20, 000
	FY 1971	10, 000

<u>U. S. Dollar Equivalent in Yugoslav Dinars</u>	FY 1973 est.	20, 000
	FY 1972 est.	20, 000
	FY 1971	10, 000





## C. ASTROPHYSICS AND EARTH SCIENCES

### I. EGYPT

#### a. On-Going and Pending Astrophysics and Earth Sciences Projects in Egypt

<u>126. Institution</u>	<u>Title of Project</u>
Smithsonian Astrophysical Observatory, Cambridge, Massachusetts	"Research in Theories of Planetary Motion"

This project involves the use of computer facilities already existing in Egypt to test a theory which may better explain the movements of the planets in our solar system, including the motion of the earth. This is a cooperative venture between American and Egyptian scientific investigators.

<u>U. S. Dollar Equivalent in Egyptian Pounds</u>	FY 1973 est.	20,000
	FY 1972 est.	20,000
	FY 1971	23,634

#### b. New Astrophysics and Earth Sciences Projects in Egypt

<u>127. Institution</u>	<u>Title of Project</u>
University of Texas Austin, Texas	"Libyan Desert Glass Occurrence"

Tektite, or natural "glass", occurs many places in the world, and theories vary whether the origin of this glass comes from impact, fusion at high temperatures, volcanic action, or even from an extraterrestrial source such as meteorites. In one of the most remote areas on the face of the earth--the region near the borders of Egypt, Libya, and the Sudan--tektites are strewn over a broad region. This project, in cooperation with the Egyptian Geological Survey, will pay one or several visits to the area, as needed, in an attempt to establish the nature and origin of this Libyan Desert "glass".

<u>U. S. Dollar Equivalent in Egyptian Pounds</u>	FY 1973 est.	22,193
	FY 1972 est.	2,391

### II. INDIA

#### a. On-Going and Pending Astrophysical and Earth Sciences Projects in India

<u>128. Institution</u>	<u>Title of Project</u>
Smithsonian Astrophysical Observatory, Cambridge, Massachusetts	"Multi-color Photoelectric Observations of Flare Stars at the Uttar Pradesh State Observatory"



Flare stars are stars discovered relatively recently which produce irregular increases in surface brightness for a few seconds. Such flares show similarities with those on the surface of our sun, though some are considerably more luminous. This study will assist in determining the causes of these currently little understood flares.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	12, 000
	FY 1972 est.	9, 000
	FY 1971	9, 000

129. Institution Title of Project

Harvard University and Smithsonian Astrophysical Observatory Cambridge, Massachusetts	"Thermal Emission and Absorption of Diatomic Molecules"
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This study aims to determine the physical constituents of late-type stars. By reproducing in the laboratory what they think is happening on the star, and observing the corresponding lines in the spectrum produced by each type of molecule, astronomers are then able to confirm the existence of given molecules by looking at the spectrum produced by the star in nature. Diatomic molecules are molecules consisting of two atoms. Some of the chemical elements common on the earth are composed of this type of molecule.

<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	20, 000
	FY 1972 est.	20, 000

130. Institution Title of Project

Smithsonian Astrophysical Observatory, Cambridge, Massachusetts	"Studies in Geodesy, Geophysics, and Celestial Mechanics at the Naini Tal Observing Station "
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This project is intended to continue, using foreign currencies, a program of cooperation between the Smithsonian Astrophysical Observatory and the Naini Tal Observing Station in India that has gone on since 1958. Naini Tal has served as one of SAO's global network of stations tracking satellites for NASA. The SAO tracking effort has already resulted, for example, in data which provide a mathematical description of this planet's deviations from a perfect sphere as well as much of what is known of atmospheric densities above 200 km.

U. S. Dollar Equivalent in Indian Rupees	FY 1973 est.	20, 000
	FY 1971	2, 000

131. Institution Title of Project

University of Hawaii Honolulu, Hawaii	"Gravity Studies in India"
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Studies of the force of gravity in various parts of the earth show variations. Measurement of these variations makes possible interpretation of the composition and density of the materials beneath the surface of the



earth, and are thus an important element in the exploration for oil and minerals. These explorations are especially important in a developing country such as India. In addition, India is an area where data are deficient which would contribute to the world-wide tabulation of data on the solid-earth environment. The data to be collected during this study would help to fill important gaps in global gravity data.

<u>U.S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	20,000
	FY 1971	2,000

<u>132. Institution</u>	<u>Title of Project</u>
Smithsonian Astrophysical Observatory Cambridge, Massachusetts	"Atmospheric Measurements Through Radio Tropospheric Scatter Techniques"

The Troposphere is a layer of the earth's atmosphere below the stratosphere, about 7 to 10 miles above the surface of the earth, where temperature decreases rapidly with altitude. In this study, radio signals will be sent between two different points in India; as these signals pass through the troposphere its properties will become better understood by its effects on the radio waves. This study will yield data on how the troposphere refracts (or bends) the waves, on atmospheric layer formation, and on wind speeds at these levels. This data can result in significant improvement of the operation of the Smithsonian Astrophysical Observatory's Satellite Tracking System.

<u>U.S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	20,750
	FY 1972 est.	20,300
	FY 1971	1,500

<u>133. Institution</u>	<u>Title of Project</u>
University of California San Diego, California	"The Effects of Cosmic Rays on Terrestrial and Extra-Terrestrial Materials"

In the atomic age the effects of radioactivity have become well known; the rate at which radioactive materials change into inert, stable materials can be measured, and hence the amount of stable material in a given substance provides information about its age--how long it has taken the radioactive material to change into inert material at the known rate of change. This study aims to look at radiation effects in substances both from outside the earth's atmosphere (meteorites) and those recovered from the earth (geological and archeological specimens) in an effort both to determine other effects of radiation. The kinds of analysis contemplated are similar to many of the studies which have been made of lunar samples brought back to the earth by the American Astronauts.

<u>U.S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	8,000
	FY 1972 est.	4,000



134. <u>Institution</u>	<u>Title of Project</u>
Harvard University Cambridge, Massachusetts	"Studies of the Excitation Processes in Stellar, Planetary and Cometary Atmospheres"

The processes which produce "excitation," or release of energy, provide important information about the processes going on in the atmospheres of stars, planets, and comets. This is a laboratory study which will simulate processes believed to be taking place in different celestial atmospheres; the results obtained can then be compared with what is actually happening in nature.

U. S. Dollar Equivalent in Indian Rupees                      FY 1973 est.    41,700

b. New Astrophysics and Earth Sciences Projects in India

135. <u>Institution</u>	<u>Title of Project</u>
Iowa State University Ames, Iowa	"Stratigraphy and Geology of Siwalik Deposits"

The Siwalik hills of Northwest India are famous for their fossil-bearing beds. Some of the major discoveries of modern paleontology have come from these fossil-bearing strata. The present project aims to increase our knowledge of the stratigraphy and geology of these hills. The Principal Investigator has had experience, having served as a staff geologist on a Yale University expedition which discovered major primate fossils in the Siwalik Hills several years ago.

U. S. Dollar Equivalent in Indian Rupees                      FY 1973 est.    30,000

III. ISRAEL

a. On-Going and Pending Astrophysics and Earth Sciences  
Projects in Israel

136. <u>Institution</u>	<u>Title of Project</u>
Smithsonian Astrophysical Observatory Cambridge, Massachusetts	"An Astronomical Observing Program in Israel"

This observing program in Israel will accumulate valuable data gathered at the same latitude and approximately half way around the world from the U. S. which can be profitably compared with similar data gathered by observatories in the Western Hemisphere. The location of comparable observing programs in Israel and the United States makes possible continuous observation of certain celestial phenomena as the earth rotates. Individual projects included in the program, on which a number of United States institutions will co-operate with the Smithsonian, are set forth separately, as follows:





- a) U. S. Navel Research Laboratory, Washington, D. C. and Massachusetts Institute of Technology "To Conduct Optical and Photoelectric Monitoring of X-ray Sources"

Certain types of stars and other heavenly bodies emit x-rays. This study aims to photograph selected sources of these rays and measure the intensity of the light they produce. Normally these types of x-rays do not penetrate the earth's atmosphere and are therefore studied through artificial satellites. This study will make observations at the same time as the satellites and the two observations can then be compared, resulting in a more accurate knowledge of the physical processes involved.

- b) California Institute of Technology "To Conduct Photoelectric Monitoring of the Continuum and Line Emission from Quasi-Stellar Objects (QSO) and the Nuclei of N-Type Galaxies"

Photoelectric monitoring involves the measurement of light intensity electrically. Light intensities are measured as they appear in the colored bands contained in the spectra produced by given celestial bodies. Quasi-stellar objects (often called quasars) are highly compacted bodies, first discovered as the sources of radio emissions. By measuring the light intensities in the spectra produced by these bodies we learn more about the nature of the physical processes involved in these unusual conglomerations.

- c) Smithsonian Astrophysical Observatory "To Conduct a High-Dispersion Abundance Analysis of Stars in the Pleiades"

Abundance analysis involves determination of the relative quantities of chemicals to be found in given types of heavenly bodies. The Pleiades is a typical star cluster. It is now assumed that the formation of all the stars in a cluster does not take place at the same time, but may be spread out over intervals of about ten million years; and it is also assumed that those stars formed earliest would be on the outskirts of the cluster. By examining the chemical elements in different stars of the cluster, this study will be able to test this hypothesis.

- d) State University of New York at Stony Brook "To Determine the Rate of Star Formation in Young Clusters"

Using photoelectric measurements, this study aims to calculate the age of individual stars in star clusters from which the rate of star formation can be determined. The study will also measure the velocity of rotation of each star and determine how that velocity changes with the age of the star. It is believed that sudden changes



in the star's rotation velocity could indicate that planets are being formed (any star throwing off planets would tend to slow down, in accordance with the laws of physics.)

e) Harvard College Observatory Cambridge, Massachusetts	"To Conduct Photometric Observations of the High Balmer Lines (Near the Balmer Limit) and the Balmer Continuum in Planetary Nebulas"
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The series of lines in the spectrum which are produced by hydrogen are called Balmer Lines. The present study aims to resolve, by the analysis of these lines of the spectrum, the divergent results which have been obtained in the study of these nebulas by radio and by optical means.

<u>U. S. Dollar Equivalent in Israeli Pounds</u>	FY 1972	70,000
	FY 1971	142,990
	FY 1970	275,200

<u>137. Institution</u>	<u>Title of Project</u>
Smithsonian Astrophysical Observatory, Cambridge, Massachusetts	"A Study of the Collective Behavior of Self-Gravitating Systems"

This is a mathematical study being conducted with Israeli astronomers which attempts to understand the mathematical laws governing the evolution of galaxies, and why star systems like the one including our own earth do not collide.

<u>U. S. Dollar Equivalent in Israeli Pounds</u>	FY 1971	15,270
	FY 1970	13,450
	FY 1969	5,400
	FY 1968	41,810

<u>138. Institution</u>	<u>Title of Project</u>
Smithsonian Astrophysical Observatory	"The Construction of Stellar Models of Evolving Stars"

This is a cooperative study with Israeli astronomers which is concerned with the life and death cycles of stars of varying sizes. Through such research may come the science needed to predict the future of our own sun, upon whose stable energy output we are totally dependent.

<u>U. S. Dollar Equivalent in Israeli Pounds</u>	FY 1971	13,880
	FY 1970	11,200
	FY 1969	27,270



#### IV. PAKISTAN

- a. On-Going and Pending Astrophysics and Earth Science Projects  
None
- b. New Astrophysics and Earth Sciences Projects in Pakistan

139. <u>Institution</u>	<u>Title of Project</u>
University of Hawaii Honolulu, Hawaii	"Compilation of Surface Geophysical Data on a National Level"

The preliminary to any type of research is the compilation of data already existing. This project aims to compile, supplement where necessary with direct observation and integrate the various available geophysical data on Pakistan. This data will be correlated to existing satellite geophysical data. The result will be of considerable benefit in the planning and utilization of natural resources.

U. S. Dollar Equivalent in Pakistani Rupees      FY 1963 est.    30,000

#### V. POLAND

- a. On-Going and Pending Astrophysics and Earth Sciences  
Projects in Poland

140. <u>Institution</u>	<u>Title of Project</u>
Smithsonian Astrophysical Observatory Cambridge, Massachusetts	"Solar Radiation Pressure Perturbations upon the Passive Geodetic Earth-Orbiting Satellite(PAGEOS)"

Passive Geodetic Earth-Orbiting Satellite (PAGEOS) is actually a large balloon which was lifted into orbit in 1966. This satellite, being both large and light in weight, is very sensitive to changes in solar radiation. By means of this project it is hoped to utilize some of the considerable expertise in this field which already exists in Poland in the analysis of data obtained by PAGEOS. Polish scientists have been pre-eminent in astronomy and astrophysics since the time of Copernicus and cooperative projects in Poland are expected to be especially valuable.

U. S. Dollar Equivalent in Polish Zolties      FY 1973 est.    72,000

141. <u>Institution</u>	<u>Title of Project</u>
Smithsonian Astrophysical Observatory	"Air Glow and Ionospheric Characteristics at the Magnetic Equator"

Air glow is the faint illumination in the night sky caused by certain physical processes in the upper atmosphere. The ionosphere is a layer of the upper atmosphere consisting of ionized atoms (ions are



atoms with missing electrons). Radio waves are directed into the ionosphere and are reflected back by the ionosphere; in the process the properties of the ionosphere, through which artificial satellites must pass into outer space, are better understood.

U. S. Dollar Equivalent in Polish Zloties                      FY 1973 est.    18, 000

b. New Astrophysics and Earth Sciences Projects in Poland

<u>142. Institution</u>	<u>Title of Project</u>
Smithsonian Astrophysical Observatory	"Geophysical Studies Employing Long Base-Line Interferometry Techniques"

"Very long base line interferometry" refers to measurements made simultaneously from two different points, say, from a station in Poland and another one in America. Such observations taken from different points reveal important facts about continental drift, polar wandering, and satellite tracking. Facts about the earth's deviation from a true sphere can also be ascertained in this fashion.

U. S. Dollar Equivalent in Polish Zloties                      FY 1973 est.    46, 000

<u>143. Institution</u>	<u>Title of Project</u>
Smithsonian Astrophysical Observatory	"The Nature of Stellar Atmospheres"

All stars have atmospheres consisting (as in the case of our sun) of mostly hydrogen, helium, and some other elements. This study aims to utilize the considerable Polish astronomical expertise in this field in obtaining new knowledge about the nature of the atmospheres of particular stars and how they differ from those of other stars and from the atmosphere of our sun.

U. S. Dollar Equivalent in Polish Zloties                      FY 1973 est.    30, 000

<u>144. Institution</u>	<u>Title of Project</u>
Smithsonian Astrophysical Observatory	"Contributions to the International Satellite Geodesy Experiment"

The International Satellite Geodesy Experiment is a cooperative international program of satellite observation which is engaged in studies seeking to determine the true shape of the earth. A number of countries, including Poland, are tracking the same satellites being tracked by the United States. This project aims to exchange and analyze comparative data gathered in the course of these satellite-tracking efforts.

U. S. Dollar Equivalent in Polish Zloties                      FY 1973 est.    30, 000





## VL TUNISIA

### a. On-Going and Pending Astrophysics and Earth Sciences Projects in Tunisia

145. <u>Institution</u>	<u>Title of Project</u>
Duke University Durham, North Carolina	"Sedimentation Studies at Bahiret El Bibane on the Tunisian Coast"

Sedimentation, the process by which many of the geological strata under the earth were formed, is a process which is still going on today. A lagoon located in South Tunisia affords an unusual opportunity to study the process. An understanding of sedimentation and sedimentary strata already formed in the geological past is indispensable for any systematic exploration for oil or minerals beneath the surface of the earth. The Principal Investigator hopes to obtain data which can be compared with data already gathered in the Bahamas.

<u>U. S. Dollar Equivalent in Tunisian Dinars</u>	FY 1973 est.	10,000
	FY 1972	8,794

### b. New Astrophysics and Earth Sciences Projects in Tunisia

146. <u>Institution</u>	<u>Title of Project</u>
Case Western Reserve University Cleveland, Ohio	"Paleomagnetic Research on the Permian and Triassic Ages in Tunisia "

So-called "red beds" from the Permian and Triassic geologic ages in Tunisia are considered important in filling in the total picture of the past geologic ages of the earth. Collections are contemplated which would complement and complete work already done on this age by the Principal Investigator.

<u>U. S. Dollar Equivalent in Tunisian Dinars</u>	FY 1973 est.	42,000
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## VII. MULTI-COUNTRY

### a. On-Going and Pending Multi-country Astrophysics and Earth Sciences Projects

147. <u>Institution</u>	<u>Title of Project</u>
Center for Short-Lived Phenomena Smithsonian Institution Washington, D. C. and Cambirdge, Massachusetts	"Excess Currency Support for the Center for Short-Lived Phenomena"



The Center for Short-Lived Phenomena is a clearing house for the receipt and dissemination of information concerning rare or infrequent natural events that might otherwise go unobserved or uninvestigated: remote volcanic eruptions, the birth of new islands in the ocean, the fall of meteorites, large fire balls, sudden changes in biological or ecological systems, and so on. With today's concern for the natural environment, the Center for Short-Lived Phenomena serves an indispensable need of the entire American scientific community, since it collects and disseminates information about natural events while they are happening and makes it possible in many cases for scientists throughout the country to study them while they are happening. The utility of this is obvious in the case of phenomena such as erupting volcanoes, tidal waves, plagues of locusts, and similar occurrences which can have such a drastic impact on man and his environment. If the nature of some of these phenomena were better understood preventive measures could be more readily applied.

<u>U.S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	3,000
	FY 1972	3,000
<u>U.S. Dollar Equivalent in Yugoslav Dinars</u>	FY 1973 est.	3,000
	FY 1972	3,000
U.S. Dollar Equivalent in Polish Zloties	FY 1973 est.	3,460



## D. MUSEUM PROGRAMS

### I. EGYPT

#### a. On-Going and Pending Museum Programs in Egypt

None.

#### b. New Museum Programs in Egypt

148. <u>Institution</u>	<u>Title of Project</u>
United States National Museum Smithsonian Institution Washington, D. C.	"Film Documentation of Field Expeditions."

Most of the projects funded by the Smithsonian Foreign Currency Program are involved in one way or another with the collection of data. A neglected aspect of documentation in this age of the media has been the recording of essential aspects of field projects on film. Because of its variety of highly visible archeological projects, Egypt has been selected for a pilot project of filming various aspects of a number of Smithsonian-supported field projects. The resulting film will be retained not merely as essential project documentation--much as field notes, drawings, maps, and still photographs are regularly retained as project documentation--but also for use in public education programs in the Smithsonian and other museums and also in the schools.

<u>U. S. Dollar Equivalent in Egyptian Pounds</u>	FY 1973	50,000
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### II. INDIA

#### a. On-Going and Pending Museum Programs in India

149. <u>Institution</u>	<u>Title of Project</u>
United States National Museum Smithsonian Institution Washington, D. C.	"Development of a Teaching Museum of Science and Technology."

The purpose of this project is to assist, under the U.S. National Museum Act, with museum expertise and support the program of the International Council of Museums (ICOM), a UNESCO affiliate, to develop teaching museums of science and technology in Asia and Africa. For example, the Smithsonian contributed in FY 1969 to studies resulting in recommendations to ICOM that there be established in India a laboratory for basic exhibits in science and technology where teaching exhibits will be built for circulation in industrializing countries. The experiment will provide opportunities to American museum specialists to observe the effectiveness of exhibits in teaching basic science and technology to people of all cultural backgrounds.



This project grew out of a resolution of the UNESCO affiliated International Council of Museums to establish a regional museum laboratory to design and produce teaching exhibits needed by developing countries. This laboratory would develop exhibits which for example, would graphically show semi-literate agricultural populations the effect on crops of new techniques as compared to traditional methods. Participating American museum specialists would evaluate the effectiveness of various museum techniques in teaching basic science to people of varying cultural backgrounds who are in the process of developing and improving their societies and ways of doing things.

<u>U.S. Dollar Equivalent in Indian Rupees</u>	FY 1973	80,000
	FY 1971	3,554
	FY 1970	13,450
	FY 1969	5,400
	FY 1968	41,810

150. <u>Institution</u>	<u>Title of Project</u>
Smithsonian Institution Traveling Exhibition Service (SITES) and the Smithsonian's National Collection of Fine Arts (NCFA) Washington, D. C.	"Preparation of an Exhibit Catalogue for a Unique Collection of Indian Paintings of the Moghul Period."

SITES gathers exhibitions from the United States and abroad and circulates them at cost to American museums and other institutions. One of the objectives of SITES is to bring to the United States exhibitions of art and other cultural manifestations of foreign lands which would otherwise be little known to us. One such project would be the bringing of the great collection of miniature paintings from the Moghul period and related items from the pre-British Muslim monarchies of India, from the museum of Benares Hindu University to the United States. The Special Foreign Currency Program support would be applied to the curatorial research and preparation of a scholarly catalogue of the collection. American museums throughout the country are interested in present exhibitions such as this which they could not easily obtain except through SITES.

<u>U.S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	5,000
	FY 1972 est.	5,000

b. New Museum Programs in India

151. <u>Institution</u>	<u>Title of Project</u>
Division of Performing Arts Smithsonian Institution Washington, D. C.	"Live Performances of Traditional Indian Performing Arts by Indian Artistic Troupes."





The Smithsonian's Division of Performing Arts has become justly famous for making better known living examples of American traditional songs and dances, notably through its annual Festival of Folk Life held on the Mall of the nation's capital around July 4 each year. It is proposed in this project to bring to America for live performances troupes of Indian artists capable of making India's traditional song and dance live here. Such troupes would be able to support themselves through engagements in this country. The funds requested here would be used to locate in India suitable troupes and to make appropriate arrangements there for the particular performances wanted and to bring the groups to America.

U.S. Dollar Equivalent in Indian Rupees

FY 1973 est. 10,000

III. PAKISTAN

a. On-Going and Pending Museum Programs in Pakistan

None.

b. New Museum Programs in Pakistan

152. Institution

Title of Project

Smithsonian Institution Traveling  
Exhibition Service  
Washington, D. C.

"An Exhibition of Pakistani  
Ethnographic Materials and  
Accompanying Scholarly  
Catalogue."

It is proposed that SITES circulate examples of the traditional arts and crafts of Pakistan. This project would support the preparation of a catalogue to accompany the circulating exhibition and would support the curatorial work required to select and describe the materials to be included. This exhibit would be presented by a number of American museums around the country.

U.S. Dollar Equivalent in Pakistani Rupees

FY 1973 est. 20,000

IV. POLAND

a. On-Going and Pending Museum Programs in Poland

153. Institution

Title of Project

National Museum of History and  
Technology  
Smithsonian Institution  
Washington, D. C.

"Preparation of Ethnographic  
Materials to Supplement National  
Collections."

The Smithsonian was given last year a small collection of ethnographic materials (Costumes, household objects, etc.) by the Polish Embassy at



Washington. The Polish Embassy has offered to expand this collection to make it suitable for circulation by SITES, and thus make it available to many other American museums; and also for study by the Museum of History and Technology. This project would provide support for a curator to study and collect in Poland the necessary materials to augment the basic collection and to transport these materials and those provided by the Government of Poland to the Smithsonian.

U.S. Dollar Equivalent in Polish Zloties                      FY 1973 est.    10,000

b. New Museum Programs in Poland

154. <u>Institution</u>	<u>Title of Project</u>
National Museum of History and Technology Smithsonian Institution Washington, D. C.	"Ethnographic Collections for U.S. Bicentennial Exhibits Based on the Culture of Immigrant Americans."

As a part of the preparations for the U.S. Bicentennial exhibitions, the Museum of History and Technology will be preparing studies of the principal cultures of origin of immigrant Americans and making collections of ethnographic materials illustrating this cultural heritage. Studies and collections from Poland would be supported by the Special Foreign Currency Program.

U.S. Dollar Equivalent in Polish Zloties                      FY 1973 est.    5,000

V. YUGOSLAVIA

a. On-Going and Pending Museum Programs in Yugoslavia

None

b. New Museum Programs in Yugoslavia

155. <u>Institution</u>	<u>Title of Project</u>
National Museum of History and Technology Smithsonian Institution Washington, D. C.	"Ethnographic Collections for U.S. Bicentennial Exhibits Based on the Culture of Immigrant Americans."

As a part of the preparations for the U.S. Bicentennial exhibitions, the Museum of History and Technology will be preparing studies of the principal cultures of origin of immigrant Americans and making collections of ethnographic materials illustrating this cultural heritage. Studies and collections from Yugoslavia would be supported by the Special Foreign Currency Program.

U.S. Dollar Equivalent in Yugoslav Dinars                      FY 1973                      5,000



## VI. MULTI-COUNTRY

### a. On-Going and Pending Multi-Country Museum Programs

156. <u>Institution</u>	<u>Title of Project</u>
United States National Museum, Smithsonian Institution, and American Association of Museums Washington, D. C.	"A Program of Professional Museum Exchanges."

The purpose of this project is to initiate a program of professional training for museum curators and technicians in collaboration with museums of India, Pakistan, Poland and Egypt, through two-way exchanges of personnel for on-the-job training. Participants would be expected to serve at least six months in a museum housing collections of direct importance to their professional development.

<u>U. S. Dollar Equivalent in Egyptian Pounds</u>	FY 1973 est.	20,000
	FY 1972 est.	15,540
<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	25,000
	FY 1972 est.	25,000
<u>U. S. Dollar Equivalent in Pakistani Rupees</u>	FY 1973 est.	10,000
<u>U. S. Dollar Equivalent in Polish Zloties</u>	FY 1973 est.	20,000
	FY 1972 est.	14,460



E. GRANT ADMINISTRATION

<u>157. Institution</u>	<u>Title of Project</u>
Office of International Activities Foreign Currency Program Smithsonian Institution Washington, D. C.	"To Defray Costs of Grant Administration Payable in Foreign Currencies."

In order to administer a national program of grants for research which is entirely conducted overseas, there is an irreducible minimum amount of time which must be spent on the ground in the countries abroad by program personnel. The program endeavors to keep administrative costs to a minimum but some are unavoidable. Some of the costs shown represent dollar savings (for example, for audit), since if the work were not done abroad at a cost in foreign currencies, it would have to be done in the U. S. at dollar cost. Administrative costs have remained a small percentage of the total program appropriation. For example, in Fiscal Years 1968, 1969, and 1970, when the appropriation remained constant at 2,316,000, the foreign currency costs for grant administration were 10,000, 15,000 and 20,000 respectively. A breakdown for costs and estimated costs for Fiscal Years 1971, 1972, and 1973, is as follows:

<u>U. S. Dollar Equivalent in Egyptian Pounds</u>	FY 1973 est.	3,000
	FY 1972 est.	3,000
<u>U. S. Dollar Equivalent in Indian Rupees</u>	FY 1973 est.	6,000
	FY 1972 est.	6,000
	FY 1971	8,000
<u>U. S. Dollar Equivalent in Israeli Pounds</u>	FY 1971	1,000
<u>U. S. Dollar Equivalent in Moroccan Dirhams</u>	FY 1971	1,000
<u>U. S. Dollar Equivalent in Pakistani Rupees</u>	FY 1973 est.	3,000
	FY 1972 est.	3,000
<u>U. S. Dollar Equivalent in Polish Zloties</u>	FY 1973 est.	3,000
	FY 1972 est.	3,000
<u>U. S. Dollar Equivalent in Yugoslav Dinars</u>	FY 1973 est.	6,000
	FY 1972 est.	6,000







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