

SMITHSONIAN INSTITUTION

Fiscal Year 1990

Justification of Estimates of Appropriations
To the Office of Management and Budget



ADMINISTRATIVELY CONFIDENTIAL

(Information not to be released until after the President's
Budget is submitted to the Congress in January 1989.)

September 1988

SMITHSONIAN INSTITUTION

FISCAL YEAR 1990

Justification of Estimates of Appropriations

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SMITHSONIAN INSTITUTION

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TREASURER •

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GENERAL COUNSEL •

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Office of Information Resource
Management
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Property Management
Office of Programming and Budget
Travel Services Office
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Office of Congressional Liaison •
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Office of Architectural History
and Preservation
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Joseph Henry Papers
National Zoological Park •
Office of American Studies
Office of Fellowships and Grants
Office of Quincentenary
Programs
Smithsonian Astrophysical Observatory
Smithsonian Environmental Research Center
Smithsonian Institution Archives
Smithsonian Institution Libraries
Smithsonian Tropical Research Institute

Assistant Secretary for MUSEUMS •

Anacostia Museum ••
Archives of American Art ••
Arthur M. Sackler Gallery and
Freer Gallery of Art ••
Conservation Analytical Laboratory ••
Cooper-Hewitt Museum ••
Hirshhorn Museum and Sculpture Garden ••
International Gallery
National Air and Space Museum ••
National Museum of African Art ••
National Museum of American Art ••
Renwick Gallery ••
National Museum of Natural History/
Museum of Man ••
National Portrait Gallery ••
National Postal Gallery ••
Office of Exhibits Central
Office of Horticulture
Office of Museum Programs
Office of the Registrar
Smithsonian Institution Traveling
Exhibition Service

Assistant Secretary for PUBLIC SERVICE •

National Science Resources Center
Office of the Committee for a
Wider Audience
Office of Conference Services
Office of Elementary and Secondary
Education
Office of Postlife Programs
Office of Interdisciplinary
Studies
Office of Public Affairs
Office of Telecommunications
Smithsonian Institution Press
Smithsonian Magazine
Smithsonian Studies
Visual Information and Associates
Reception Center

Assistant Secretary for EXTERNAL AFFAIRS •

Development Office •
Institutional Advancement •
Office of International
Relations
Office of Special Events
Smithsonian National Associate
Program
Smithsonian Resident Associate
Program

• Secretary's Management Committee

• The assistant secretaries for research and museums collaborate in the oversight of scholarly and presentational activities in these bureaus and offices

SMITHSONIAN INSTITUTION

FISCAL YEAR 1990 ESTIMATES OF APPROPRIATIONS

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SMITHSONIAN INSTITUTION
FY 1990 BUDGET REQUEST
(\$000's)

<u>APPROPRIATION</u> <u>ACCOUNT</u>	<u>FY 1989</u> <u>CONGRESSIONAL</u> <u>REQUEST</u>	<u>FY 1990</u> <u>REQUEST</u>
Salaries and Expenses	\$ 215,008	\$ 229,926
Instrumentation	1,206	2,176
Repair and Restoration	20,835	35,000
Construction	10,150	13,985
Zoo Construction	<u>5,305</u>	<u>8,100</u>
TOTAL	\$ 252,504	\$ 289,187

INTRODUCTION

Centered on the Mall in Washington, D.C., the Smithsonian Institution operates major facilities and activities throughout the country and overseas. It is one of the world's leading research centers and encompasses the world's largest museum complex. Each year it attracts millions of visitors to its museums, galleries, and zoological park. Many others also view the annual Folklife Festival and Smithsonian traveling exhibitions, which appear across the United States and abroad. As custodian of the National Collections, the Smithsonian possesses more than 134 million art objects, natural history specimens, and artifacts. The Institution displays many of the items in these collections for the enjoyment and education of visitors. These items are also available for research by the staff of the Institution and by hundreds of visiting students, scientists, and historians each year. Other significant study efforts draw their data and results directly from terrestrial, marine, and astrophysical observations at various Smithsonian installations.

The Smithsonian complex presently consists of 13 exhibition buildings on and near the Mall in Washington, D.C. and in New York City in the fields of science, history, technology, and art; a zoological park in Washington, D.C. and an animal conservation and research center near Front Royal, Virginia; the Anacostia Museum, which performs research and exhibit activities in a low income area of the city in cooperation with the community; a preservation, storage, and air and spacecraft display facility at Suitland, Maryland; two natural preserves, in Panama and on the Chesapeake Bay; an oceanographic research facility at Link Port, Florida; astrophysical stations in Massachusetts and Arizona; and supporting administrative, laboratory, and storage areas.

FY 1990 BUDGET HIGHLIGHTS

Budget formulation procedures developed last year integrated and strengthened the Institution's internal planning and budgeting processes. The better coordinated, more comprehensive process should lead to greater efficiency and effectiveness of resource allocation decisions. These principal steps of the process preceded decisions on the Institution's FY 1990 planning and budget priorities:

- Bureau and office directors submitted to members of the Secretary's Management Committee their plans and priorities for the next five years;
- Management Committee members assessed these plans relative to Institutional priorities and held meetings with bureau and office directors to explore pertinent issues;
- Management Committee members provided written feedback on plans and priorities and further planning guidance;
- The Management Committee reoriented the Institution's "Statement of Purpose and Goals" (Exhibit 1) and refined its management and program "Areas of Emphasis" (Exhibit 2) and reissued them to bureaus and offices to guide budget formulation;
- Bureaus and offices prepared FY 1990 budget requests; and
- The Secretary's Management Committee determined funding priorities based on the "Areas of Emphasis."

FY 1990 Budget Overview

The Smithsonian Institution's FY 1990 budget request for all accounts totals \$289.2 million, or \$34.9 million more than the planning target issued by the Office of Management and Budget for FY 1990. The Institution's FY 1990 budget again places increased emphasis on elevating the appropriation for the Repair and Restoration of Buildings account. The Institution must continue to eliminate the substantial backlog of deferred maintenance and repairs in its various facilities. The remainder of the request for increased resources will support the Institution's diverse long-term programmatic goals and cover various uncontrollable expenses. Following are more specific highlights of the FY 1990 budget request for each of the Institution's four appropriation accounts.

Salaries and Expenses

The Salaries and Expenses (S&E) request totals \$232.1 million and 4,476 work-years. This represents an increase of \$15.9 million and 200 workyears over the FY 1989 request to Congress.

The S&E request includes additional funds totaling \$4.4 million to cover basic "uncontrollable" cost increases for necessary pay, rent, utilities, postage, and communications. The remainder of the S&E request would allow \$11.5 million of program growth, with \$900,000 of this growth directly in support of the management of a much expanded facilities repair and restoration program. The distribution of this \$11.5 million among the Secretary's various "Areas of Emphasis" (Exhibit 2) is as follows:

<u>Area of Emphasis</u>	<u>Amount</u>
Management Initiatives	\$ 1,689,000
Research and Research Support	2,772,000
Museum Management and Public Services	4,071,000
Facilities	1,983,000
Administration	<u>986,000</u>
TOTAL	\$11,501,000

The following paragraphs profile some of the major initiatives in the requested S&E budget for these various areas.

Management Initiatives--Management, greatly committed to renewed affirmative action initiatives, expanded efforts to achieve diversity in the professional staff. A more diverse professional staff will shape future Smithsonian programs and exhibitions to reflect more accurately the Nation's cultural and ethnic composition. The Institution requests that additional resources substantiate several temporary positions, designated affirmative action, established during FY 1988 or projected for FY 1989.

The Institution also requests funds for related minority program initiatives. The Office of Museum Programs will conduct training on museum interpretation techniques to improve the depiction of cultural and artistic traditions. The National Museum of Natural History has embarked on a long overdue program to develop new Native American Halls to present its visitors with an accurate portrayal of North American Indians and their cultures. The Smithsonian Institution Traveling Exhibition Service will develop more affordable exhibitions that are socially responsible, culturally and ethnically diverse, and appealing to cross-cultural audiences.

Also, the National Air and Space Museum will establish an apprentice program. The program will employ high school graduates and enable the Museum to preserve and restore valuable artifacts while teaching the necessary skills to an aspiring new generation.

Research and Research Support--A major portion of the Institution's request for additional funding for research will enable the Astrophysical Observatory to continue two important projects involving the development of new and the reconfiguration of existing pieces of major scientific instrumentation. The construction of the submillimeter telescope array will allow SAO scientists to study more effectively the formation of stars and planetary systems and the puzzling processes taking place in the cores of galaxies and quasars. The conversion of the Multiple Mirror Telescope to a telescope with a single 6.5-meter diameter mirror will enable SAO to gather data on objects much fainter than is currently possible. The conversion of the MMT will also enable scientists to study more than twice as much of the universe than with the present instrument.

The request for "Research and Research Support" also includes staff and equipment for the new Barro Colorado Island (BCI) laboratory to be constructed in FY 1989 and FY 1990. For over 40 years, the Smithsonian Tropical Research Institute (STRI) has provided field research and logistical support for scientists from throughout the world to study at BCI. With the new laboratory fully-staffed and equipped, STRI will be in a strong position to fulfill its responsibilities to these researchers in tropical biology.

In addition, the Smithsonian requests funds to study the evolution of ecosystems. Staff at the Museum of Natural History will document and analyze fossil records of terrestrial ecosystems for plants and animals extant for 400 million years. Causes of mass extinction and changes in marine populations are other area of study that NMNH staff will undertake. As another component of their research, scientists will examine fossils and the effect that man has had on island ecosystems.

The Institution also requests funds for equipment replacement for several of its research bureaus. STRI has a world class cadre of scientists who consistently conduct forefront studies on evolution, ecology, and behavior of tropical plants and animals, including mankind. STRI's continued leadership in tropical biology depends on regular, cyclical replacement of worn or outdated scientific equipment. Similarly, the National Zoo, as a leading international center for animal exhibition and for biological and veterinary research, must also have a sound capability to purchase laboratory equipment.

Also, the National Zoo has embarked upon sophisticated new programs to replace the traditional cage-based, animal-oriented zoo with a more accurate reflection of the unity of both plants and animals. The Zoo's modern facilities need funds and staff to operate them.

Finally, research journals are the heart blood of communication between Smithsonian researchers and their colleagues worldwide. Smithsonian Institution Libraries collections attract well-known visiting scholars, fellows, researchers, and students to the Institution. The Libraries request funds to regain the capability to purchase such journals, which it has lost as the result of domestic and international inflation.

Museum Management and Public Services--Other components of the FY 1990 budget request direct themselves at providing better museum management and better services to the public. The Institution requests funds for its Collections Information System (CIS). This on-line system increases access to and improves accountability for the collections and improves inventory control. The Museums of American History, Natural History, and Air and Space and the Office of Information Resource Management have requests for their respective effort components for the new system.

The Institution also seeks funding for an Assistant Director for Public Programs at the Museum of Natural History. The primary responsibility of this position will be to integrate and strengthen exhibits and educational programs to enhance the total visitor experience. Also, to better serve the public and international sponsors, the Smithsonian must coordinate exhibition space more effectively. Additional staff for Office of Exhibits Central will better enable the Institution to oversee gallery spaces that are pan-institutional.

The National Museum of American History has had an increasingly severe space shortage for several years. Leased space for NMAH will house displaced collections while the Institution renovates the Museum and the Museum reinstalls major exhibit halls.

The Institution also requests funds for collections acquisitions. The Museum of African Art would acquire important works of art before prices escalate to colossal heights. With funds to acquire collections, the Anacostia Museum will seek to preserve the material culture of Black American history, both within the Smithsonian

and in other institutions. A stronger National Collection benefits scholarly research and public education.

The Smithsonian's Columbus Quincentenary Program will commemorate the voyages of Columbus and the subsequent encounter between European and indigenous peoples. One of the major goals of the Institution's program will be to highlight the experiences and contributions of all people touched by the Columbus landfall. For FY 1990, seven Smithsonian bureaus are seeking new resources to continue developing various Quincentenary programs.

Facilities--A significant portion of the S&E request reflects the Institution's expanded program for facilities repair and restoration. The Institution estimates that the current backlog of deferred repairs and other imminent major restorations totals \$197 million, and the Institution has not yet identified the total backlog in all buildings and facilities. In acknowledgement of this need, Congress substantially increased the Institution's funding for the Restoration and Renovation of buildings account in the last few years. The Institution is seeking a further expansion of this program in FY 1990. However, the expanded workload associated with this level of repair work is beyond the capability of existing staff. The Institution, therefore, requests additional funds to staff the various administrative offices affected by the expanded facilities repair program.

Administration--Among the most urgent of administrative needs are resources to implement the delegated examining authority for prospective job candidates. The Institution will integrate the civil service personnel processes with the Institution's own search procedures to fill vacancies in certain specialized professions and occupations more quickly. The Institution also requests resources to support demands in the areas of information, architectural history and preservation, procurement, legal services, data administration, and user support.

Repair and Restoration

The Smithsonian Institution is requesting \$35.0 million for its Repair and Restoration of Buildings (R&R) account. First, \$15,835,000 is for the Major Capital Renewal program to replace major building systems that are approaching the end of their useful lives. In addition, the Institution requests \$19,165,000 for Repair, Restoration and Code Compliance projects. Amounts requested in these two subaccounts will allow the Smithsonian to continue major restoration work and to reduce the backlog of deferred maintenance and repair projects that have accumulated in recent years as the result of inadequate levels of funding. As cited above, inspections of the Institution's various facilities thus far completed indicate that the cost of required repair and restoration work totals approximately \$197 million.

Construction

For the Construction account, the Institution requests a total of \$13,985,000. This request includes funds for the design of renovations necessary to make the Old General Post Office Building usable (\$3,000,000) and for the Galeta/Atlantic laboratories and dormitory at the Tropical Research Institute (\$4,000,000). The Smithsonian seeks funds totaling \$5,985,000 for Alterations and Modifications to facilities, work that is required to increase the functionality of these facilities based on new or different program use. Finally, the Institution requests \$1,000,000 for construction planning for future projects.

Construction and Improvements, National Zoological Park

The request for the Construction and Improvements, National Zoological Park account is \$8,100,000. This amount includes \$1,800,000 for the highest priority repair and renovation projects at Rock Creek Park and \$800,000 for the highest priority projects at Front Royal. The remaining \$5,500,000 requested is for the Amazonia exhibit.

EXHIBIT 1

SMITHSONIAN INSTITUTION

Statement of Purpose

The Smithsonian Institution was created by Act of Congress in 1846 to carry out the terms of the will of James Smithson of England, who bequeathed his entire estate in 1826 to the United States of America "to found at Washington, under the name of Smithsonian Institution, an establishment for the increase and diffusion of knowledge among men."

Joseph Henry, the first Secretary, in his efforts to give direction to activities of the fledgling Institution, commented on Smithson's will in his annual report for 1864:

"He evidently did not intend by these precise terms to found a library or a mere museum for the diffusion of popular information to a limited community, but a cosmopolitan establishment, to **Increase** the Sum of human knowledge and to diffuse this to every part of the civilized world. No other interpretation of the will is either in accordance with the terms employed or with the character and habits of the founder. The Increase of human knowledge, by which we must understand additions to its sum, would be of little value without its diffusion, and to limit the latter to one city, or even to one country, would be an invidious restriction of the term **Men**."

Over the course of its 142-year history, and under the direction of succeeding Secretaries, the Institution has evolved into an eminent research center and the world's largest museum complex. In service to all mankind, its activities span the globe and are devoted to research, museology, and public education in the arts, sciences, and history.

The Smithsonian is a unique establishment which is both publicly supported and privately endowed, and whose governance is vested in an independent Board of Regents composed of federal officials, members of Congress, and private citizens. Donations from both the public and private sector increase its collections, and continuing additions to its trust funds expand and nourish the Institution's usefulness. Appropriations by Congress provide federal support for the Smithsonian's far-reaching services to the public. Annually hundreds of thousands of service hours are provided to the Institution by dedicated volunteers.

The Smithsonian conducts a wide range of programs in carrying out its broad goal of increasing and diffusing knowledge. One of its basic commitments is the conduct of original research in many fields. Another is the selective acquisition, management, care, exhibition, and security of collections that are also among the primary objects of its research. The Institution's holdings are a trust responsibility and serve as important assets for future generations. Related responsibilities include the maintenance of its buildings, facilities, and natural areas in Washington and other locations around the world.

In seeking to study and understand subjects of world importance, the Smithsonian participates in joint ventures with other organizations in the United States and on every continent. Fundamental data are assembled for use by planners and research workers in other organizations, both government and private, national and international in scope. Scientific, historical and art studies, which enhance human knowledge of the natural and cultural worlds and contribute to societal growth, are major endeavors. The results of the Institution's varied activities are disseminated to racially, ethnically, culturally, and economically diverse audiences through exhibitions, publications and other public media programs.

Most important to fulfilling the basic purpose of its founding benefactor, the Institution places the highest priority on achieving quality in the conduct of its activities while making the most effective use of available resources.

EXHIBIT 2

SMITHSONIAN INSTITUTION

Goals of the Institution

The Institution seeks to achieve its basic mission to increase and diffuse knowledge in the following ways:

- By pursuing research, collections management, exhibitions, publications, and other program activities devoted to helping explain -- for a wide range of audiences, and through the use of a wide range of media -- the present state of understanding of diverse fields of the arts and sciences as well as related problems or issues of contemporary importance.
- By giving special emphasis to exhibitions and other programs that will increase participation by culturally diverse communities, minorities, handicapped persons, senior citizens, and other specialized groups.
- By providing research, curatorial, and professional leadership and expertise of the highest quality, through emphasis on excellence of the staff and through maintaining and improving technical assistance, fellowship programs, equipment, and facilities.
- By promoting joint research, collections management, museum education, exhibition, and other interpretative programs with other domestic and foreign academic, research, and museum enterprises through a sharing of knowledge, expertise, exhibitions, collections, facilities and other resources.
- For the sake of future generations of scholars and visitors, by careful attention to the acquisition, care and preservation of collections and institutional facilities that house them, especially as related to protection, inventory, storage, building maintenance, equipping activities, and renovation of exhibit and other public areas.

- By dedicating research, exhibition, publication and other programmatic efforts to the long-term need for conservation and improvement of our natural and human resources, and drawing attention to the special responsibility each generation has to its successors.
- By maintaining management, administrative, and support services to meet program needs, by fostering strong internal financial and other management information systems and controls, by periodic assessments of current programs and support activities and related operating practices and procedures, and by orderly planning for new and renovated facilities for purposes of conducting research, collections management, education, and public related programs.

EXHIBIT 3

SMITHSONIAN INSTITUTION

Areas of Emphasis

A. Management Priorities.

- Endeavor to maintain effective communications between central and bureau management, encourage Institution-wide communications channels to permit new ideas for program and operating improvements to surface from all staff, and expand cooperative program efforts among bureaus with common interests.
- Continue efforts to improve staff quality, with particular emphasis on equal employment and affirmative action initiatives, by providing new opportunities for cross training among various offices, encouraging completion of high school education and/or advanced degrees, and supporting special training conducted by the bureaus and offices of the Institution.
- Critically evaluate all programs and support activities for purposes of discontinuing those that have outlived their usefulness or divesting them to other institutions, improving the quality of program products and delivery of services, and redirecting resources to more important efforts. Elevate management's use of information on spending and resource distribution patterns to facilitate analysis of relative resource needs.

B. Research and Research Support; Collection and Non-Collection Based.

- Enhance the Institution's overall scholarly environment by providing opportunities for scholarship through a variety of internal competitive programs, and encouragement in seeking outside support and joint programs, appointments, and cooperative efforts with other institutions.
- Increase bureau flexibility and responsibility for development efforts directed at museum and research initiatives in art, history and science areas.

- Provide for orderly planning and commitments for research instrumentation and facility development (STRI plan, SAO Whipple base camp, MMT conversion, submillimeter telescope).
- Fortify and balance biological and biodiversity research and associated technical support, especially among taxonomy, systematics, molecular biology, species propagation and other environmental areas of investigation.
- Recognize and promote generic museum issues as appropriate areas of academic pursuit and research, including, but not limited to, definitions of museum learning, advanced techniques in collection management, conservation, evaluation tools and experimentation in exhibition techniques, and the history and philosophy of museums.

C. Museum Management and Public Services.

- Continue to strengthen the physical care and management of collections, and related automated information systems for research and accountability;
- Produce and reinterpret exhibitions so that they appeal, enfranchise, and are understood by the broadest possible audience.
- Re-examine and change the exhibition process so that a team approach is implemented, systems of approval are streamlined and costs of exhibition development and production are reduced.
- Enhance visitor experiences and services based on researched demographics and needs.
- Examine and improve the balance of public programs as they relate to minorities, particularly Blacks, American Indians and peoples of Hispanic, Near Eastern and Far Eastern origins.
- Promote greater public understanding of other cultures, especially through the Columbus Quincentenary program, in order to provide a long term and lasting foundation for encouraging international cooperation and scholarly ex-

change with Latin America. Other areas of particular Institutional interest include the pursuit of international cultural understanding with the Near and Far East and the Soviet Union.

D. Facilities.

- Correct the backlog of deferred building maintenance and strengthen preventive maintenance programs. Accelerate renovation of exhibition space, especially with regard to opportunities for refurbishment of exhibitions in the NMNH. Continue with initial equipping of the Museum Support Center.
- Examine and pursue orderly scheduling and development of major renovations and new construction projects; develop an in-house facilities planning capability and review process that will translate institutional program objectives into a long range plan for major new facility needs, priorities, phasing and their costs, including the impact on annual operating expenses.

E. Administration.

- In order to successfully accomplish institutional program goals, alleviate operating and funding deficiencies in protection and plant services, safety and environmental programs and accounting, personnel and procurement activities.
- Investigate the costs of providing various services through contract arrangements, rather than through in-house channels and continue to undertake other appropriate management improvements studies.

F. General Development.

- Continue to examine and consider various realistic ways to increase basic trust resources of the Institution, including a general capital campaign, cultivation of donors, international markets, alternative investments, and expanded use of volunteers where appropriate.
- Examine and continue to pursue new product development, new auxiliary enterprise opportunities, and opportunities for collaboration that may exist among core revenue-producing programs.

MANAGEMENT IMPROVEMENT ACTIVITIES

Consistent with the President's Management Improvement Program, the Institution has undertaken a number of activities to increase the efficiency and effectiveness of its operations.

Credit Management

Debt collection from outside persons or businesses has not been a significant problem at the Institution. In the spirit of the President's goals, however, the Institution has taken actions to reduce the level of outstanding travel advances to employees, inasmuch as these constitute interest-free loans to them. Over the past three years the Institution has reduced the level of such advances from \$597,350 (1,722 items; 12 percent under 30 days) to \$366,934 (626 items; 55 percent under 30 days). The Institution has also tightened its procedures for denying further travel advances to those employees who have not accounted for previous travel funds and to require them to submit accounts within ten working days of their return.

Financial Management

The Office of Financial Management and Planning (OFMP) has coordinated an effort to comprehensively define the Institution's requirements for a financial information system. These criteria indicate that this system must meet the needs of a decentralized organization with: a centralized support operation; a variety of funding sources; and a high volume procurement/payment process. The system must also allow better access to and delivery of financial information throughout the Institution. OFMP has reviewed several Federal and commercial systems; OFMP is testing one in prototype to determine its feasibility for the Institution.

The Office of Programming and Budget (OPB) last year implemented the first phase of a new automated budget process, which it integrated with the planning process. Initial automation efforts:

- increased efficiency in assembling all of the financial data components of the budget submissions to OMB and the Congress;
- increased the Office's access to program and financial information for analysis and more effective decision-making; and
- strengthened the relationship between the short- and long-term planning processes.

When the Institution implements its new financial information system, it can use OPB's automated budget and planning system as one of its modules.

OPB this year expanded its use of automation in the budget formulation process by implementing more decentralized, standard wordprocessing procedures. These new procedures employ a common software for the production and assembly of narrative components of the budget justifications submitted by the Institution's various bureaus and offices. The new procedures reduce duplication of typing effort, minimize error, and save time.

OPB also has completed the initial planning phase for a new Personnel Cost Projection System and expects completion of the system in mid- 1989. The new system will be a user-friendly system, rely on personal computers, have position management features, and be capable of projecting various categories of personnel costs. The new system will facilitate planning and managing this major category of expenses.

Implicit in these improvements is the transition from the obsolete Honeywell mainframe computer. This change will provide access to a wider range of off-the-shelf software packages, reduce the need for costly customizing of software, and thus save programming resources.

The Smithsonian Institution's internal controls program embodies the principles outlined in Office of Management and Budget (OMB) Circular A-123, with an Internal Controls Steering Committee established in 1983 to oversee a formal internal controls and review effort which the Management Analysis Office (MAO) conducts on a cyclical basis. MAO, assisted by the Office of Audits and Investigations, monitors and reports to the Committee. The 1988 review is currently under way.

Productivity Improvement

The Office of Protection Services (OPS) annually schedules security surveys of Smithsonian units and activities as part of a planned program, with additional reviews added as the need arises. This year OPS conducted a security survey of the National Numismatics Collection in the National Museum of American History. This survey assessed physical security requirements of related storage and exhibit areas along with access procedures for visitors, including researchers, collectors, and other interested people.

The need for cost-effective facilities restoration, renovation, and preservation led to a more comprehensive building inspection program in 1987. The Institution's Office of Plant Services (OPlantS) conducts an annual inspection to identify and document physical plant needs essential for improved facilities planning. As OPlantS further documents existing discrepancies, the inspection program will include the projection of operational life cycles for building equipment systems and other major components, such as roofs and facades. Plant Services will use this information for a scheduled program to meet replacement and maintenance requirements.

An assessment of Smithsonian international programs and activities, including oversight and management, has led the Institution to augment its international efforts. An International Activities Council (IAC) was formed in 1988. The IAC is composed of the assistant secretaries for research, museums, public service, and external affairs. It exercises more comprehensive and better coordinated oversight of international programs and provides policy guidance for the Smithsonian's International Center. The IAC also oversees the newly reorganized programs and units of the former Directorate of International Activities.

The Office of Personnel Administration requested and received delegated examining authority from the U.S. Office of Personnel Management for 15 core occupations important to the Institution's work. This delegation will enable the Smithsonian to target its recruitment efforts and hire qualified applicants faster. Beginning in FY 1989, the National Academy of Public Administration will undertake a review of the Institution's personnel operations.

Procurement Management

The Office of Procurement and Property Management (OPPM) conducted an initial review of the new, simplified small (under \$1,000) purchasing system to determine propriety, cost-effectiveness, and adherence to regulations and procedures. This review and critique of the exercise of delegated authority covered the major bureaus

which account for the bulk of dollar expenditures. The Office of Audits and Investigations determined that overall procedures were proper and that sufficient internal controls exist to preclude waste, fraud, and abuse. The Procurement Executive continued to ensure implementation of the policy directives of the Office of Federal Procurement Policy (OFPP) and to coordinate planning and scheduling of all high dollar procurements. OPPM also updated handbooks and other internal publications to ensure proper document flow and full compliance with procedure.

Privatization

The Institution observes the requirement, outlined in OMB Circular A-76, that agencies rely upon commercial sources to supply needed products and services. Each year the Management Analysis Office undertakes two studies of Smithsonian activities to assess whether the Institution should continue to provide selected services internally or whether it should contract for these services. So far, these studies have covered grounds maintenance, elevator and escalator maintenance, and the activities of Office of Exhibits Central. This year MAO will complete a review of building custodial services, along with scheduled assessments of the Institution's guard force, paint shop operations, and selected fulfillment operations.

SMITHSONIAN INSTITUTION
MAJOR MANAGEMENT IMPROVEMENT INITIATIVES

<u>AREA OF IMPROVEMENT</u>	<u>DESIRED RESULT</u>
<u>Credit Management</u> Reduction of outstanding travel advances and vouchers	Better management of cash
<u>Financial Management</u> Financial information system	Upgrade accounting and budgeting systems and provide better access to financial information
Automated budget process	Improved efficiency and timeliness; better data accessibility and analytical capability; less duplication of effort
Personnel cost projection system	Better capability to analyze and project personnel cost components; stronger position management
Change in computer mainframe	Savings in programming resources
Internal Controls Steering Committee	Oversight of progress in weak areas where recommended changes have been made
<u>Productivity Improvement</u> Delegated Examining Authority	Targeted recruitment and faster processing
<u>Privatization</u> Contracting out studies	Cost/benefit analyses of various services; will allow for savings where possible

NONAPPROPRIATED SOURCES OF FUNDING

In addition to the support provided by Federal appropriations, the Institution receives nonappropriated funds to expand and enrich its programs. The Institution presents nonappropriated fund activities (Trust funds) along with the Federal budget request to provide an overview of all uses of funds for each Smithsonian bureau. It must be emphasized that the estimates for Trust funds are subject to the uncertainty of donations, grants, and contracts with the Institution, fluctuations in visitor attendance, and the volatility of the economy, the last of which directly affects restaurant, mail order and shop revenues, Associates' memberships, and other auxiliary activities. The Institution's gross operating revenue, less the expenses of the auxiliary activities, represents the net operating revenue available for programmatic and other worthwhile purposes.

The FY 1989 Trust budget comprises approximately 26 percent of net operating revenues. These revenues include grants and contracts received from government agencies. Expectations are that these will total nearly \$24 million in FY 1989. The Institution anticipates gross Trust fund revenues, excluding government grants and contracts, to be over \$200 million in FY 1989. However, the Institution projects net income to be in the \$54 million to \$55 million range (which includes \$19 million for restricted purposes).

The Trust funds include unrestricted funds, restricted funds, and government grants and contracts, and the Institution applies them in the following manner:

Unrestricted Funds

General - The sources of general unrestricted funds are investment income; unrestricted endowment income; net proceeds from museum shops and food service concessions; sales of Smithsonian books, records, and other products based on designs and objects in the collections; the Resident Associate and National Associate Programs (including the Smithsonian and Air and Space magazines); and overhead recovery on grants and contracts the Smithsonian receives and from internal administrative fees charged to other Trust-funded activities. Overhead recovery is the principal source of Trust support for central management and administrative service units of the Institution, such as legal counsel, accounting, personnel, procurement, and budget. General funds also support various activities, such as the Visitor Information and Associates' Reception Center, the Cooper-Hewitt Museum, Smithsonian Tropical Research Institute, Office of Telecommunications, Office of Folklife Programs, and a variety of Institutional and bureau-based programs. The Board of Regents approves these allotments.

Special Purpose - These funds arise from revenue-producing activities operated by various bureaus and offices. The two largest of these activities are the Theater and Spacearium operations of the National Air and Space Museum. Special Purpose funds also include: miscellaneous revenues from the sale of posters, exhibit brochures, and publications; tuition reimbursement from universities; the museums' share of sales in the restaurant and museum shops; membership and admission fees; exhibit rental income; and investment income from current fund balances.

In FY 1979, the Board of Regents approved the annual transfer of General funds to Special Purpose funds for certain programs previously financed through Federal appropriations. These include the Institution's various fellowship programs (FY 1989 allotment of \$3 million). The Institution also uses Special Purpose funds to make awards under its Collections Acquisition, Scholarly Studies, and Educational Outreach Program. Of the total \$4.75 million approved for the Program in FY 1989, \$1.75

million is available to purchase exceptional objects important to the collections. In FY 1987, the Cooper-Hewitt Museum purchased a Tibetan Temple Hanging, and these funds were instrumental in the Hirshhorn Museum and Sculpture Garden's purchasing three works of art: Untitled, Jasper Johns 1954, constructions; Gymnast, William Tucker 1985, sculpture; and Untitled, Jannis Kornellis 1986, sculpture. In FY 1988, the National Museum of American History acquired the DeVincent sheet music collection, which includes illustrations that depict cultural and social history. The National Museum of American Art purchased the painting, Yliaster (Paracelsus), by Marsden Hartley. In addition, the Renwick purchased an art deco fire screen, its first acquisition through the Program.

The Program has designated \$2.45 million for innovative scholarly research projects which by definition or because of their schedule do not fit within the Federal budget process. These include multi-disciplinary research projects conducted within and between bureaus and projects that have received external funds requiring matching Trust support. For example, biologists at the National Museum of Natural History and Tropical Research Institute are collaborating to study bee biology in two Mexican biospheres. The study includes the basic biology of the species, as well as its response to the introduction of Africanized honey bees. Results of this study will provide baseline data to determine the impact of the invading species.

The Program awarded grants to the National Museum of American Art and the Conservation Analytical Laboratory to utilize neutron-induced autoradiography to study the history of various paintings. Also, scientists at the Smithsonian Astrophysical Observatory are testing a new technique for faint object astronomy with long baseline stellar interferometers. This technique will make possible ultra-precise optical astronomy of extragalactic objects from ground-based instruments.

The Institution has allocated the remaining \$550,000 of the \$4.75 million available for this Program to conduct a wide range of educational outreach programs of benefit to the public, with special focus on diverse cultural audiences. For example, the Conservation Analytical Laboratory developed a two-year project to provide a course on the analysis of Hopi yellow-firing pottery, created an internship for Hopi students, and produced video documentation on the results of the scientific analysis of the Hopi ceramics. Another grant advanced the use of interactive video technology in public education. Also, grants supported symposia and production of videos and educational materials to accompany exhibitions. In addition, the Program provided funding to prepare a select group of elementary school teachers, principals, curriculum specialists, and superintendents from throughout the U.S. to organize and lead improvement efforts in their local elementary level science programs.

In FY 1985, the Board of Regents approved an annual Trust fund allocation for the Special Exhibition Fund. The Institution has generally met the cost of exhibition programs with Federal funds, which will continue to provide the predominant financing for the Institution's overall exhibition effort. Individuals, foundations, and corporations have provided supplemental donations. Administered in the same way as the Collections Acquisition, Scholarly Studies, and Educational Outreach Program, the Special Exhibition Fund, with \$3.2 million in FY 1989, will provide funds for temporary or permanent exhibitions proposed by Smithsonian bureaus that, regardless of scale, are outstanding in terms of their educational value to the public. This Fund will give special consideration to exhibitions that approach content in imaginative ways; that allow bureaus to explore new or expand current interpretive or exhibition techniques; that are worthy but, by their nature, unlikely to attract private funds; and that are likely to reach previously under-served audiences.

One exhibition supported by this program was "King Herod's Dream: Caesarea on the Sea," which explores architectural evidence of an ancient city on the Mediterranean coast of Israel. Other exhibitions include "Crossroads of Continents," the first Soviet-North American exhibition ever organized; "Science, Power, and Conflict," which attempts to establish links between scientific, social, political, and economic goals and conflicts; and "Folk Art in America: Hemphill Collection."

Restricted Funds

Restricted Trust funds include gifts, grants, and endowments from individuals, foundations, organizations, and corporations that specify the use of the donation or bequest. Generally, these funds provide support for a particular exhibit or research project. The Freer endowment is the largest restricted endowment in the Institution. Under the terms of the original gift and bequest, this fund is strictly limited to uses benefiting the Freer Gallery of Art.

Government Grants and Contracts

Various government agencies and departments provide grants and contracts for special projects which only the Smithsonian can conduct because of its expertise in a particular area of science, history, art, or education and because of its ability to respond quickly to certain needs.

AFFIRMATIVE ACTION EMPLOYMENT

Several positions appear in the Smithsonian's FY 1990 budget request designated "affirmative action". The Institution is requesting these positions to substantiate a number of temporary appointments made during FY 1988 and projected for FY 1989. During FY 1988, the Institution acknowledged that previous efforts at affirmative action had been unsuccessful in research/curatorial areas and high-level administration. Management decided to launch an immediate hiring initiative. This initiative encouraged every major bureau to actively pursue qualified minorities and women in areas of obvious deficiency. The goal is to achieve diversity among the professional staff who will influence future Smithsonian programs and exhibitions. A balanced staff eventually will cause Smithsonian programs and audiences to reflect more accurately the cultural and ethnic diversity of this Nation.

The budget includes a request for 20 workyears and \$864,000 for positions and support in 11 bureaus and offices. These bureaus and offices have identified 20 qualified candidates and already have placed several in temporary appointments. These funds will enable the Institution to convert their appointments from temporary to permanent, thereby guaranteeing a new, more diverse mix of staff. In addition, the Institution requests another 5 workyears and \$248,000 for projected appointments during FY 1989.

The Institution hopes that if it hires a significant number of new minority professional staff at once, these staff in turn would encourage other minorities and women to apply for routinely occurring vacancies. Therefore, these first 25 positions represent an investment and catalyst for continued progress in the future. The Institution anticipates that this will be the only year that it will make such a special request. The following table details these positions by unit:

<u>UNIT</u>	<u>POSITION TITLE</u>	<u>FTE</u>	<u>COST</u>
Smithsonian Tropical Research Institute	2 half-time Staff Scientists	1	\$ 45,000
Smithsonian Environmental Research Center	Biologist and Zoologist	2	74,000
National Zoological Park	Conservation Biologist	1	52,000
SI Libraries	Reference Librarian	1	36,000
Museum Programs	Training Specialist	1	30,000
Natural History Museum	Botanist	1	36,000
	Marine Biologist	1	44,000
	Anthropologist	1	44,000
	Botanist	1	44,000
	Geologist	1	36,000
	Archeologist	1	44,000
American History Museum	2 Curators & support	2	100,000
	Curator	1	62,000

<u>UNIT</u>	<u>POSITION TITLE</u>	<u>FTE</u>	<u>COST</u>
American Art Museum	Education Specialist	1	36,000
	Curator	1	44,000
National Portrait Gallery	Public Programs Coord.	1	40,000
Conservation Analytical Laboratory	Research Paint Conservator	1	44,000
Interdisciplinary Studies	Program Specialist	1	53,000
Administration	Undesignated	5	248,000
	TOTAL	25	\$ 1,112,000

FY 1990 UNCONTROLLABLE INCREASES

The Institution seeks funds to pay costs that are beyond its control. These costs result from established practices in regulating wages, higher rental costs, and the effects of inflation and other factors. A \$1,723,000 reduction in the amount contained in the FY 1989 budget for the Federal Employees Retirement System offsets these costs. The Institution requests \$4,387,000 for uncontrollable costs in the following areas:

Salary and Related Costs

--Within-grade Step Increases	\$2,599,000
--Health Insurance Benefits	1,024,000
--Federal Employees Retirement System	(1,723,000)
--Personnel Payroll System	<u>33,000</u>

Total Salary and Related Costs	\$1,933,000
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Utilities, Postage and Communications	\$ 94,000
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Rental Space	\$ 760,000
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Inflation	<u>\$1,600,000</u>
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Grand Total, Uncontrollable Increases	<u>\$4,387,000</u>
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SALARY AND RELATED COSTS - The Institution requests a net amount of \$1,933,000 for the projected higher salary and benefits costs in FY 1990 for FY 1989 staff. The Smithsonian has calculated costs required for within-grade increases (\$2,599,000) for each of the bureaus and offices based on workyears authorized by the Office of Management and Budget (OMB). In FY 1990 the Institution also requires funds to cover the increased operating costs for the new Personnel Payroll System (\$33,000) and for employee health insurance (\$1,024,000). These requested increases are partially offset by a reduction of \$1,723,000 which reflects base funds which exceed the projected cost of the Federal Employees Retirement.

Within-grade Step Increases - The Smithsonian seeks \$2,599,000 in FY 1990 for within-grade step increases. For General Schedule employees, Section 5335 of Title 5, United States Code requires these increases. Law and prevailing rates apply to wage employees. Increases include the part-year cost of new actions scheduled to occur in the budget year, as well as the cost of annualizing FY 1989 step increases.

Health Insurance Benefits - The Institution must also have additional funds to cover its cost of employee health insurance. The cost of health benefit plans rose an average of 31 percent effective January 1988. The full-year FY 1990 cost to the Institution of these increases is \$1,024,000.

Federal Employees Retirement System - The Federal Employees Retirement System (FERS) Act of 1986 (Public Law 99-335) established a new basic benefit pension plan and a savings plan for Federal civilian employees. The Institution's FY 1989 request to Congress provides a funding base of \$6,181,000 to cover the increased costs of this plan. This amount reflects guidance from the Office of Management and Budget Bulletin 87-2. Subsequent guidance in OMB Bulletin 88-6 has resulted in revised estimates for FERS costs for FY 1990 and following years. Based on the revised estimates, the

FY 1990 request reflects a reduction of \$1,723,000 from the FY 1989 Congressional request level.

Personnel Payroll System - The Institution uses the computer services of the Department of Agriculture's National Finance Center (NFC) to support personnel management and payroll production. Estimates are that the FY 1990 operating costs will be approximately \$830,000, based on NFC's cost for all communication services and \$101.68 per employee (civil service and Trust, including temporaries regardless of duration on the payroll) times an estimated 7,000 employees. The Institution has calculated the Trust share of the costs for its employees to offset one-third of the total requirement. With base Federal funds of \$522,000 anticipated in FY 1989, the Smithsonian requires an increase of \$33,000 for the Federal share of processing the payroll and personnel data and related communication services.

UTILITIES, POSTAGE AND COMMUNICATIONS - In FY 1989, a base of \$17,156,000 is available to fund the costs of electricity, steam, gas, fuel oil, water, postage, and communications for nearly all Institution facilities. The Smithsonian needs an increase of \$94,000 in FY 1990 to cover:

- increased electrical costs associated with new facilities at the Smithsonian Environmental Research Center and the Tropical Research Institute;
- increased natural gas costs associated with an estimated 15 percent rate increase currently requested by the Washington Gas Company;
- increased costs based on a postal rate increase effective in May 1988; and
- rising costs for telephone services.

The Smithsonian's projections of future utilities costs consider a variety of factors. These include:

- comparative data on actual energy consumption in previous years for each facility;
- adjustments for normal weather conditions for this area based on information provided by the National Weather Service;
- actual and projected rates charged by utility companies;
- actual and projected reimbursements for utility costs from concessions, museum shops, and the Friends of the National Zoo;
- modifications to work and public spaces within facilities;
- energy conservation efforts under way in all Smithsonian buildings;
- improvements to heating, ventilating, and air conditioning systems and components installed throughout the physical plant;
- the design of new facilities; and
- projected increases in consumption caused by expanded use of computers and other equipment throughout the Institution.

The following table shows the costs and base funds available to cover the components of the Utilities account between FY 1988 and FY 1990.

ANALYSIS OF UTILITIES AND COMMUNICATIONS COSTS

FY 1988 - FY 1990

	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>	<u>FY 1990</u> <u>Estimate</u>
<u>ELECTRICITY</u>			
<u>Use</u> - Millions of KWH	109.0	108.0	108.0
<u>Unit Cost</u> - Average per KWH	.062	.065	.069
<u>Cost</u> - \$000's	\$6,766	\$7,000	\$7,461
FY 1990 Estimated Cost			\$7,461
FY 1989 Base			<u>\$7,324</u>
Base Shortage, Electricity			\$ 137
<u>STEAM</u>			
<u>Use</u> - Millions of Pounds	209.0	209.0	209.0
<u>Unit Cost</u> - Avg. per 1,000 lbs	15.50	15.50	15.50
<u>Cost</u> - \$000's	\$3,239	\$3,239	\$3,239
FY 1990 Estimated Cost			\$3,239
FY 1989 Base			<u>\$3,472</u>
Base Surplus, Steam			\$ 233
<u>GAS</u>			
<u>Use</u> - Millions of Cubic Feet	1.343	1.247	1.247
<u>Unit Cost</u> - Avg. per cubic Ft.	.5987	.6415	.6415
<u>Cost</u> - \$000's	\$ 804	\$ 800	\$ 800
FY 1990 Estimated Cost			\$ 800
FY 1989 Base			<u>\$ 713</u>
Base Shortage, Gas			\$ 87
<u>FUEL OIL/WATER</u>			
<u>Cost</u> - \$000's	\$ 250	\$ 150	\$ 150
FY 1990 Estimated Cost			\$ 150
FY 1989 Base			<u>\$ 150</u>
Base Shortage, Fuel Oil/Water			\$ -0-
<u>TELEPHONE</u>			
	\$3,560	\$3,700	\$3,900
FY 1990 Estimated Cost			\$3,900
FY 1989 Base			<u>\$3,597</u>
Base Shortage, Telephone			\$ 303
<u>POSTAGE</u>			
	\$1,750	\$1,900	\$2,050
FY 1990 Estimated Cost			\$2,050
FY 1989 Base			<u>\$1,900</u>
Base Shortage, Postage			\$ 150
<u>TOTALS</u>			
			\$17,600
			\$17,156
			<u>\$ - 350</u>
			\$ 94

Electricity - The major component of the Utilities account is electricity. Estimates of electrical consumption consider increases associated with the conversion of the existing National Air and Space Museum (NASM) cafeteria to museum use, the new Mathias wing at the Smithsonian Environmental Research Center (SERC), and the new Tupper facility and dormitory under construction at the Smithsonian Tropical Research Institute (STRI). Relinquishing the Radiation Biology Laboratory (RBL) building in Rockville, Maryland and the old African Art Museum complex on Capitol Hill has offset these consumption increases for the Institution. However, while the Institution expects a net decrease in electrical consumption for FY 1989 and FY 1990 over FY 1988, PEPCO has requested a rate increase from the D.C. Public Service Commission for FY 1989. The FY 1990 estimates have annualized this projected rate increase. Additionally, the cost of utilities in Panama continues to rise, and this inflation accounts for part of the estimated rate increase. As a result, the Institution requires \$137,000 in additional base funds to cover the estimated electricity costs in FY 1990.

Steam - Because the actual costs of full occupancy of the Quadrangle are significantly less than previously anticipated, the Smithsonian projects a \$233,000 surplus in steam costs.

Gas - The reduced consumption projections reflect the release of the RBL facility in Rockville, Maryland and the African Art Museum Complex on Capitol Hill. However, an expected 15 percent rate increase would increase costs in FY 1989. The Washington Gas Company requested an increase from the Public Service Commission in January 1988. As a result of this anticipated rate increase, \$87,000 in additional base funds are necessary to cover estimated gas costs in FY 1990.

Telephones - Telephone costs associated with operations at the Smithsonian Tropical Research Institute continue to rise. The expanded use of automation in research and administration necessitates this increase. With the introduction of new Institutional payroll, personnel, and accounting systems planned for FY 1989 and FY 1990, the Smithsonian expects telephone costs to continue to increase as STRI ties into these systems. Additionally, costs associated with new facilities at STRI and SERC and increases in FTS costs due to increased use of this system are also playing a major role in rising communications costs. Efforts continue to limit communications costs through increased monitoring and review of long distance calls, limited access to long distance lines to reduce the potential for abuse, and increased monitoring of telephone charges to reduce billing errors. Despite these efforts, the Smithsonian requests an additional \$303,000 to enable the Institution to meet projected communications costs in FY 1990.

Postage - Ongoing efforts to control postage costs continue to limit the increases necessary for providing postage services to the Institution. A halt to first-class domestic package mailings and reduced express mail services for domestic mailings have decreased postage costs. Also, management monitors the proper use of the postage indicia on Smithsonian mail. Despite these steps, postage costs continue to rise, and the Institution is projecting a deficit of \$150,000 for FY 1990, in part from increased mailings for program activities and public information requests but more as a result of the postal rate increases effective May 1988 for all mail classes.

Fuel Oil/Water - The Smithsonian estimates base funds to be adequate to cover anticipated costs for FY 1990.

Energy Conservation - The Institution continues to monitor and limit all forms of energy consumption. A computerized energy management system reduces peak energy demand by cycling motors on and off and selectively shutting down equipment when necessary. This system, when fully installed, will monitor equipment in all buildings for fluctuations or malfunctions and alert staff to inspect for problems. Ongoing efforts also include:

- continuing the phased program of performing comprehensive building energy audits;
- renovating heating, ventilating and air conditioning, plumbing and electrical systems;
- reducing lighting levels in work and nonpublic areas;
- installing more efficient lighting fixtures;
- operating heating and air conditioning systems at the minimum level necessary to prevent damage to the collections;
- curtailing electrical consumption during nonpublic hours; and
- increasing attention to energy conservation when determining space use, modifying space, and designing new facilities.

Through the use of the Facilities Management computer system, the Smithsonian will eventually control all building lighting systems. This computerized control turns lights on and off as use fluctuates, thereby reducing electrical consumption. Computerized lighting controls are now in place at the Museum of Natural History, the National Air and Space Museum, and the Quadrangle. The Smithsonian plans to install such a system for the Museum of American History in FY 1989 and in later years in other major buildings.

RENTAL SPACE - For FY 1990, the central rental account, managed by the Office of Plant Services, requires \$230,000 for uncontrollable expenses. This account provides for the Federal proportion of the rental expenses for administrative and program activities located at L'Enfant Plaza, the Smithsonian Institution Service Center at 1111 North Capitol Street, and the research bureaus of the Archives of American Art in New York City and Boston, Massachusetts. The amounts shown below reflect projected costs for rental space at these sites:

FEDERAL RENTAL PROGRAM ADMINISTERED BY THE OFFICE OF PLANT SERVICES
FY 1988 - FY 1990

(\$000's)

	FY 1988 Actual Cost		FY 1989 Estimated Cost		FY 1990 Estimated Cost	
	<u>Federal</u>	<u>Trust</u>	<u>Federal</u>	<u>Trust</u>	<u>Federal</u>	<u>Trust</u>
L'Enfant Plaza	\$ 408	\$942	\$ 802	\$951	\$ 930	\$ 994
North Capitol St.	1,017	--	950	139	1,045	125
Archives of American Art:						
- New York	150	--	155	--	160	--
- Boston	<u>8</u>	<u>--</u>	<u>13</u>	<u>--</u>	<u>15</u>	<u>--</u>
Total Costs	\$1,583	\$942	\$1,920	\$1,090	\$2,150	\$1,119
Base	<u>\$1,583</u>	<u>\$942</u>	<u>\$1,920</u>	<u>\$1,090</u>	<u>\$1,920</u>	<u>\$1,119</u>
Surplus/(Deficit)	\$ --	\$ --	\$ --	\$ --	\$(230)	\$ --

The FY 1990 estimate for Federal rental costs for L'Enfant Plaza reflects annual cost increases specified in the lease agreement. Appropriated funds support all program space, such as the Office of Folklife Programs and the Office of Fellowships and Grants. The ratio of Federal and Trust program salary expenses determines the rental expense allocation for applicable administrative space. The Smithsonian Institution Press also pays rent costs based on the ratio of Federal to Trust salaries, which recognizes the dual nonprofit/for-profit function of the Press, such as production of research and educational materials, government forms, manuals and reports as well as marketing books and recordings. The Institution charges "equivalent rent" to auxiliary activities, specifically Smithsonian National Associate Program, Resident Associate Program, and the Smithsonian magazine. Specifically, these activities pay for the administrative office space that they occupy in non-rented Institution buildings based on the number of square feet occupied times the cost per square foot of space at L'Enfant Plaza. Payments by the auxiliary activities, including the Smithsonian Institution Press, partially offset the total rent charge for L'Enfant Plaza.

The total rental expense for space at 1111 North Capitol Street reflects the annual cost increase specified in the current long-term lease agreement. The aforementioned rent allocation policy on administrative and programmatic space also governs Federal/Trust apportionment of rent for this location.

The rental expense for the Archives of American Art represents funding requirements for its new space located in the area with a concentration of New York's art museums and galleries.

For FY 1990, the projected Federal share of the Central rental account is \$2,150,000. The Institution anticipates a sum of \$1,920,000 in FY 1989. Therefore, the Smithsonian requires an additional amount of \$230,000 to defray space rental costs at these locations in FY 1990.

ADDITIONAL RENTAL SPACE REQUIREMENT - There is increasing demand on the Institution to provide space on the Mall for new or expanding programmatic activities. In order to accommodate these programmatic needs, one or more of the administrative units now in the Arts & Industries Building must move to rental space. At this time, the likely candidates for such a move would be either the Office of Information Resource Management or the Office of Personnel Administration. An additional 20,000 square feet in L'Enfant Plaza will accommodate the space needs of either of these units through FY 1990.

The Institution bases the requested increase upon the 70 percent federal share (\$390,000) of a rental cost of \$27.83 per square foot. In addition, the Institution requests a one-time increase of \$140,000 to partially cover the costs of modifying the new space to meet the needs of the transferred unit. The Smithsonian will cover the remaining 30 percent of the rental costs (\$170,000) and modification costs (\$60,000) from nonappropriated Trust funds.

INFLATION - Inflationary costs erode bases established by bureaus to purchase equipment and supplies vital to their programs. Rapid economic growth, full employment levels, and predicted higher prices for food and clothes, are several factors economists fear will result in higher inflation rates. An escalated inflation rate would exacerbate previous losses in purchasing power as evidenced by the examples listed below.

Exhibitions - Inflationary increases for construction materials, equipment, and supplies place a severe strain on the base resources needed to maintain an active exhibition program. The reconstruction of a permanent hall in one of the Institution's larger museums often costs several millions of dollars. The chart below illustrates cost increases for several items used extensively in exhibits preparation.

Exhibition Materials

<u>Item</u>	<u>FY 1987 Cost</u>	<u>FY 1988 Cost</u>	<u>Percentage Increase</u>
Foam rubber, 50"x 25"x 5", heavy density, per sht.	\$20.55	\$27.34	33
Audio video protector, ea.	4,400.00	4,800.00	9
Blueprint paper, 23"x 34", 250 shts.	24.43	27.08	11
60-tooth cutoff blade, ea.	36.95	71.79	94
Incandescent lamp, 75PAR/SP/65WM, ea.	3.45	3.86	12
Plexiglass:			
1/8" x 4' x 8' UF3-sheet	126.72	140.29	11
1/4" x 4' x 8' UF3-sheet	180.16	199.05	11
1/8" x 4' x 8' clear sheet	53.75	58.88	10
Gatorboard:			
1/4" x 4' x 8' - sheet	48.43	59.32	23
Plywood:			
3/4" birch sheet	30.24	34.08	13
1/2" birch sheet	23.36	27.84	19
A/V Equipment:			
Video tape deck - each	995.00	1,200.00	21
Video tape stock - case	123.00	148.00	20

Collections Management - Comprehensive collections management programs, essential to the preservation of the invaluable objects of the Institution, are not immune from inflationary effects. Some recent price increases in this area have been significant. A list of examples illustrating cost increases for collections management type items follows.

Collections Management Equipment and Supplies

<u>Item</u>	<u>FY 1987 Cost</u>	<u>FY 1988 Cost</u>	<u>Percentage Increase</u>
Acid-free cardboard 40"x 50", 25 shts.	\$113.75	\$123.95	9
Storage case, conservator line, unit cost (order of 24)	948.00	1,116.00	18
Cabinet, insect, ea.	577.00	650.00	13
Cabinet, herbarium, ea.	510.00	618.00	21
Vials, genitalis, plastic 3/32", carton (of 1,000)	50.00	95.00	90

Packing, flo-pak, bag (14 cu. ft.)	8.90	10.00	12
Cotton Muslin per yd.	1.75	2.30	32
Mylar sheets:			
8" x 10", per hundred	8.33	8.75	5
11" x 14", per hundred	16.13	17.18	7
Drop-front print box:			
16" x 20" x 3"	4.75	5.05	6
20" x 24" x 3"	6.75	7.20	6
Pin, straight:			
1/2 lb. box of 2,500 pins	3.00	4.30	43
Plastic tweezers, 124 mm.	2.10	5.85	179
Nitric acid fluming, 500 ml.	34.45	49.70	44
Ethanol, 4 liters per case	83.04	138.40	67
Super-X 4142 film, 8"x10" 50 shts.	59.72	68.31	14

Research - Bureaus continue to experience higher prices for the maintenance and repair of sophisticated scientific equipment. For example, a maintenance contract for one type of scanning electron microscope costs \$5,650 in FY 1988. Vendors predict a cost of \$6,700 for FY 1989, an increase of 19 percent.

The Smithsonian's strength as a research institution is bolstered by the quality of its research support operations. The Institution's researchers depend on research tools, whether the latest scientific equipment or books and research journals. Without compensation for lost buying power, the Smithsonian will inevitably lose credibility as having a research facility adequate for the requirements of its research staff. The chart below illustrates examples of price increases for research related items which the museums and the Zoological Park purchases.

Research Equipment and Supplies

<u>Item</u>	<u>FY 1987</u> <u>Cost</u>	<u>FY 1988</u> <u>Cost</u>	<u>Percentage Increase</u>
Type 53 Polaroid film, case	256.00	287.50	12
Video copier paper, K61U	24.00	40.00	67
Videodisc film	114.59	174.45	52
Ketamine (anesthesia) 10 ml.	3.70	4.34	17
Rompon, tranquilizer, 100 ml.	56.08	64.78	16
Prep blades, pkg. of 50	13.64	16.58	22
Microscope, M-3 (basic scope w/o options), ea.	666.00	798.00	20
Lamp, mercury vapor, ea.	29.00	31.61	9
Polaroid film, 200 shts., pkg.	270.00	285.00	6
Sheet film, 200 shts., pkg.	32.00	34.00	6

Facilities Management and Administration - The effects of inflation in the administrative and facilities management areas are felt when purchasing custodial and building maintenance supplies and equipment; in the costs of security and safety items vital to the protection of visitors, collections, and staff; and in computer maintenance and training. Vendors of computer hardware and software advise an increase of nine percent over current FY 1988 prices for machine maintenance. Contracts with consultants developing computer applications for the Institution have

an inflation factor starting at seven percent. An annual contract with a testing laboratory for the Institution's health units increased 12 percent in FY 1988 above the cost in FY 1987 for an equal number of tests. Other examples of higher prices in this area are in the table below.

Administrative and Buildings Maintenance Supplies and Contracts

<u>Item</u>	<u>FY 1987 Cost</u>	<u>FY 1988 Cost</u>	<u>Percentage Increase</u>
Computer tapes, blank	161.00	169.00	5
Photograph mailers, 100	28.46	38.24	34
Messenger envelopes, box	13.90	19.42	40
Extermination, annual contract	312.36	438.00	40
Floor cleaner, equal quantity per year	2,953.50	3,102.00	5
Paper towels, equal quantity per year	300.60	443.60	48
Manila file folders, box of 100	2.95	4.24	44
Ballpoint pen, dz.	2.33	3.24	39
Trash removal (one museum) annual contract	30,000.00	36,000.00	20

For FY 1990, the Institution seeks \$1.6 million to help offset the cumulative and anticipated costs resulting from inflation. The amount represents 3.2 percent of the Institution's Federal budget estimated for FY 1989, excluding personnel, utilities, rent, and Museum Support Center equipment and move costs.

Inflationary increases represent significant costs that have the cumulative effect of seriously eroding virtually all ongoing programs. The impact of inflation is equivalent to a significant reduction each year to the base resources of all Smithsonian organizational units. As a consequence, inflation affects scientific research, educational and public programs, and the care and conservation of the Institution's collections, some of which are the finest in the world.

OFFICE OF THE ASSISTANT SECRETARY FOR RESEARCH

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	29	1,205	2	256	-	1	-	171	2	306
FY 1989 Estimate	29	1,229	2	256	-	111	-	483	2	303
FY 1990 Estimate	30	1,339	2	544	-	110	-	485	2	243

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of the Assistant Secretary for Research provides guidance, planning and overall policy direction to the Institution's research efforts and to research support activities. The Office is responsible for tracking research trends both internally and externally in the arts, humanities and sciences. Also included in this line-item is the Joseph Henry Papers, which is a documentary publication project dedicated to collecting, transcribing, editing, and publishing the manuscripts of Joseph Henry, a pioneer American physicist and first Secretary of the Smithsonian Institution. For FY 1990 the Office of the Assistant Secretary requests an increase of 1 workyear and \$110,000 for Carbon Dating Services (\$40,000) and the Diving Program (1 workyear and \$70,000).

PROGRAM - I. The Office of the Assistant Secretary for Research: The Office, in concert with the Secretary and other appropriate management staff, supervises the research activities of the Institution. The Office serves as the major institutional liaison for research centers in the United States and abroad. Also, the OAS/R is responsible for oversight and coordination of diving activities.

A fundamental responsibility of this Office is to develop guidelines to ensure the superior quality of research conducted at the Institution. This entails providing guidance on shifts of emphasis, suggestions for new areas of research, access to state-of-the-art facilities and equipment, and advising on the selection and promotion of scholarly staff. In addition, the Office strives to better disseminate Smithsonian research findings to the general public and to specialized audiences.

Carbon Dating Services - Contract services for dating, cleaning, and conserving objects are significant to Smithsonian research in such areas as history, art, and science. In FY 1987, the Institution established a competitive fund to support carbon dating. Smithsonian staff submits proposals and an internal committee reviews proposals for scholarly merit and cost efficiency. This fund allows for contracting of analyses which lead to the acquisition of valuable data for a wide range of research projects.

Solar Research Studies - The director of this unit retired in early FY 1988, and the program transferred to the Smithsonian Environmental Research Center (SERC). An explanation appears under the SERC program section in this document.

II. The Joseph Henry Papers: The Joseph Henry Papers collects, transcribes, researches, edits, annotates, and publishes the manuscripts of Joseph Henry. Publication objectives are a 15-volume letterpress series, an indexed microform edition, and special publications aimed at a more general audience. The Papers of Joseph Henry is a source of unpublished and unknown letters and papers. The documents and commentary provided by the editors give insight into the history of science, the development of Federal policy towards the sciences, the institutional and social structure of the scientific community of the 19th Century, and the history of the Smithsonian Institution.

The Henry Papers staff will complete work on the sixth volume of the series in FY 1989. This volume covers the years 1844-1846 and details Joseph Henry's work at the College of New Jersey (now Princeton University). Henry describes his extensive experimentation in electricity and magnetism in laboratory notebooks. Letters, notes, and newspaper articles trace the establishment of the Smithsonian Institution and Joseph Henry's election as the first Secretary. Preliminary selection of 300 manuscripts from the 3,720 available for publication in Volume Seven began in FY 1988. The staff will complete this procedure in FY 1989. The transcription, research, and annotation of these manuscripts will begin in FY 1989 and continue through FY 1990. This book will focus on Henry's efforts to establish the Smithsonian Institution as a center for the support of original research.

The Henry Papers project is a centralized source of Henry correspondence collected from 30 foreign countries and 328 depositories in the United States. Two major Henry Papers resources are the 60,000-item document index and the Alexander Graham Bell-Joseph Henry Library. Both are essential for research in the history of science and the cultural history of the United States. Students, interns, scholars, genealogists, and the general public use this material. Examples of topics studied are the history of acoustics, electricity, magnetism, meteorology, museums, and photography.

EXPLANATION OF PROGRAM INCREASE - For FY 1990 the Office of the Assistant Secretary requests an increase of 1 workyear and \$110,000 for Carbon Dating Services (\$40,000) and the Diving Program (1 workyear and \$70,000).

Carbon Dating Services (\$40,000) - The Institution will meet scientists' requests for samples and provide accurate material analyses as an integral part of larger research programs. Material dating provides data for research in such sciences as anthropology, geology, and paleontology. A survey confirmed that it costs more to equip, establish, and house a modern carbon dating laboratory than to contract out with commercial firms for these services. The requested funding will provide contract services for dating, cleaning, and conserving objects, essential to Smithsonian research in the areas of history, art, and science.

Diving Program (1 workyear and \$70,000) - The diving officer will enforce the scientific diving policies, regulations, and procedures and ensure that Smithsonian procedures conform to nationally recognized standards. Over 120 scholars from the National Museum of Natural History, National Museum of American History, National Zoological Park, Smithsonian Tropical Research Institute in Panama, and the

Smithsonian Environmental Research Center in Edgewater, Maryland collect and study underwater subjects and environments. The number of scientists requiring diving skills has increased over the last five years. In addition to permanent staff members, over a hundred other scientists dive annually under the auspices of the Institution in support of collaborative research activities

To meet the required guidelines of the U.S. Department of Labor Occupational Safety and Health Administration (OSHA), the Smithsonian Diving Program needs to strengthen its oversight responsibility. These guidelines exempt scientific diving from OSHA standards applicable to commercial diving (29 CFR Part 1910, Federal Register, Vol. 50, No. 6 pp. 1046-1049). The guidelines require that Smithsonian appoint a diving safety officer and establish a Diving Control Board that "...consists of a majority of active scientific divers and has autonomous and absolute authority over the scientific diving program's operations." The Institution will hire a full-time diving safety officer to comply with OSHA exemption requirements.

In coordination with Smithsonian's Scientific Diving Board, the diving officer will train and certify divers, approve diving plans and operations, inspect diving sites, develop emergency evacuation and first aid plans, as well as maintain diving certification records. Other program expenses include travel to the various research sites, equipment, and supplies. The diving officer will ensure the safety of individuals diving and coordinate diving activities among all bureaus.

NONAPPROPRIATED SOURCES OF FUNDING:

I. The Office of the Assistant Secretary for Research: Unrestricted General and Special Purpose Funds - Annual allotments provide these funds which support the salary, benefits, and expenses of the Assistant Secretary for Research. An allotment also supports three significant international foundations. The foundations operate field research stations used by Smithsonian staff members as well as by the world scientific community. The Seychelles Islands Foundation operates the former Royal Society station on the Island of Aldabra, located in the Indian Ocean, where biological research occurs. The Charles Darwin Foundation operates a biological research station in the Galapagos Islands. The King Mahendra Trust for Nature Conservation provides scholars with access to unique environments on the Indian subcontinent by operating a field station in the terai region (a lowland plain) of Nepal where significant ecosystem research is in progress. Smithsonian support facilitates the continued accessibility of these areas for the research community at large. The Smithsonian provides support for the exchange of scholars and scientific information between the Smithsonian and a number of nations, principally, the People's Republic of China and Cuba. A Special Purpose fund provides for the Research Opportunities Fund, which supports unanticipated general research. While this Office administers the Program, the expenditures appear in the budgets of the recipient organizations.

Restricted Funds - These consist of restricted endowments, gifts, and grants from individuals, foundations, and corporations that specify the use of the donation or bequest. Smithsonian units receive competitive awards from the Seidell Endowment Fund, which this Office administers and which provides for dissemination of scientific information. The expenditures of the recipient organizations reflect the FY 1988 awards from the Seidell Endowment.

Government Grants and Contracts - The Office of Naval Research has provided

contract funds for the continuation of studies in the area of manpower research and development.

II. The Joseph Henry Papers: Unrestricted General and Special Purpose Funds- Funds are available from the Institution's Research Opportunities Fund to support research projects.

Restricted Funds - The Joseph Henry Papers receives support in FY 1988 and FY 1989 from the National Academy of Sciences and the Richard Lounsbery Foundation. These funds support the temporary appointment of a research assistant. The Smith College Tuition Fund defrays travel and auxiliary support costs for staff, interns, and volunteers.

Government Grants and Contracts - Funds received in FY 1988 from the National Science Foundation support a joint seminar on nationalism and internationalism in science held in conjunction with the Australian bicentennial.

SMITHSONIAN ASTROPHYSICAL OBSERVATORY

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	105	9,892	51	2,977	48	3,902	-	140	92	15,576
FY 1989 Estimate	108	10,416	51	3,078	45	4,076	-	30	111	19,200
FY 1990 Estimate	111	10,558	51	3,866	46	4,454	-	30	108	24,407

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - On the eve of its centennial year, the Smithsonian Astrophysical Observatory (SAO) enjoys recognition as a world leader for basic research in astronomy, astrophysics, and space science. SAO coordinates its scientific programs with the Harvard College Observatory, and together, the two observatories form the Center for Astrophysics in Cambridge, Massachusetts. In addition, SAO operates the Oak Ridge Observatory in Massachusetts and the Fred Lawrence Whipple Observatory in Arizona; the latter is the site of the Multiple Mirror Telescope, a joint project with the University of Arizona.

Ground-based telescopes; instruments aboard rockets, balloons, and space satellites; and laboratory experiments provide scientific data. The Observatory's computers assist in the analysis of these data, with results and scientific interpretations published in scientific journals and reports. SAO also disseminates information to a wider audience through lectures, books, and the popular media.

For FY 1990, the Institution requests no-year funding in the Major Scientific Instrumentation line-item for the non-personnel support to complete the design of the submillimeter telescope array and to continue the program for the conversion of the Multiple Mirror Telescope to a single-mirror instrument, 6.5 meters in diameter. In addition, the FY 1990 request for SAO reflects an increase of 3 workyears and \$142,000 for personnel costs and rent associated with the submillimeter telescope array. Since this increase is related to the Major Scientific Instrumentation request, the justification for these positions appears in the Major Scientific Instrumentation section of this budget.

PROGRAM - Founded in 1890 by the Institution's third secretary Samuel Pierpont Langley for studies of "the new astronomy," the Smithsonian Astrophysical Observatory (SAO) today prepares to celebrate its centennial as one of the world's premier centers for astrophysical research. From its pioneering studies of solar-terrestrial relationships and its establishment of a worldwide satellite tracking network, SAO has been a leader in fields as diverse as the application of new technology to telescope design, the observation of cosmic X-rays, and the survey of large-scale structure in the universe. Since its move to Cambridge, Massachusetts, in 1956, SAO has closely

associated with the Harvard College Observatory (HCO). The partnership of the two observatories in the Center for Astrophysics (CFA) created in 1973, has allowed a broad interdisciplinary approach to research that combines observations across the entire electromagnetic spectrum with theoretical studies to provide a deeper understanding of the basic physical processes shaping the cosmos.

Research programs fall into seven divisions, with efforts coordinated so as to complement each other: atomic and molecular physics, high-energy astrophysics, optical and infrared astronomy, planetary sciences, radio and geoastronomy, solar and stellar physics, and theoretical astrophysics. Data-gathering facilities include telescopes at the Fred Lawrence Whipple Observatory in Arizona and the Oak Ridge Observatory in Massachusetts. In addition, SAO scientists have access to data provided by instruments aboard rockets, balloons, and space satellites, as well as by laboratory experiments conducted in Cambridge. In support of this research, SAO maintains engineering and publications departments, a computation facility, an image-processing laboratory, and an extensive astronomical library. Because it is located outside of the Washington metropolitan area, SAO has its own administrative structure funded by both Federal funds and indirect charges to contracts and grants.

On behalf of the International Astronomical Union, SAO operates two global science information services: the Central Bureau for Astronomical Telegrams and the Minor Planet Center. The first is responsible for receiving, verifying, recording, and disseminating information about transient astronomical phenomena, such as comets and supernovae. The second center computes orbits and provides observational information on asteroids, as well as serving as the official arbiter of minor planet nomenclature.

The results of SAO research appear in established scientific journals, and in the CFA Preprint Series, SAO Special Reports, and other technical papers, distributed to scientific and educational institutions worldwide. SAO also disseminates information intended for wider, more general audiences through lectures, books, and the popular media. An extensive program of public information and education includes monthly "Observatory Nights" in Cambridge and regularly scheduled tours of the Arizona facility. SAO also conceived and, with HCO, is now leading an innovative program to develop secondary school curriculum materials that use examples from astronomy to teach basic principles of physics and mathematics.

Among the significant scientific accomplishments of the past year were these highlights:

-- SAO scientists obtained the first convincing evidence for a planet circling a star other than our own Sun, by using a painstaking technique designed to detect minute variations in a star's motion caused by the gravitational attraction of a companion body. SAO astronomers found that the faint star HD 114762, one very much like our Sun, at a distance of some 90 light years from Earth, had a slight periodic wobble due to a large planet in orbit about it. Because our viewing angle of the orbit is still unknown, scientists cannot calculate the size of the planet with any certainty, but it is most likely a giant body some 10 to 20 times more massive than Jupiter. Since the planet's distance from HD 114762 is about the same as that of Mercury from the Sun, it would have oven-like temperatures and, thus, not be a suitable habitat for life. However, this discovery supports the popular speculation that other stars in our galaxy have planetary companions--and that some of them may even have conditions conducive to the development of life and the evolution of intelligence.

-- Ironically, scientists believe they know more about what happened in the first three minutes after the Big Bang that started the universe than about many events occurring much later, including the formation of our own Milky Way galaxy. Although scientists have found some stars that date back 15 billion years to the time when the galaxy presumably first collapsed out of a primordial dust cloud, these stars are very rare--only about one in every thousand in the neighborhood of our Sun. Working with colleagues at the University of North Carolina, SAO astronomers have now identified and studied several hundred of these "first generation" stars. The survey suggests that the creation of the Milky Way was a most sedate affair, perhaps taking more than a billion years to complete.

-- Scientists are able to probe and map the large-scale structure of the Milky Way by measuring the distribution of carbon monoxide gas, a molecule that emits strong radio signals at millimeter wave lengths. This year, SAO scientists completed the first complete survey of clouds of carbon monoxide, which has led to the discovery that the inner part of the Milky Way may contain as much matter in molecular form as previously seen in the form of atomic gas.

-- Although the Sun is not a particularly copious emitter of X-rays, its two-million-degree-Centigrade gaseous outer atmosphere, or corona, does radiate strongly in this wavelength. In one very successful experiment this year, culminating many years of development, a novel SAO-built X-ray telescope equipped with a modified Hasselblad camera and special high-sensitivity film flew aboard a suborbital sounding rocket to make extremely high spatial resolution images of the hot corona. The analysis of these data is currently underway.

A brief summary of the research conducted in each of SAO's seven divisions follows. In each section, the first paragraph describes the research in general terms and the subsequent paragraphs describe recent accomplishments, in addition to those highlighted above.

Atomic and Molecular Physics - Almost all the information coming from astronomical objects is in the form of light. To understand the physical conditions within those objects, as well as the intervening medium through which the light travels, one must first understand the complex atomic and molecular processes that both create the light and alter it during its long journey to Earth. Through a combination of theoretical studies and laboratory experiments, SAO scientists in this division attempt to describe these interactions of light with atoms and molecules.

In one such project, SAO scientists have studied how the presence of unusually large molecules in space may change our understanding of interstellar cloud chemistry. Increasing evidence suggests giant molecules, ranging in sizes between 30 to 1000 atoms each, may lace the interstellar medium. These molecules may be the source of infrared radiation seen near many astronomical bodies. Moreover, the presence of such molecules, known to researchers as polycyclic aromatic hydrocarbons, could also account for scientists' failure to observe certain atoms predicted by (previously) standard astrophysical models.

Inside very hot astronomical bodies, a process known as dielectronic recombination causes electrons to collide with positively charged atoms to form atoms with lower charges. This process is particularly prevalent in high-temperature, low-density gaseous plasmas, such as those in the outer atmospheres of the Sun and other stars. SAO scientists have developed an extremely sensitive ion beam experiment

which can duplicate conditions similar to those in the solar corona and can measure the rates of dielectronic recombination.

High Energy Astrophysics - High-energy, X-ray radiation accompanies some of the most energetic--and violent--processes in the universe. Fortunately for humans, the Earth's atmosphere absorbs these X-rays, but this absorption also means that scientists must make all observations from balloons, rockets, or space vehicles. SAO scientists are currently analyzing X-ray data from several past missions and are preparing instrumentation intended for future space flight.

The reduction and analysis of data obtained by spacecraft, such as the Einstein Observatory, continues at SAO. The goal is the cataloging of all observed X-ray sources and the mapping of the distribution of sources of cosmic X-rays. Such maps are already providing the basis for systematic studies of stars, galaxies, clusters of galaxies, and quasars.

Scientists can study clusters of galaxies, the largest aggregations of matter yet recognized in the universe, by observing the X-ray emissions from the very hot gas filling the space between individual galaxies. One project during the past year involved using both X-ray images from the Einstein satellite and visible light observations of both large clusters and smaller groups of galaxies to compare the amount of matter found in the galaxies with that seen in the medium between them. The study found a much larger percentage of gas in the large clusters, thus suggesting that galaxy formation (by condensation out of the gaseous medium) may be more efficient in smaller clusters. Further studies will seek to determine how much of the intercluster gas is primordial--left over from the early formation of the universe--and how much originated more recently as a result of processes inside the stars. Indeed, SAO scientists examining images of nearby galaxies have already found some evidence that explosive forces in galactic centers may be driving gas out into the surrounding space.

Other galaxy studies have suggested a connection between hot X-ray halos of elliptical galaxies and the radio sources often found at their centers. As the hot gas in an X-ray halo cools, some falls toward the center of a galaxy, perhaps serving to power the radio source there. In other less powerful radio galaxies, the falling gas may actually disrupt the extended structure of radio emission. This hypothesis would explain why only relatively bright radio galaxies have extended radio lobes.

SAO scientists and technicians are also working on the design of a High Resolution Imaging Telescope to fly aboard the Advanced X-ray Astrophysics Facility (AXAF), one of the major space observatories planned for launch by the United States in the next decade.

Optical and Infrared Astronomy - Optical and infrared astronomy research at SAO ranges from studies of the large-scale structure of the universe to the formation and evolution of stars. In support of this research, SAO operates the Fred Lawrence Whipple Observatory (FLWO) in Arizona, site of the Multiple Mirror Telescope (MMT), the world's third largest optical telescope, jointly run with the University of Arizona. Other optical telescopes at the FLWO undertake the large-scale surveys and other observations; and a 10-meter-diameter light collector, the most sensitive of its type, conducts ground-based searches for high-energy gamma rays. In collaboration with Harvard, SAO also operates the Oak Ridge Observatory in Massachusetts and there employs a variety of instruments for research ranging from asteroid orbital determinations through galactic studies to the search for extraterrestrial

intelligence. The long-term program using a 1.5-meter telescope at the FLWO to survey the distribution of more than 10,000 galaxies within 200 million light years of Earth has produced a striking three-dimensional map that suggests the galaxies deploy on flattened sheets surrounding vast, bubble-like voids, some more than 100 million light years in diameter. This year, SAO extended the survey to the Southern Hemisphere through collaborative programs with observatories in Brazil and Argentina. The initial results indicate the large-scale structures seen in the northern sky prevail throughout the universe. The discovery of these structures poses serious challenges to all existing models for the evolution of the universe.

A significant milestone in ground-based gamma-ray astronomy was the detection by SAO scientists and their collaborators of gamma rays coming from the Crab Nebula. The observation using the 10-meter-diameter light collector establishes a "standard candle," i.e., a steady source of gamma-ray emission at a known level against which to search for and measure other, weaker sources in the sky. The result of a five-year project to develop an imaging technique, the Crab observation also offers new clues to the physical processes at work within the expanding shell of that exploded star and provides a measure of its magnetic field.

Planetary Sciences - Research in planetary sciences at SAO strives to understand the planets, satellites, and other small bodies of the solar system, as well as the processes that created them presumably out of a great, whirling, primordial cloud of gas and dust billions of years ago. Research continued this year also on the wealth of data provided by the European Space Agency's Giotto mission to Comet Halley in 1986, and a new study is underway on the likely mode and place of comet birth.

As part of investigations on the mineral composition of meteorites, SAO scientists have calculated that the original solar nebula must have been rich in oxygen, suggesting that icy, comet-like, pre-solar material may have vaporized and then recondensed without ever mixing with the nebula's gases.

Worldwide interest in Supernova 1987A continued to play a major role in the record-breaking activity of the Central Bureau for Astronomical Telegrams. An unprecedented number of reports on comets--16 new discoveries and 17 recoveries--added to the total of messages received and transmitted this year. A similar increase in the international effort to find and observe minor planets led to the establishment of new guidelines for defining discoveries and communicating data to the Minor Planet Center. The Oak Ridge Observatory closely coordinates its regular observations of newly discovered, unusual, or faint minor planets and comets with these two astronomical information services.

Radio and Geoastronomy - Research in radio astronomy attempts to understand the structure, evolution, energy sources, and ultimate fate of those astronomical objects throughout the universe that emit radio waves. As pioneers in very long baseline interferometry (VLBI), SAO scientists use this radio observing technique to measure directly drifts among the continents, to probe the interior of the Earth, to determine the distances to cosmic sources, and to study their structures.

One major effort has been to measure the size of our own galaxy and the distance to neighboring galaxies. By charting the relative motions of water-vapor masers surrounding a newly formed massive star, SAO scientists can determine the distance to that star with high precision. Scientists used this technique to measure the distance to the center of the Milky Way, and this year, new data improved the accuracy of that measurement. SAO astrophysicists carried out similar measurements of maser complexes

in the neighboring galaxy M33; these measurements may make possible the first direct determination of this galaxy's rotation.

SAO scientists developed a simple model of the energy balance in interstellar clouds, and this model explains the size, density, and internal motions in 100 such clouds. Many scientists think these massive structures are the birthplace of stars.

SAO continued its leadership in the development of instruments for astronomical research, including highly stable atomic clocks built to support programs of VLBI, deep space tracking efforts, and national time-keeping programs. Most novel, an optical interferometer, constructed on Mt. Wilson by SAO in collaboration with several other institutions, began daily observations to determine the position of stars with an accuracy 10 to 100 times greater than is possible with conventional telescopes.

Solar and Stellar Physics - Research in solar and stellar physics is concerned with understanding the physical processes underlying the behavior of the Sun and other stars. Scientists study stars like the Sun to understand the dependence of observed properties on factors such as their age, composition, and physical association with others in pairs and groups. Of particular interest to SAO scientists is the behavior of hot gas under varied conditions--in the Sun's interior, in the outer atmospheres of stars, in the space between the stars, and in the material ejected by young stars and supernovae.

For example, one of the major unknowns of solar physics is the process that heats the Sun's outer atmosphere, or corona, and creates the powerful flow of gas and supercharged particles called the solar wind that sweeps over all the planets. An SAO-conceived instrument called an Ultraviolet Coronagraph Spectrometer (UVCS), designed to create artificial eclipses, will address this problem by allowing continuous observation of the solar corona and study of the solar wind; SAO hopes the UVCS will be one of the experiments aboard the international Solar Heliospheric Observatory (SOHO), scheduled for launch in the mid-1990s.

SAO scientists have shown that almost all stars seem to form disks of gas and dust around them early in their life cycles and, thus, have the potential for developing planetary systems. Both observational and theoretical studies continued this year on the properties of these circumstellar accretion disks and their role in stellar evolution. For one such star, infrared and optical observations showed material in the disk spiralling inward and falling onto the star's surface at a rate sufficient to power its extraordinarily strong stellar wind.

To study magnetic activity cycles in other stars, SAO scientists observe the relationship between this activity--as evidenced by "spottedness" on a star's surface--and stellar rotation. For example, since dark regions, or "starspots," cover one hemisphere of the giant star Delta Coronae Borealis, scientists have determined its exact period of rotation from accurate measurements of the star's periodic dimming. A new research tool used for these observations is the Automatic Photoelectric Telescope (APT), a relatively low-cost, fully automated, instrument, ideal for long-term monitoring of such cyclic stellar brightness variations. SAO has established two such telescopes at the FLWO in Arizona, and plans are now underway to develop a worldwide network.

Theoretical Astrophysics - Theoretical astrophysicists study the objects and systems of the universe by means of mathematical analysis and computer simulations. Although usually intended to provide interpretations of observed phenomena, this

research often results in the prediction of new phenomena not yet seen. Among other investigations last year, SAO scientists studied the processes that destroy globular clusters, possible explanations for the cosmic background radiation thought to be a remnant of the Big Bang, the manner in which large gas clouds collapse to form galaxies, the properties of the material spiralling into black holes, and the instabilities in the powerful winds expelled from stars.

Globular clusters are dense, spherical congregations of several million stars, usually found on the periphery of the Milky Way. Among the oldest objects in the galaxy, globular clusters may hold clues to understanding its formation. The manner in which destruction of globular clusters occurs becomes important in accounting for observed differences between the orbits of globular clusters and halo stars, also found outside the main disk of our galaxy. In their investigations, SAO theorists found that tidal disruption had destroyed most of the initial population of clusters and those remaining have generally been distributed in orbits aligned along the plane of the galaxy.

Scientific Equipment Replacement and Improvement Program - Since FY 1984, SAO has undertaken a comprehensive long-term program to replace and improve obsolete laboratory and computer equipment. Additional funding received in FY 1987 and FY 1988 offsets the cumulative erosion of the base for computer equipment that resulted from across-the-board reductions since FY 1985. (In accordance with the FY 1988 conference report for the omnibus continuing resolution, the Institution has provided an additional \$250,000 for this purpose from within available Smithsonian funds, yielding a total yearly addition of \$500,000.) SAO has made significant progress in developing a network for computers distributed throughout SAO. An Observatory-wide Ethernet system now links together new computer workstations and their associated disk- and tape-drives. This system is allowing significant easing of the pressures on SAO's still fully overloaded central computers. In addition, microprocessor-controlled data acquisition and data presentation capabilities have substantially enhanced the effectiveness of existing laboratory equipment.

Development of Scientific Instrumentation - Beginning in FY 1989, the Institution has requested support for the non-personnel costs for two projects for the Smithsonian Astrophysical Observatory as no-year funding under the Major Scientific Instrumentation line-item: (I) the development of an array of submillimeter telescopes; and (II) the conversion of the Multiple Mirror Telescope. Both of these cutting edge scientific projects involve the fabrication of major new instrumentation that will take a number of years to plan, design, and complete. The Institution anticipates the development of the submillimeter array to continue through the mid-1990s, and the development will require total funding currently estimated at \$30 million (FY 1987) for construction on a continental U.S. site; the cost would be about 25 percent higher if the Institution locates the array on a prime mountain site in Hawaii. The conversion of the Multiple Mirror Telescope, which SAO expects to complete by FY 1994, will require total estimated funding from the Smithsonian of \$10 million (FY 1987).

Facilities Development - With funding provided in FY 1988 and requested in FY 1989 as part of the Construction appropriation, SAO will design and construct a new base camp for the Whipple Observatory. The present base camp is antiquated, its main building being over 50 years old. Even more important, in October 1983, massive flooding destroyed the bridge connecting this camp and the Observatory, and Santa Cruz County will not rebuild it. The new base camp will be on the Observatory side of the river and will be accessible from the Pima County bridge. The new base camp will

provide space for all needed functions. Its facilities will include the Administrative Building and Visitor Center, with space for purchasing, fiscal, engineering and secretarial support, and for displays and briefings about the activities conducted at the Observatory; a vehicle maintenance shop, with service and storage space to accommodate more than 60 vehicles, primarily buses and heavy machinery used for road maintenance; and a warehouse facility.

EXPLANATION OF PROGRAM INCREASE - For FY 1990, the Institution requests no-year funding in the Major Scientific Instrumentation line-item for the non-personnel support to complete the design of the submillimeter telescope array and to continue the program for the conversion of the Multiple Mirror Telescope to a single-mirror instrument, 6.5 meters in diameter. In addition, the FY 1990 request for SAO reflects an increase of 3 workyears and \$142,000 for personnel costs and rent associated with the submillimeter telescope array. Since this increase is related to the Major Scientific Instrumentation request, the justification for these positions appears in the Major Scientific Instrumentation section of this budget.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Unrestricted general funds come primarily from overhead charged on contracts and grants. SAO used these funds to support administrative positions and some other administrative costs of SAO. Special purpose funds come mainly from two sources: external users of SAO's Computer Center and the Institution's Trust Funds, with the latter providing by far the larger share. SAO may use the former for research and computer-related purposes in future years. Trust funds provide direct support for certain research projects and, mostly, for the Fellowship and Visiting Scientist programs.

Restricted Funds - Restricted funds consist of specific endowments, as well as gifts from individuals, foundations, or corporations earmarked for particular purposes.

Government Grants and Contracts - SAO receives the majority of its funds through government agency contracts and grants for research in areas of SAO's expertise. SAO conducts this research often in cooperation with both governmental and academic institutions in the United States and abroad. In FY 1990, expectations are for increased funding through contracts from NASA to SAO for development of instrumentation for both the Advanced X-Ray Astrophysics Facility (AXAF) and the Solar Heliospheric Observatory (SOHO).

SMITHSONIAN TROPICAL RESEARCH INSTITUTE

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	109	5,231	3	247	-	388	-	270	9	614
FY 1989 Estimate	125	5,816	3	211	-	333	-	444	9	578
FY 1990 Estimate	129	6,125	3	222	-	338	-	125	9	587

* FTE = Full-time equivalent

**FTP = Full-time permanent

Abstract - The Smithsonian Tropical Research Institute (STRI) is the Nation's premier center for basic research on the ecology, behavior, and evolution of tropical organisms. Located in the Republic of Panama, STRI conducts collaborative research throughout the New and Old World Tropics. STRI applies results of this basic research to carefully selected conservation and resource management problems, seeking viable alternatives to traditional agricultural and forestry practices which contribute to the massive deforestation of the world's tropical forests. In addition to STRI scientific staff, scientists throughout the world who conduct research in tropical biology use STRI facilities for their fieldwork. The terms of the Panama Canal Treaties of 1979 designate STRI as the custodian of the Barro Colorado Nature Monument, a 12,000-acre tropical nature preserve located in the Panama Canal consisting of Barro Colorado Island (BCI) and five adjacent mainland peninsulas. Other STRI research facilities include a marine laboratory at Naos Island (on the Pacific Ocean); a marine laboratory at Galeta Point and a field station in the San Blas Islands (both on the Atlantic Ocean); and a research library, laboratories, conference and study facilities, and administrative headquarters in Panama City. STRI scientists also engage in collaborative research with colleagues in U.S. universities and in other tropical countries including Malaysia, India, Madagascar, Kenya, Senegal, Costa Rica, and Venezuela.

For FY 1990, STRI requests an increase of 3 workyears and \$540,000 to staff and equip the new laboratory on Barro Colorado Island (2 workyears and \$250,000); to provide an expanded base for the replacement and acquisition of scientific equipment (\$250,000); and to begin the planning process for the Fourth World Congress on National Parks to occur in Panama in 1992 (1 workyear and \$40,000). The resources contained in this line-item also reflect 1 workyear and \$45,000 associated with the Institution's strengthened affirmative action plan. Justification for these resources appears in the central Affirmative Action section of this budget. A reduction of \$276,000 in STRI's base funding offsets these increases. (This reduction reflects the second portion of the one-time costs of equipping the Tupper Center).

PROGRAM - The Smithsonian Tropical Research Institute is the Nation's leading international center for the advancement of basic research in tropical biology. STRI

performs four major functions: 1) conducts fundamental research on the ecology, evolution, and behavior of tropical plants and animals, including mankind; 2) provides major facilities and logistical support for the international scientific community to study both terrestrial and marine tropical biology; 3) is deeply committed to environmental education and to conservation and management of tropical ecosystems; and 4) has the treaty-assigned responsibility to protect and manage the Barro Colorado Nature Monument.

There is a compelling need for improved understanding and conservation of tropical ecosystems. Conversion of tropical forest to scrub and grassland appears to affect global, as well as regional, climatic patterns and may adversely affect the North America environment. Species loss eliminates potential sources of medically and commercially important natural products. STRI's basic research provides the essential framework for effective management and conservation plans. STRI's annual report and STRI Contributions to Research, an offprint of nearly 200 STRI publications, summarizes current research projects.

Descriptions of STRI's most significant accomplishments and major program activities during FY 1988 follow:

Experimental Analysis of Forest Dynamics - Barro Colorado Island is unique among tropical field stations with respect to the amount and quality of logistical and technical support provided to STRI staff and distinguished visitors from numerous universities and research institutes. This makes it possible to conduct large, long-term experiments normally impossible in a tropical forest. Such experiments are necessary to determine the effects of environmental factors on forest dynamics.

STRI is in the fourth year of a major experiment examining the effects of seasonal drought on growth and reproduction of forest trees and understory plants. Researchers have irrigated two tracts of forest during the annual dry season to maintain wet-season soil-moisture levels and have compared these tracts with non-irrigated controls. A major finding is that, contrary to expectation, many species do not respond significantly to increased soil moisture during the dry season.

STRI scientists and collaborators are using new techniques and instruments in the field to study physiological adaptation to drought. They have shown, for the first time, that individual plants are capable of increasing their tolerance to drought over periods of days and even hours. This plasticity results in improved carbon gain and reduced water loss during periods of low rainfall and helps explain why irrigation does not dramatically alter growth and reproduction. This finding offers guidelines for development of tropical agro-forestry schemes using native species.

On Barro Colorado Island, STRI personnel initiated a pioneering study into the responses of tropical tree roots to soil fertility. Tropical forest soils are often deficient in nutrients, such as phosphorous, and can have toxic levels of others, such as aluminum. As much as 50 percent of the total annual biomass production of some tropical forest plants may go into root growth, yet little information exists on the factors controlling this pattern.

STRI researchers experimentally manipulated nutrient levels on large forest plots, in order to determine the effects upon growth of tree roots and shoots. Infrequent, inexpensive fertilizer treatments may increase the proportion of total plant growth manifested as above ground wood, a result of great potential economic importance for continuous-yield agro-forestry projects.

Biological Diversity - The origin and maintenance of the great species richness in the tropics is a fundamental research interest at STRI. One important, long-term component of this program is the 124 acre forest census on Barro Colorado Island. STRI researchers supervise the mapping and measurement of over 250,000 trees on the site every five years. Analyses completed during FY 1988 suggest that juvenile trees located near adult trees of the same species have lower growth rates and survivorship than juveniles located near unrelated adults. This fact suggests that dense aggregations of a single species will be less successful than mixed stands--a result with economic implications for tropical forestry, which traditionally has favored monocultures. This study has also identified native species that grow rapidly and may replace exotic species such as Eucalyptus and pines in plantation forestry.

Biological Catastrophes - STRI's long-term basic research programs provide a context for evaluating environmental catastrophes. A major oil spill occurred in April 1986 near STRI's Galeta Marine Lab on the Atlantic coast of Panama, significantly affecting marine and intertidal communities. STRI is currently conducting a five-year study of the impact of the oil spill on biological communities for the Minerals Management Service of the United States Department of the Interior. STRI is coordinating an international team of over a dozen scientists to compare the recovery of biological communities in spill-affected areas to natural population variation prior to the spill. Damage to coral, seagrass, and mangrove communities has proven to be more severe, and more enduring than suggested by less rigorous studies elsewhere. This work is providing invaluable guidelines for management of oil spills in tropical and semi-tropical marine habitats. The findings are possible only because of the rigorous pre-spill research STRI conducted in the area.

Conservation Research - STRI scientists are developing agro-forestry techniques to produce a sustained-yield, economically viable buffer zone for the Barro Colorado Nature Monument. This will provide added protection against traditional agriculture, regional climatic change, hunting, and forestry harvests. These scientists have planted many native and introduced species of trees and crops together in a 2.5 acre "Forest Garden." All foliage in the plot is palatable to livestock. Many species fix nitrogen and improve soil fertility. Researchers can use the project as a model for expanded agro-forestry in the deforested areas within the Panama Canal watershed. It is also a model for buffer zone projects elsewhere in the tropics.

Molecular Evolution and Plant Physiology Initiative - With funding provided in FY 1988 and requested in FY 1989, STRI is establishing a research program in molecular evolution and plant physiology. While STRI scientists have always made some use of molecular and physiological techniques, this support significantly enhanced their ability to undertake major research in these fields. Studies of molecular evolution now permit STRI scientists to address basic questions concerning the processes of speciation, maintenance of genetic variation in populations, and the nature of population differentiation. Studies of tropical plant physiology are providing essential insights into the nature of plant adaptation to environment, information necessary to apply basic knowledge to the urgent problems of forest conservation and management.

Visiting Scientists - STRI promotes additional basic research in tropical biology by hosting several hundred students who work in association with the staff and visiting scientists from many countries. These scientists can pursue research in biologically rich environments without being intellectually isolated. Hundreds of scientists from major universities and research institutions from most of the United

States and from all over the world ensure a continuing infusion of new ideas leavened by the long experience in the tropics of STRI's permanent staff.

During FY 1988, scientists from Princeton University and the United States Geological Survey continued research on the role of tropical forests and wetlands in the production of "greenhouse gases," including methane and carbon dioxide. These gases have significant effects on regional and global climatic patterns. Deforestation and agriculture are likely to alter the dynamics of gas production and circulation, further complicating predictions about the future of tropical and extra-tropical climates.

Publications - Work at STRI resulted in the publication of over 200 scientific papers and books during calendar year 1987. Staff and visiting scientists are currently involved in over 150 research projects which will produce at least the same number of publications.

Facilities - STRI's research facilities in Panama include the Barro Colorado Nature Monument, marine laboratories at Naos Island and Galeta Point, a small field station in the San Blas Islands, and a cloud forest station at an elevation of 6,500 feet in western Panama. STRI also operates a 63-foot research vessel for studies in both the Atlantic and Pacific Oceans. Since STRI's research programs include both comparative studies among habitats and geographic regions and numerous carefully organized experimental studies, these facilities also serve as the home base for research at numerous other sites throughout Panama.

The new Tupper Laboratory and Conference Center will become operational during FY 1989. This facility will provide modern office, laboratory, and conference facilities for STRI scientific staff and visiting scientists, similar to those at major research universities. It will support development of plant physiology and molecular evolution programs at STRI. During FY 1989, STRI will also complete construction of the new dormitory, kitchen, and dining hall on Barro Colorado Island, which will provide modest living facilities for the large number of researchers who use BCI.

The Institution has requested as part of its FY 1989 Construction appropriation funding to build a new laboratory facility, a vivarium, an insectary, and a growing house on BCI. In addition, part of the FY 1990 Construction appropriation is a request for funding to construct a Galeta/Atlantic laboratory and dormitory.

Fellowships, Conservation and Environmental Education - Because of its location in the Republic of Panama, STRI is in an excellent position to play two significant roles in the study and conservation of tropical environments. STRI actively engages in the education of creative scientists from tropical and nontropical nations. Second, STRI is aware that the survival of tropical ecosystems depends on the combined efforts of international organizations, governments, the private sector, and people in the tropical countries themselves, and STRI is both a committed leader and participant in tropical conservation efforts.

Approximately 80 men and women (38 from Latin America) representing a dozen nations participated in STRI's academic programs in FY 1988. Also, STRI and the University of Panama organized a graduate-level course in bryophyte ecology and systematics for a second year.

STRI's premier reference library for tropical studies enhances its educational function in tropical biology by serving STRI's staff, visiting scientists, and students from universities and secondary schools in Panama. Currently, the library has over 1,000 patrons per month.

STRI is deeply involved in conservation activities in the Republic of Panama. STRI works actively with Asociacion Nacional para la Conservacion y la Naturaleza, a newly formed local affiliate of the Nature Conservancy, in its efforts to purchase and protect endangered natural areas. STRI also provided financial and logistical support for the planning of the major new Darien National Park. Intensive studies of green iguana and paca management are providing protocols for the eventual domestication and use of these species as a standard component of Panamanian agriculture. Studies of fast-growing plantation trees and new crop plants are in progress on the mainland west of Barro Colorado Island. The results of these studies will provide local farmers with sustained-yield agricultural techniques that eliminate the need to continually remove forest to provide new crop land.

Although the primary emphasis of STRI continues to be basic research, its understanding of tropical organisms and environments deepens and broadens over time. As the result, STRI is better capable of applying this knowledge to the increasingly serious environmental and economic problems confronting the Republic of Panama and other tropical countries. STRI's educational programs are producing both greater interest and expertise among students in the tropics in the application of basic knowledge to practical problems. Eventually, their nations will be better able to address such problems.

EXPLANATION OF PROGRAM INCREASE - For FY 1990, STRI requests an increase of 3 workyears and \$540,000 to staff and equip the new laboratory on Barro Colorado Island (2 workyears and \$250,000); to provide an expanded base for the replacement and acquisition of scientific equipment (\$250,000); and to begin the planning process for the Fourth World Congress on National Parks to occur in Panama in 1992 (1 workyear and \$40,000). The resources contained in this line-item also reflect 1 workyear and \$45,000 associated with the Institution's strengthened affirmative action plan. Justification for these resources appears in the central Affirmative Action section of this budget. A reduction of \$276,000 in STRI's base funding offsets these increases. This reduction reflects the second portion of the one-time costs of equipping the Tupper Center.

Staffing and Equipment for new Laboratory on Barro Colorado Island (2 workyears and \$250,000) - Modernized facilities to house laboratory equipment and computers are essential to complement more traditional observational field studies. BCI is the principal United States site for terrestrial research in tropical biology. STRI will construct a new laboratory on Barro Colorado Island in FY 1989 and FY 1990 to replace several obsolete structures as part of its Master Plan. With its completion in late FY 1990, STRI must expand current essential maintenance and plant services for the new, more sophisticated building.

STRI must have five new positions: a facilities maintenance engineer, a maintenance mechanic, an air conditioning mechanic, an electrician, and a custodial worker. To service the expanded research activities in the new laboratory, STRI must also have four new support positions: an animal care technician, a growing house technician, a general laboratory technician, and a secretary. STRI would fill these new positions in July 1990. Based on the construction timetable, July hires will allow STRI to train personnel before relocating program activities and operations to

the new facility. For FY 1990, STRI requests partial-year funding of 2.25 workyears and \$50,000 for these 9 positions. STRI will require additional funding in FY 1991 to annualize the partial-year costs of these positions. (Full-year funding for these positions will require 9 workyears and \$202,000.)

The total requirements for furnishing and equipping the new laboratory on BCI will be \$375,000. STRI would purchase the following items:

- scientific equipment (\$250,000);
- basic furniture and furnishings (\$100,000);
- health, safety, and general maintenance equipment (\$25,000).

For FY 1990, STRI requests \$200,000 to begin these purchases. Continuation of this funding in FY 1991 would complete the purchase of this equipment.

For over 40 years, STRI has provided field research and logistical support for scientists from throughout the world to study at Barro Colorado Island. With the new laboratory facility fully-staffed and equipped, STRI will continue to fulfill its responsibilities to these researchers studying tropical biology.

Scientific Equipment Replacement and Acquisition (\$250,000) - Equipment incorporating recent technological advances is more time-efficient and permits new insights in tropical biology. STRI has a world class cadre of scientists who consistently conduct leading studies on evolution, ecology, and behavior of tropical plants and animals, including mankind. STRI's continued leadership in tropical biology depends on regular, cyclical replacement of worn or outdated scientific equipment. STRI's relatively isolated location and the harsh tropical climate require back-up systems to ensure continuous operation and more frequent replacement of certain equipment.

The following are among the basic research equipment that requires periodic replacement: devices used in DNA analysis and plant physiology studies, in the electrophoresis laboratory, and in computerized meteorological and video image processing; and microscopes, precision balances, and environmental chambers. Replacement costs of laboratory equipment have risen considerably during the last few years. For example, a microscope whose cost was \$4,500 in 1985 now costs \$15,000. Among the needed research equipment that incorporates recent technological developments are:

- a spectrophotometer for tissue and soil analysis (\$25,000),
- a gas chromatograph for analysis of organic compounds (\$15,000),
- a high pressure liquid chromatograph for analysis of pheromone used in insect communication (\$35,000),
- a carbon hydrogen nitrogen analyzer for organic analysis of plant tissues (\$30,000).

Over the past several years, STRI has worked to increase funding for its Scientific Equipment Acquisition and Replacement Program to a level adequate to follow a regular, cyclical replacement schedule. With funding requested in FY 1989, STRI's base for this program will be \$214,000. Even at this level, however, STRI cannot follow an optimal replacement and upgrading program. For FY 1990, STRI requests an increase of \$250,000 to establish an expanded base of \$464,000 for this program. STRI anticipates that additional funding for this program will continue to be a high budget priority in future years.

The objective of STRI's equipment program is to build a sound infrastructure for its research programs using state-of-the-art technology. The productivity of STRI's scientific staff, especially new members trained in the use of modern equipment, depends on the continued expansion of this program. Without appropriate laboratory equipment, STRI will lose its leadership role in basic research in tropical biology.

World Congress on National Parks (1 workyear and \$40,000) - STRI is currently planning to commemorate the 500th anniversary of Columbus' voyages by sponsoring the Fourth World Congress on National Parks. The Congress will highlight recent progress in park development in Panama, including the Barro Colorado Nature Monument, and will foster increased regional and international cooperation. By sponsoring this Congress, STRI will make a permanent contribution to international scientific exchange of information on park management and conservation.

The International Union for Conservation of Nature and Natural Resources (IUCN), the world's major non-governmental conservation organization, has long been a focal point for international concerns about national parks. Once a decade, IUCN organizes a congress. This Congress assembles scientists, park managers, policymakers, and interested media to discuss the world's most pressing issues in national park development and maintenance. The last such conference, held in Bali in 1982, produced important recommendations now being implemented by global park managers. The Bali Congress resolved to hold the next decade session in the neotropics in 1992 to celebrate the Columbus Quincentenary and to focus on environmental issues in this symbolic year. The government of Panama agreed to host this Congress provided that STRI and other organizations in Panama play a major role in substantive conference planning.

For FY 1990 through FY 1992, STRI will request funding to hire a temporary staff of three positions to fulfill its host responsibilities and to support the travel costs of Third World participants to this Congress. For FY 1990, STRI will hire a conference coordinator to begin the planning for the Congress and requests \$6,000 for office equipment, advance publicity, and travel. For FY 1991, STRI will seek a second administrative assistant position and in FY 1992 an assistant coordinator along with funding for travel costs.

Nowhere is the problem of establishing and managing national parks more critical than in the tropics. Human pressure there is eliminating vast areas of tropical forests. The 1992 IUCN Congress may be the last opportunity to organize the developing world and to establish policies for resource management before the loss of forests leaves few options. STRI's role in organizing the Congress will be an expression of our Nation's commitment to protect the world's natural resources.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These derive from a variety of sources including receipts and collections from users of Barro Colorado Nature Monument facilities (20 U.S.C. 79b (d)) and annual allotments. Such funds support, in part, the salaries and related costs of the fellowship program, the senior sabbatical program, insurance, supplies, and a long-term collaborative research program with the Forest Research Institute in Malaysia. Funds also support a short-term fellowship program in tropical biology; visiting scientists and students; field research; seminars and lectures; environmental, conservation, and education activities in Panama and defray expenses of international scientific colloquia and ceremonial occasions.

Restricted Funds - Funds are in the form of restricted endowments which specify the use of the donation or bequest and gifts and grants from individuals, foundations, organizations, or corporations for specific purposes. These funds further scientific research related to the biological, ecological, and behavioral processes which serve as the basis of tropical ecosystems; research related to geophysical events; publication and distribution of research results; and studies relating to endangered tropical environments.

Continuing support from the Exxon Corporation provides short-term tropical biology fellowships and assistance to 30 students from developing Latin American countries.

A grant awarded by the W. Alton Jones Foundation, Inc., supports research on the management of the green iguana for human consumption and the domestication of the paca as a food source. These projects develop alternatives to the destruction of tropical forests for conventional agriculture (particularly extensive cattle rearings), and STRI has conducted them over a five-year period in the vicinity of the Barro Colorado Nature Monument. The project will end during FY 1988, unless STRI raises additional funding.

Government Grants and Contracts - Beginning in FY 1987, a \$3 million contract with the Minerals Management Service of the United States Department of the Interior funded a five-year study of the catastrophic oil spill at the Galeta Field Station.

SMITHSONIAN ENVIRONMENTAL RESEARCH CENTER

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	28	1,373	2	99	-	102	-	35	2	399
FY 1989 Estimate	28	1,397	2	100	-	105	-	10	2	213
FY 1990 Estimate	32	1,579	2	100	-	105	-	7	2	200

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Smithsonian Environmental Research Center (SERC) performs basic scientific research on coastal land/water systems. SERC currently occupies 35,000 square feet of laboratory, office, educational, and support buildings and 2,600 acres of land on a tidal river system. The interdisciplinary staff, visiting scientists, and students study how land use, air quality, and weather variations affect (a) the movement of nutrients, eroded soil, and other materials through the system; (b) the dynamics of plant and animal populations; and (c) the overall health of the system. For FY 1990, SERC requests an increase of 2 workyears and \$108,000: to improve security and maintenance (2 workyears and \$58,000) and to upgrade the SERC computer (\$50,000).

Also contained in this line-item is an increase of 2 workyears and \$74,000 associated with the Institution's strengthened affirmative action plan. Justification of these resources appears in the central Affirmative Action section of this budget.

PROGRAM - SERC research has the goal of attaining a better overall understanding of how coastal land/water environmental systems function. Research staff address a wide variety of ecological questions while conducting long-term interdisciplinary study of a tidal subestuary of Chesapeake Bay (Rhode River) and its watershed. This watershed contains a mosaic of upland and floodplain forests, marshlands, cropland, pasture, abandoned fields, and residential areas typical of the mid-Atlantic Coastal Plain. The Center has already studied such problems as the effects of herbicides on plants in Chesapeake Bay, acid rain's effects upon deciduous forest and fish reproduction, and the role of riparian forests in alleviating pollution from agriculture.

Research Results - SERC compiled research findings on 15 years of nutrient dynamics at its site on the Chesapeake Bay and at other research centers. Excessive nutrient enrichment is a serious problem in Chesapeake Bay. The present overall nutrient inputs of nitrogen and phosphorus have an atomic ratio of about 15, the ideal ratio to foster high algal growth. Of these inputs, land runoff provides 66 percent of this nitrogen, mostly from the piedmont and mountain regions of the watershed, and 22 percent of the phosphorus, mostly from the coastal plain watersheds. Seventy-three

percent of the phosphorus comes from point sources. Direct atmospheric deposition on tidal waters accounts for 10 percent of nitrogen inputs. A regional landscape perspective will be necessary for efficient control of nutrient inputs to Chesapeake Bay.

The blue crab is a species with major economic and ecological importance to the Chesapeake Bay. Most crabs in any given population are missing at least one limb which they normally regenerate. Laboratory experiments conducted showed the impact of limb loss and regeneration upon growth rates and molting frequency. Loss of a single limb, including claws, had no significant effect. Multiple losses significantly reduced both growth and molt increment. Crabs regained normal growth after regeneration.

SERC studied the effects of competition within monocultures of wild rice in tidal marshes. As plant density increased and self-thinning mortality occurred, the surviving plants became more uniform or equal in size as a result of competition for light. These results were similar to those from studies of other populations such as forest trees and old field weeds. These results have important implications to plant evolution since only the survivors of this self-thinning process will complete sexual reproduction.

SERC also conducted experiments continuously exposing various tidal marsh plant communities to roughly double the current ambient atmospheric carbon dioxide concentrations. This experiment simulated atmospheric compositions predicted for early in the next century. SERC developed and tested open top chambers on three different plant communities. Results showed increased growth and shoot densities and delayed fall senescence in *Scirpus* communities and no observed growth effects for a *Spartina patens* community. *Scirpus* shoot nitrogen content also decreased as a result of the increased growth rates. This decrease could have long-term effects on nutrient cycling within this community.

SERC continued research on the ecology of bird species which nest in the Atlantic coastal plain but winter in the tropics. In the Yucatan peninsula of Mexico, there are 42 such species. Most of these prefer tropical forest during the winter, but species which utilize forest edges during the breeding season prefer similar habitat in the tropics. Thus, the impact of forest fragmentation and clearing is equally important in both breeding and wintering grounds for these species.

Educational Activities - SERC provides a broad range of educational activities, including teacher-led field trips, self-guided nature trails, and guided tours. Groups of students and the general public observe firsthand a variety of natural habitats. A work/learn program enables students to work with scientists, both in the field and in the laboratory. Predoctoral, postdoctoral, and sabbatical programs for professionals at all levels enable visiting researchers to carry out collaborative or independent research at SERC. The results of SERC's research disseminate through the publication of findings in scientific journals, the presentation of research findings at national and international scientific meetings and seminars, the training of scientists, and public education activities.

EXPLANATION OF PROGRAM INCREASE - For FY 1990, SERC requests an increase of 2 workyears and \$108,000 to improve security and maintenance (2 workyears and \$58,000) and to upgrade the SERC computer (\$50,000).

Security and Maintenance (2 workyears and \$58,000) - Security and maintenance are essential for the protection and care of the various research sites and facilities located at the Edgewater site in Maryland. SERC has 2,600 acres of land with 15 miles of shoreline that must be patrolled daily. There are numerous study sites along the

shore line, in the bay, and in the rivers leading to the bay. These study sites and staff need protection from boaters and poachers to continue the long-term monitoring of environmental systems. Recent construction resulted in the addition of new specialized research space with attendant equipment. This state-of-the-art equipment increases the total property value at the site. SERC requests an additional security position to assist the one security guard SERC currently has on its staff. The added position will guarantee patrolling of the area seven days a week and help to ensure the safety of staff and property.

Recent improvements added 35,000 square feet of laboratory/office space to the SERC facilities. SERC requires daily maintenance of the plumbing for the new space and for the existing buildings. Water systems in the older buildings require constant repair and replacement to maintain a working system. The central Office of Plant Services (OPlantS) located on the Mall, 40 miles from Edgewater, Maryland, currently provides plumbing services to SERC. The travel time OPlantS staff requires does not allow them to respond to emergencies such as water pipe breaks, sink overflows, etc., in time to avoid water damage to the facilities. The addition of a plumber to the maintenance staff would greatly improve the daily maintenance of the operating systems.

Computer Upgrade (\$50,000) - SERC is analyzing large data sets collected over the last 10-15 years. These data, concerning important issues such as acid rain, pollution, and land runoff effects on water quality, demand extensive, timely analyses. The staff is growing and new analysis techniques require better computer resources. Given the rapid development of computer techniques, the present equipment (purchased in 1982) is now obsolete. SERC needs a system which will support more users at one time, and one that will store and process larger volumes of data. As staff grows, demands on the computer are growing. On-going projects accumulate even larger data bases.

Buying the new equipment will reduce annual maintenance costs substantially. The new computer system will operate much faster and be capable of supporting a growing scientific staff. Also, with this new system, SERC will maintain compatibility with other Smithsonian units. The SERC computer facility will become part of a Smithsonian network.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Allotments provide these funds. Uses include support of special events, work/learn and fellowship programs, and the salary costs of a docent coordinator and a public program director.

Restricted Funds - Donations, bequests, and foundation grants designated for specific subjects of investigation provide these funds. For FY 1989, a grant from the World Wildlife Fund continues to support investigation of the effects of land use changes in the Yucatan peninsula upon migratory bird populations which nest in the Chesapeake region and winter in Mexico.

Government Grants and Contracts - Various Federal and State agencies supply funds for special projects conducted at SERC utilizing the expertise of the staff and the unique physical site characteristics. A grant from the Chesapeake Research Consortium supports research on the nutrient dynamics of the Rhode River system while a grant from the U.S. Department of Energy furthers the study of greenhouse effects on marshes. A contract from the Maryland Department of Natural Resources supports a study of the efficiency of a low cost method of stream liming to neutralize fish spawning grounds.

NATIONAL ZOOLOGICAL PARK

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	329	12,979	1	132	-	153	1	129	-	61
FY 1989 Estimate	342	13,890	1	134	3	381	1	461	-	134
FY 1990 Estimate	347	14,247	1	134	3	614	1	568	-	203

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - Since 1889, the National Zoological Park's (NZP) primary mission has been the advancement of science and the instruction and recreation of the people. The Zoo's live collection, open to the public, occupies 163 acres at Rock Creek Park in Washington, D. C. The Zoo also maintains a major conservation, animal breeding, and research center on 3,150 acres in Front Royal, Virginia. Through its programs in research, conservation, animal health and education, NZP serves the public and specialized audiences and promotes understanding of animal adaptations and evolution and the interaction of wildlife with the environment. For FY 1990, the Zoo requests 4 workyears and \$361,000 to support current programs (4 workyears and \$191,000) and to support the equipment upgrade and replacement program (\$170,000). The resources contained in the line-item reflect 1 workyear and \$52,000 associated with the Institution's strengthened affirmative action plan. Justification for these resources appears in the central Affirmative Action section of this budget. The FY 1990 estimate in the table above also reflects a decrease of \$56,000 associated with one-time equipment costs for the Molecular Systematics and Evolution Program.

PROGRAM - At its Rock Creek site, NZP is responsible for the maintenance and welfare of over 6,200 animals comprising 470 species. The large increase in the animal population over past years results from the new Invertebrate Exhibit which houses approximately 4,000 animals. The Zoo chooses its species primarily for their interest to the public and their contribution to research and conservation. The Zoo keeps nearly 800 animals representing 38 species, whose status in the wild is precarious, at the Front Royal Conservation and Research Center (CRC). These animals form the basis for the Center's long-term breeding and research potential.

The major programs of the National Zoo are animal exhibition; animal management; animal conservation and propagation; research; and public education. In addition to its leadership in animal management practices, the Zoo plays a major role in developing new techniques for long-term sperm and embryo storage and embryo transplantation. These techniques play a crucial part in conservation. Many species, particularly in the tropics, become endangered because of man's disturbance of their natural habitats. Because many species are dwindling in number, the Zoo has an energetic program of conservation research into endangered species' natural habitats.

NZP also conducts pioneering studies in the reintroduction of zoo-bred animals to their native habitat. The Zoo is also developing programs on the roles the public and zoos can play in animal conservation.

Animal Exhibition - The Park exhibits animals primarily to excite the Zoo visitor about biology and the natural world. The National Zoo is rapidly transforming its principal focus to a "biopark" by shedding traditional distinctions between plants and animals, aquatic and terrestrial life, vertebrates and invertebrates, and even science and art. Instead of separate aquariums, botanical gardens, natural history and art museums, the biopark will emphasize the interrelationships between plants and animals, living and extinct organisms, water and land, form and function. This will show the influence of man on nature, including domestication, agriculture, hunting, art, and environmental impact.

A new exhibit for gibbons, located on a wooded ridge in Rock Creek, opened in the summer of 1988. This is an appropriate stage for their spectacular locomotion and territorial calling. The graphics and plantings are restful, understated, and organic reminders of the Asian origins of these very endangered forest apes.

The newly renovated waterfowl wetlands in front of the Bird House, completed in August 1988, include a variety of waterfowl and wading birds. This naturalistic, contemplative setting, surrounded by aquatic plants, will come alive each spring with the elaborate courtship rituals of a wide variety of ducks, geese, and swans.

Spectacled bears, golden-headed tamarins, prairie dogs, king vultures, and snake-necked turtles were among the nearly 1,000 births and hatchings that in 1988 bolstered stocks of threatened species and delighted visitors. The addition of a male gorilla from the Boston Zoo increased the possibility of a gorilla birth at the zoo. Japanese spider crabs are on exhibit in a specially designed 3,500 gallon tank in the invertebrate exhibit. This crab is the largest crustacean in the world with a leg span of approximately nine feet. The Government of Indonesia presented two young Komodo dragons to the National Zoo. These lizards will live in a renovated exhibit in the reptile complex. The Zoo hopes that these animals will eventually form the core of a breeding program for this rare and interesting species. Asiatic lions, sloth bears, tiger quolls, white storks, curly tailed lizards, and blue ringed octopus were significant additions to the exhibit program.

Animal Management - Of prime importance is the health and well-being of the animals under the Zoo's care. The Zoo strives to provide the animals with natural and congenial conditions which contribute to good health and diminish stress. In addition, the National Zoo provides the most advanced techniques in health care, preventive medicine, emergency treatment, surgery, dentistry, and neonatal medicine. As part of the medical program, the Zoo has a pathology staff that provides in-house diagnostic services and engages in research related to disease prevention. The staff maintains a scientifically based nutrition program, with the highest standard of food preparation to supplement the best available medical care. The staff maintains comprehensive medical and general records for all animals.

The medical case load is about 3,000 cases per year with approximately 700 hospitalized patients. With the new hospital at the Conservation and Research Center now functional, two hospitals are available. The Front Royal hospital houses a quarantine room and a suite of rooms for major surgical procedures. The staff uses hospital laboratories for urinary hormone analysis, semen freezing, antibiotic assays, and clinical pathological studies.

The completion of the new Rock Creek hospital provides a state-of-the-art medical facility for the Zoo's collection. New laboratory space will enable clinical medicine, pathology, and reproductive physiology studies to expand. Clinical studies include improving anesthetic techniques in mammals, birds, reptiles, and invertebrates, and using and modifying newer tools, such as ultrasound, endoscopy, and Nuclear Magnetic Resonance, to aid in their specialized diagnostic problems.

Staff of the Department of Pathology, in a collaborative study with area medical institutions and the San Diego Zoo, identified a new viral hepatitis of marmosets and tamarins. The disease, which has occurred in ten zoos over the past seven years, has been particularly prevalent in the golden lion tamarin and poses a further threat to this already endangered species. The Zoo is establishing an infectious disease laboratory in the new pathology facilities to study further this virus with the intent of developing preventive methods. Researchers also defined a new chronic debilitating kidney disease, renal medullary amyloidosis, in dorcas gazelles. They began a study of an iron storage disease in the Bali mynah collection which resembles hemochromatosis in humans. Published reports describing the results of the completed projects will provide useful information for other zoological collections. Additional funding to equip this facility will help the Zoo provide the best of care for its animals, particularly through groundbreaking research resulting from cooperative efforts with other research organizations.

During 1987, the Zoo made major advances in its research on reproductive physiology and endocrinology. The Endocrinology Research Laboratory in the veterinary hospital complex at the Conservation and Research Center continues its research to monitor hormonal metabolites in voided urine. This is an ideal, non-invasive approach to the study of endocrinology of wildlife species in zoos. Researchers can use this technique to diagnose pregnancy and predict parturition in Eld's deer and the Przewalski's horse. Studies are now in progress involving Pere David's deer, muntjac, and golden lion tamarins. The laboratory also diagnoses and monitors the pregnancy of the Zoo's giant panda, Ling-Ling. These results are important in ensuring good prenatal and postnatal care.

Research continued on the domestic ferret as a model for the highly endangered black-footed ferret. During the past year, successful methods accounted for atraumatically inseminating ferrets by laparoscopy. This is a fiber-optic system which deposits sperm directly into the uterus through the abdominal wall. The procedure resulted in a conception rate of 70 percent and the births of over 140 domestic ferret offspring. Furthermore, researchers developed successful procedures to freeze-store ferret spermatozoa. Female ferrets, inseminated with sperm cells stored as long as one year, gave birth to 31 kits.

The Zoo advanced further in the fields of gamete research and embryo technology. Of particular significance was collaborative research with the Dallas Zoological Park which resulted in the birth of a suni antelope after embryo transfer. The Zoo became the first research laboratory to produce carnivore offspring (domestic cat kittens) from in-vitro fertilized embryos. Following this accomplishment, NZP researchers improved laboratory procedures for producing embryos. At present, approximately 80 percent of all cat eggs fertilized in-vitro result in embryos. The Zoo has recently collaborated with State of Florida officials who manage the highly endangered Florida panther in using this technology. Researchers used the in-vitro fertilization procedure, developed for the domestic cat, to recover puma eggs. They achieved a 45 percent fertilization rate which included the production of 10 cleaved embryos.

The Department continued its studies on the effects of inbreeding on the reproductive function of free-ranging species. Two field studies compared the amount of genetic diversity with reproductive and endocrine performance. A study in the Serengeti National Park, Tanzania involved successful immobilization, recovery, and data collection from more than 60 free-living lions. More recently, the scientific staff conducted one of the first genetic-reproductive studies of the koala, collecting similar information from 60 free-ranging males living in outbred and isolated populations in southeastern Australia.

To fortify and balance biodiversity research with the discipline of species propagation, the NZP is proposing to establish a Genetic Resource Bank which will rely heavily on the rapidly developing field of cryobiology. Various task group reports have emphasized the importance of developing strategies for maintaining genetic diversity in wild fauna. Gamete and embryo cryopreservation may be instrumental in aiding the conservation and management efforts for mammals. There has been publicity directed at dwindling habitat, the loss of species and genetic diversity, and the potential of artificial breeding technology. However, no organized effort exists, either in the United States or elsewhere, to sample, evaluate, cryopreserve, maintain, and use germ plasm from animals other than common domestic species. The Genetic Resource Bank will help international efforts to preserve rare and threatened sources of biodiversity. The proposed program will have three functions:

- fundamental research in the discipline of low temperature biology and storage of viable biological cells, especially sperm and embryos;
- development and application of new ideas in cryobiology and state-of-the-art techniques of controlled breeding to conservation and propagation of rare and endangered animals; and
- training intra- and extramural scientists in the application of cryobiological techniques to archival and conservation activities.

Animal Conservation and Propagation - The Conservation and Research Center plays a leading international role in wildlife conservation through its programs in captive propagation of endangered species, interdisciplinary research, and international training. The Center's facilities provide a unique environment for long-term propagation of endangered species, including mammals such as Przewalski's horse, the Arabian oryx, the Burmese brow-antlered deer, the clouded leopard, the maned wolf, the red pandas, and birds such as Guam rails, Micronesian kingfishers, Bali mynahs, and red-crowned and white-naped cranes. Breeding stock of nearly 800 birds and mammals of 38 species are the core of collaborative programs with North American zoos. CRC manages scientifically many of the species under cooperative species Survival Plans. Through these programs the Zoo will continue its leadership role in endangered species propagation.

Each year the Conservation and Research Center sponsors, for developing country nationals, a wildlife conservation and management curriculum lasting two months. Zoo staff hold this program three times a year for people of Third-World countries. For FY 1988, 27 students representing 17 countries participated. Some of the represented countries include: China, Sri Lanka, Brazil, Ghana, Kenya, Gambia, Malaysia, and Bhutan. Over 250 students from over 30 Third-World countries have participated in the course.

A new sister program for zoo biology and animal management training was held in Thailand, Malaysia, Brazil, and Burma. This program promises to promote conservation

through the urban zoos of tropical countries. Recently, the Center expanded its important role in Third-World training and conservation by hiring an overseas conservation extension officer, who will work with governmental and non-governmental organizations in Asia to identify and address conservation needs through training, management, and research. The Zoo will also continue ongoing programs for American students of veterinary medicine, pathology, animal behavior, and animal management.

In 1987, researchers completed a four-year study of the endangered one-horned rhinoceros in Nepal's Royal Chitwan National Park. Wildlife scientists are analyzing the results for publication. This 15-year program on Nepal's ecology and conservation of endangered lowland habitats will continue with support from the United States Agency for International Development, the World Wildlife Fund-United States, and the Smithsonian's International Environment Science Program. The program will soon become a self-sufficient training and research center. Other reintroduction programs that exist for Eld's deer, Guam rails, and Bali mynahs are taking place in Thailand, Micronesia, and Indonesia.

Successful animal propagation requires much cooperation between zoos. Zoo staff transfer animals between zoos for demographic and genetic management, and they deliver many animals to foreign zoos. NZP continues to explore opportunities to place rare and important species in zoos outside the United States to promote reproduction, public education, and zoological interest. For example, the Zoo transferred a pair of Eld's deer to Thailand in late 1987 to commemorate the 60th birthday of the King of Thailand. This gesture is also relevant to the breeding and the reintroduction programs in which NZP scientists are helping this endangered species. Zoo staff are responsible for the management of seven endangered species on a national or international level. The staff are deeply committed to the long-term management of several other species.

Research - The success of the NZP programs in conservation and propagation depends largely upon the Zoo's research. The reintroduction of the golden lion tamarins to the wild would not have been possible without sophisticated and painstaking research. Zoo researchers had to study in great detail the structure of the social and family life of tamarins. This research included studying their foraging and feeding behavior. All this was required in order to successfully breed and, ultimately, reintroduce natural groups of animals capable of surviving in the forests of Brazil. Zoo studies are now emphasizing a variety of approaches to better understand the diet, metabolism, and genetics of the golden lion tamarin. The National Zoological Park's field ecology program in the Poco das Antas Reserve, Brazil is also focusing on in depth examination of the mating system and social organization of golden lion tamarins. Their studies also include the ecology of associated vertebrates and invertebrates so that scientists can predict how and why the future population might expand. Additionally, NZP scientists are:

- charting the rehabilitation of degraded habitat;
- studying methods of encouraging support for conservation by local communities;
- testing new techniques for training tamarins to survive in the wild in the area of the Poco das Antas Reserve.

Research at the Zoo concentrates on understanding aspects that influence the biology and behavior of both species and people. One major area of interest is in growth. Studies focus on the natural development patterns of different species in order to determine the ontogenetic and evolutionary basis for species differences in

adult behavior. For example, scientists are conducting studies that show the interaction of inborn behavioral tendencies with learned behavior. One application of these studies of learning is the training of adults and young of zoo born animals for survival in the wild.

Studies by Zoo staff resulted in several new advances on growth patterns of marine mammals. The Zoo has now accumulated a unique data set on the milk composition and the concurrent growth and development of several species of seals and sea lions. With this data scientists can correlate patterns with ecological and evolutionary factors. Zoo researchers studying the endangered monk seal of Hawaii are examining the finding that female seals nurse pups besides their own. This behavior may derive from ecological conditions and may be influencing unfavorably the decline in numbers of monk seals. Future studies will assess whether the degree of fostering varies in different habitats.

A major new focus of research at the National Zoo is on genetic studies. A population genetics project will contribute to the long-term viability of zoo populations of critically endangered species. NZP scientists are developing automated demographic models and long-term breeding plans for zoo populations of tigers, Asiatic lions, and golden lion tamarins. The Zoo's genetics specialists are advisors to many international programs for endangered species, including Bali mynahs, California condors, black-footed ferrets, and tigers.

New molecular genetics studies have found that the three forms of lion tamarins, although very different in appearance, are almost indistinguishable biochemically. Future studies of the lion tamarins will focus on distinguishing more clearly the three types. The studies will compare the lion tamarins with other tamarin species to determine to what degree their depauperate genetic state is specific to them or general to all marmosets and tamarins. Geneticists are also looking at many ungulate species to determine the degree of genetic variation across a broad array of species. The Zoo is expanding technical expertise and using state-of-the-art DNA fingerprinting techniques to uncover relationships among closely related animals. Similar studies aim to determine population relationships for species that are almost genetically invariant.

Zoo staff are conducting important new studies on the relationship between mating systems, reproductive behavior, and genetic paternity. Studies of the behavior of purple martins suggest that the male of a pair in this colonial breeding species is not always the father of the young for which he cares. Similar results for other species of birds and mammals suggest that researchers must re-evaluate current sociobiological theory concerning kin selection and the evolution of social behavior.

The Zoo continues to make major advances in the study of animal communication. The development of a new heart rate monitoring technique in birds now allows the NZP to evaluate the physiological responses of birds to potentially stressful situations, including social interactions. Initial studies have shown that while stressed the heart rate of sparrows nearly doubles to 1,000 beats per minute. Scientists will now be able to determine whether the singing of other birds or interaction with other birds during territorial encounters results in a comparable stress level. Additional studies will focus on whether the function of singing by birds fundamentally differs between tropical and temperate climate songbirds. Evidence suggests that the former use song to determine the location of conspecifics and the latter use song to disturb listeners and to provide distance information. Scientists also are conducting in-depth studies of giant pandas' and golden lion tamarins' vocal and long distance

communication as a mechanism for helping successful reproduction and maintaining group isolation and cohesion.

The successful application of energetic evaluation techniques to studies of mammalian reproductive strategies has led to an increase in research projects asking energetically related questions. The Zoo initiated studies of energy conservation in group-living tamarins and marmosets, the comparative energetics of precocial social and non-social rodents, and an examination of the energetics of social dominance and reproductive success in the eastern chipmunk in FY 1987. Numerous projects now keep the Zoo's original modest energetics laboratory busy.

In recent years the increase in research programs, students, and research associates has strained the dispersed, outdated, and cramped facilities at the Department of Zoological Research. In mid-1988, extensive renovation of the Research Building commenced. By mid-1989 it will provide modern laboratory suites for nutrition, energetics, and video and audio analysis for the growing Department. The Zoo will have improved and enlarged animal holding and office space.

In early 1988, NZP constructed a temporary genetics laboratory in the Propagation Building to support the newly established Molecular Genetics Unit. The Genetics Laboratory will expand when the Nutrition Lab relocates from the Propagation Building to the renovated Research Building in 1989. This relocation will provide the needed space to accommodate the Genetics Unit and the large number of molecular genetics projects the Unit monitors.

Public Education and Information - The Zoo seeks to inform and educate the large and diverse audience it serves through a wide range of creative programs, exhibits, and materials. The National Zoo News, a newspaper for area teachers, keeps them informed about the Zoo and its many educational programs, ranging from multi-visit activity based programs to single visit programs. Teacher-training workshops are a key component of school programs. Outreach for schools includes loan kits for teachers in the Washington area, featuring objects, books, and related curriculum materials. The emphasis in recent years has been on activity-based programs, where students have opportunities for close observation of animals. New programs of this type include:

- "Dinosaurs and Reptiles," a two-visit program jointly conducted with the Museum of Natural History;
- "Invertebrates"; and
- "A Closer Look," a six-visit program for city children and their teachers.

With its support society, The Friends of the National Zoo, the Zoo offers classes to adults in conservation, animal behavior, and exotic animal medicine. Participants completing six courses receive certificates in wildlife studies. To date, several hundred people have received certificates, and many more have enrolled in the classes.

In all its programs, the Zoo is placing more emphasis on conservation education. ZooArk is a temporary exhibit on zoos and world-wide conservation programs. Developed by the Zoo, it travels to zoos throughout the country under the auspices of the Smithsonian Institution Traveling Exhibition Service (SITES). The exhibit, aimed at family audiences, includes interactive elements such as computer games and rotating panels.

The Zoo, along with the National Portrait Gallery and the Museum of Natural History, is planning an innovative museum program, "Bison, Butterflies, and Conservation" for junior high school students. This three-part program combines behind-the-scenes museum and zoo visits, historical role playing, and discussion of contemporary issues.

Educational exhibits developed in 1988 will accompany new animal displays, including Gibbon Ridge, Wetlands, Japanese Spider Crab, and Komodo Dragons. In addition, a continuing program of identification and information labels covers a diversity of subjects. A photographic exhibition entitled "The Zoo: Then, Now and Future" will mark the Centennial year, 1989.

An updated Master Graphics Plan will comprise all forms of orientation for the public, including directional signs and a map-brochure. This plan will reflect both major physical changes, such as the completed renovation of Olmsted Walk, and the major themes of the Zoo's Centennial celebration.

People across the United States are able to share in the achievements of the Zoo through print, television, symposia, and film. Nationally televised programs, such as the August 1987 Audubon Society special "On the Edge of Extinction," have underscored the National Zoo's role in preserving endangered species. Other events, like the Sunset Serenades series, featuring folk, jazz, and blues concerts, reach out to new audiences to bring them to the Park in the peaceful, early evening hours during the summer. The "Symposia for the Public" series introduces serious biological topics to the public through illustrated lectures and discussions. The eighth symposium, held in April 1988, provided a forum for the discussion of human cultures as variables that any nation must include in its strategies for development and wildlife conservation. Proceedings from several of the symposia appeared in collections. The Smithsonian Institution Press published Animal Extinctions and Animal Intelligence in 1985 and 1986 respectively, and Perceptions of Animals in American Culture is in press. The public reception of the books has been favorable.

Additional public lectures held throughout the year focus on a variety of wildlife and environmental topics. The most recent lecture was on the evolution and distribution of the lesser apes: siamangs and gibbons.

EXPLANATION OF PROGRAM INCREASES - For FY 1990, the Zoo requests 4 workyears and \$361,000 to support current programs (4 workyears and \$191,000) and to support the equipment upgrade and replacement program (\$170,000). The resources contained in the line-item reflect 1 workyear and \$52,000 associated with the Institution's strengthened affirmative action plan. Justification for these resources appears in the central Affirmative Action section of this budget. The FY 1990 estimate also reflects a decrease of \$56,000 associated with one-time equipment costs for the Molecular Systematics and Evolution Program.

Support of Current Programs (4 workyears and \$191,000) - The National Zoological Park is engaged in a major construction and improvement program that began in 1974. In the past 15 years the Zoo has invested over \$50,000,000 in new or rebuilt exhibits and support facilities. However, the modern facilities and the programs the Zoo has scheduled will be of little value without the support staff and funds necessary to operate the facilities.

As the construction program continues, it transforms the zoological park into a biological park which stresses the diversity and interdependence of plants and

animals. The biopark concept represents a new type of biological exhibit. The purpose is to eliminate the unnatural separation of animals and plants, common to most zoos. In nature, plants inextricably intermix with animals, and the biopark will show aquatic and terrestrial ecosystems as interlinked and interdependent. This biopark will incorporate the best of zoos, aquariums, botanical gardens, and natural history museums.

This will require an increase of 4 workyears and \$191,000 in staff and support funds in FY 1990. The expanded exhibitry at the Park requires a curatorial position and one keeper position. The addition of an exhibits specialist and a general maintenance position will meet the increased demand for upkeep and expansion of the exhibits. This request will also fund exhibit and plant materials to support the new biopark theme.

To move from the traditional cage-based, animal-oriented zoo to a more accurate reflection of the unity of life on earth will require sophisticated new programs. The requested resources will continue to move the Zoo in this direction.

Equipment Upgrade and Replacement Program (\$170,000) - The Zoo is a leading international center for animal exhibition, biological and veterinary research, conservation, and public education. The Zoo must have a sound financial base for the purchase of laboratory equipment. Functional equipment will ensure continued success with the reintroduction of the Zoo's endangered species program, its medical program, and in its cooperative efforts with other national and international research organizations, including other zoos.

In the last few years the Zoo has completed surveys of its equipment at Rock Creek and Front Royal, Virginia. These reviews indicate that the average life of equipment ranges from six to 13 years. Much of the Zoo's research equipment is obsolete because of recent technological developments. The productivity of the staff, especially new members trained in the use of modern equipment, has decreased because of the condition of the equipment. The alternative of sending samples to commercial laboratories for analysis is not always an appropriate choice or the best solution. The longer the samples are in transit, the greater the chance of damage. Commercial laboratories establish their own priorities regardless of customers' requirements. On-site laboratory analysis enables quicker turnaround and more versatility in testing.

Congress appropriated funds in FY 1987 to enable the Zoo to purchase equipment for the new veterinary hospital. These funds remained in the operating base and provided additional equipment for the hospital. The Zoo has redirected limited funds on a case by case basis to purchase some equipment items. These redirections have helped. However, additional funds are necessary to ensure a regular, cyclical replacement plan for important pieces of Zoo equipment.

Most departments engaged in activities crucial to the health of the collection are using equipment ten years or more old. Such equipment often does not have the capabilities that today's research requires. In some cases departments must resort to repairing equipment they ought to replace. The requested funding will permit the Zoo to purchase such equipment as: a stereo dissecting microscope, costing \$4,000; an inverted phase microscope, costing \$15,000; and a research microscope, estimated cost \$15,000. The stereo dissecting microscope currently in use is 15 years old. Even though it is still functional, its use is limited. Newer microscopes have additional capabilities, including still camera and video-taping attachments. Researchers are

able to store tapes for later review and study purposes. The new milli-q-water purifier, which costs \$7,000, detoxifies water and removes trace elements making water pure for storing and examining tissue samples. The foremost value of obtaining an ultra-low temperature freezer, costing \$85,000 for the Pathology lab which depends on proper storage of diseased tissue samples, is that this freezer will extend the shelf life of tissue samples indefinitely. A sample stored for years may prove invaluable for later examination.

The requested \$170,000 will facilitate cyclical replacement and upgrading of equipment for the Zoo. The request for FY 1990 will supplement \$300,000 of base funding. Through additional requests, the Zoo will seek support to reach the optimum base level of \$800,000 by FY 1994. At an annual level of \$800,000, equipment would turn over between 8-12 years. The request for FY 1990 will ensure that Zoo staff have equipment that is crucial to monitor and maintain the health of the live collection and to support present research needs.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds derive from a variety of sources including fees for providing services and general use of the facilities by Trust fund units or outside organizations. The Zoo uses these funds to support and maintain its facilities, to purchase animals for the collection, to support a number of 3-year assistantship positions, and to meet the salary and support costs of the Director.

Restricted Funds - Gifts and foundation grants provide these funds which support specific research projects and educational programs. The Zoo has received grants from the Packard Foundation, the PEW Trusts, and the World Wildlife Fund to support the training of Zoo professionals from developing nations in wildlife management and zoo management. The Golden Lion Tamarin reintroduction program in Brazil continues to receive outside support from various organizations. The Zoo has received a grant from the U. S. Fish and Wildlife Service to study reintroduction techniques for the domestic ferret. This is a first step to a research project for the endangered Black Footed Ferret.

SMITHSONIAN INSTITUTION ARCHIVES

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	15	577	6	255	-	-	-	-	-	-
FY 1989 Estimate	15	644	6	215	-	-	-	-	-	-
FY 1990 Estimate	17	724	6	215	-	-	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - Smithsonian Institution Archives (SIA) is keeper of the Institution's records and is responsible for documenting the Smithsonian's history. As the Smithsonian grows and diversifies, so do its records. To acquire, keep, and service an adequate historical record, the Archives must grow and diversify as well. Modernization and annual resource increases are necessary to acquire, maintain, and service records for research. SIA requests an increase of 2 workyears and \$80,000 in FY 1990 and further support in outyears for a decade of modernization to be sure future archives meet the needs of future research.

PROGRAM - SIA's staff identifies, appraises, accessions, preserves, arranges, and describes documents pertinent to Institutional history. The staff does research and provides reference service to museum staff, scholars, and the public. It advises other archives, both in the Smithsonian and outside the Institution.

Staff and Facilities - Archivists, historians, technicians, and clerical personnel staff SIA. The office is in the Arts and Industries Building for the benefit and convenience of users. A records center on North Capitol Street holds inactive records awaiting disposition. SIA leases remote storage in Springfield, Virginia, for records exceeding central storage limits. SIA has long-range plans to acquire comprehensive archives facilities near the Mall and security storage of documents on the grounds of the National Zoo's Conservation Research Center at Front Royal, Virginia.

Program Accomplishments - SIA has reviewed and redefined its program to produce a master program statement and a plan for a decade of modernization essential to serve future research. The Smithsonian's Management Committee has recently reviewed this program and offered institutional support to meet general goals. American Management Systems, Inc. analyzed SIA functions and information systems for automation potential. All three reviews concluded SIA needs modernization, including improved staffing, equipping, automation, and facilities.

In FY 1988, SIA produced a concept paper on the management and needs of archives throughout the Institution; set up a Smithsonian Institution Archives and Special

Collections Council to identify and coordinate Institutional archival program needs, concerns, and policies; completed a guide to photographic collections in the National Museum of American History, scheduled for publication in FY 1989; published a guide to Smithsonian Institution Archival, Manuscript, and Special Collection Resources; completed a major survey and draft disposition schedules for the Archives of American Art; and conducted symposia on audio-visual documentation for Smithsonian staff. The following table summarizes some activities of the Archives:

<u>Statistical Summary of SIA Activity</u>	<u>FY 1987</u>	<u>FY 1988*</u>
Total Holdings at Year-end (cubic feet)	13,441	14,471
Accessions Added (cubic feet)	1,334	1,030
Reference Inquiries	1,538	1,300
Items Provided to Researchers	5,552	5,800
Pages of Copy Provided to Researchers	27,664	26,300

*Projected through 30 June 1988.

EXPLANATION OF PROGRAM INCREASE:

Smithsonian Archives Modernization (2 workyears and \$80,000) - The increase will provide programming services and staff training to automate survey reports, stack management, accessions, and reference service. This is the first step in a ten-year development plan to make future archives meet future research needs.

The Smithsonian Archives is a resource of information for the Nation. Its records are administratively more complex and technically more sophisticated each year. Annual accessions averaged 825 cubic feet during 1977-87, and exceeded 1,000 cubic feet in five of those years. The Institution's records grow in direct proportion to Smithsonian growth. The Archives has a ten-year plan to keep pace with this development.

This first stage in the SIA's new program calls for the hiring of two archives technicians, needed as records are transferred to the Archives. The technicians will customize off-the-shelf hardware and software to archival applications. Also, the technicians will handle machine-readable records. The automated system will position SIA to join the National Research Libraries Information Network (RLIN) and to share catalogue information with nearly 100 major research libraries throughout the country. As the Archives acquires hardware and software, management functions and information will keep current with technological developments.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - An annual allotment provides funding for personnel and associated support costs.

SMITHSONIAN INSTITUTION LIBRARIES

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	97	5,070	10	388	-	58	-	-	-	-
FY 1989 Estimate	99	5,079	10	390	-	2	-	-	-	-
FY 1990 Estimate	100	5,265	11	417	-	3	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Smithsonian Institution Libraries (SIL) serves the Institution and the public by providing information resources and services to support Smithsonian research, curatorial, publication, and administrative activities, and participation in the creation of a national bibliographic data base and programs for publications, exhibitions, and inter-library loans. Its collections of more than one million volumes, including over 20,000 journals, are available to Smithsonian and outside scholars through a system of 14 branch libraries in 38 locations. SIL purchases books for all Smithsonian organizations and coordinates requests for automated information sources. These services help to avoid duplicate library-related procedures and expenses within the Institution. For FY 1990, SIL requests an increase of \$150,000 to maintain adequate funding for the rapidly increasing costs of SIL's current serial subscriptions.

Also contained in this line-item is an increase of 1 workyear and \$36,000 associated with the Institution's strengthened affirmative action plan. Justification of these resources appears in the central Affirmative Action section of this budget.

PROGRAM - The Smithsonian Institution Libraries (SIL) provides both centralized and decentralized services. The central collections support multi-disciplinary research and emphasize interdisciplinary topics such as management, fund raising, conservation, and museology. The specialized collections in the branch libraries are outstanding in natural history, American ethnology and culture, tropical biology, African art, decorative arts and design, astrophysics, the history of science and technology, aeronautics and astronautics, conservation research, and horticulture. SIL's collections include approximately 35,000 rare books, primarily in science, technology, applied art, aerospace, and natural history. The largest of these rare book collections is the Dibner Library consisting of 19,000 volumes and manuscripts on the history of science and technology.

Three operational divisions compose the SIL: Research Services, charged with direct reference assistance to SI researchers; Collections Management, responsible for the selection, acquisition, and preservation of library collections; and Automated Systems, which manages the SIL bibliographic data bases, catalogs and maintains

inventory control of SIL collections, and coordinates all automation of SIL operations. By centralizing acquisitions and cataloging, preservation and conservation activities, administrative services, and interdisciplinary reference/information services, SIL has achieved system and cost efficiencies.

Research Services - The Research Services Division of the Smithsonian Institution Libraries serves as the link between the Libraries' collections and researchers. In order to make the SIL collections and services as accessible to users as possible, the Division consists of 14 branch libraries and one remote annex physically dispersed in 38 locations around the Mall, in other Washington locations, and in Cambridge, Massachusetts, New York City, and Panama. The level of staffing is in proportion to the size of the collections and the extent to which Smithsonian staff, visiting scholars and researchers, and the general public use each library. All branches offer sophisticated subject and information science expertise to provide users with the information they require.

In FY 1988, SIL circulated 66,965 items to borrowers both within and outside the Institution: 37,961 volumes from the SIL collections; 5,412 volumes borrowed from other libraries to meet the needs of SI researchers; 14,516 items photocopied from SIL materials; and 9,076 items photocopied from other libraries or from a commercial document delivery service. Locating articles and monographs not held by the SIL requires searching both electronic data bases and printed indices and catalogs, requesting the item on loan either through a national computer network or via the U.S. mails, and receiving items requested and delivering them to the users. Increasingly, SIL staff rely on commercial document delivery services to make information from professional journals more rapidly available.

In addition to borrowing items for SI researchers, SIL lends items to other libraries nationwide. Of the 66,965 circulation transactions in FY 1988 described above, 6,912 represent loans of volumes and photocopies from SIL collections to users in other libraries via inter-library loan.

The Research Services staff also supports research by preparing lists of new acquisitions and bibliographies on specific topics. Bibliographies direct users to new sources of information and are particularly useful in responding to frequently asked questions or for topics of general interest. SIL distributes several hundred bibliographies annually in response to inquiries, especially from the branches in the Museum of African Art, the National Zoological Park, the Museum Reference Center, and the Office of Horticulture. Some of these bibliographies, as well as acquisition lists, prepared by these and other branches are in such demand that SIL distributed them on a regular basis to other libraries both in the United States and abroad as well as to individual scholars and interested members of the public.

Reference staff assist researchers daily. In FY 1988, they responded to 74,160 reference questions. These ranged from straightforward requests for names, dates, and places to complex questions requiring several hours, if not days, of investigation to answer. To find the information requested, the staff uses a wide variety of reference tools, including standard published reference works and electronic data bases. Many branches also produce form letters in order to respond efficiently to frequently asked questions.

The Research Services Division is also responsible for the housing and maintenance of the collections. In FY 1988, SIL moved or renovated several branches in order to provide additional and better quality space in which to house the

collections and provide improved reading and study space for users. The Smithsonian Environmental Research Center (SERC) branch library moved into new quarters in the renovated Calf Barn. The National Museum of American History (NMAH) reclaimed the storage area which housed some 45,000 serial volumes, plus trade catalogs and auction catalogs that the branch itself could not accommodate. Part of this collection moved to the Smithsonian Institution Libraries Remote Annex (SILRA) at 1111 North Capitol Street. The remainder relocated to a new temporary storage area in the museum to await the construction of the Dibner Study Center which will house it eventually.

SILRA itself underwent renovation, including the installation of air conditioning and expansion of floor space to accommodate the materials transferred from NMAH. Improved environmental conditions increase the longevity of collections by retarding the rate of deterioration. SILRA also serves as a processing/staging area for other large collections and houses a preservation facility.

In the National Museum of Natural History, the Department of Anthropology provided an additional room adjacent to the present library to relieve the overcrowding in the stacks and permit the continued growth of the collection. Having added shelving and rearranging the current reading room, the Department of Anthropology can accommodate several thousand volumes in the new space. Finally, to provide additional office space for the National Air and Space Museum (NASM), the NASM Branch Library installed compact shelving and consolidated collections.

Collections Management - Staff of the Collections Management Division select, acquire, preserve, and deaccession all library materials that form the SIL collections, which now contain more than 1,024,000 volumes. In early 1988, the Institution approved the revision of SIL's Collections Management Policies, which serves as a guide for collections acquisition, control, maintenance, and deaccession.

The spiralling cost of serials subscriptions forced SIL to cancel many duplicate subscriptions as well as titles of lesser value. Inflation is particularly acute in foreign journals because of the weakness of the dollar abroad and the rise in rates charged to North American subscribers.

In February 1988, SIL hired a preservation specialist to initiate, establish, and administer preservation policies and procedures to enhance SIL's ability to preserve its non-rare materials. A 1986 preservation survey revealed that nearly one-third of the collections housed outside rare book facilities are too brittle to withstand continued use. At particular risk are volumes published between 1870 and 1930; over 90 percent of them are severely deteriorated. As a first step, SIL is developing a contract with a commercial micro-publisher to film a 2,200-volume collection of publications resulting from international expositions held from 1834 to 1915. The project will begin in October 1988. In cooperation with a commercial publisher, SIL will also produce an illustrated guide to accompany the microform collection.

In June 1988, SIL began to administer the Smithsonian International Exchange Service (IES), formerly known as the Office of Publications Exchange. Staff of SIL's Acquisitions Services, which already maintains an active exchange program with nearly 3900 exchange partners worldwide, administers the unit. SIL will review prospects for streamlining the service and for enhancing its participation in the Smithsonian's global mission to diffuse knowledge.

As FY 1988 drew to a close, SIL began planning to evaluate some of its historical collections using methodologies developed by the Association of Research Libraries for its National Collections Inventory Project. The resulting data will assist in determining priorities for preservation and in identifying gaps and weaknesses in the research resources required to support the Institution's scholarly enterprises.

Automated Systems - SIL uses electronic technology for most of its internal library operations and for resource sharing and communication with other libraries.

The Institution's Bibliographic Information System (SIBIS), installed in 1984, is the major mechanism for most SIL functions. It provides an on-line system with a central data base of bibliographic information. Electronic processing and machine readable files that can be updated and accessed from decentralized locations are replacing manual processes and files.

For the past seven years, SIL has conducted a program to convert its manual catalogs to machine-readable format. The converted records, which conform to the highest national standards, form the SIL on-line catalog. Through sophisticated search keys, such as key word searching, SIL makes collections accessible from any location within the Institution. In FY 1988, SIL completed the basic conversion of standard manual files with approximately 375,000 records added to the data base. The program now concentrates upon upgrading and converting partial and substandard records. SIL will continue to barcode each volume represented in the on-line catalog to allow electronic identification and circulation control.

Since 1974, SIL has participated in the Online Computer Library Center (OCLC), a national bibliographic utility, with more than 8,000 member libraries, and a data base of more than 18 million records. SIL uses OCLC for creating and sharing records of its collections and for on-line interlibrary loans.

The SIBIS acquisitions module is for on-line ordering, processing of orders, account maintenance, interface with accounting, and on-line access to order information. SIL implemented automatic claiming of books ordered, but not received, in FY 1988. The system tracks ordered items for expected delivery date and automatically generates a claim notice for overdue items.

Implemented in FY 1986 the SIBIS electronic mail system for inter-office communication has fostered better and faster communication between SIL staff.

During FY 1988 a Circulation Implementation Committee planned all aspects of the SIBIS automated circulation system. As a first step in automating, SIL began phasing in the circulation data base in July, 1988. The new circulation system will be operational in the first branch in September, 1988. The automated circulation system will track the location and status of works in SIL collections, thus improving accountability and security, and will provide more accurate data about the use of the collections.

In 1988, SIL installed a local area network (LAN) in its central administrative offices. Fifteen microcomputers running word processing and spread sheet software allow administrative staff to share files, modems, and printers, save keying time, and minimize errors due to rekeying.

Although SIL has used microcomputer technology since 1984, in FY 1988 SIL established system-wide policies and standards for software, hardware, maintenance,

and training. The majority of SIL staff now employ microcomputers in their work to improve productivity as well as the quality of daily work.

During 1988, SIL continued the cataloging of previously uncataloged gift and trade literature collections, with contract work supplementing the work of in-house staff. During FY 1988, SIL cataloged almost 13,500 titles by contract. In addition, SIL indexed and added over 2,300 trade catalogs to the SIL on-line catalog. SIL began to catalog the trade collections, previously indexed for access only through the SIL on-line catalog. SIL will add these collections to OCLC data base for access by researchers nationally. SIL also began cataloging rare items in the Cooper-Hewitt Museum branch library, approximately 100 volumes by contract. Because of the difficulty and complexity of original cataloging required for most of the older uncataloged collections, progress is slow and over 200,000 items await processing.

Outreach -- In FY 1988, SIL continued its commitment to national and international responsibilities via a series of lectures, exhibitions, and translated publications. On February 16 the SIL, as a member of the Washington Collegium for the Humanities (WCH), presented "Alchemical Death and Resurrection: Alchemy in the Age of Newton," a public lecture for the WCH Spring Lecture Series, "Death and the Afterlife in Art and Literature."

SIL published two illustrated catalogs, one to accompany its exhibition, "Book Conservation Laboratory Tenth Anniversary Exhibition," held in the Dibner Library, Special Collections Branch, October through January and the other for SIL's exhibition "Marbled Papers in Books" which will open in September. In February SIL presented a Memorial Exhibition in honor of Bern Dibner (1897-1988) which highlighted his life and accomplishments. From May through July, an exhibition of selected issues of 19th- and 20th-century journals purchased from The Franklin Institute in Philadelphia was on display in the Dibner Library.

Through the Translation Publishing Program, SIL published: Description of the Tula Weapon Factory in Regard to Historical and Technical Aspects (orig. pub. Moscow, 1826) and Mammals of the Soviet Union, Vol. I (orig. pub. Moscow, 1961). SIL also produced Information for Borrowers for distribution to SIL users.

EXPLANATION OF PROGRAM INCREASE:

Acquisitions Inflation (\$150,000) - Research journals are the heart blood of communication between Smithsonian scientists and scholars and their colleagues worldwide. Smithsonian curatorial and research staff also benefit directly from support for the acquisitions budget. From it SIL purchases only the most important books and journals in each subject of active Smithsonian interest. Over the years this careful selection produced substantial research collections in such areas as natural history, anthropology, aeronautics, astrophysics, decorative arts, African art, and the history of science and technology. SIL collections attract well-known visiting scholars, fellows, researchers, and students to the Institution. The collections also benefit the wider academic community, who seek SIL resources through interlibrary loan. Maintaining strong internal collections of the most heavily used books and journals allows SI staff to work productively. Scholars can concentrate on research, rather than wasting time searching for resources in other locations.

The erosion of SIL's purchasing power over the past three years has reduced acquisitions. SIL cannot postpone purchasing journals until prices come down. To cancel and later renew a subscription creates gaps in the collection that are

expensive and virtually impossible to fill, even by interlibrary loan. Most libraries, including the Library of Congress, will not loan current journal issues or back-files. Although they will make photocopies of articles, these can take weeks to reach the researcher.

Without budget assistance, SIL must cancel several of its current journal subscriptions. To add vital new journals to the collections to keep pace with the expanding fields of SI research requires an even greater increase. External economic factors, including a 42 percent decline in the American dollar since 1985, extraordinarily increased the costs of foreign and domestic journals. The average subscription price for SIL journals rose from \$107 in 1985 to \$133 in 1987. With an increase of \$150,000 in its acquisitions budget in FY 1990, SIL will maintain journals essential to ongoing Smithsonian research programs.

The Faxon Publishers' Service Bureau, which tracks subscription prices, projects that by the beginning of FY 1990, overall journal prices will have risen by 36 percent from 1986. The Smithsonian uses many specialized research titles. These show much higher increases, as the following examples for specific science and history journals show:

<u>JOURNAL</u>	<u>FY1986</u>	<u>FY1988</u>	<u>PERCENT INCREASE</u>
Analytica Chimica Acta	\$1,080	\$ 1,620	50%
Journal of Experimental Marine Biology & Ecology	760	1,247	64%
Aquaculture	579	935	61%
Earth & Planetary Science Letters	451	714	58%
Journal of Advertising History	90	248	176%
Review of Scientific Instruments	309	408	32%
Historical Journal of Film, Radio, and Television	110	161	46%
Photographic Abstracts	103	212	106%

Inflation also affects the purchases of scholarly books. Academic/scholarly books are more expensive than collegiate or trade publications because of their specialized nature. Preliminary data from the Library Materials Price Index Committee of the American Library Association show that academic book prices rose 10 percent between 1986 and 1987. This is twice as high as inflation in many other goods and services.

SIL has made significant efforts to reduce costs. In September 1987, SIL staff, with SI scholars, began a serious review of journal subscriptions to identify nonessential titles. As a result, SIL cancelled nearly \$25,000 of duplicate subscriptions. Unfortunately, these cancellations include many necessary and unique journals that support the Smithsonian's fundamental programs.

SIL must pay serials subscriptions a year in advance of receiving the issues. Payments made in FY 1987 were for subscriptions that extended into FY 1988. In FY 1987, SIL exceeded its internal serials budget by \$66,000 and covered the shortfall with funds needed for book purchases. SIL placed an immediate moratorium on new serials subscriptions for FY 1988. Since industry projects further increases for FY 1989, SIL has extended the moratorium. The requested FY 1990 increase in the SIL acquisitions budget will prevent the cancellation of \$70,000 worth of subscriptions essential for Smithsonian research programs.

SIL has also attempted to reduce costs by purchasing only "core" works for its collections and borrowing peripheral items from other libraries. In FY 1988, SIL staff requested 14,500 books and journal articles through inter-library loan. This high figure testifies to the inability of the Libraries to respond to many scholar's needs from its own collection. Further, inter-library loan relies reciprocity. SIL is already a heavy borrower from other institutions. Further inroads into the maintenance of SIL's collections would make it impossible to assist other institutions in any way comparable to its demands on them.

Funding at the level of \$150,000 for FY 1990 and at the requested levels for the succeeding years will maintain SIL's core collection of journals at present levels. If the dollar remains relatively stable, the requested level of funding must continue for at least five years for SIL to regain the purchasing power lost during the recent depreciation of the dollar and inflation in the journal market.

This staggering rise in journal subscription rates has hampered SIL's ability to acquire books and journals essential to Smithsonian research. The rapid fall of the American dollar abroad since 1985 and a continuing high level of book and journal inflation have diminished the purchasing power of all libraries. These events have deprived the Institution's scientists and curators of the research tools on which they depend. Unless SIL receives the requested increase, the Libraries must cancel unique journal subscriptions and reduce the number of scholarly books purchased. Until now, SIL moved funds from other lines of its budget to maintain buying power. Prices continue to rise, and annual shifts of funds to meet these costs harm other library programs. Already SIL's ability to support new research programs in the Secretary's areas of emphasis, such as molecular biology and biodiversity, has decreased. Further cuts would drastically affect support of SI's long-term, ongoing research programs.

NON-APPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - An allotment funds administrative salaries and related support costs including travel, training, and supplies. A program allotment supports such special events as public lectures and seminars. Purchases in honor of Bern Dibner, longstanding SI benefactor, and from the Franklin Institute exhausted a special purpose fund in 1988.

Restricted Funds - Gifts and grants from individuals, foundations, endowments, organizations, and corporations provide these funds for specific purposes. These funds will support the preparation costs for a future publication on international exhibitions and provide for the purchase of rare volumes on the history of science.

MAJOR SCIENTIFIC INSTRUMENTATION

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	-	525	-	-	-	-	-	-	-	-
FY 1989 Estimate	-	1,206	-	-	-	-	-	-	-	-
FY 1990 Estimate	-	2,176	-	-	-	-	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The development of major scientific instrumentation is vital to enable Smithsonian scientists to remain at the forefront of their fields. Because of the magnitude of the costs to fabricate new instruments and to reconfigure existing ones, the Institution requests funding for such projects under this subaccount, rather than under individual bureau line-items. Since these projects will, of necessity, require long-term development and multiyear funding, the Institution also requests that funds in this subaccount be available until expended.

For FY 1990, the Smithsonian requests no-year funding of \$2,176,000 to continue the design of the submillimeter telescope array (\$1,281,000) and the conversion of the Multiple Mirror Telescope (\$895,000). In addition, the Institution asks for funding for the personnel costs associated with the submillimeter telescope array design study as one-year funding in the Smithsonian Astrophysical Observatory (SAO) line-item. However, the justification for those positions is included here because of their relationship to the Major Scientific Instrumentation request.

PROGRAM - The development of major scientific instrumentation, such as telescopes, requires research and development (R&D) over an extended period of time. Teams of Smithsonian scientists, technicians, and contractors, focused on critical telescope subelements such as optics, detectors, receivers, and support structures, are engaged in these R&D efforts. To facilitate the unique, extended R&D efforts that are integral to the acquisition of major scientific instrumentation, the Institution established this no-year subaccount in the FY 1989 budget.

In the FY 1989 budget, the Smithsonian requested funding under this subaccount for two projects for the Smithsonian Astrophysical Observatory:

- the development of an array of submillimeter telescopes; and
- the conversion of the Multiple Mirror Telescope.

Both of these forefront scientific projects involve the fabrication of major new instrumentation that will take a number of years to design and complete. SAO anticipates the development of the submillimeter telescope array to continue through the mid-1990s. SAO estimates that the array will require total funding at \$30 million (1987) for construction on a continental site and about 25 percent more on a site in Hawaii. SAO expects to complete the conversion of the Multiple Mirror Telescope by FY 1994. SAO estimates the total cost to the Smithsonian of the conversion will be \$10 million (1987).

EXPLANATION OF PROGRAM INCREASE:

Design Study for an Array of Submillimeter Wavelength Telescopes (\$1,281,000) - SAO's submillimeter wavelength array will make fundamental contributions to astronomy and astrophysics in several areas.

(1) For studies of star formation, the array offers the prospect of detecting and studying gas falling into very young stars and, thereby, gaining detailed knowledge of how stars are formed. With unprecedented resolution and sensitivity, the array will provide images of high-velocity gas flows from recently formed stars. These images will elucidate the mechanisms that limit the growth of a star and will help to answer the fundamental question: Why is the sun the size it is? The array will map the structure and motions of the disks that eventually contract into stars. Scientists will then be able to study the way in which these factors cause multiple star systems and planets to form.

(2) Use of the array will generate new information about galaxies. Detailed maps of the emission from carbon monoxide molecules will provide our first clear view of the spiral structure of galaxies outlined by giant molecular clouds. The array also will allow astrophysicists to study the emission from the dust surrounding young stars in galaxies. Study of these emissions will reveal centers of star formation not visible with optical telescopes. These two new views of galactic structure will expand our understanding of the now mysterious ways that spiral patterns in galaxies originate and sustain themselves.

(3) Because of its high sensitivity, the array will provide accurate measurements of the submillimeter wavelength emission from quasars and active nuclei of galaxies. These measurements will clarify the relationship between these enormously energetic objects and reveal the source of their energy. These measurements also will be crucial to distinguishing between the mechanisms leading to quasars that emit radio waves and those that do not. An explanation for these mechanisms is one of the most important unsolved enigmas in our quest for understanding the source of energy in quasars.

(4) The array will give new information about the surfaces and atmospheres of planets and other objects in the solar system. Maps of Mercury, Mars, Saturn's rings, and some dozen other bodies will reveal the temperature and structure immediately beneath the surface. This information is needed to understand the nature of the subsurface composition. New data gathered on emission from molecules in the atmospheres of Venus and Saturn's satellite Titan should also provide insight into planetary weather.

(5) Finally, the array is likely to make unexpected discoveries. Only a few telescopes will be able to work at submillimeter wavelengths. The array's ability to discriminate spatially will be at least ten times greater than that of

any of these other, single, submillimeter telescopes. If the past is any guide, this unique capability should lead to serendipitous discoveries.

Scientific Justification -- The last frontier for ground-based astronomy consists of observing the skies with telescopes sensitive to submillimeter waves, light with wavelengths between those of infrared and radio waves. The radiation from the formation of stars and planetary systems, and from the puzzling processes taking place in the cores of galaxies and quasars, is usually most intense at submillimeter wavelengths. Therefore, scientists can best study such processes at these submillimeter wavelengths. Only in the past few years has technology advanced sufficiently to allow the construction of telescopes that can observe the universe at submillimeter wavelengths.

In 1982, the ten-year plan of the Astronomy Survey Committee of the National Research Council (NRC) recognized the desirability of submillimeter wavelength observations. Several single-antenna telescopes capable of such observations are now under construction or beginning operation. Expectations are that these telescopes will dramatically advance the field. However, none of them will be able to discern details finer than about 10 seconds of arc. This limitation means that their resolving power will be less than one-tenth of the leading astronomical instruments in other wavelength regions, including the Very Large Array (VLA) and the Hubble Space Telescope (HST).

The NRC study also recommended development of advanced spatial interferometers at all wavelengths to improve resolving power. SAO's submillimeter wavelength telescope array will be a premier response to the NRC's recommendation. In 1983-1984, a committee of seven SAO scientists conceived the proposed interferometric array; they subsequently published a study on the scientific need for the array and its technical feasibility. In particular, SAO scientists recommended an array of six submillimeter wavelength telescopes. The array would have resolving power of better than 1 second of arc. This resolution is far finer than for any single-antenna submillimeter wavelength telescope and comparable to that of the VLA and the HST.

Astronomers worldwide received SAO's 145-page study, and 25 astronomers with relevant expertise provided detailed reviews. (SAO received about a dozen other signed reviews.) The strong consensus of the reviews supported SAO's conclusion that a submillimeter wavelength array has very high scientific potential, is technically feasible, and is of appropriate scale for SAO to undertake.

Status and FY 1990 Plans -- SAO began its submillimeter program in FY 1987. In that year, SAO hired a submillimeter receiver scientist and started to equip a receiver laboratory. With funding provided in FY 1988, SAO continued to develop its expertise in the technology for submillimeter receivers and, in particular, to start the design and construction of receivers for use on existing telescopes. SAO is currently hiring the senior receiver leader. The receiver scientist will assist the senior receiver leader in development of advanced systems and devices, building on the foundation of equipment and facilities already established by the receiver scientist. With funding requested in FY 1989 under this subaccount, SAO will begin a detailed design study for the planned array of submillimeter telescopes.

For FY 1990, the Institution requests a total of \$1,281,000 in no-year funding to complete the design study. This total represents an increase of \$670,000 over the

FY 1989 level. The main elements of the FY 1990 phase of the design study and their costs are:

- site planning (\$131,000);
- antennas and enclosures (\$550,000);
- receivers (\$150,000);
- correlators (\$200,000); and
- telescope-control and data-acquisition computers (\$250,000).

The personnel costs for the project are more suited to the SAO operations budget, and SAO has requested them there. With funding requested for FY 1989, SAO will hire a project scientist, a digital leader, and a software leader for the project. The project scientist will help define, investigate, and decide the design questions which have significant impact on the scientific capabilities of the array. The digital leader will design the digital correlator and other special-purpose digital electronic devices for the array. The software leader will conduct computer simulations of the performance of candidate array designs, and will design the architecture of computer programs for data acquisition and analysis. For FY 1990, the Institution requests an increase in the SAO line-item to hire a mechanical engineer, a receiver technician, and a digital technician (3 workyears and \$122,000). The three specialists are needed to assist the scientists in completing work on the design of the submillimeter telescope array. SAO will also contract with outside experts, as appropriate, to study and build system prototypes and to conduct computer simulations, as part of the design study. The Institution also requests a sum of \$20,000 to support the space rental costs for project staff in the SAO line-item.

Project Schedule -- SAO will complete the design study by the end of FY 1990, and thereafter construction could begin. Over the following six-year period, SAO estimates that it could complete the construction of the array at a total cost of approximately \$30 million (1987), including the design study and SAO personnel costs. SAO estimates annual operating expenses for the array to be about 8 percent of construction costs. The majority of these operating expenses represent personnel costs; SAO would hire almost all of these personnel during the design and construction phases of the project.

The following chart shows the total level of funding required for the project from FY 1989 through FY 1995:

PROJECTED FUNDING FOR SUBMILLIMETER TELESCOPE ARRAY

FY 1989 - FY 1995

	<u>FTE</u>	<u>(\$ Millions)</u> ^{/1} ^{/2}
FY 1989	3	0.8
FY 1990	6	1.6
FY 1991	18	5.1
FY 1992	28	6.5
FY 1993	31	6.0
FY 1994	33	5.0
FY 1995	<u>33</u>	<u>5.0</u>
TOTAL	152 ^{/3}	30.0

^{/1} Rounded to the nearest \$100,000; represent 1987 dollars.

^{/2} Includes all personnel costs for the project.

^{/3} Represents the cumulative workyear requirement over the seven year period; see text.

Conclusion -- When operational, the SAO submillimeter wavelength telescope array will be a major scientific instrument of international stature. The array will be unique in the world in its combination of wavelength coverage and resolving power. It will enhance the scientific competitiveness of the United States measurably. Since astronomical observations from space are suffering severe delays, in part due to the Challenger tragedy, the construction now of technologically advanced, pioneering ground-based instruments such as the SAO array is especially timely.

Conversion of the Multiple-Mirror Telescope (MMT) (\$895,000) - In FY 1988, SAO began the process of converting the MMT to a telescope with a single 6.5-meter diameter mirror. This conversion will more than double the light-gathering power of the telescope and increase its field of view one hundredfold. The converted telescope will therefore allow scientists to observe many objects simultaneously; for certain types of problems, the converted telescope will then permit more than a hundredfold increase in efficiency of data collection over the MMT.

Scientific Justification -- The increased collecting area of the converted telescope will allow astronomers to gather, on objects 2.5 times fainter, data of the same quality as now obtained. This improvement will allow the use of the converted telescope in many new areas of research, where the extreme faintness of the objects involved precludes the use of the present telescope. Further, the added light-gathering power means that more than twice as much of the universe would be accessible for study than is now possible. SAO has already established itself as a world leader through the discovery and study of the "bubble" structure of the universe. Expanding such studies beyond the MMT's present horizon will be very important to determine if even larger structures exist; if they do, we might again have to rethink our understanding of the evolution of the universe.

The expanded capability of the converted telescope also will be especially beneficial for the study of clusters of stars and galaxies. SAO astronomers could complete in a few hours projects which now require many nights on the MMT. For example, SAO scientists could conduct studies of the dynamics of clusters of stars, an area in which SAO scientists have been among the world leaders. Similarly, the study of clusters of galaxies, hitherto prohibitively demanding of telescope time, would become feasible. Research on these clusters may hold the key to an understanding of the distribution of matter in the universe. This distribution has a fundamental bearing on the evolution of the universe, in particular on how galaxies formed--a question that has baffled scientists for decades.

In addition, it will be possible to measure the velocities of gas in very distant galaxies. Astronomers can then compare these velocities, which are often related to the intrinsic brightnesses of the galaxies, with the apparent brightnesses of the galaxies to determine their distances. This technique would allow us to determine the rate of expansion of the universe when it was younger. A measurement of this rate is critical if we are to understand the evolution and ultimate fate of the universe: will it continue to expand forever, or will it eventually collapse?

The increased collecting area will allow pioneering studies of certain rapidly changing astrophysical phenomena. In such cases, changes occur too rapidly for astrophysicists to study them with any of today's telescopes. For example, some of these rapidly changing processes take place in double stars. The members of these stars are so close to each other that their surfaces almost touch. Scientists similarly can study phenomena in systems with one star whose core is so dense that not even light can escape from it--a black hole. Such systems give rise to very unusual

conditions; their study would be possible with the converted telescope and would allow us to gain insights into new physical processes.

These examples provide just a small sample of the scientific justifications for the conversion of the MMT. A conference held at SAO in April 1986 resulted in a 50-page proceedings which discusses in more detail the various reasons for the conversion.

Status and FY 1990 Plans -- With funding provided for the conversion project in FY 1987 and FY 1988 and requested for FY 1989, SAO will:

- purchase the materials required for the casting of the mirror in the University of Arizona Mirror Laboratory (the casting is currently scheduled for FY 1990);
- contract with consulting engineers to carry out the initial conceptual design of the telescope; and,
- develop the detailed design of the primary mirror support and associated thermal control system for the mirror figuring; the cell to support the mirror; and the optics-support structure and telescope drive system.

For FY 1990, the Institution requests a total of \$895,000 to continue the conversion process. This represents an increase of \$300,000 over the FY 1989 level. The main efforts in FY 1990 will be to:

- fabricate the support and thermal control system for figuring the mirror;
- begin to fabricate the primary and secondary mirror cells; and
- begin to fabricate the optics-support structure.

Project Schedule -- Expectations are that the conversion of the MMT will be complete by FY 1994 at a total cost to the Smithsonian of \$10 million (1987). This total includes amounts allocated in FY 1987 for glass and refractories, mostly from Institutional Trust funds, and the amounts indicated in the following chart.

PAST AND PROJECTED FUNDING FOR CONVERSION OF THE MULTIPLE MIRROR TELESCOPE

	<u>FY 1987 - FY 1994</u>
	<u>(\$ Millions)</u> ^{/1}
FY 1987	0.5
FY 1988	0.5
FY 1989	0.6
FY 1990	0.9
FY 1991	2.0
FY 1992	2.0
FY 1993	2.0
FY 1994	<u>1.5</u>
TOTAL	10.0

^{/1} Rounded to the nearest \$100,000; represent 1987 dollars.

Conclusion -- The conversion is the most cost-effective way to ensure that Smithsonian astronomers will remain in the forefront of ground-based optical and infrared astronomy through the remainder of the twentieth century and beyond.

OFFICE OF ASSISTANT SECRETARY FOR MUSEUMS

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	24	1,083	1	190	-	65	3	294	-	-
FY 1989 Estimate	24	1,111	1	193	-	61	1	104	-	-
FY 1990 Estimate	27	1,351	1	239	-	57	-	4	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of the Assistant Secretary for Museums (OASM) provides operational oversight for 14 museums and 6 major bureaus. It manages essential museum functions, including collections management, exhibitions, education, and public orientation. OASM acts as a liaison with national and international museum organizations and conducts special studies to improve museum operations and methods. This line-item includes the Office of Museum Programs (OMP) and the Office of the Registrar.

For FY 1990, the Assistant Secretary requests an increase of 3 workyears and \$210,000 for a Museum Interpretation Program (\$75,000); OMP training and information service (2 workyears and \$60,000); and the establishment of a stipend fund (\$75,000).

Also contained in this line-item is an increase of 1 workyear and \$30,000 associated with the Institution's strengthened affirmative action plan. Justification for these resources appears in the central Affirmative Action section of this budget.

PROGRAM - I. The Office of the Assistant Secretary for Museums - The Office oversees the operating and public functions of Smithsonian museums and encourages the development of new techniques in museum administration and practices. The Office administers two Trust-funded programs, the Collections Acquisition Program, which helps the purchase of major acquisitions by Smithsonian museums, and the Special Exhibition Fund, which provides partial funding for important and innovative exhibitions. The Office is planning for the new Experimental Gallery located in the Arts and Industries Building. The Experimental Gallery will be a place where new techniques can be tested for presenting information and objects to various types of audiences. The Office also works closely with specialized committees, i.e. Native Americans, Hispanics, educators, etc.; encourages cooperation between Smithsonian and outside museums with common interests; and strives to improve public programs related to minorities, particularly Afro-Americans, American Indians, and peoples of Hispanic, Near Eastern, and Far Eastern origins. In addition, the Office works cooperatively with national and international museum organizations and professionals to promote cultural understanding and scholarly exchange, in the areas of education, exhibitions, and collections management.

II. Office of Museum Programs - The Office of Museum Programs (OMP) conducts training for museum professionals and provides a unique resource for information on museum functions and practices. OMP offers approximately 55 annual workshops on museum practices at the Smithsonian and other locations, educational opportunities, services, and publications designed for the Native American community, and internships in museum practices. In FY 1988, OMP organized 80 visits to the Smithsonian for museum professionals from 25 countries and the United States and arranged 25 annual Minority Awards for two-week residencies at the Smithsonian. The staff provided museum consultations and career counseling for over 250 national and international students and museum personnel. The Office also produces and distributes audiovisual programs on conservation and museum practices for loan and sale to museums and educational organizations. Currently, staff are working on a six-year project to determine how museums can increase their educational contributions to the community. The Office supervises programs for the Museum Reference Center (MRC), a major library source of museum-related information in the United States. The MRC responded to approximately 9,000 inquiries and published Museworld and several new bibliographies in FY 1988.

III. Office of the Registrar (OR) - The OR designs systems which keep the National Collection safe from harm and permit access by the widest audience possible. The National Collection -- a red diamond, a yellow orchid, a Gilbert Stewart painting, Dizzy Gillespie's oddly bent horn -- reflects the diversity of American interests. The Smithsonian represents these interests through more than 135 million artifacts and specimens, each contributing to the diversity.

Researchers and the public gain access to the National Collection through the Collections Information System (CIS). Staff enters information about each object or specimen into the CIS and creatively uses this information in exhibitions, publications, and public programs. Automation of the CIS is a multi-year, interbureau effort organized by the OR. This effort identifies appropriate technology, training needs, and resources crucial for effective collections management.

The OR designs inventory and internal control procedures to provide accountability for Smithsonian Collections. Collections management policy results from interaction between the OR and bureaus. In FY 1988, the OR revised and reissued the Institution's primary collections management policy directive. Essential staff training and opportunities for the exchange of information occur through the Registrar's Council. Working with the Office of Museum Programs, the OR teaches principles and techniques of collections management to museum colleagues. As a leading participant in the International Council of Museums/Documentation Committee, the OR maps the development of collections automation systems worldwide.

EXPLANATION OF PROGRAM INCREASE:

I. Office of the Assistant Secretary - Museum Interpretation Program (\$75,000) - Recent audience surveys and research on demographics indicate the need to reinterpret the Smithsonian's public programs to make them more appealing to culturally diverse audiences. In FY 1988, the Smithsonian and the Rockefeller Foundation jointly sponsored a conference on problems of representing world cultures in museum settings, which reinforced this need. Special committees at the Smithsonian that focus on the special interests of American Indians and Hispanics make the Institution more aware of improvements that could be made in current exhibitions and programs for the public.

The requested funding will advance SI staff's ability to produce public programs that appeal to all segments of American society regardless of race, religion, education, and income level. With this funding, the OASM will train all levels of museum staff through a series of workshops, lectures, and seminars. Examples of proposed topics follow:

- How to design "hands-on" exhibitions to help the museum visitor better understand the subject matter;
- How to prepare labels that scholars, novices, and children can read and understand;
- How to include bilingual narrative into exhibitions;
- How to expand public programs to better attract underserved audiences.

To conduct these workshops, the OASM will contract with outstanding museum interpretation professionals from around the country. Contract expenses include travel, per diem, fees, and clerical assistance. Base resources will provide supplies, equipment, and space for workshops and conferences.

Staff trained in museum interpretation techniques will improve the portrayal of cultural and artistic traditions in the Smithsonian's public programs. Such training will increase the Institution's responsiveness to a broader range of visitors.

OMP Workshops (3 positions) - The Office of Museum Programs has three (3) temporary positions. Due to the lack of full-time permanent positions, recruitment and retention of highly qualified staff has not been possible. The expiration of temporary appointments causes constant turnover. Turnover adversely affects the continuity of programs that serve the museum community. For example, the Workshop Program Assistant position has been vacant for three months because highly qualified candidates will not accept temporary employment. OMP does not request additional funds for conversion of these temporary positions to permanent status.

OMP Training and Information Services (2 workyears and \$60,000) - Two full-time permanent positions will strengthen and expand training and information services for the national and international museum community. One staff position will enhance training on museum philosophy and practices. OMP will develop a core curriculum for each workshop and initiate more responsive training formats for museum professionals with different levels of expertise. The new staff member also will initiate more collaborative projects with outside experts and professional museum organizations, such as the American Association of Museums. Another objective will be to establish a major new clearinghouse for information about training opportunities that are available both in this country and abroad.

Funding also will provide additional reference materials for the Museum Reference Center (MRC), the only comprehensive library of museum information in the United States. These materials will make the Center more useful for new scholarly research on important topics, such as how people learn in museum environments and how museums can be more responsive to their constituencies. The other staff position will allow OMP to create a new slide library, produce more and better-annotated bibliographies, improve current cross-referencing and retrieval systems, and conduct more research on museum-related topics. These efforts will benefit MRC users from museums across the

country and throughout the world and Smithsonian staff who research and lecture on museological topics.

Museum Practices Internship Stipend Fund (\$75,000) - A central stipend fund for internships in museum practices will enhance the Smithsonian's ability to attract and recruit minority groups. By tradition, these groups have not considered careers in the museum profession.

The requested funding would allow approximately 30-45 intern candidates to participate in museum training. OMP will place qualified interns in supervised projects in Smithsonian bureaus and offices. Projects will emphasize research and applied learning in generic museum topics. Interns also may participate in OMP workshops with museum professionals and conduct supervised research in the Museum Reference Center.

Stipends defray living costs and attract individuals who otherwise could not afford to live in the area without outside employment, which, of course, detracts from the benefits of the internship. The stipends will enhance outreach efforts by offering museum practices training and research opportunities to under-served audiences.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Annual allotments provide unrestricted funds from the Smithsonian Institution's unrestricted general trust funds to support the salary, benefits, and expenses of the Assistant Secretary for Museums; expenses for directorship search committees; and Institutional memberships in professional associations. Special Purpose funds provide funding for the Collections Acquisition Program, which facilitates the purchase of major acquisitions by the Smithsonian museums, and the Special Exhibition Fund, which provides partial funding through a competitive process for important and/or innovative exhibitions throughout the Smithsonian Institution. While this office administers the funds, the account of the recipient organizations reflect the expenditures.

The Office of Museum Programs receives an annual allotment for awards to minority professionals attending the OMP workshops. These awards help defray travel and subsistence expenses. In addition, OMP has two revolving Trust funds for training and for the audio-visual loan and sales program to accommodate fees and services.

Restricted Funds - In FY 1988, the Office of Assistant Secretary for Museums received a grant of \$58,000 from the Morris and Gwendolyn Cafritz Foundation and \$150,000 from the Rockefeller Foundation for the development of an Experimental Gallery to study alternative approaches to exhibition design and production. Fund raising for this project is continuing, and additional grants are anticipated for FY 1989 and FY 1990.

The Kellogg Foundation sponsors the Office of Museum Programs' project to "expand the educational influence of museums" and has since FY 1982. The purpose of the grant is to establish a network of museums in the United States who then examine issues and provide means of implementation so that museums can increase their educational impact in their communities. Decision-makers from museums and representatives from other educational sources explored all aspects of museum operations. The grants will cease at the end of FY 1988, and OMP will disseminate the print and non-print products of the Project.

THE NATIONAL MUSEUM OF NATURAL HISTORY/MUSEUM OF MAN

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	550	23,762	3	287	4	532	19	3,958	24	1,265
FY 1989 Estimate	577	26,209	3	224	4	700	17	4,174	18	1,139
FY 1990 Estimate	594	27,907	3	322	6	664	18	4,032	18	1,172

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The National Museum of Natural History/Museum of Man (NMNH/MOM) houses the largest and most valuable assemblage of natural history specimens and human artifacts in the world. The Museum staff is actively engaged in the care, conservation, and study of these collections. The scientists and scholars conduct research on living and fossil animals and plants, rocks, minerals, and meteorites. Studies of human artifacts are illuminating human biological diversity and cultures, ancient and modern.

For FY 1990, NMNH/MOM requests 11 workyears and \$1,450,000 to support the Native American Cultural Hall renovation (\$100,000); an Assistant Director for Public Programs (1 workyear and \$85,000); Evolution of Terrestrial Ecosystems research (1 workyear and \$125,000); Evolution of Marine Ecosystems (1 workyear and \$69,000); Evolution of Island Ecosystems (3 workyears and \$106,000); Human Ecological History research (1 workyear and \$77,000); Native American Collections Documentation Project (1 workyear and \$73,000); Collections Information System (\$125,000); conservation of the collections (1 workyear and \$30,000); Arctic Archaeology research (1 workyear and \$75,000); and a Columbus Quincentenary exhibition (1 workyear and \$585,000).

Also contained in this line-item is an amount of 6 workyears and \$248,000 associated with the Institution's strengthened affirmative action plan. Justification for these resources appears in the central Affirmative Action section of this budget.

PROGRAM - The collections of the National Museum of Natural History/Museum of Man contain more than 118 million specimens of plants, animals, fossils, rocks, minerals, and human cultural artifacts. They are essential to the Nation's scientific community, since they provide fundamental documentation for the study of man and of the flora, fauna, and geology of our planet and outer space. The Museum shares its work with the scholarly community through publications, symposia, and scholarly exchanges and with the public through exhibitions, publications, and educational programs. More than eight million visitors to the Museum in 1987 are testimony to the success of NMNH's public programs. Statistics show equally large visitor attendance so far in 1988. These attendance levels make the Museum the most heavily visited natural history museum in the world.

In FY 1987, the Museum's collection increased by approximately 850,000 specimens. This increase resulted from donations, purchases, expeditions of Museum scientists, and deposits from other government agencies. The Museum is responsible by law to serve as the ultimate repository for the collections of natural history, archaeology, and ethnology gathered by United States government agencies. In addition, it provides laboratory space and research facilities for 80 scientists from affiliated Federal agencies with natural history missions, such as the United States Department of Agriculture, National Marine Fisheries Service, Fish and Wildlife Service, Geological Survey, and National Institutes of Health.

Worldwide Research - Scientific research on the Museum's collections and the publication of scientific findings are fundamental to the mission of the Museum. The following includes some of the Museum's 1988 research initiatives:

--For the second consecutive year the Museum sent teams of scientists to Beni Biosphere Reserve, Bolivia, and Manu Reserved Zone, Peru. Here long-term, in-depth biodiversity inventories are underway with the collaboration of the Bolivian and Peruvian governments, host country scientists and students, and international conservation organizations. Data from these studies will help protect many of the rare and endangered species of the neotropics. Some of these plant species may yield new sources of food, medicines, biological controls, and important germ plasm for agricultural use.

--Museum botanists and colleagues from the United States, France, Germany, the Netherlands, and the Guianas explored Montagne de Tortue, a remote and botanically unknown mountain range in French Guiana, bringing back an abundance of new, barely known, or seldom collected species. The expedition was part of a long-term multinational effort to analyze the little-known vegetation of the Guianas. One goal is to determine what areas in the Guianas merit special protection based on biotic diversity.

--Museum scientists investigated the remnants of a vast coastal forest that was once continuous along the northern Atlantic coast of Brazil. Because of logging, only patches of forest survive. Now, sugar and cocoa plantations thrive where forests once stood. The Museum is investigating the composition, distribution, and evolution of the plants and animals in Amazonia and the Atlantic Forests.

--The Folsom people who hunted bison and other game animals in the western portion of the Great Plains and Rocky Mountain regions between 10,900 and 10,400 years ago were among the earliest human inhabitants of the Americas. In 1988, Museum archaeologists continued investigations of a Folsom site in the San Luis Valley, Colorado, uncovering new data bearing on the activities of roving Folsom hunting bands. A team of volunteers from the newly initiated Research Expeditions Program helped the scientists. The Smithsonian National Associates Program sponsored this program.

Conferences and Workshops - The Museum organizes major international symposia to stimulate and help the exchange of scientific knowledge and ideas. Symposia also provide the public with greater knowledge of important scientific research. In addition, the Museum sponsors training workshops to provide important help to the scientific community. The following includes some notable 1988 gatherings:

--The Museum organized an international workshop to reassess and clarify the systematic status and biological knowledge of squid, octopuses, and cuttlefishes,

families important throughout the world as fishery resources. The meeting brought together for the first time experts from China, Japan, the Soviet Union, Australia, and ten other nations and will result in an up-to-date handbook that will contain natural history data useful to biologists, ecologists, and fishery resource managers.

--"Americans Before Columbus: Prehistoric South Americans" was the Museum's second Quincentennial Public Forum. This forum gave the public an opportunity to hear seven leading South American anthropologists discuss research findings on the first human inhabitation of South America.

--Fifty Bolivian and Peruvian biologists and 17 Puerto Rican biologists, participating in biodiversity inventories, attended training workshops held at Beni Biosphere Reserve, Bolivia, Manu Reserved Zone, Peru, and Luquillo National Forest, Puerto Rico. The Museum will train hundreds of host-country biologists and conservationists as the Biodiversity Program expands. This training will help develop inventories of species in these tropical ecosystems.

Research Publications - A Museum oceanographer reported, in the April 1988 issue of Science, that the northeastern edge of the Nile delta is rapidly subsiding. The rise in sea level and the Aswan Dam's blockage of normal sediment flows on the Nile river worsen this condition. This condition could result in flooding of a large part of the northern delta plain by the year 2100. Such flooding would inundate agricultural lands where several million people now live. These findings result from a multidisciplinary study in the Delta directed by the Museum in cooperation with the Egyptian government. This article was one of the approximately 500 scientific papers and articles published this year, as in past years, by the Museum staff. Many of these papers have a major impact on the world scientific community.

Collections Management - Aided by the Institution's Office of Information Resource Management, a multi-year effort to convert the collections inventory data base to a modern on-line Collections Information System is underway. This system will allow more effective scholarly use of the Museum's vast collections and help maintain inventory control. Approximately one million records are now accessible through this system.

--NMNH/MOM is working with the Massachusetts Institute of Technology on the development of an electronic collection image system of the Museum's Native American artifacts. One goal is to provide Native American artifact images to tribal museums and educational institutions throughout the country.

--NMNH/MOM continues its development of long-range conservation strategies in an effort to improve physical care of the collections. A department-by-department survey is underway to determine conservation priorities.

--Continuing projects in 1988 included moving approximately 1.5 million specimens to the Museum Support Center; cleaning and stabilizing ten thousand collection items to prepare them for the move to the support center; incorporating nearly 850 thousand items acquired in 1987 into the collection; and maintaining the loan and exchange programs, the most active of any museum in the world. The Museum loans or exchanges an average of 300,000 items annually.

Notable 1988 acquisitions include:

- A collection of 9,000 display quality seashells of rare form, pattern, and color;
- A 5.03 carat red diamond, one of only five documented red diamonds in the world; and
- A complete skeleton of a 90-million-year old shark, the finest of its kind ever discovered.

Exhibits - "King Herod's Dream: Caesarea on the Sea," a Smithsonian Traveling Exhibition Service exhibition, drew nearly 300,000 visitors to the Museum's Thomas M. Evans Gallery during its three-month showing in 1988. This exhibition traced the colorful history of Caesarea, which was an ancient Mediterranean seaport and a significant center of early Christianity.

--"Plains Indian Art--Continuity and Change," was an exhibit of selected works of contemporary Plains Indian artists which showed the influence of tribal traditions. Organized by the Museum's American Indian Outreach Program, the exhibition compared objects made in the 19th century, from the Smithsonian collections, with similar objects made by contemporary Plains Indian artists.

--"Andrew Jackson Grayson: The Audubon of the West," exhibited paintings by a brilliant self-taught 19th-century American artist. This exhibition, presented by the Museum in cooperation with the Oakland Museum, was the first public showing of Grayson's 156 surviving bird paintings.

--Opening in September 1988 is "Crossroads of Continents: Cultures of Siberia and Alaska," an exhibition developed jointly by the Museum and the Soviet Academy of Sciences with the collaborative aid of the International Research and Exchanges Board. The exhibition will mark the first time that the people of both continents have had the opportunity to view many early and important archaeological and ethnographic collections from this remote but important Soviet geographic region. The exhibition will travel to seven cities within the United States and Canada and, in the Soviet Union, Moscow, Leningrad, and two other cities.

--A symposium will complement the "Crossroads" exhibition, and the Smithsonian Press will publish a 360-page exhibition catalog with contributions from Soviet and American scholars. A "Crossroads" school packet and film program is under preparation.

--Planning is in progress for "Vision of the Americas," a new permanent exhibition hall that will explain the diversity and dynamics of Native American life. In 1988 members of the planning committee visited Alaska, Washington, and British Columbia to view Native American exhibits, museums, and cultural centers and meet with representatives of Indian tribal, political, and cultural organizations. An objective was for Museum staff, during this early design stage of the exhibition hall reconstruction, to learn the preferred manner of representation.

Work continues on the Museum's permanent paleontology hall, "Fossils: The History of Life." In September 1988, the public will have a chance to view the renovated exhibit of the conquest of land by plants and animals 420 million years ago. Among the highlights will be a diorama of one of the world's early forests, 395-345 million years ago.

Education - Relying on nearly 300 docents who volunteer to provide educational services, the Museum's Office of Education produces programs and develops instructional materials to accompany Museum exhibits. Special facilities include the Discovery Room, a nationally known hands-on facility for children; the Naturalist Center, where natural history objects, books, and equipment for visitors aged 12 and older are available; and the live Insect Zoo. The Museum's Friday Film and Lecture Series presents weekly programs throughout the year.

Special activities in 1988 included demonstrations of Native American craftsmanship in late November and early December, which brought Indian artists from the American southwest and plains to the Museum. There were festivals, tours, and seminars in association with major temporary exhibitions, including: "Ebla to Damascus"; "King Herod's Dream"; "Tropical Rainforests: A Disappearing Treasure"; and the Museum participated in the development of the special exhibition by Asian and Pacific artists, "Across the Sea and Over the Mountains: Immigration -- Its Hardships and Rewards," produced in honor of Asian-American Heritage Week.

EXPLANATION OF PROGRAM INCREASE:

For FY 1990, NMNH/MOM requests 11 workyears and \$1,450,000:

- to support the Native American Cultural Hall renovation (\$100,000);
- for an Assistant Director for Public Programs (1 workyear and \$85,000);
- for Evolution of Terrestrial Ecosystems research (1 workyear and \$125,000);
- for Evolution of Marine Ecosystems research (1 workyear and \$69,000);
- for Evolution of Island Ecosystems research (3 workyears and \$106,000);
- for Human Ecological History research (1 workyear and \$77,000);
- for the Native American Collections Documentation Project (1 workyear and \$73,000);
- for the Collections Information System (\$125,000);
- for conservation of the collections (1 workyear and \$30,000);
- for Arctic Archaeology research (1 workyear and \$75,000); and a
- Columbus Quincentenary exhibition (1 workyear and \$585,000).

Also contained in this line-item is an amount of 6 workyears and \$248,000 associated with the Institution's strengthened affirmative action plan. Justification for these resources appears in the central Affirmative Action section of this budget.

Native American Cultural Hall (\$100,000) - Attendance at the Natural History Museum exceeded all other Smithsonian museums in 1987. Millions of visitors view the Museum's halls on North and Central American Indian cultures. The Smithsonian has embarked on a long overdue program to develop new Native American halls to present its visitors with an accurate portrayal of North American Indian culture. The Museum will

renovate an exhibition area and remount the exhibit with thousands of objects, some never before exhibited. The new exhibition will combine solid scholarship with innovative design techniques.

During the first phase of this program the Museum closed several exhibit cases, removed offensive material deemed inappropriate for public display, painted and recarpeted galleries, assembled new displays, and began constructing a theater to present films on Native American cultures. The Museum hired three conservators to review the Museum's ethnographic collections which will provide objects for the exhibition.

After receiving a number of proposals, the Natural History Museum Planning Committee will select the firm to serve as the design consultant for developing the Hall. This decision will be made in FY 1989. The Planning Committee will also incorporate into the master concept ideas and suggestions based on the Committee's recent visits to Northwest Coast Native American exhibits, museums, and cultural centers. The Committee also met with representatives of tribal groups and political and cultural organizations to discuss proper ways to portray Native American cultures. The Committee will also consult with representatives of the Southwest and other major Native American groups.

For FY 1990, NMNH/MOM requests \$100,000 to begin preparing for a new permanent exhibition hall. Work planned for FY 1990 includes:

- removing exhibit cases,
- modifying the HVAC system,
- installing sprinklers and fire alarms, and
- removing walls and creating open spaces to accommodate the final design concept.

Conservators will continue to ready the thousands of objects selected to become part of the permanent display. The anticipated completion date for the renovated Native American Hall is FY 1992 at a total estimated cost of \$5 million. Without the requested funding in FY 1990 there will be a delay in construction and future costs will escalate.

The visiting public, which the Museum again anticipates to exceed over eight million, will be well-served by the addition of the new Native American Culture Hall. By reconstituting an outdated and misconception laden exhibit, the Museum will create a modern space housing an accurate display of the cultures, history, demography, and prehistory of ancient, yet still vital native peoples.

Assistant Director for Public Programs (1 workyear and \$85,000) - The Museum seeks funding to establish a senior level position of Assistant Director for Public Programs. As the most popular natural history museum in the world, NMNH/MOM has a special responsibility to enhance the visitors knowledge of our natural world and human activities which impinge on natural processes. The primary responsibility of this position will be to integrate and strengthen the NMNH exhibits and educational programs to enhance the total visitor experience. As the role of NMNH/MOM continues to evolve from static display techniques to interactive exhibits and education, better coordination of these traditionally parallel efforts is vital. Increasingly, museums

throughout the world are establishing senior level positions in public programming to properly meet the public's needs. Base resources will fund travel and other support requirements.

Evolution of Ecosystems (5 workyears and \$300,000) - Modern ecosystems are the result of many natural "experiments" through time. Through studies on the evolution of terrestrial, marine, and island ecosystems, NMNH staff seek to understand the evolution of these biotas, their response to past environmental crises, and the ways that species achieve diversity, distribute themselves, and adapt. The following details three separate but complementary components of the proposed evolutionary studies program:

(A) Evolution of Terrestrial Ecosystems (ETE) (1 workyear and \$125,000). The requested resources will enable increased field and laboratory study to assemble a data base on terrestrial ecosystems extant for 400 million years. ETE researchers study "greenhouse" climates of the Cretaceous Period, which existed about 100 million years ago. An understanding of the responses of ecosystems to past greenhouse climates could enable us to predict the consequences of such phenomena today.

Under the leadership of four curators from the Departments of Paleobiology and Anthropology, the Museum is documenting and statistically analyzing the fossil record of terrestrial animals and plants. Research concentrates on the intervals before and after extinctions and before the emergence of human influences. With a data base structure designed in FY 1988, data acquisition can begin. The Museum is publishing Terrestrial Ecosystems Through Time, based on the 1987 workshop conference involving many scientists from other institutions. This volume establishes the status and future goals of terrestrial ecosystems research. By FY 1990, ETE will expand its role in this research by engaging in field and laboratory projects.

The requested funds will allow the Museum to hire a museum technician to help with field and laboratory tasks. These funds will also enable present curatorial staff to undertake field projects and other activities to fill specific needs of the ETE data base. The requested funds will pay for workshops and the assistance of outside researchers who can contribute to this data base. Funds for equipment will finance additional workstations, service contracts, and other activities for the ETE curators. Additional support will fund transporting objects from the field, communications, printing and reproduction, and supplies.

The certainty that mankind eventually will face the consequences of catastrophes, either natural or man-made, makes it essential to understand the history of terrestrial ecosystems and how they have responded to major changes.

(B) Evolution of Marine Ecosystems (1 workyear and \$69,000). Many of today's coastal marine ecosystems appear specially endangered. Evidence of this is borne by many closed fishing areas and the death of many dolphins in 1987. This program will study the causes of previous mass marine extinctions. Studies will also focus on the cause of changes in marine populations that led to present day diversity. The goal of the program is to determine from fossil records what distinguishes successful from unsuccessful marine communities and to compare them to present day ecosystems.

The requested funding will support two areas of study: comparison of selected modern biotic communities with similar fossil communities; and examination of the large NMNH data base for clues of evolutionary success and failure. NMNH will hire one scientist to initiate the proposed studies. Other requested funds will support

computers and accessories to analyze and add to the existing data base. Funding will cover the cost of travel to supplement and expand the present collections.

The NMNH/MOM has the largest group of multidisciplinary specialists in the world working on paleobiological and modern biological problems. This Museum may be the only institution in the world where such a cooperative venture can be accomplished in one organization. These studies on mass marine extinctions must continue. Upon the death of the seas, the death of the planet is certain to follow.

(C) Evolution of Island Ecosystems (3 workyears and \$106,000). Smithsonian scientists are studying little-known mass extinctions of faunas of birds and other animals which swept the world's isolated islands well after the end of the last ice age. An urgent need exists to locate and preserve fossils from these areas before they are destroyed by the encroaching human population. This may be the most important fossil extinction event to understand because it apparently was caused by prehistoric human activities.

Smithsonian scientists are tracing this wave of destruction through the Atlantic, Indian, and Pacific Oceans. They are finding that island ecosystems were recently much richer than they are now. Many new life forms are being discovered, including over 40 unique kinds of birds from Hawaii alone. These are scientifically important findings because they undermine earlier studies that played a prominent role in the development of modern theories in ecology, evolutionary biology, and conservation. Smithsonian research efforts include collaborative work with specialists in the fields of paleontology, archaeology, palynology and radiometric dating.

The Smithsonian is the acknowledged leader in this area of research. NMNH is the only place that can adequately conduct this program. This is because the Museum has two resources unavailable at other institutions:

- extensive skeletal collections, particularly of birds, which researchers use to identify bones recovered from the Pacific islands; and
- a knowledgeable staff to interpret the results.

The funds requested will provide for three museum technicians/research assistants, who will process new fossil collections and help prepare scientific publications. Remaining funds will support field research costs, shipping, contractual support, supplies, and equipment.

The major benefit of this program is new scientific data on the problems of conservation and the importance of resource management. The program provides data and collections essential to scientific understanding of the evolution of island faunas and island diversity. Such knowledge has played an essential role in evolutionary theory since the time of Charles Darwin.

Human Ecological History (1 workyear and \$77,000) -- International scientific cooperation is the cornerstone of human origins research. Smithsonian's research has forged strong bonds with the research organizations in Kenya, Ethiopia, China, and India which possess outstanding resources in this area of study. The Institution's program is now in a position to take an unparalleled role in stimulating and leading a cooperative international investigation of human origins and ecological history. NMNH plans to establish an innovative research program in the long-term dynamics of human

adaptions to the environment. Looking back and examining man's history will help us see ahead and protect the future course of mankind. Researchers will examine major transitions in the ecological history of mankind. This research will document changes in humans caused by the environment since their origin as hunters, through their adaptive shift from hunting and gathering to agriculture, and to a state level of socio-political organization and beyond.

The research program will include fieldwork in areas of East Africa, especially Kenya. Sites on the African continent offer extraordinary research opportunities to study human origins and early adaptions to the environment. Field and laboratory studies will focus on the actual deposition processes by which skeletal materials, tools humans made and used, and the remains of plants and animals humans and their early ancestors used, form archaeological sites. Plant and animal remains, abundantly present in archaeological sites but often overlooked, constitute a rich and detailed long-term record of the changing relationship between humans and their biotic environment. Such archaeological materials hold the promise of significant new illumination of major adaptive transitions in the ecological history of the human species.

The requested funding will support the hiring of a professional zooarchaeologist. It will also establish a permanent laboratory to analyze archaeological faunal remains. This funding will also cover the costs of field research and equipment, travel, and logistical support for research teams. In future years, the program will include outreach and training that will disseminate its findings to both the scientific community and the public through seminars, exhibitions, fellowships, and intern programs.

The Human Ecological History (HEH) Program will integrate a variety of new research technologies with anthropological, biological, and geological research in NMNH and collaborating institutions in an unprecedented manner. HEH's emphasis on the ecological context of human biological and cultural evolution complements the Museum's other new interdisciplinary programs in Biological Diversity, Evolution of Ecosystems, and Molecular Systematics.

Native American Collections Documentation Project (1 workyear and \$73,000) - The NMNH Native American Collections Documentation Project will increase the Institution's ability to make informed and timely decisions in response to reburial and repatriation requests of American Indian people. Each request may result in an irrevocable deaccession decision. The project ensures that the Museum will thoroughly understand and consider fully all relevant cultural and scientific issues.

The program will respond to Native American peoples' increasing interest in access to collections relating to their own tribal heritage. With this funding, NMNH will:

- establish provenance of Native American collections, including evidence linking collection items to known tribal groups and determining the legal and ethical circumstances surrounding the Institution's collection and/or acquisition of those items;
- comprehend the cultural attitudes toward such material both at the time of collection and at the present time;

- evaluate the present and potential scientific importance of the involved collections;
- review and make informed decisions on deaccessioning collection items;
- analyze and document, for the benefit of future study, items the Museum will deaccession.

To conduct these activities the Museum will hire one specialist to respond to specific repatriation and reburial requests. NMNH will also contract with scholars in specific areas where there is no staff expertise. Other project expenses include travel and equipment. Expansion of resources may be necessary in future years to meet the growing interests of Native Americans in the National Collections.

The Native American Collections of NMNH/MOM are of enormous interest to American Indian people. The historical and cultural heritage the collections represent is crucial to their communities of origin. The Native American Collections Documentation Project will ensure the Institution's responsiveness to reburial and repatriation requests of tribal communities.

Collections Information System (\$125,000) - Development of a modern Collections Information System (CIS) will guarantee inventory control and expanded scholarly access to the large and growing National Collections of NMNH/MOM. Every year more than 2,000 visiting scholars, 240 resident researchers, affiliated scientists, and fellows must access collection information. In addition, the Museum's loan program is one of the most active among the museums of the world. The Museum loans and exchanges an average of 300,000 specimens every year, and a range of pertinent information follows these loans and exchanges. A modern Collections Information System will ensure that the Museum meets the increasing demands for access to collection records and maintains better inventory control over its 118 million items.

In late FY 1987, the Museum successfully completed a prototype project for the data retrieval component of CIS on 170,000 records for the Division of Fishes. Since that time, the Museum has converted approximately one million records from the Institution's 20-year-old, antiquated system into the new data retrieval component of CIS. This conversion permits faster retrieval of information (seconds or minutes rather than a week in the batch processing mode), immediate updating of records, and ensures greater accuracy of data entry. Conversion work is a multi-year effort.

The requested funding will permit the Museum to initiate the second phase of CIS development. This phase will document collections transactions, such as loans, exchanges, and accessions, and generate automated loan invoices and other management documents. Most of these activities use manual systems. With the requested funding, the Museum will contract with data base designers and purchase special printers to generate documents. The Museum requires continued support for full system design and maintenance.

Development of the CIS is an important Institutional priority. The system provides expanded scholarly access and guarantees inventory control of the National Collections.

Conservation of Collections (1 workyear and \$30,000) - A high priority of the Museum is to remove outdated, inaccurate exhibits and reconstruct exhibition halls that are educational, stimulating, and reflect current scientific theories. The

success of these exhibitions in part depends on the objects the Museum displays. It is important that Museum collections receive appropriate care to ensure their longevity for either exhibition or research purposes. Many items are the only ones of their kind and need to be preserved for subsequent generations.

This increase for FY 1990 will fund one permanent staff conservator to support increased exhibit activities. The incumbent will be responsible for:

- conserving objects for exhibitions;
- contracting for outside conservation services;
- coordinating the work of contractors;
- overseeing conservation aspects of loan processing;
- advising the exhibits program on evaluating materials, designing cases and mounts, as well as packing; and
- other topics relevant to the care of both departmental and borrowed specimens.

Conservation work associated with the new Native American Cultural Hall will be one of the incumbent's first major projects.

NMNH is planning a long-range, phased effort to improve the conservation within the Museum. With the addition of one permanent staff conservator for exhibitions, NMNH can ensure appropriate physical care for both NMNH and borrowed collections placed on exhibit. The requested funding will enhance the creation of lively, effective exhibits for public enjoyment and education.

Arctic Archaeology (1 workyear and \$75,000) - Among government agencies, only the Smithsonian gives priority to Arctic research and training in Arctic social science; other involved agencies manage and regulate activities. Congress recognized the importance of these studies and passed the Arctic Research and Policy Act of 1984 (ARPA) mandating the development of a coordinated policy for Arctic research. The Smithsonian participates in the ARPA process by coordinating review and planning in areas of cultural and natural history research. The NMNH seeks to expand its Center for Arctic Anthropological Research; to enhance its Arctic research program, especially in Alaska; and to disseminate information about Arctic peoples by publishing, exhibiting, and conducting training programs.

The Smithsonian has unparalleled Arctic anthropological collections which are a rich source of scholarly information. The Museum holds the largest collection of ethnological, archeological, and physical anthropological specimens in the world. The collections number over 75,000 specimens and include major ethnographic film, photographic, and archival collections from Arctic regions. Researchers have yet to analyze many items from these collections and make them available to scholars and the public. For FY 1990, the requested increase will fund a Western Arctic archaeologist to curate the Museum's Western Arctic collection. The archaeologist will engage in collaborative research with local communities, native groups, Alaska museums, and university and government archaeologists living in Alaska.

Primarily as a result of a small mini-exhibit's traveling to villages throughout coastal Alaska, there was a revival of traditional artifact forms and designs, both for practical implements and decorative work. As a result, communities expressed interest in preserving local oral traditions and social customs. The Native peoples identify, record, and discuss elements of traditional spiritual life, often for the first time in many years. This resurgence of community interest proves that the effort to bring museum collections out into the field has profound effects. Also for FY 1990, the requested funds will support a specialist on contract to train Native peoples and Arctic residents in museum collection study, local exhibition development, and research techniques. This person will work closely with international organizations and research institutions. A small amount of remaining funds will support travel, other services costs, and equipment for the program.

Mid-19th-century Smithsonian scientists were the leaders of the first generation of American Alaska specialists. The natural history collections and information gathered on their expeditions provided the scientific basis for the decision to purchase Alaska from Russia in 1867. This history of the Arctic is part of American history. What better custodian for a Center for Arctic Research is there than the oldest institution in the world with a continuous history of Arctic research, the Smithsonian.

Columbus Quincentenary (1 workyear and \$585,000) - The National Museum of Natural History's Quincentenary program will produce a 13,000-square-foot major exhibition, "Seeds of Change." Opening October 12, 1991, the exhibition will remain on view for a minimum of 13 months, through the celebration year of 1992. Through its exhibitions, programs, symposia, and publications, "Seeds of Change" will provide an ideal forum for acknowledging and presenting the changes in the Americas after 1492. This is a story that encompasses the full range of the natural sciences, and this exhibition's impact and value will last far beyond the Quincentenary commemoration.

In FY 1990, the Museum will prepare to distribute educational materials, including a set of six posters on the exhibit, two teacher's guides, student activity books, and light-weight panel versions of the exhibit. Participants contributing to the development of these materials include: the National Council for the Social Studies, the National Science Teachers Association, the American Library Association, and the Federation for State Humanities Councils. Due to this combined effort, the exhibition will reach out to the eight million Museum visitors, and over 150,000 teachers, 45,000 librarians, and through them, their constituents nationwide.

The existing base combined with one additional workyear will provide for the hiring of a registrar to handle the loan, shipment, and care of all specimens in the exhibition and the production of two major symposia. The first symposium will deal with demographics of Amerindians, a topic of great importance and much debate. Smithsonian Press will publish the papers produced for this conference. The second symposium will explore the impact of the encounter on native biotas of the New World. Information gathered at this conference will be important to exhibition research. The balance of the requested increase will fund design costs and produce the exhibition itself, to include original murals, dioramas, models, two audiovisual presentations, and interactive video. The designers will complete the plans in FY 1990 and begin accepting contracts for the major components.

NMNH will produce a quality exhibition that will touch on the lives and lifestyles, contributions and experiences of Native Americans, Afro-Americans, Hispanics, and all other peoples of this continent. The Museum's program will also

join all natural sciences to produce one, historic effort for this major national celebration.

NONAPPROPRIATED SOURCE OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds derive from a variety of sources, including annual allotments for special purposes: the Museum's share of net proceeds from the Museum shop, cafeterias, vending machines, and other receipts, such as sale of educational posters and folios; royalties from Smithsonian Press staff publications; and tuition reimbursement grants from local universities for courses taught by Museum staff. Program allotments provide support for events related to the opening of new exhibitions. During FY 1988 allotments funded personnel costs of the museum director, administrator for the Marine Systems Laboratory, a computer statistician to help Museum researchers, and a research assistant for the Hawaiian Fossil Bird project. An allotment also provides continued temporary support for research on the evolution of terrestrial ecosystems, documenting the characteristics of ecosystems before and after major environmental disturbances and the emergence of human impact. Special Purpose funds help finance exhibit hall brochures, preparation of audio-visual materials, special research publications, field research, Museum internships and fellowships, travel and supplemental training for support staff, specimens and tools for the Naturalist Center, and furnishings and educational materials used in the Discovery Room.

In addition, funds from the Institution's Collections Acquisition Program, Scholarly Studies Fund, Educational Outreach Program, Research Opportunities Fund, Smithsonian Society, International Exchange Program, and the Special Exhibition Fund support research, education, and exhibition projects. During FY 1988 these Institutional funds will help develop educational outreach materials and innovative public programs for a new audience: newly arrived Southeast Asian refugees and immigrants to the greater Washington metropolitan area; a study establishing baselines and evaluating changes of the north-central Nile delta in the Quaternary Period; and production of an exhibit, "Beyond the Java Sea: Art of Indonesia's Outer Islands."

Restricted Funds - These funds are in the form of restricted endowments which specify the use of the donation or bequest and of gifts and grants provided by individuals, foundations, and corporations for specific purposes. Such funds provide support for a particular exhibition or research project. Among these restricted funds is a field-based and laboratory research investigation of carcinogens in the waterways of north central U.S., funded by the National Fisheries Contaminant Resource Center. A gift from Mill Pond Press will support biological research in the arctic region. As part of the Quincentenary celebration, the Space Biospheres Ventures grants enable the Museum to build a self-sustaining tropical aquatic mini-biosphere for exhibition.

In FY 1988 the Museum's Marine Systems Laboratory completed its Great Barrier Reef project, advising the Park Authority in Australia on building the "Coral Reef Aquarium," under funding through the American Australian Bicentennial Foundation, Reader's Digest, NALCO Chemical Company, Phileology Trust, United Airlines, and Hewlett-Packard Corporation.

In FY 1982, the Museum undertook the management of the Smithsonian Marine Station at Link Port, Florida, as an integral part of its marine research program. The Hunterdon Endowment supports oceanographic research at this facility, which offers a unique environment in which to study an oceanographic transitional zone between

temperate and tropical biotas. Research focuses on the life history, systematics, and ecology of a wide spectrum of plant and animal marine life. Contributing to the research efforts are a resident scientist, dozens of Smithsonian visiting scientists from NMNH/MOM and SERC, postdoctoral fellows, and numerous national and international visiting investigators. The Seward Johnson Endowment Fund also provides support for operation and maintenance of the Johnson-Sea-Link submersible program conducted at the facility by the Harbor Branch Oceanographic Institution (HBOI). In 1987, the Smithsonian and HBOI signed a long-term lease agreement for land upon which the Institution could construct a Smithsonian laboratory and residential facility for a Smithsonian laboratory and residential facility. The Marine Station is preparing a conceptual design and will then raise funds to cover these construction costs. NMNH is preparing other materials in order to begin a major fundraising effort in the near future.

Government Grants and Contracts - Various government agencies and departments provide these funds for special projects which the Museum can conduct because of its unique scientific expertise in certain fields. An example of continuing government contract support is the National Center for processing and distributing polar biological specimens and data, funded by a contract from the National Science Foundation to the Smithsonian Oceanographic Sorting Center. During FY 1988, the Institution will complete the Systematics of Aedes Mosquito Project, contracted by the U. S. Army, as well as a phase of the Turks and Caicos Smithsonian Research Grant, the Agency for International Development funded to develop the Caribbean king crab as a food resource for the Third World.

NATIONAL AIR AND SPACE MUSEUM

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	212	9,005	3	236	46	2,961	2	890	7	360
FY 1989 Estimate	216	9,497	3	261	45	4,183	2	937	5	298
FY 1990 Estimate	222	9,794	3	251	45	4,004	2	738	4	200

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The National Air and Space Museum (NASM) is an international repository for artifacts and documentation related to the development of aviation, space flight, and space science. Through its exhibitions, research, collections management, and education programs, the Museum serves a wide public audience and a scholarly community interested in the history and technological achievements of aviation and space flight. In addition to its Mall location, NASM maintains a facility for the preservation and restoration of artifacts at the Paul E. Garber Preservation, Restoration, and Storage Facility in Suitland, Maryland.

For FY 1990, NASM requests an increase of 6 workyears and \$297,000 for: an archivist to maintain historical documents and photographs (1 workyear and \$75,000); a curator and programmer/analyst (2 workyears and \$120,000); a collections information system (1 workyear and \$60,000); a Restoration Apprentice Program (2 workyears and \$36,000); and a World Atlas of Satellite Images (\$6,000).

PROGRAM - Legislation established NASM on August 12, 1946. The completion of the Mall Museum in 1976 greatly strengthened NASM's role as a national resource for public and scholarly interest in the history of air and space technology. More than 113 million people have visited the Museum since it opened, making it the most popular museum in the world. NASM's collections include more than 300 historic aircraft, 250 spacecraft, and extensive holdings of artifacts, papers, photographs, films, microfiche, video disc, and technical drawings. These resources are available for interested American and foreign scholars to study.

The exhibition program uses state-of-the-art techniques in design, presentation, and equipment to convey the excitement of the subject matter to the visitor. An active scientific research program, aimed at understanding both terrestrial and planetary geology, is an important endeavor of the Museum. Active programs in historical research, collections management, preservation, and restoration of artifacts are central to the Museum's curatorial efforts. As a public institution, NASM devotes considerable attention to education and outreach activities, providing workshops, lectures, films, planetarium presentations, docent tours, and written materials to schools and visitors to the Museum. During FY 1987, the Museum

reorganized to balance its research, exhibitions, education, and collections management functions.

NASM handles exhibits preparation, collections storage and management, preservation, and restoration at the Paul E. Garber Facility in Suitland, Maryland. At the Garber Facility, the Museum has restored more than 63 historic aircraft and spacecraft from its collection, with the restoration of additional artifacts planned each year. The Garber Facility also displays approximately 90 aircraft, numerous spacecraft, and other flight-related objects. In FY 1988, approximately 50,000 people will visit the Garber Facility.

Research - Research is the foundation of the Museum's efforts as a primary resource center for the science and technology of aviation, space, and geophysical science. Research findings also support the exhibitions, publications, educational, historic restoration, and archival programs. Research undertaken by the Museum staff encompasses the history of space science and exploration; the history of aeronautics; contemporary developments in these fields; and comparative studies of the Earth and other planets using satellite images and data. In addition, the Museum engages in two applied research and development programs: the historic preservation of aircraft and spacecraft; and the storage and retrieval of archival and photographic information.

-- Aeronautics: The Smithsonian History of Aviation book series will include scholarly monographs treating various aspects of aeronautical history, reprints of major works currently out of print, and translations of major works by foreign authors. Beginning in FY 1989, the series will reprint classics of aviation history such as Nick Komons' Bonfires to Beacons: Federal Civil Aviation under the Air Commerce Act, 1926-1938; Charles A. Lindbergh's We; and Cecil Lewis' Sagittarius Rising, an account of a WWI pilot. A goal of the series is to attract to the Museum and the Smithsonian Press the highest quality manuscripts produced by scholars working with the Institution.

Research and writing continue on several books to appear in upcoming years. These include The Wright Flyer: The Study of the Process of Invention; The Boeing 247; a catalog to accompany the centennial exhibit on Igor Sikorsky; a publication exploring the history of the development of the small gas turbine engine in the U.S.; an historical perspective of the civil pilot training program under FDR; and a history of Blacks in aviation.

-- Space Science and Exploration: The Museum's joint program of research and documentation of the Hubble Space Telescope, in collaboration with the History of Science Department at Johns Hopkins University, will serve as a rich source of research material for future historians and will provide a valuable current record of space technology. Cambridge University Press will publish a monograph of this work in FY 1989. This Department is also conducting historical research on satellites, the interaction of aerospace and computing technologies, spacesuit technology, weather satellites, and the Soviet space program.

The Glennan-Webb-Seamans Project continues its broad program to document and study the history of the nation's space program, with emphasis on its administration and management. In FY 1988, the project conducted oral history interviews with key administrators and program managers from the National Aeronautics and Space Administration (NASA) and other aerospace industry executives and managers. Preparation of a national survey of resources for aerospace history and an in-depth survey of Washington area resources for space history, in cooperation with NASA and

the USAF History Office, continues in FY 1989. Begun in FY 1986, the Space Astronomy Oral History Project (SAOHP) continues to conduct interviews with key participants in space science and plans a revised edition of the SAOHP catalog for FY 1990. The success of the oral history program has stimulated interest in experimenting with video histories and has led to Sloan Foundation's funding of a pilot video history program. During the first two years, the museum conducted video history sessions on a wide range of topics. These include the origins of the aerial reconnaissance studies at the Rand Corporation, the history of X-ray astronomy and aeronomy at the Naval Research Laboratory, aspects of the history of the Mariner Venus program, and observing techniques in ground-based astronomy.

-- Earth and Planetary Studies: NASM established The Center for Earth and Planetary Studies in 1973. By analyzing remote-sensing data from satellites, the Center researches comparative planetology and the development of the Earth's landforms and surface composition. Research projects on satellite remote-sensing of desert fringe regions increased scientists' understanding of the effects of climatic change on surface materials in Africa's Sahelian zone. The Center for Earth and Planetary Studies has also conducted field work in the inland Niger Delta of Mali, western Egypt, and northern Sudan. By combining recent satellite images with those taken 14 years earlier, researchers can better assess the movement of sand and soil that has taken place due to the recent period of drought. Research in mapping and analyzing surface features on the Moon and Mars continued throughout FY 1988 with funding by NASA.

In FY 1983, NASA designated the Center for Earth and Planetary Studies as a Planetary Image Facility, a repository allowing researchers access to the collections of images of the planets taken by NASA space probes. Researchers from the Smithsonian and other institutions make extensive use of this facility. Plans are now underway to link the Planetary Image Facilities across the country. Using this computer network, each facility can share the images in its collection with other facilities that store images and information from different space missions.

Exhibitions - In August 1987, the Museum acquired the Voyager, the first aircraft to fly around the world without stopping and without refueling. It is currently on exhibit in the Museum.

A new exhibition on loan from the European Space Agency, titled "Space Science Satellites," opened in August 1988. It displays four large European satellite models: Ulysses, the only planned mission to study the polar regions of the Sun; Giotto, which made the closest encounter with Halley's comet; Exosat, to study X-ray emissions from dead and dying stars; and Hipparcos, designed to study star positions. This exhibit also features a film taken by the Giotto satellite in its encounter with the nucleus of Halley's Comet.

Additional new exhibitions opened in FY 1988 including the "U.S. Customs Service," "Robert Taylor Art Show," and "Women In Helicopter Aviation."

During FY 1989 the Museum will open "Beyond the Limits: Flight Enters the Computer Age." This major gallery, which traces the development and use of computers in aviation and space, will include hands-on displays, interactive video units, a state-of-the-art theater, and a working robotic arm.

Other plans for FY 1989 include the display of the Hubble Space Telescope Structural Dynamic Test Vehicle. This artifact simulated the effects of space

conditions on the telescope in preparation for its launch aboard the space shuttle. The art gallery plans an exhibit of Italian futurist art work, focusing on the subject of flight in FY 1989, and an exhibit commemorating the centennial of Igor Sikorsky's birth. Illustrating benchmarks in his life as a pioneer designer and industrialist, this exhibit will concentrate on his designs for aircraft, seaplanes, and helicopters. The Museum will remodel the Sea-Air Operations gallery in FY 1989 to expand the Ready Room and to offer a new film of aircraft carrier deck take-offs and landings. The gallery will highlight the six major aircraft carrier battles in the Pacific during World War II, with special tribute to the USS Enterprise, the most decorated carrier of the Pacific war.

The Museum's visitor information center opens in FY 1990. Six interactive units stationed around the Museum will provide visitors with current information on all Smithsonian museums, plus detailed information on all NASM galleries, films, and presentations. Also in FY 1990, the Museum will present the work of artist Roland Emmett, including drawings of his unique and whimsical sculptures, such as the Pussiewillow II.

In FY 1991, a major new gallery entitled "The Great War in the Air" will open. Emphasizing the use of aircraft as a weapon in war for the first time, this gallery will demonstrate the emergence of air power during World War I.

Presented in a specially equipped theater which uses an innovative, high-resolution projection system (IMAX) and a giant screen for extraordinarily realistic effects, films related to air and space travel complement the exhibits. The latest IMAX film, "On the Wing," which premiered in June 1986, presents a comparison of natural and artificial flight, featuring a mechanical replica of the flying reptile, pterodactyl. Another recent IMAX film, "The Dream is Alive," featured actual film footage shot by the astronauts on three Shuttle missions. A new film project planned for FY 1989, titled "Exploring The Blue Planet," will include never before seen film footage shot by the astronauts on earlier Shuttle missions, plus numerous still photographs of planet Earth taken from space. In commemoration of the International Space Year 1992, the Museum is co-producing another IMAX film highlighting achievements in space exploration by many different countries.

Development of Collections - In FY 1988, the Museum acquired a Lockheed T-33A, a jet trainer used by all branches of the military; a Lockheed Super Constellation, a 4-engine propeller driven airliner; a Junkers Ju 52, a highly acclaimed transport used by European and South American airlines; a McDonnell-Douglas F4S Phantom II, a Navy carrier and USAF standard fighter used in Vietnam; and a Rolls-Royce Conway turbojet engine, a pioneer jet engine used on Boeing 707s and Douglas DC-8s.

In FY 1988 other important acquisitions included a full scale model of an X-29 forward swept wing aircraft; an X-29 computer, similar to the ones used to control the X-29 aircraft in flight; a V-2 rocket gyroscopic integrating accelerometer, the first device to use a computer-programmed fuel cut-off in a rocket; an F-16 aircraft tail fin, used to test the feasibility of substituting composite material for metal in operational aircraft; and a Cray computer, the first computer powerful enough to challenge the wind tunnel as an aeronautical tool. All of these artifacts are part of the new gallery, "Beyond the Limits: Flight Enters the Computer Age." The Museum also acquired a collection of solar X-ray astronomy detectors, representing 30 years of technological evolution; Space Shuttle insect flight boxes, used to carry insects during three Space Shuttle flights; and an infrared Fourier transform spectrometer,

used for detecting complex molecules in planetary atmospheres and in interstellar clouds. NASM continually acquires from NASA missions additional space artifacts.

To date, NASM has acquired 14,000 feet of duplicate footage of original aviation newsreels produced by the Movietone News Company from 1919 to 1939. These cover topics such as Charles Lindbergh and his Lockheed Sirius, the Spirit of St. Louis arriving at the Smithsonian Institution, Jack Northrop and the original flying wing, and the Women's Air Derby of the late 1920s. This extremely valuable footage (part of the collection of 800,000 feet of Movietone newsreel film on aviation currently owned by the University of South Carolina) is on nitrate film. Under the terms of an agreement signed with the University in FY 1986, NASM will retain a master negative and a duplicate positive film copy of any nitrate film footage transferred to safety film and return a positive copy to the University for its collection. The goal is to save all of this historically valuable material for future generations.

Preservation and Restoration of the Collections - In FY 1988, NASM completed restoration of the Fowler Gage Tractor, a wooden aircraft built in 1912; the forward fuselage of the Enola Gay B-29; and the OS2U Kingfisher, which battleships and cruisers carried for aerial reconnaissance. Restoration will continue in FY 1989 on the German Arado 234, the first jet bomber; the rear half of the Enola Gay B-29; the ATS-6 applications satellite; a HS-293 Glide Bomb, a German WWII missile; the Mariner 10 structural/thermal engineering model, used to test structure and temperature stress; and the Hughes Racer, a mid-1930s technological masterpiece for aircraft speed and design. Restoration will begin in FY 1989 on the Japanese Shinden, an advance design canard fighter interceptor; a 1912 French Caudron Bomber, the first airplane designed primarily for bombing; the Hubble Space Telescope model; the Sopwith Snipe, the RAF's first fighter and ultimate Sopwith design; a Fokker D VII, the most highly regarded German fighter aircraft of WWI; the Herring Curtiss, an early aircraft of the Curtiss pusher variety, significant in the development of flight control systems; and the Apollo 11 command module. The treatment program, initiated in FY 1983 to reduce further deterioration of aircraft not yet restored, remains at the heart of the restoration activities.

-- Video Disc Project: This preservation program for archival photographs and other visual collections consists of photographing the images on 35mm film and then transferring this film onto video disc format. The project has transferred over 500,000 images and completed five discs. The fifth disc, completed in FY 1987, contains NASA material including 70mm color photos taken from the Space Shuttle. By facilitating greater access to the collection and eliminating the loss or destruction of the originals, this project has expanded the availability of these vast collections to scholars throughout the world. The Museum completed the sixth disc in FY 1988, which contains images from all the lunar probes (Ranger, Surveyor, and Apollo missions), including views of rock and soil samples. The seventh disc, produced in FY 1989, will focus on photographs in the Museum's collections of rockets, missiles, manned space missions, aeronautical artifacts, and engines. Plans are now underway for discs eight and nine, which will concentrate on the Wright Field collection in FY's 1990 and 1991. The program shares its technical expertise with other offices throughout the Institution.

Public Education and Orientation - The Museum's educational programs continue to serve an expanded national and international audience. The Education Resource Center (ERC) opened in January 1988, modeled after NASA's Teacher Resource Centers, with support from NASA and other agencies. It provides slides, video tapes, photographs, software, and written materials to educators on aerospace-related topics. To date

over 1,500 teachers have visited the Center. In FY 1988 the Educational Research Center held numerous educational workshops for in-service and graduate credit for teachers. Topics included weather, astronomy, and manned spaceflights. The Center will repeat more popular workshops in FY 1989. In FY 1988, ERC completed curriculum materials for "Discovery" and "History of Flight," as well as a Space Shuttle Activity Book. It held summer workshops for the Anacostia community, in cooperation with the National Urban Coalition. Everyone over eight years of age could participate in building and flying kites, hot air balloons, and rockets. The Museum received a Lindbergh Grant to develop a slide package called "Fragile Earth" and a grant from the Association of Science and Technology Centers to train teachers from the District of Columbia. Forty of the 94 members of the Museum's Regional Resource Program participated in the August 1988 meeting. They received updated briefings on the Museum's collections, research, restoration, and education programs from Museum staff.

In FY 1988, the Museum began a new educational outreach program aimed at minority students in the local community. This program provides speakers and educational materials directly to the classrooms of elementary and middle level schools. It is popular with the local community and will continue throughout FY 1989 and beyond.

The Museum created the Office of University Programs in June 1985 to support the academic activities of the Museum. This program includes liaisons with The Johns Hopkins University, the Massachusetts Institute of Technology, and Wellesley College. In FY 1987, the Museum received a grant from the Sloan Foundation for the development and presentation of a workshop and videodisc and curriculum packages for liberal arts colleges and universities. These educational materials provide in-depth case studies on the Wright wind tunnel and the Space Shuttle.

The Museum launched Air and Space/Smithsonian magazine in FY 1986 as a bi-monthly educational and informative publication addressing broad issues on aviation and space for the lay public. Market research indicated a higher than average appeal for a magazine of this type. The subscription renewal rate is promising.

NASM continues to present numerous series of free lectures, seminars, symposia, and films to the public. These include the General Electric sponsored aviation lecture series, which in FY 1988 included Brig. General Charles E. Yeager (USAF Ret.) lecturing on "Faster than Sound" and Air-Vice Marshal Ronald Dick (RAF) on "Tactical Air Power." The 11th annual Von Braun Memorial lecture in May 1988 featured Samuel C. Phillips on "Destination Space: Managing the U.S. Space Program." John W. Fozard gave the Charles Lindbergh Memorial lecture on "Engineering Elegance in Jumping Jets." Other highlights in FY 1988 included "Towards a Venus Encounter, 1962: Space History Symposium"; "Blacks in Aviation: Three Historic Films"; Carl Sagan on "Voyage to Venus: The Mission of Mariner 2"; Captain Jon McBride (USN) on "Back To Space"; and Michael Collins on "An Assessment of the Past, Present, and Future of Space Exploration." The Exploring Space Lecture Series included "Exploring the Planet Mars"; "Do Black Holes Exist?"; "Supernovas: Grand Finales or New Beginnings?"; and "The Color of the Universe." The film series continued in FY 1987, showing some very popular movies including "Top Gun," "Close Encounters of the Third Kind," and "E.T. The Extraterrestrial." The Museum also offers a weekly evening of free family activities during the summer.

Publications - In FY 1988, the Museum published the Air and Space Bibliography. Planned publications in FY 1989 and beyond include The Boeing 247, part of the famous aircraft series; The Wright Flyer: The Study of the Process of Invention; U. S. Women in Aviation: 1940 - 1985; Our Weather from Above: America's Meteorological

Satellites; an exhibition book titled Beyond the Limits: Flight Enters the Computer Age, to accompany the new exhibit gallery of the same title; Caring for the Collections of the National Air and Space Museum; and A Catalog of the Art Collection of the National Air and Space Museum.

EXPLANATION OF PROGRAM INCREASE:

For FY 1990, NASM requests an increase of 6 workyears and \$297,000 for: an archivist to maintain historical documents and photographs (1 workyear and \$75,000); a curator and programmer/analyst (2 workyears and \$120,000); a collections information system (1 workyear and \$60,000); a Restoration Apprentice program (2 workyears and \$36,000); and a World Atlas of Satellite Images (\$6,000).

Archivist (1 workyear and \$75,000). NASM is the national repository for historical records of air and space research and achievements. With the requested resources, NASM will improve its ability to access, identify, and preserve significant documents and photographs in the history of aviation and space. Better accountability over the archives will result.

The Museum recently convened an external Collections Management Advisory Committee. It recommended that NASM should do the following:

- access, identify, and maintain the most significant documents and photographs,
- expand the scholarly content of the archives,
- locate repositories around the country that can accommodate and maintain newly available collections yet make them available to the Smithsonian, and
- provide research guides for all aerospace archival materials.

The requested senior archivist will oversee these activities. In addition, the senior archivist will establish better control over the acquisition, organization, use, care, access, and inventory of these collections. Requested funding will also pay for necessary travel and supplies. To assist the requested senior archivist, NASM will transfer three full time permanent technical positions to the new archival division.

NASM is the repository for the nation's historical record of air and space. It is essential that the nation have a comprehensive and accurate archives for the future. Greater emphasis on the archives will enhance attendant research activities which depend on this valuable information.

Space Science and Exploration Curator and Center for Earth and Planetary Studies Computer Programmer/Analyst (2 workyears and \$120,000). (A) The study of past and future successes in the national aerospace program can benefit other industries and scientific disciplines. NASM will document and analyze the evolution of the space program to discover the implications for other programs that graduate to "big science."

The United States' space program was one of the first efforts in large-scale science. Scholars in NASM's Space Science and Exploration Department have been conducting interviews with early NASA administrators and with other scientists, engineers, and administrators. Those interviewed were instrumental in guiding the Apollo program to the Moon and in designing early military surveillance methods. These interviews, and the archival collections they generate, yield valuable

information regarding NASA's transition to larger, more expensive aerospace projects. They are especially useful in their portrayal of administrative problems and issues.

To direct in-depth studies of the Space Science and Exploration project, NASM must have an additional curatorial position. Since scientific program and administrative evolution has relevance for other diverse organizations, scholars from complementary fields, such as the sociology of large organizations, the history of contemporary science, and the economics of science and technology, should examine this subject. NASM has no curators with backgrounds in these areas. By hiring a scholar to coordinate this project, NASM and other organizations will gain useful new perspectives on programs that make the transition to big science. A sociologist or historian of science on the staff of the Space Science and Exploration Department can undertake broadly conceived studies on the organization of large-scale national aerospace projects.

(B) NASM's remote sensing program will provide more knowledge about the spread of deserts, the increasing instability of the planet's surface, and the effect of climate on surface materials. NASM will use satellite sensing and improved data analysis to study the African drought and other physical processes. Scientists and world leaders will use this information to deal more effectively with the famine, mass migrations, and tribal warfare of the area.

With an improved capacity for data analysis, Center for Earth and Planetary Studies (CEPS) can access greater amounts of satellite data. CEPS will analyze automated data from Space Shuttle radar, meteorological stations, and satellites from several foreign countries. Scientific results based on these data will produce a more complete picture of the global climate and changing environment. In NASM's joint research projects with NASM/Goddard Space Flight Center, the U.S. Geological Survey, and numerous universities and research groups, the programmer/analyst will coordinate and eliminate duplicate computer programs and data.

NASM must have a scientific computer programmer/analyst to assist researchers in their analysis of this data. This position will increase CEPS' capacity for data analysis, which will allow the Center to participate more fully in global scientific studies. Requested funds will support the programmer/analyst position, as well as travel, supplies, and equipment. These programs are ongoing, and both positions are full-time permanent.

A scientific programmer/analyst in the Center for Earth and Planetary Studies will compile a wide range of satellite and space probe data. The capability to analyze this data comprehensively has significance for research in geophysics, global environmental systems, and comparative planetology.

Collections Information System (1 workyear and \$60,000). The transfer of all inventory data from an obsolete computer to a larger, newer one will result in a complete, up-to-date inventory on one master list. Auditors also have cited the need for better accountability over collections, which this system will provide.

The Museum will transfer its inventory data from the Institution's Honeywell computer to the IBM. The Honeywell already has exceeded its intended productive lifespan. After compiling all inventory data on one master list, NASM will clean up the records. Staff will spot check particular artifacts in the collection and on display to verify correct information on the master list. Using manual and duplicate records, staff will verify computer records for each artifact.

Since the Museum will continue to accession and deaccession artifacts, the requested computer programmer will maintain the Museum's inventory and its portion of the Institution's Collections Information System. Requested funds will support the computer programmer position and equipment purchases.

With over 30,000 artifacts in the NASM collection, it is essential that the Museum have a complete, up-to-date inventory. This master inventory will enable researchers to locate any artifact in the collection and enable the Museum to exercise better control over its artifact collection.

Restoration Apprentice Program (2 workyears and \$36,000). As the Museum's present, restoration staff reaches retirement age, many of the hard-earned skills and techniques they use will be lost. An apprentice program will enable the Museum to preserve and restore valuable artifacts while teaching the necessary skills to an aspiring new generation.

This apprentice program will employ high school graduates who have shown the required skill and interest in such a vocational program. They will work hand-in-hand with senior restoration staff for on-the-job training and attend formal classroom sessions to learn the skills and techniques required to restore early wood and metal aircraft. At the same time, these employees will be preserving artifacts that are currently deteriorating, maintaining them until full restoration begins. Requested funds will support two full-time permanent Museum technicians. These projects are ongoing.

The Museum's aeronautical restoration staff are experts in the field. These senior staff members are the best qualified to provide on-the-job training to a new generation of restoration staff.

Quincentenary Program - The World Atlas of Satellite Images (\$6,000). In commemoration of the Columbus Quincentenary, NASM will produce a World Atlas of Satellite Images. These images originated from manned and unmanned space missions and show the largest coverage of Earth to date.

The World Atlas will be a major reference work on world physiography and global processes. It will include a user's guide. The guide will describe the imagery from different satellite systems, pertinent facts about images, and sensor characteristics (multispectral, radar, film, camera systems, etc.).

The production of this atlas as a Quincentenary program underscores the importance of the science of cartography to early explorers and how state-of-the-art technology continues to expand geographic knowledge. NASM will cooperate with other interested agencies, including NASA, NOAA, the European Space Agency, EOSAT Corporation, SPOT Image Corporation, the Environmental Research Institute of Michigan, to obtain satellite images for this project.

Requested funds will purchase necessary supplies. NASM will complete the World Atlas in FY 1992.

The World Atlas will provide the public and scientists around the world with a major reference on world physiography and satellite imagery. It will explain the scientific principles and practical applications of satellite remote sensing. The

Atlas will portray advances in our knowledge of the Earth as the result of space missions.

NONAPPROPRIATED SOURCES OF FUNDING

Unrestricted General and Special Purpose Funds - These funds come from a variety of sources including the Museum's share of the net proceeds from the Museum shops and restaurant, the net proceeds resulting from bureau activities (such as the Theater and Planetarium), and small allotments. In addition to meeting expenses of the Theater and Planetarium, these funds finance fellowships, research chairs, guest lecturers, symposia, and special events. A portion of the proceeds from the Theater and Planetarium provide particular support for the production of new IMAX films including "The Dream Is Alive," "On the Wing," and "Exploring the Blue Planet," as well as other Institution programs. The Museum also received supplemental outside funding for these new films. In March 1989, a new show, "Calling All Stars," will premiere in the Albert Einstein Planetarium. The show traces efforts to locate life in the Universe. The Lindbergh Chair of Aerospace History, the Chair in Space History, and the International Fellowship provide continuing support for distinguished scholars to study at the Museum. Other fellowship programs include Guggenheim and Verville fellowships, which support pre-or-post doctoral students and distinguished scholars in aviation and space science.

Restricted Funds - Funds provided are in the form of restricted endowments which specify the use of donations or bequests, and of gifts and foundation grants by individuals, organizations or corporations for specific purposes. Examples of these funds are the Ramsey Endowment, for research relating to naval flight history; the Guggenheim Endowment, for lectures and stipends; the Martin Marietta Chair in Space History, for historical research by distinguished scholars in the space sciences; and the NASM Educational Fund. The Sloan Foundation provided grants beginning in FY 1987 for a four-year videohistory program as well as a workshop, videodisc, and curriculum package on aviation history. NASM received numerous corporate donations, both monetary and "in kind," to support the gallery "Beyond the Limits: Flight Enters the Computer Age" in FY 1987 and FY 1988 as well as pledged donations for FY 1989. The Glennan-Webb-Seamans Fund for Research in Space History received additional funds in FY 1988 from corporate sources.

Federal Grants and Contracts - Various agencies and departments provide funds for special projects conducted at NASM because of the Museum's expertise in a given area. Continued funding from the National Aeronautics and Space Administration grant program supports the following research activity in planetary geology by the Museum's Center for Earth and Planetary Studies: photogeologic investigation of planetary tectonic features, the structural geology of the Basalt Plains of Washington state, and the Planetary Image Facility. The research project on satellite remote-sensing of central Mali, which began in FY 1984, continues to determine the long-term effects of climate change on the fragile environment of the inland Niger delta region. This research expanded in FY 1985 to cover fringe areas of the world's deserts and will receive continued financial support. The Space Telescope Historical Project, a joint effort between The Johns Hopkins University and NASM, with partial funding from NASA, will complete its planned publication in FY 1989.

NATIONAL MUSEUM OF AMERICAN HISTORY

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	326	13,500	2	198	9	565	6	3,816	-	-
FY 1989 Estimate	336	14,462	3	201	9	985	5	2,321	-	-
FY 1990 Estimate	346	15,618	2	184	9	945	1	1,599	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The National Museum of American History houses the national collections that represent the political, cultural, scientific, and technological development of the United States. The Museum devotes itself to preserving the national heritage by improving and conserving its collections and interpreting these materials for the public and scholarly community. Through exhibitions, research publications, and an array of lectures, symposia, concerts, tours and demonstrations, and film and broadcast features, NMAH presents the unique cultural and scientific heritage of the United States to more than five million visitors per year. In addition to the Mall building, the Museum maintains the exhibition "1876 Centennial," located in the Arts and Industries Building, as well as caring for collections stored and exhibited at six buildings in Suitland, Maryland. For FY 1990, American History requests an increase of 7 workyears and \$994,000 to provide critical storage space for displaced collections (\$430,000); to support the Museum's conversion to the Institution's new computerized Collections Information System (2 workyears and \$111,000); to support the Museum's plans to commemorate the Columbus Quincentenary (2 workyears and \$385,000); to provide full-time support for the Museum's Afro-American Community Project (1 workyear and \$18,000); and to employ two research assistants to support affirmative action hires (2 workyears and \$50,000).

Also contained in this line item is an increase of 3 workyears and \$162,000 associated with the Institution's strengthened affirmative action plan. Justification for these resources appear in the central Affirmative Action section of this budget.

PROGRAM - Collections Management - The National Museum of American History possesses the largest and most comprehensive collection of its kind in the world. Covering a wide spectrum of materials, sizes, and descriptions, the museum objects include railroad trains, automobiles, textiles, photographs, paintings, sculpture, paper materials, clothing and costumes, tools, power machinery, clocks, weapons, ceramics and glass, musical instruments, scientific instruments of all kinds, one million numismatic specimens, and 14 million stamps. The Museum preserves and protects this irreplaceable "history book of objects" through a strong collections management program that includes proper storage, conservation, registration, and archival functions.

-- Master Space Plan: The Museum's Master Space Plan is a long-term, multi-million dollar program which integrates the retrofitting of the physical building with the redesign and reinstallation of the Museum's exhibition halls. In FY 1988, six new workyears in the Museum's base supported the preparation and transfer of collections in conjunction with this work. Major portions of the Museum will close in phases. The new staff will pack, clean, move, store and keep records on hundreds of objects that move to offsite locations in Rockville, Maryland and Springfield, Virginia.

-- On the Mall: In FY 1987, the Museum continued active acquisition and loan programs and relocated thousands of objects under the Museum's Master Space Plan. Over 100,000 objects came into the permanent collections, while the Museum lent or borrowed 2,500 objects for exhibitions. The Collections Management Steering Committee guided efforts to complete backlogged accessions. Newly designed automated recordkeeping programs became available in the National Numismatic and National Philatelic Collections as well as the general collections. Staff began to organize and make early collection files more accessible for research and accountability.

-- Suitland Facility: In FY 1988, the Museum continued the asbestos cleanup program begun in FY 1985. This continued cleanup makes the more than one million objects stored at the Institution's Suitland facility accessible for exhibit, research and loan, and reduces the potential health hazard to staff working with those collections. The renovation of Building 19, completed in April, 1988, provides optimal environmental conditions for sensitive collections at the facility and a clean area to receive collections from Building 17, the next major decontamination target.

-- Museum Support Center: In FY 1987, the Museum began formal planning for the transfer of collections from several of its curatorial divisions to the Museum Support Center (MSC). In FY 1988 work progressed on identifying collections slated to move to the MSC. Staff began listing and packing dolls, toys, and patent models at Silver Hill for future shipment.

Collections Acquisition - In FY 1988 the Museum received numerous significant objects through purchases and gifts. The acquisitions include: the Duke Ellington Collection of music manuscripts, scrapbooks, photographs, financial records, recordings, and memorabilia; folk instrumentalist Elizabeth Cotton's guitar, and 300 harmonicas from the Peter Kassin collection, one of the finest in this country; a terrestrial globe made in the 1830s by D.C. Murdock of West Boylston, Ma., one of the first manufacturers of school apparatus in the United States; over 5,000 stereographs from the 1850s to the 1870s, which include images of the American Civil War, the Russo-Japanese War, and the laying of the transatlantic telegraph cable; a very rare U.S. Marine Corps bandsman's red dress coat and blue helmet from 1894; the Hoffman/Boaz Afro-American Collection of 1500 postcards collected during the early years of the Civil Rights movement; three pieces of rare American Indian trade silver; the unique pattern strike in copper of the 1794 dollar, the first U.S. dollar; the medical laboratory instruments and notebook used by Dr. Stanley Cohen of Stanford University, who together with Dr. Herbert Boyer invented and patented the technique for producing recombinant DNA and a dozen genetically-engineered pharmaceuticals that have just appeared on the market, including the new "wonder drug" TPA (tissue plasminogen activator) used to dissolve blood clots.

Conservation - In FY 1988, the Division of Conservation rehoused or gave basic stabilization treatments to over 30,000 objects. This is part of a continuing program to survey and conserve the backlog of objects at risk due to unsafe storage conditions

or fragility. The rehousing of the entire Graphic Arts print collection is now almost complete, with nearly 25,000 prints surveyed and put into acid-free folders and new protective boxes over the past two fiscal years. Work on the First Ladies Gowns accelerated through the hiring of a costume conservator; 6 of the First Ladies Gowns are now on display. The new reinstallation of the First Ladies display will open in 1991 or 1992. Planning began for the construction of a specialized laboratory devoted to the museum's holdings of over 40,000 costumes, uniforms, flags, and other textile and fragile organic objects.

Archives - In FY 1988, the Archives Center acquired twenty-five separate archival collections. Staff primarily devoted time to cataloging the two most significant acquisitions -- the Duke Ellington Collection of musical manuscripts and related historical materials and the Sam De Vincent Collection of Illustrated American Sheet Music. The Sam De Vincent Collection consists of 130,000 pieces of music from 1790 to the present, of which 90 percent is out-of-print and much of it quite rare. The Museum developed plans for several descriptive publications and an exhibition of the Duke Ellington material, to happen within the next few years.

Exhibitions - The Museum's long-term Exhibition Reinstallation Program calls for the redesign of many of the Museum's exhibit halls with an up-to-date interpretation and presentation of the collections. In FY 1988, NMAH installed fifteen exhibitions, including some about difficult and even controversial subjects. Highlights include: "A More Perfect Union: Japanese Americans and the United States Constitution," an exhibit about the constitutional process examining the experiences of Americans of Japanese ancestry during World War II; "The Search for Life: Genetic Technology in the 20th Century," covering the history of molecular biology and its applications in agriculture and medicine; "A Material World," a permanent installation exploring the changing composition of artifacts from predominantly "natural" to "manufactured" materials; and "Frank Lloyd Wright: In the Realm of Ideas," a traveling exhibition exploring the ideas and achievements of Frank Lloyd Wright in a gallery exhibition as well as a full size model of his Usonian House, on view outside the Museum.

In FY 1989 several significant exhibitions will open: "The American Presidency, 1789-1989" which celebrates the bicentennial of the first presidential inauguration by depicting the office of the presidency as it has evolved over the years; "Sports Feeling: U.S./Soviet Sports Photography," a traveling exhibition of American and Soviet sports photography that speaks to the universality and humanity of sports; "The Ceremonial Court," a re-creation of various White House spaces based on the original molds and castings from the White House; "The Way to Independence: Memories of a Hidatsa Family, 1840-1920," which chronicles the transformation of American society through the experiences of three members of a Hidatsa Indian family; and "Men and Women: Dressing the Part," which looks at some of the standards of appearance and behavior for men and women in American culture.

Public Programs - In FY 1988 the Museum's Department of Public Programs presented a wide variety of education activities, publications, and media events with an emphasis on encouraging the participation of minority audiences. Popular programs emphasizing the cultural heritage of Black, Asian, Hispanic, and Native Americans included: The Program in Black American Culture, the American Sampler Series, Jazz in the Palm Court, and the Jacksonville Bandstand programs. The Museum also began a Program in Hispanic American History. This public program included a scholarly symposium, a performance/lecture demonstration, a film, and an exhibit tour. Also, the Museum's recruitment of minority docents expanded.

Other highlights of the year included:

- the Museum-sponsored "Smithsonian National Outreach Conference" which brought together an international assembly of experts on developing and serving minority constituencies;
- a symposium and series of performance programs on "Black Migration and the American City: Forging the African-American Urban Community," held in conjunction with the exhibit, "Field to Factory: Afro-American Migration 1915-1940."
- "Music and Dance from the Southern Plains", featuring members of the Pawnee, Ponca, Potawotomi, and Kiowa tribes;
- a forum on the History of Washington D. C.'s Latino community;
- a program of "The Songs and Stories of Working Americans", held in conjunction with the "Life in America: After the Revolution" exhibition;
- and a special exhibit and tribute to Irving Berlin in honor of the centennial of his birth.

Research - Staff in the Department of Social and Cultural History are working on a number of significant collections-related research projects. The indexing and studying of the artifacts of Afro-American culture, housed in five Smithsonian museums, will conclude soon. The study of Old Believer Orthodox Icons resulted in an exhibition, brochure, and symposium. The SI Press will publish the results of the project in a book, available during 1990. Other research projects include: the Hispanic Collections Project (a review of some 3,000 items of ethnographic Hispanica aimed at preparing a guide in 1992); the Judaica Project (to result in an index and guide in 1991-1993); the East European Costume Project (a guide to a 1,000-piece collection); and the completion of a major volume entitled, Men and Women: Dressing the Part, which will explore how clothing reflects attitudes toward gender.

In the Department of the History of Science and Technology, research is underway on great historical clocks of America and their depiction of the American past. Staff is also analyzing navigation instruments in public and private collections for a new understanding of the manufacture and use of these instruments in Colonial America. Staff will produce scholarly publications on these as well as on the role of the military in the development of lasers and atomic clocks. Medical History staff are working on several video history projects, including a series of interviews with Dr. Ledley, inventor of the first CAT-scanner, and interviews with Dr. Leroy Hood, designer of the prototype of the first DNA synthesizer. Other ongoing projects include: a study of 19th and 20th-century cotton gins, a history of the American railroad freight car, and research on the evolution and social impact of the computer in America. In the National Philatelic Collections staff is producing a comprehensive history of the movement of mail in America, incorporating research on newly acquired mail wagons, vans and trucks. The Robert Mills Papers has collected and is preparing to publish in a microfilm edition over 3,000 letters and papers concerning this important 19th century American architect, who designed the Washington Monument.

EXPLANATION OF PROGRAM INCREASE - For FY 1990, American History requests an increase of 7 workyears and \$994,000 to provide critical storage space for displaced collections (\$430,000); to support the Museum's conversion to the Institution's new

computerized Collections Information System (2 workyears and \$111,000); to support the Museum's plans to commemorate the Columbus Quincentenary (2 workyears and \$385,000); to provide full-time support for the Museum's Afro-American Community Project (1 workyear and \$18,000); and to employ two research assistants to support affirmative action hires (2 workyears and \$50,000).

Also contained in this line-item is an increase of 3 workyears and \$162,000 associated with the Institution's strengthened affirmative action plan. Justification for these resources appears in the central Affirmative Action section of this budget.

Storage Space Rental (\$430,000) - The Museum has had severe space shortage for several years. NMAH has filled all of its available storage areas, and asbestos still contaminates buildings at Silver Hill. Leased space at the Fullerton Industrial Park in Springfield, Va. will house displaced collection's while renovating the NMAH building and reinstalling major exhibition halls.

The Museum needs a total of 48,000 square feet to house objects safely while the Museum renovates and constructs. The "Master Coordination Plan," prepared by an architectural consulting firm, confirmed this requirement. The Museum decided to lease space only after exploring and rejecting other options due to costs, security, or inadequate environmental systems.

The requested funds will pay rental costs of \$247,000 on 36,000 square feet. The remaining \$183,000 is for utilities, security, minimal adjustments to meet safety requirements, and some storage equipment to efficiently use the space. In FY 1991, the Museum will request funds to lease an additional 12,000 square feet. NMAH will need this level of funding until other facilities become available late in the next decade.

Additional storage space will accelerate renovation; eliminate improper storage of objects in corridors; facilitate access to the collections for research; strengthen collection management efforts and provide staging and swing space for the Suitland Butler Buildings, now undergoing repair.

Collections Information System (2 workyears and \$111,000) - The Smithsonian Institution's Collections Information System (CIS) increases access to the collections and improves accountability and inventory control. The on-line CIS also will provide up-to-date information about the collections for research, exhibition and public information.

Frequent demands from scholars and the public require an automated system to respond expeditiously to questions about the collections. The Smithsonian Institution Office of Audits and Investigation reports the need for increased resources to improve management of collections information. For the Museum's more than 16 million objects, a system that provides integrated, on-line interactive access to collections information is essential. In FY 1990 the Museum will convert 1.3 million records to the Institution's Collection Information System (CIS) on the IBM from the Honeywell system. Increased public service, in the form of quicker response time, will result from this automated system.

The Museum has invested considerable effort and funds into preparation for the migration of collections data onto the CIS. By receiving the necessary support at this juncture, NMAH will continue to make progress and coordinate our efforts with the central Smithsonian CIS program now underway.

Columbus Quincentenary Program (2 workyears and \$385,000) - In 1986 the Museum began a 5-year program of public symposiums, archaeologically-based exhibits, and related publications. The program leads toward the establishment of a major permanent exhibition, "American Encounters," commemorating the observation of the Columbus Quincentenary.

The exhibition will examine diverse peoples of North America from the early colonization period to the present. It will present the interactions and contributions of Spanish, French, English, Dutch, Swedish, and African settlers, and the American Indians.

The funds and personnel requested for FY 1990 will enable the Quincentenary Program to:

- 1) proceed with the development of "American Encounters," opening in March, 1992;
- 2) write scripts for and shoot trial versions of pilot film, videodisc, and audio-visual sequences for the exhibition, including a major segment on Native American perceptions of European colonization;
- 3) hire an Education Specialist to plan, develop, and test curriculum kits and interpretive activities for the exhibition;
- 4) produce a symposium and related publication on European interactions with Native American peoples during the 16th and 17th centuries;
- 5) produce a case exhibit on archaeological evidence of early European settlers in North America and their relationships with other inhabitants;
- 6) present lectures, performances, and other public programs which demonstrate the nature and diversity of Hispanic American culture.

The permanent exhibition and its related public programs will reinforce the Museum's commitment to new audiences. Also, the Smithsonian Institution will provide the general public with a more accurate presentation of America's multi-cultural past.

Afro-American Community Project (1 workyear and \$18,000) - The Afro-American Communities Project serves to collect, classify, and inform social history scholars around the country. Comparisons of black life in selected cities help illustrate the extent to which blacks exercised control over their local communities and organized themselves to address local challenges, while remaining committed to the wider issues of civil rights and antislavery.

The project collected and computerized the largest database ever assembled on pre-Civil War free blacks. Gathering historical data on free black communities in ten pre-Civil War Northern Cities, it analyzes the structure and function of black families, institutions, and the political and social organization within these Afro-American communities. The project continues to expand its holdings, adding data from the Black Abolitionist Papers microfilm. It will assemble new data, which is a rich source of information on Antellum Blacks, into an index of information and writings by and about abolitionists.

Currently the Project's staff consists of one part-time Museum curator and occasional support staff provided by intermittent grants. Funding requested in the FY 1990 request would provide full-time research and programmatic support. Secure funding for full-time staff would ensure that the project will continue.

The Afro-American Community project supports research in an important cultural area and improves the balance of public programs relating to minorities. Materials developed by the project influence exhibits at the National Museum of American History as well as other museums around the country. The project will move the Museum to the forefront of historical research and scholarship on minority contributions to American society. The project will improve disseminating information to the public and research community.

Research Assistants (2 workyears and \$50,000) - The Museum will strengthen research in the history of biology and political history by reassigning support functions from senior curators to technicians. The Museum will target the positions for affirmative action and will assign the research assistants on a rotating basis to curators throughout the Museum.

Due to the ambitious exhibit reinstallation program at NMAH, curators spend a significant portion of their time on script writing, general exhibit oversight, and other exhibit related responsibilities. Research has become increasingly difficult as these exhibit responsibilities take priority. With better support, curators can continue collection and exhibit responsibilities, while pursuing more vigorously their research objectives.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - This income is from various sources, including the Museum's share of museum shop and cafeteria sales, publication royalties, and various annual allotments. In FY 1989, these funds will support the salary and benefit costs for the positions of museum director and a graphics designer, an Afro-American Communities project, and the Museum's unique Chamber Music performance and recordings program.

Restricted Funds - The principal sources of income for these funds are individual or corporate gifts and foundation grants provided for specific purposes. In FY 1988, NMAH received the following gifts and grants: generous gifts from the AT&T Foundation, Northern Telecom, Electronic Data Systems, Unisys Corporation, and Xerox for a major new permanent exhibition entitled, "Connected: The Emerging Information Age;" a major gift from McDonalds for an exhibit on 20th century Life in America; a generous gift from the National Cosmetology Association for the exhibit, "Men and Women: Dressing the Part;" a generous gift from Les Dames of Los Angeles for the reinstallation of the First Ladies exhibit; a gift from the Advanced Technology Laboratories for an exhibit on ultrasound; a gift from Time Incorporated for an exhibit on US/USSR Sports Photography; a gift from the American Association of Equipment Lessors for an exhibit on Irving Berlin; a gift from Federal Express for an oral history project; gifts from Stone & Webster and from Alan Hilburg & Associates for a major permanent exhibit on 19th-century Life in America; a gift from Electronic Industries Association for an exhibit on the 50th anniversary of television; a gift from the Pott Foundation to produce a film for the Museum's Hall of American Maritime Enterprise; a gift from the American Society of Anesthesiologists to refurbish the Museum's exhibit on Pain; and a gift from the Recording Industry of America to support an exhibit on Musical History.

Government Grants and Contracts - The Museum received a Federal grant from the Department of the Interior for the installation of a temporary exhibition on the Federal Duck Stamp Program.

NATIONAL MUSEUM OF AMERICAN ART

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	118	5,036	-	114	4	246	-	314	-	-
FY 1989 Estimate	119	5,297	-	59	4	702	-	387	-	14
FY 1990 Estimate	126	5,550	-	65	4	482	-	509	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The mission of the National Museum of American Art (NMAA) is to acquire, preserve, study, and exhibit works of American art. Paintings, sculpture, graphic arts, and crafts are available for view and research. The Renwick Gallery, part of the National Museum of American Art, exhibits American crafts, decorative arts, and design objects. The Barney Studio House is a period home the Museum maintains for tours and interpretive programs.

For FY 1990, NMAA requests an increase of 5 workyears and \$173,000 to provide additional research and professional support (2 workyears and \$106,000); to create a Minority Professional Apprenticeship Program (1 workyear and \$30,000); to support the development of an exhibition commemorating the Columbus Quincentenary (1 workyear and \$20,000); and to improve building and maintenance support (1 workyear and \$17,000).

Also contained in this line-item is an increase of 2 workyears and \$80,000 associated with the Institution's strengthened affirmative action plan. Justification for these resources appears in the central Affirmative Action section of this budget.

PROGRAM - With a permanent collection of nearly 34,000 objects, the Museum is a center for research, exhibition, and public education. NMAA acquires approximately 1,000 new works of art each year. Due to limited space, items from the permanent collection rotate from storage to exhibition in the galleries. The entire collection is available for study or for loan to other exhibitors throughout the country. Conservation staff restore and preserve these irreplaceable art works to ensure their availability for future generations. Scholarly research by the professional staff results in publications, exhibitions, and educational programs.

Researchers from a variety of disciplines use the Museum's reference materials. The NMAA developed and maintains three unique research data bases:

- Inventory Of American Paintings Executed Before 1914 - data on all paintings by American artists.
- Smithsonian Art Index - a list of art works housed in the Institution's non-art museums.

-- Index of American Art Exhibition Catalogues - documentation of artistic activities in this country and Canada.

These inventories comprise more than 500,000 computer entries and constitute the most complete data base on the subject of American art in existence. The Inventory of American Sculpture will ultimately add 250,000 records to the Museum's data base.

Collections - The Museum received several important gifts in FY 1988, including paintings by Thomas Moran, Sanford Gifford, and William Bradford, which strengthen NMAA's holdings in 19th century landscape painting. Other acquisitions strengthen the Museum's holdings in both graphic arts and folk art and contribute to the increasing distinction of the NMAA collection.

Other gifts to the Museum included paintings by Leon Kroll, Louisa Matthiasdottir, Jennings Tofel, and Kenneth Young; an assemblage by Mike Wilkins; sculpture by Alex Katz and Boris Gilbertson; graphic work by Eddie Arning, Chuck Close, Sam Gilliam, Marsden Hartley, Deborah Remington, and Jack Savitsky; photographs by Edward Curtis, H. Arthur Taussig, and William Eggleston; and decorative arts by Cornelia Breitenbach, Philip Moulthrop, and Neil Tetkowski. Mr. Herbert Waide Hemphill, Jr. continues to make additional gifts of folk art to the Museum supplementing last year's acquisition of much of his collection.

The Museum purchased Thomas Cole's The Pilgrim of the World at the End of His Journey, a painting previously known only through written description. Another rare canvas from the artist's final series, The Pilgrim of the Cross at the End of His Journey, is already at NMAA. The Museum also purchased major works by John Trumbull (Portrait of the Misses Mary and Hannah Murray) and Marsden Hartley (Yliaster [Paracelsus]), a forceful, vivid example of Hartley's spiritual themes. Other purchases included paintings, sculpture, graphic works, photographs, and decorative arts by artists representing the full breadth of American artistic achievement.

Publications - Smithsonian Studies in American Art, the Museum's new scholarly journal, enjoyed a successful second year. The journal went from two issues in its first year to three in 1988. Publication on a quarterly basis will begin in 1989. It is co-published with Oxford University Press and has a circulation of about 1,500 copies. In its survey of the year's best magazines, Library Journal wrote that "Among new art entries, the leader by far is Smithsonian Studies in American Art...."

Abbeville Press, one of New York's foremost art publishers, offered Perpetual Motif: The Art of Man Ray, an anthology of critical essays on a leading apostle of the avant-garde. NMAA will publish a critical biography, Paulanship, in January 1989. Several works in progress at the Museum include: a comprehensive study of the work of Albert Pinkham Ryder, a catalogue of avant-garde photography in the 1980s, and a book on American artists who exhibited in the French salons in the nineteenth century.

The Museum produced a large, four-color pre-tour booklet for children, called On Our Way to the National Museum of American Art, and reprinted two other booklets, Hispanic-American Art and Afro-American Art. In addition, the Museum began publishing a new newsletter, The American Art Network, serving the community of former Smithsonian fellows and scholars generally.

Six publications won awards in 1988. The Washington Book Publishers bestowed a first-place award in its promotion and direct-mail category for the invitation to Gene Davis, A Memorial Exhibition. The Gene Davis and Modern American Realism: The Sara

Roby Foundation Collection catalogues won design awards. The American Art Deco brochure, the On Our Way to the NMAA booklet, and the invitation to Lost and Found Traditions: Native American Art 1965-1985 all received awards from the American Association of Museums. The American Federation of the Arts chose the Gene Davis catalogue for its Award of Excellence.

Research - NMAA began a nationwide appeal to solicit information for its newest research data base, the Inventory of American Sculpture. Over 12,000 museums, historical societies, and cultural institutions around the country received introductory letters and questionnaires. The number of respondents is growing steadily. The Inventory of American Sculpture began with a core of 24,000 records developed through an FY 1987 pilot project. Plans for this program include a national survey of outdoor sculpture and conservation assessment. NMAA and the National Institute for the Conservation of Cultural Property will conduct this survey and assessment, in cooperation with the American Association for State and Local History, National Conference of State Historic Preservation Officers, National Park Service, and Smithsonian Conservation Analytical Laboratory.

The Inventory of American Paintings Executed Before 1914 also benefited from the sculpture solicitation. The questionnaire included an appeal for new and updated information on paintings. Renewed contact with organizations who contributed information to this earlier research data base revitalized and enhanced the Inventory of American Paintings for the 1,800 researchers who used this resource in FY 1988.

Nearly 300 nitrate and deteriorated acetate negatives from the Museum's Peter A. Juley and Son Collection are now preserved for future use on stable film. NMAA added over 3,700 slides and 6,700 prints to the Slide and Photograph Archives in FY 1988. The total number of holdings is nearly 120,000 slides and 250,000 prints and negatives in the Museum's collections.

Museum staff researched approximately 2,500 artists' names for the Artist Authority Project. This research ensures that the statistics on the artists are accurate and identical among the seven data bases the Museum maintains. Selective mailings continue to request additional biographical information on these artists.

Exhibitions - During FY 1988, the Museum exhibited works by individual artists or assembled showings based upon thematic topics relevant to the history of American art. Museum curators organized "City Life: Photographs by Bruce Davidson" and "Special Delivery: Murals for the New Deal Era." "Special Delivery," drawn from the Museum's collection of mural studies from the 1930s and 1940s, will tour five locations throughout the United States between 1989 and 1991. "Alice Pike Barney: The Paris Years" remains at Barney Studio House. An installation of works from the Renwick's growing permanent collection provided an overview of the history of American ceramics during the past century. Several exhibitions organized by other institutions which included paintings, sculpture, photography, graphic arts, textiles, ceramics, and Native American art include:

- "Supreme Instants: The Photography of Edward Weston," Center for Creative Photography, University of Arizona at Tucson;
- "Wanderlust," Hallmark Photographic Collection, Kansas City, Missouri;
- "Lost and Found Traditions: Native American Art 1965-1985," American Federation of Arts, New York City; and
- "Cynthia Schira: New York," Spencer Museum of Art, University of Kansas at Lawrence.

Paintings and sculpture from the 19th and early 20th century collections provided the basis for the thematic installation "Images of Innocence: The Child in American Art." "Drawings from the Collection" and "Olympian Trials" represented the graphic arts. "Olympian Trials" was the first showing of selected photographs of athletic events from Walter Iooss, Jr.'s portfolio, "Shooting for the Gold," which NMAA received from Fuji Photo Film USA, Inc. "Treasures from the National Museum of American Art," on tour since February 1986, returned to NMAA in 1987. NMAA completely reinstalled its permanent collection galleries throughout the museum with the "Treasures."

The Museum lent nearly 200 works from its collections and continued its policy of placing European works on long-term loans to other institutions in the United States and abroad. The Museum sent a group of 17th- and 18th-century English and Dutch paintings to the National Art Gallery in Wellington, New Zealand in exchange for their loan to NMAA of John Singleton Copley's portrait Mrs. Humphrey Devereux.

Projected exhibitions for FY 1989-90 include: "Perpetual Motif: The Art of Man Ray;" "Paul Manship;" "The Photography of Invention: American Pictures of the '80s;" "Stephen De Staebler: The Figure;" "Masterworks of Louis Comfort Tiffany;" "Albert Pinkham Ryder;" "Irving Penn: The Promised Land;" and exhibitions drawn from the Patricia and Philip Frost Collection of American abstract art and the Herbert Waide Hemphill, Jr. Collection of American Folk Art.

Interpretive Programs - During 1988, the National Museum of American Art and its Renwick Gallery offered a rich and varied program of lectures, films, panel discussions, craft demonstrations, and seminars. Museum staff designed programs to interpret and amplify the public's knowledge of the Museum's permanent collection and temporary exhibitions. NMAA again presented a successful month-long series of free, illustrated lectures by pre-doctoral Smithsonian Fellows.

The Primerica Foundation, along with the Sacred Circles Fund and the Smithsonian Educational Outreach Fund, sponsored a program of lectures, films, and craft demonstrations with "Lost and Found Traditions: Native American Art 1965-1985." The Renwick hosted a panel discussion on "Craft in the Black Art Experience," moderated by Rick Powell, former NMAA Fellow, co-sponsored by the James Renwick Alliance and the Smithsonian's Committee for a Wider Audience. Gibbs M. Smith, Inc. co-sponsored an illustrated lecture by Barbara Mayer, who discussed her book Contemporary American Craft Art: A Collector's Guide.

The Overbrook Foundation funded a symposium on "American Traditions in Watercolor." Speakers included Susan Strickler of the Worcester Art Museum and Kathleen Foster of the Pennsylvania Academy of the Fine Arts. Photographer Bruce Davidson discussed his work at the opening of the exhibition "City Life: Photographs by Bruce Davidson." Author Studs Terkel moderated a panel discussion on New Deal art which complemented the exhibition "Special Delivery: Murals for the New Deal Era." Panelists included artists Jack Levine, Allan Crite, Eleanor Coen, and Max Kahn.

The NMAA plans to continue outreach programs in FY 1989. "Dada and Surrealism in America" is the subject for an international symposium planned for 1989. It will focus attention on the exhibition "Perpetual Motif: The Art of Man Ray." Family activities will extend the Man Ray exhibition to the community. Programs for the "Photographs of Invention" will celebrate the 150th anniversary of photography.

EXPLANATION OF PROGRAM INCREASE - For FY 1990, NMAA requests an increase of 5 workyears and \$173,000 to provide additional research and professional support (2 workyears and \$106,000); to create a Minority Professional Apprenticeship Program (1 workyear and \$30,000); to support the development of an exhibition commemorating the Columbus Quincentenary (1 workyear and \$20,000); and to improve building and maintenance support (1 workyear and \$17,000).

Also contained in this line-item is an increase of 2 workyears and \$80,000 associated with the Institution's strengthened affirmative action plan. Justification for these resources appears in the central Affirmative Action section of this budget.

Research and Professional Support (2 workyears and \$106,000) - NMAA's burgeoning collection demands additional curatorial attention, study, and publication. Recent acquisitions, such as the Herbert Waide Hemphill Collection of American Folk Art and several other large collections, open new areas of emphasis within the collection. The current staff level is inadequate to assimilate effectively these acquisitions and develop accompanying program opportunities.

The requested funding will provide much needed strength for the Museum's fundamental responsibilities to its collections and exhibitions and provide a broader approach to collecting and interpreting American art. This increase will provide funding for a recognized expert in 19th-century art to bolster the programs of the Painting and Sculpture Department. Currently, the department has five full-time and one half-time positions, of which only one curator has expertise in the broad range of 19th-century works. This additional position will devote more time to the care, maintenance, and study of the rapidly increasing collections; identify new opportunities for enhancing the collections; develop additional major exhibition programming in the specialty; and increase the number of publications and public programs for the general public and scholarly specialists.

The Painting and Sculpture Department has no research assistant for its many projects. A research assistant position will provide basic help to the curatorial staff. The researcher will track and maintain current market prices for works on acquisition priority lists and for other prospective acquisitions. Responsibilities will also include maintaining photographic record files for comparative purposes; helping in the preparation and maintenance of informative gallery text for the general public; and assisting in preparation of public programs sponsored by the department. The remaining funding will provide necessary supplies and research travel.

Curatorial activities at NMAA serve a wide variety of scholars, students, collectors, and a growing number of the general public. It is imperative that those activities keep up with the rapidly expanding collection. The presence of a research assistant will enable the curatorial staff to devote additional time to more critical primary functions.

Minority Professional Apprenticeship Program (1 workyear and \$30,000) - A Minority Professional Apprenticeship Program at NMAA will increase opportunities for minority curatorial candidates with scholarly credentials and museum experience. The goal is to make minority museum profession candidates more competitive by giving academically-trained young professionals intensive, on-the-job experience in the Museum. This program will provide minority candidates with the object-related experience and other museum skills necessary for a museum career.

The Minority Professional Apprenticeship Program will offer temporary appointments at the entry level for minority candidates who have completed graduate education. Each apprentice will work under the guidance of a staff mentor, in an area related to his or her academic expertise. Assignments will include work in research, acquisitions, collections review, exhibitions, and interpretive programming, with a special emphasis on developing strong writing skills. Following a successful one- or two-year work experience, program administrators will circulate a summary of the apprentice's work to Smithsonian administration and bureaus and to outside museum employers to ascertain job opportunities. With this funding, NMAA will hire the first apprentice for a pilot program. NMAA will request additional funds for one or two more apprentices in the future to expand a successful program.

A lack of significant professional experience often thwarts recruitment efforts for minority curatorial candidates. The Minority Professional Apprenticeship Program will give minority candidates a more competitive advantage. It will also provide the invaluable credential of a position in a major Smithsonian museum.

Columbus Quincentenary (1 workyear and \$20,000) - When Columbus came to the New World, he set in motion westward exploration and settlement. In the 19th century, expansion transformed the American landscape, forever altered the fates of both newly-arrived and native Americans, and profoundly changed our democratic institutions and ideals. The Promised Land will present artworks and cultural objects that portray the dreams that inspired westward expansion and the complex legacy of experience those dreams engendered. The exhibition, "The Promised Land: Images of Western Expansion, 1820-1910," will be a significant contribution to the 1992 Quincentenary celebration by the Smithsonian. The theme of the exhibition and accompanying book will be westward expansion in America as it relates to the Columbus Quincentenary. The project will examine all aspects of the settlers' encounter with a new land and its people.

Using paintings, sculpture, graphic arts, printed books, and collateral materials, the exhibition will show how the receding frontiers of the West assumed a mythic attraction for Americans between 1820-1910. The exhibition will show the dual nature of the settlement of the West. This exhibition will explore the positive aspects of development, its problems, and dislocations, both physical and cultural, that attended this intrusion into nature's wilderness and the encounter with its native inhabitants.

This exhibition will synthesize a generation of new research in the art and cultural history of the American west. The show will highlight an especially rich area of Smithsonian collections and major works by George Catlin, Charles Bird King, John Mix Stanley, and Thomas Moran. New research into the intentions and accomplishments of the explorers and early settlers will expand our understanding of this westward impulse. A book based on the new research will accompany the exhibition.

The requested funding and workyear will guarantee the timely completion of research needed during the period of preparatory work. With this funding NMAA will hire a research assistant who will help the NMAA curatorial staff locate and compile material critical to the development of the major book and exhibition. NMAA will need the requested funding through FY 1992.

Custodial Staff - (1 workyear and \$17,000) - The Office of the American Art/Portrait Gallery (AA/PG) Building Manager provides maintenance and building management support for the AA/PG Building, Renwick Gallery, and Barney Studio House. Programs and activities for the three bureaus in the three buildings have increased considerably. However, the staff and budget for the Office of the Building Manager (OBM) which supports them has remained constant for more than ten years.

The three buildings are in constant use by AA/PG staff as well as other Smithsonian and outside groups. Building management staff are unable to keep up with all the activities, and many areas are receiving inadequate routine maintenance. Supervisors must constantly shuffle staff assigned to the labor force and craft shop to cover immediate custodial needs of the buildings.

The requested funding will guarantee an improved schedule of routine cleaning, lamping, painting, and other maintenance services of the OBM. With this funding, the OBM will hire one additional custodial worker. The National Portrait Gallery, which shares building management responsibility, has a similar request for 1 workyear and \$17,000. NMAA and the Gallery plan to request additional resources each year through FY 1994.

The AA/PG Office of the Building Manager serves a wide variety of users of the space in the three buildings it supports. Additional funding is imperative if it is to maintain the level of services expected by the Institution, outside groups using our facilities, and the visiting public.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Annual Smithsonian allotments and fees for services provide these funds. Examples of fees received are:

- Sale of deaccessioned works of art
- Royalties from publications
- Exhibition participation fees
- Revenue shares from restaurant and gift shop sales
- Sales of slides and photographs
- Tuition reimbursement from universities for NMAA interns

During FY 1988, an unrestricted trust fund allotment expanded the work of the Inventory of American Sculpture. Structural testing of the Barney House is underway to determine the degree of renovation required to prevent further deterioration of this historic house. Funds from the sale of deaccessioned works of art support the purchase of new acquisitions such as Marsden Hartley's Yliaster. The special purpose fund for royalty income partially supports the publication costs for the catalog Perpetual Motif: The Art of Man Ray. Funds from the J. Paul Getty Center for the History of Art and the Humanities make possible the archival preservation of the Juley Collection of photographs. Research support staff will complete the preservation work on the Juley Collection in FY 1995. Exhibition fees allow the employment of one staff person in the Registrar's office. In 1988 exhibition fees also funded the tour of the "American Art Deco" exhibition. Funds also are available from the Smithsonian's Collections Acquisition, Scholarly Studies, and Educational Outreach Program, Research Opportunity Fund, and Special Exhibition Fund to support research, education, and exhibition projects.

Restricted Funds - Individuals, foundations, and corporations provide funds for specific purposes. The Robert Tyler Davis bequest makes possible the acquisition of prints and drawings. Funds from the Henry A. Luce Foundation pay staff of the Inventory of American Sculpture. In FY 1988, a gift from Consolidated Natural Gas provides for the purchase of contemporary American landscape photographs; they pledge additional contributions in 1989-1990. Funds from Primerica and Sacred Circles Fund sponsor craft demonstrations for the "Lost and Found Traditions" exhibition. Tiffany & Company will provide funds for the "Tiffany" exhibition in FY 1990.

NATIONAL PORTRAIT GALLERY

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	85	4,038	-	25	-	37	-	323	-	67
FY 1989 Estimate	87	4,068	-	25	-	46	-	509	-	-
FY 1990 Estimate	92	4,190	-	41	-	71	-	572	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The National Portrait Gallery (NPG) dedicates itself to the exhibition and study of portraits of people who have made significant contributions to American history and of the artists who created such portraiture. For FY 1990, NPG requests an increase of 4 workyears and \$82,000 to provide a museum technician (1 workyear and \$25,000), clerical support staff (2 workyears and \$40,000), and necessary custodial staff (1 workyear and \$17,000).

Also contained in this line-item is an increase of 1 workyear and \$40,000 associated with the Institution's strengthened affirmative action plan. Justification for these resources appears in the central Affirmative Action section of this budget.

PROGRAM - The Gallery continually explores the heritage and accomplishments of the American people by collecting, studying, preserving, and exhibiting portraits in all media as both historical and artistic documents.

As NPG's collections have developed, substantial research into American political, social and intellectual history, and the history of American art is possible using the portraits acquired and the works brought to Washington in special exhibitions. These research results, published by curators and historians, appear in scholarly articles and monographs. The publications constitute a growing body of books of permanent research value. Temporary exhibitions in the Gallery frequently present subjects or artists never before explored. These exhibits assemble works from public and private collections and displays them with objects in the Gallery's permanent collections. Professional conservators on the Gallery's staff care for the collections of the National Portrait Gallery.

As the following narrative will indicate, the Gallery has maintained an active and successful program in recent years, without substantial increases in budget or staff. As the 1990s begin, the Gallery faces new challenges in maintaining its acquisition activity in the face of increasing art prices; in housing its collections in an orderly and safe manner; and in managing its records. The Gallery's curatorial, registrarial, and educational activities need new space, as well as the growing collection itself. Also, staff and resources require modest increases.

Collections Acquisitions - In 1988, the gift of Everett Kinstler's portrait of President Gerald R. Ford from the Gerald R. Ford Foundation enhanced the Gallery's Presidential Portrait series, along with the purchase of a miniature of President McKinley by Emily D. Taylor.

NPG acquired a major Gilbert Stuart portrait of the American statesman, Rufus King, through a partial gift from the Smithsonian Society and from museum purchase funds. Another substantial acquisition was Marguerite Zorach's portrait of "Marianne Moore and Her Mother," purchased with appropriated funds.

Through the Smithsonian Institution Collections Acquisitions Program, the Gallery purchased Thomas Hicks' portrait of his uncle Edward Hicks, the "naive" Quaker artist. He was best known as the painter of the several versions of "The Peaceable Kingdom." NPG also acquired Charles Peale Polk's portrait of the agricultural scientist, David Wiley, enhancing the NPG's holdings of early American scientists as well as adding to its collection of portraits by the family of Charles Willson Peale.

Among the most important gifts to the collection were a wax bust of Chief Justice John Marshall by Robert Ball Hughes (from Allan and Janice Lowell Ludwig); a bronze head of John Held, Jr., by Mahonri Young (a partial gift from the widow of the subject, the 1920s cartoonist); and an oil portrait of Karen Horney by Suzanne Carvallo Schulein.

Major photographs purchased in FY 1988 include a 1923 vintage platinum print portrait of cinematographer Karl Struss by Edward Weston; a dye-transfer color print of Judy Garland and Mickey Rooney by Harold Edgerton, the inventor of the stroboscopic flash; a self-portrait of W. Eugene Smith, a legendary photo journalist; a vintage silver print of author Theodore Dreiser by Charles Sheeler; a portrait of Ezra Pound by Richard Avedon; a rare and unusual vintage Barbara Morgan photograph of Martha Graham performing "Deep Song;" an early photograph of Lazlo Moholy-Nagy taken in Paris by the Hungarian-born Ergy Landau; an extremely rare Civil War vintage carte de visite of Mathew Brady; and rare vintage portraits of Igor Stravinsky by Edward Weston and Alfred Langdon Coburn. Major gifts to the Collection in FY 1988 include two daguerreotypes and sixteen 1862 vintage 17 x 21 inch Mathew Brady glass plate negatives of the actor Edwin Forrest from the collection of the Edwin Forrest Home for Retired Actors in Philadelphia; a collection of sixty portraits by Irving Penn selected and donated by the artist; Joanne Verberg's unique 20 x 24 inch Polacolor ER portrait of artist Andy Warhol from an anonymous donor; and a portfolio of Hollywood portraits by George Hurrell a gift from Mr. David Davis of Los Angeles.

In FY 1988, the Gallery acquired several drawings, including William Glackens' humorous image of Charles Dana Gibson, Reginald Marsh's portrait of Thornton Wilder (the gift of Wilder's sister), J. Alden Weir's charcoal of John Twachtman, Eastman Johnson's pencil of William Henry Vanderbilt, Cecilia Beaux's drawing of Henry James, an early Raphael Soyer self-portrait, and an ink sketch of Man Ray by Czech artist Adolf Hoffmeister. The Gallery fortunately found intriguing caricature material including three pastels by William Cotton, several pieces by William Sharp, ten charcoals by Isabella Howland, a watercolor cartoon of Bryan and Hearst by Peter Newell, a watercolor of Eddie Cantor, and a pencil of Senator Theodore Bilbo by Sam Berman. The purchase of William Henry Brown's silhouette of Elias Howe and the rare and brilliantly colored 1775 mezzotint of John Hancock by Joseph Hiller, Sr. added two significant early works on paper to the collection. In addition, NPG acquired a Thomas Hart Benton self-portrait lithograph, and posters depicting Joe Louis, Gen. Pershing, Lillian Russell, and Paul Robeson.

Collections Management: The Gallery has almost completed a new inventory of the Photographs Collection and the Prints and Drawings Collection. The reorganizing of collection storage made efficient use of the available space. The computer database contains a location guide to storage, improving access to the collection. This makes future inventories and relocation of storage simpler.

NPG personnel will make gelatin silver prints of the Mathew Brady negatives late in FY 1988. At the beginning of FY 1989, the cleaned negatives will make historically accurate albumen or salted paper prints. During FY 1989, Gallery technicians will record the Meserve Collection negatives into the computer database, generating an alphabetized list and access numbers for each portrait.

Continuous growth of both the Photograph and the Prints and Drawings collections will render the present storage area for graphic arts inadequate by the beginning of FY 1990. The design and installation of compressed storage units is a priority for the 1990 fiscal year.

After renovations within the third floor office areas of the museum in late 1987, the Registrar's Office moved into the new third floor quarters. Prior to the move, the Registrar's space was extremely limited, crowding both personnel and files. In order to comply with established museum practices, the Gallery's has long needed to move its official collection files to an area secured and controlled by the Registrar. The transfer of files covering approximately half of the museum's collection took place with the first move. NPG needs a study to prepare for the move of the remaining files to determine the proper type of filing units and the amount of space needed. NPG will require additional temporary help to move the files, after procuring a storage system.

The Registrar's office has made increasing use of microcomputers in its work. A recent innovative application is in preparing a computerized index of objects on display in the museum. Available at the NPG information desk and at various other points within the museum, the index is for the use of public and staff. This index enables inquirers to determine the location of all portraits of a particular person or by a particular artist, on view. The Gallery has updated this index (the only one of its kind in the Smithsonian--for nearly 10 years) using the latest-model desk computer and a recently obtained laser printer in the Registrar's office.

Since FY 1987, NPG entered on computer the location of objects in storage in the American Art and Portrait Gallery Building and during FY 1989 will enter those stored in off-premises. NPG was successful in automating approximately one third of its inventory records and will continue to work toward full computer control of these files.

Exhibitions - Two major exhibitions opened at the Gallery in 1988. "American Colonial Portraits: 1700-1776" was the first in a series of exhibitions commemorating the Bicentennial of the Constitution of the United States. The exhibition assembled, for the first time in half a century, masterworks from public and private collection throughout the country as well as from England, Ireland, Jamaica, Bermuda, and Canada.

In April the King and Queen of Sweden opened "Masterpieces from Gripsholm Castle: The Swedish National Portrait Collection." Part of the celebration of the 350th anniversary of Swedish settlement in America, this exhibition brought to the National Portrait Gallery 61 portraits ranging from a late-medieval wood carving to a

contemporary photo-realist painting. It was the second in a planned series of shows displaying highlights from the world's great portrait collections.

Smaller exhibitions opening in 1988 were "Studies from Life: Portrait Photographs by Julia Margaret Cameron," which included 51 images borrowed from the J. Paul Getty Museum, and "The Artist's Mother," featuring works by twentieth-century artists who used their mothers as the subject or inspiration for their work. The Heckscher Museum, Huntington, New York, organized the latter exhibition.

December 1987 marked the beginning of the first overseas tour of a major exhibition from the National Portrait Gallery. The Gallery originally intended the exhibition "Then and Now: American Portraits from the Past Century" as part of the US/China cultural exchange accord. When political problems arose Gallery personnel rescheduled it for the Hong Kong Museum of Art, followed by showings at the Hokkaido Museum of Modern Art in Sapporo, Japan, and the Sogetsu Gallery of Art in Tokyo.

NPG mounted exhibitions of Recent Acquisitions in January and August. In August of 1988, the Gallery opened "Champions on TIME," an exhibition of 25 portraits of athletes featured on the cover of TIME Magazine. All but one of the portraits is from the Gallery's collection.

Polaroid Corporation sponsored "The Instant Likeness: Portraits in Polaroid," which also opened in August of 1988. The photographs in the exhibition surveyed the forty years of instant photography's history as reflected in portraiture and include the work of some of the most familiar names in American photography.

1989 will see the continuation of NPG's exhibitions commemorating the Bicentennial of the Constitution and the establishment of the new Federal government. In March the Gallery joins with the United States House of Representatives and the United States Senate in organizing "The First Federal Congress 1789-1791." This exhibition will celebrate the two-hundredth anniversary of the convening of Congress. In October, to celebrate the creation of the United States Supreme Court, NPG opens "Portrait of the Law" and plans to feature images of distinguished American jurists from the years of the early republic to the late twentieth century. The primary purpose of this exhibition is to highlight those individuals who were pivotal interpreters and shapers of our legal constitutions during the last two hundred years. The final exhibition in this series, opening in the fall of 1990, will focus on the executive branch of government through an examination of the life of President Andrew Jackson.

"Isamu Noguchi Portrait Sculpture," opening in the spring of 1990, is the first retrospective overview of an important and little-known aspect of the work of this major contemporary Japanese/American artist. "To Color America: The Portraits of Winold Reiss" opening in October of 1989, will introduce the public to the life and work of this German artist who came to America in 1913 and produced stunning portraits of non-white Americans. The Gallery, to facilitate the installation of this show, will dismantle and reinstall in other locations several smaller exhibitions.

The Photographs Department will spend a significant amount of time in FY 1989 on three exhibitions scheduled to open in FY 1990: an exhibition of the Irving Penn gift (organized jointly with the National Museum of American Art); an exhibition of treasures from the NPG Photograph Collection planned to coincide with the Penn exhibition; and a reinstallation of the Meserve Collection gallery. Catalogs will

accompany the Penn and Treasures exhibitions, and the Meserve Gallery will have a brochure.

Loans made from the National Portrait Gallery collections to museums and institutions across the United States and abroad have tripled in number in the last two years. The Smithsonian Institution's Traveling Exhibition Service toured a portion of the Gallery's Harmon Collection of outstanding Black Americans. For FY 1989 SITES plans to have a second exhibition of TIME cover art work for FY 1989. An exhibition entitled "Athletes and Heroes" completed a nearly three year tour in FY 1988. The Museum's portrait of Mary Cassatt traveled to France and Canada and will go on to New York for the Edgar Degas retrospective. NPG loaned works to several dozen museums and institutions during FY 1988 and received requests for many other objects during FY 1989.

NPG will join with the Prado Museum in Madrid and the Kimbell Art Museum in Fort Worth, Texas, in organizing a major exhibition as part of the 1992 Columbus Quincentenary observance. Directed by the Kimbell deputy director, William B. Jordan, the exhibition will concentrate on 16th century Spanish portraiture, exploring the new indigenous artistic movement in Spain during the reign of King Philip II. This was the time when Spanish colonial influence in the Western Hemisphere was at its height. This exhibition will include period masterpieces borrowed from the Prado, the Kunsthistorisches museum in Vienna, and the British Royal Collections. This exhibit will incorporate the latest research into 16th century painting and cultural developments.

Publications - The National Portrait Gallery's Publications Department produces books and ephemera for a general adult reading public, documenting the museum's collections and exhibitions. FY 1988 marked the culmination of the Publication Department's largest and most ambitious project ever, the newest edition of the National Portrait Gallery Permanent Collection Illustrated Checklist. This valuable reference documents some four thousand portraits--all illustrated--and includes two indexes.

The present fiscal year also saw another milestone: the publication in Hong Kong of the exhibition catalog Then and Now: American Portraits of the Past Century from the National Portrait Gallery. The exhibition in Hong Kong of 51 portraits from the Permanent Collection afforded the opportunity to print this accompanying catalogue there as well, at approximately one-third the cost of printing such a book in the United States. Subsequently, a Japanese language edition of the book, published in Tokyo, will reach new audiences in both Japan and the United States. Overseas corporate foundations funded both publications.

Now in production is the full-length book to accompany the Gallery's major fall exhibition, On the Air: Pioneers of American Broadcasting, which the Smithsonian Institution Press will publish as a trade book in September. A full year of exhibition-related publishing will follow, generating about six new titles.

Education - The Education Department of the National Portrait Gallery offers a daily schedule of gallery tours and presents intensive elementary and secondary school programs, as well as outreach programs for senior citizens. Trained education aides and docents conduct these programs outside the Gallery and tours on the premises. The education program menu includes such slide-lecture presentations as "FDR, A Rich Legacy," and musical performances such as "A Tribute to Cole Porter." The Gallery is trying to reach out to new audiences by developing programs that address the needs and

interests of multi-ethnic communities nationwide. In addition, the Gallery will foster public awareness of senior adult programs by producing a brochure, available in the Fall of FY 1989. Research, conducted to develop supplemental education packages for teachers nationwide, has begun. A self-guide brochure for families with young children is underway. The Education Department offers a Lunchtime Lecture and tour series that highlights special exhibitions, while Speaker's Bureau slide-lecture presentations illuminate the permanent collection using a thematic approach (for example, "Leading Ladies: Women and Reform in the United States" and "Men of Progress: Nineteenth Century American Inventors").

Cultures in Motion: Portraits of American Diversity (CIM) is a series of public programs that promotes serious reflection on portraiture, biography, and history. These programs bring the museum's collection to life through lectures, symposia, one-person biographical plays, recitals, concerts, storytelling, and other performances. Cultures in Motion programs are a constructive way for museum visitors to broaden their understanding of the multi-ethnic aspects of American history.

Research - The Catalog of American Portraits (CAP) continued to serve both professional and non-professional researchers in American art history and American history during FY 1988. CAP contains approximately 3,100 additional portrait records in the computerized database. Institution's received 15 computer printouts (and accompanying negatives) covering their portrait collections. Field gathering of new portrait material and photographing of collections continued, with five public collections and three private collections added to the survey.

NPG completed a major editing of some 40,000 records each in four different indexes and entered corrections into the database. The department continues an active role in the Smithsonian-wide endeavor to establish a Collections Information System. Work progressed in the editing of the early Southern States Survey material. The Gallery implemented a portrait artist-geographic region index. Work is underway to include two large and important local collections in the database--the portraits at the U. S. Capitol and those in the National Museum of American Art.

The CAP's first priority in the coming fiscal year is to continue to serve research interests to the best of its ability. With office staff back up to strength, NPG expects greater progress in the processing of field research material. Field work will continue as time and funds permit, with the completion of the two local collections mentioned above a major goal.

During FY 1988, the Peale Family Papers staff continued its work of transcribing, researching, and annotating selected letters and documents of the noted artist and naturalist Charles Willson Peale and his artist-sons Rapahelle, Rembrandt, and Rubens. NPG published Volume 2 of The Selected Papers of Charles Willson Peale and His Family, in April of 1988. Subtitled The Artist as Museum Keeper, 1791-1810, the volume appeared in two parts consisting of about 1300 pages, illustrated in black and white and in color. Volume 3--The Artist in Retirement, 1810-1820--and Volume 5--The Autobiography of Charles Willson Peale, 1741-1827--will appear together. Both volumes scheduled for publication in 1991 will celebrate the 250th birthday of the artist.

The project has also successfully launched a research program to identify portraits by Rembrandt Peale (1778-1860) and collect information about the extensive work of this important American artist. With private funds from the Smithsonian Institution and the Baltimore Gas and Electric Company, this large effort required two consultants to assist the Editor in this large effort. Publication of a catalog

raisonne of Rembrandt Peale's total oeuvre will meet scholarly needs in the art historical world. An exhibition of Rembrandt Peale's portraits will follow the completion of the catalog.

EXPLANATION OF PROGRAM INCREASE - For FY 1990, NPG requests an increase of 4 workyears and \$82,000 for a museum technician (1 workyear and \$25,000) additional clerical support staff (2 workyears and \$40,000), and necessary custodial staff (1 workyear and \$17,000).

Museum Technician (1 workyear and \$25,000) - The reinstalled permanent collection will not deteriorate further with the additional technical staff. The new position will also provide general maintenance of Gallery exhibitions and exhibition spaces.

The installing and maintaining of special exhibitions, and producing two major and several smaller loan exhibitions annually consume all existing design and production staff time. Maintenance of the permanent collection requires daily gallery checks, prompt repair of damaged pedestals, vitrines, labels, etc., and gallery changes such as small exhibition moves and labeling of new portraits.

A staff shortage deferred essential maintenance of the permanent collection, recently reinstalled at considerable expense.

Clerk Typists (2 workyears and \$40,000) - The Gallery will increase reference services to the public and improve professional staff efficiency. The collections (approximately 14,000-15,000 items) are twice as large as they were ten years ago without an increase in clerical positions.

The requests for manuscript typing, labels for exhibitions (text), and brochure typing have increased significantly. The number of letters and memoranda generated has more than doubled in the ten-year time period. Cataloguing, data processing, and other clerical functions also increased. To keep pace with the workload, professional staff must now perform routine clerical tasks. Offices such as the Library, Conservation Lab, Photographic Services, Registrar, and Publications do not have clerical staff and rely heavily on other offices for support.

Automation of clerical duties improved efficiency of existing staff but did not decrease the workload. The additional clerical staff would halt the decrease of service to the public and enable professional staff to devote full-time to the collections and programs of the Gallery.

Custodial Staff (1 workyear and \$17,000) - The American Art/Portrait Gallery Office of the Building Manager will guarantee an improved schedule of routine cleaning, lamping, painting, and other maintenance services. For example, NPG will clean areas with high ceilings once a week, compared with the monthly cleaning cycle now in place. The facilities in the AA/PG Building, Renwick Gallery, and Barney Studio House are constantly in use by AA/PG staff, as well as other Smithsonian and outside groups. While programs and activities increased considerably, the staff and budget for the Office of the Building Manager (OBM) has remained stable.

The building management staff cannot keep up with all the activities, and many areas are not receiving routine maintenance. Staff assigned to the labor force and craft shop are reassigned continuously to cover immediate custodial needs of the buildings. This reassignment affects staff efficiency.

With this funding, the OBM will hire one additional custodial worker. The National Museum of American Art, which shares building management responsibility, has a similar request for 1 workyear and \$17,000. NPG and American Art plan to request additional resources each year through FY 1994. Additional funding is crucial to maintain the level of services expected by the Institution, outside groups using our facilities, and the visiting public.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds -- Several sources, including the Gallery's share of sales in the restaurant and museum shop, sales of photographic reproductions of portraits in the collection, and participation fees from museums make up these funds. These funds help defray the expenses of public lectures, symposia, and special events in coordination with the opening of exhibitions; associated costs of loan exhibition development and management; and the research expenses of staff who are preparing special publications or lectures. In addition, funds from the Institution's Collections Acquisition, Scholarly Studies and Educational Outreach Programs, Research Opportunities Fund, and Special Exhibition Fund support research, education, and exhibition projects.

Restricted Funds -- Designated for specific purposes, these funds are in the form of gifts and grants from individuals, foundations, organizations, and corporations.

The Gallery has received a generous contribution from American Express International, Inc. to assist in sponsoring the traveling exhibition "Then and Now: American Portraits of the Past Century from the National Portrait Gallery" to the Hong Kong Museum of Art and Japan. The exhibition is a survey of important trends in American portraiture during the past 100 years selected from the collections of The National Portrait Gallery. Emery Worldwide, Inc. and Nippon Cargo Airways assisted with the shipping of the exhibition. Burlington Northern Inc. made a donation in support of "To Color America: The Portraits of Winold Reiss." The Baltimore Gas and Electric Foundation provided funds to support a catalog and exhibition of the paintings of Rembrandt Peale. During FY 1988, through contributions from family and friends, research in the art of portraiture will benefit from the establishment of the Gloria Haas Fellowship Fund. Income from the fund is for fellowships to enable graduate students in the history of art, as well as other related fields, to work at the National Portrait Gallery for specified periods of time on research of benefit to the Gallery and to their own studies. The Gallery also received substantial contributions for future activities and general support from The Barra Foundation, Inc., the Clarence and Jack Himmel Foundation, The New York Community Trust, and smaller gifts from a number of individual donors.

HIRSHHORN MUSEUM AND SCULPTURE GARDEN

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	78	3,335	-	18	-	230	-	1,007	-	-
FY 1989 Estimate	78	3,409	-	18	-	417	-	756	-	-
FY 1990 Estimate	78	3,409	-	20	-	399	-	789	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - Public Law 89-788 signed on November 7, 1966 established the Hirshhorn Museum and Sculpture Garden (HMSG) as the Smithsonian's modern and contemporary art museum. The collection is the basis of an active program of exhibitions. The museum staff conducts extensive research, prepares catalogues, and offers a variety of educational activities. The Smithsonian is not seeking funds for programmatic increases for FY 1990 for the Hirshhorn Museum.

PROGRAM - In keeping with its status as a museum of modern and contemporary art, the HMSG conducts programs of research, exhibitions, collections management, acquisitions, deaccessions, and education activities involving audiences of all ages. The museum opened to the public on October 4, 1974. The Museum attracts over one million visitors per year making it one of the most visited contemporary art museums in the United States.

Research - The Museum's resources include 13,000 works of art, a curatorial file providing information on artists and works in the collection, and a library with 35,000 books and catalogues. Students and researchers can view works of art not on display for study purposes. The staff researches the provenance, exhibition history, iconographic significance, and physical condition of each work of art in the permanent collection. The staff also conducts extensive research in preparing exhibitions. A computer system gives access to collection information and also recalls video images installed on the system.

Exhibitions - The Museum conducts an active exhibition program that draws upon works in its collection and other collections. Nearly 700 works from the permanent collection are on display at any time. The museum makes extensive loans to other museums.

In FY 1988 the Museum organized three major exhibitions: "Different Drummers," "Russian and Soviet Paintings, 1900-1930: Selections from the State Tretyakov Gallery, Moscow, and the State Russian Museum, Leningrad," and "Alberto Giacometti." The Russian and Soviet paintings exhibition included more than 90 paintings and 69 artists active in the years before and after the Bolshevik Revolution of 1917. These

paintings are part of the collections of two of the largest museums of Russian and Soviet art in the Soviet Union. This is the first time the American public has had the opportunity to view most of the material in this exhibition. After its initial display at the HMSG, "Alberto Giacometti" will go to the San Francisco Museum of Modern Art. Exhibitions organized elsewhere shown at the HMSG were: "A Quiet Revolution: British Sculpture Since 1965," and "Expressiv: Central European Art Since 1960." Several small exhibitions based on the permanent collection were also on view.

In FY 1988 with partial funding from the Smithsonian Institution's Special Exhibition Fund, the Hirshhorn added two new exhibition programs, "Directions" and "Works." "Directions" -- recast from the Museum's large-scale biennial thematic show -- will augment the special exhibitions mounted in the lower-level gallery with small group shows of works by emerging artists and solo exhibitions of specific bodies of work by better-known artists. This series of small exhibitions featured "Joel Shapiro: Painted Wood," "Sherrie Levine," and "Robert Cumming." This series will continue in FY 1989 with partial funding from the Smithsonian Institution's Special Exhibition Fund. Artists to be featured in FY 1989 are Walter Pichler, Mel Chin and Keith Sonnier.

The second program the HMSG initiated is innovative in that it integrates the Museum's building and grounds into the creative process. The HMSG commissions artists to visit the Museum and create temporary site-specific works. "Works" introduces viewers to a group of artists who create art in a nontraditional way. Artists who created "Works" in FY 1988 included Sol LeWitt, Kate Ericson and Mel Ziegler, and Vernon Fisher. This series of exhibitions will continue in FY 1989 with partial funding from the Special Exhibitions Program. The second series will start with the artist Krzysztof Wodiczko's projection of images on the outside of the museum. This will be followed by Buster Simpson and Houston Conwill.

In FY 1989, HMSG will show three major exhibitions: "Gerhard Richter Paintings," "Recent Acquisitions," and "Robert Moskowitz: Paintings and Drawings, 1959 - 1989." After opening at the HMSG, the "Robert Moskowitz" exhibition will travel to the La Jolla Museum of Contemporary Art in California and to the Museum of Modern Art in New York City.

For FY 1990, major exhibitions firmly scheduled are: "Francis Bacon" and "Culture and Commentary." Exhibitions under consideration are: "Bay Area Figurative Artists," and "Baldessari." "Culture and Commentary," is a major survey of the art of the eighties. The exhibition will focus on the work of ten to fifteen artists from Europe, Canada, and the United States whose expressive voices have fully developed in the eighties. For artists here and abroad the central and poignant question was: how to continue ... how to create work which, while cognizant of the potency of the means of mechanical production and the ubiquity of reproductions, still asserts faith in the possibility of making an original 'mark.' Some artists eventually dismissed the need to be original, and blatantly used the imagery of other artist's work as a beginning point for their own.

Collections Management - The museum inventories its entire collection on a three-year cycle with spot checks made at least annually. The Museum deaccessions works of art, which are offered for sale to bureaus of the Smithsonian Institution before being offered to the public at auction. According to the agreement with Mr. Hirshhorn, the Hirshhorn uses proceeds from any such sales to purchase new works of art. Work continues on integrating the bequest of Mr. Hirshhorn into the permanent

collection. The Museum develops object records, and the Registrar and the Conservation Laboratory examines the objects. Staff photographers will record the objects for both identification and reproduction purposes. The Office of the Registrar is working to move the permanent inventory from the old mainframe computer to the new mainframe. This office is also working to add video images to the inventory system.

Acquisitions - The function of the HMSG, as described in the legislation, is to be "a museum in Washington, D.C. where modern art could be exhibited and studied...[to]...enrich the culture of the Nation." To reflect current developments in the visual arts an active acquisitions program is essential. In FY 1988, the Museum purchased the following: Timber's Turns, 1987, by Martin Puryear; Ancient Wall, 1976, by Philip Guston; Spanse 1987, by Nancy Graves; Landscape, 1987, by Robert Moskowitz; and Sanctuary, 1988, by Gerhard Richter.

At the October 29, 1987, meeting the Board of Trustees voted to accept a gift of eight works of art from the Estate of Marion L. Ring. These works, which include a 1937 sculpture, "Seated Girl," by Ernest Barlach, is the most valuable gift to the museum since Mr. Hirshhorn's bequest.

Education and Public Orientation - To help visitors understand modern art the Museum creates a variety of educational materials. These include brochures and mini-catalogues the public receives free of charge. The Education Department trains docents to lead regular and special tours of the exhibitions. This Department also programs the Orientation Room with both original creations and with outside productions. The HMSG has outreach programs to assist visitors before they arrive at the Museum. The Museum developed new outdoor signage which informs passers-by of the current major exhibition.

The Museum sponsors three film series free of charge: a lunchtime series about artists and their work; an evening series of films by artist filmmakers; and a Saturday film series for young people. Other events held in the auditorium include concerts by the 20th Century Consort and lectures by artists, critics, and art historians. Occasionally, a symposium will accompany a related exhibition.

"Currents," two free seminars, exposes high school juniors to the trends and ideas represented in new works of art. These published comments and observations of the students become available to the public as a free handout.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds come from several sources including, the Museum's share of sales in the museum shop, plaza cafe, and other miscellaneous receipts. An allotment meets the travel expenses of the Museum's Board of Trustees. Partial funding supports the 20th Century Consort which has been performing at the Hirshhorn Museum for over ten years.

Restricted Funds - The Hirshhorn Museum and Sculpture Garden has four endowment funds. The first fund comes from the \$1,000,000 that Mr. Hirshhorn pledged at the signing of the initial agreement, and the second comes from the monies left to the Museum in his will. The third endowment comes from the sale of works of art. Finally, the Museum receives funds from the Holenia Trust, a Swiss foundation financed by Mr. Hirshhorn. The Museum can only use these four funds to purchase works of art. At the beginning of each year, the Board of Trustees of the HMSG has authorized

10 percent of the value of the endowment funds for use as a purchase fund for the current year. In FY 1988, the Women's Committee of the Associates granted the museum funds to purchase a new screen and two refurbished 35mm projectors for the auditorium.

Individuals, foundations, organizations, and corporations designate their gifts and grants for specific purposes. The Lannan Foundation gave HMSG a \$50,000 grant to purchase works of art by emerging artists.

Generous grants from the Xerox Corporation and Credit Suisse provide partial support costs for the "Alberto Giacometti" exhibition. Balair supplied air transportation from Switzerland. The Pro Helvetia Foundation gave funds for the brochure for the Giacometti exhibition and for a symposium.

ARTHUR M. SACKLER GALLERY/FREER GALLERY OF ART

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	67	3,899	1	90	-	1	22	1,528	-	-
FY 1989 Estimate	68	4,292	1	91	-	-	23	2,616	-	-
FY 1990 Estimate	71	4,527	1	94	-	-	23	2,572	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Arthur M. Sackler Gallery, established July 28, 1982, joined the Freer Gallery of Art. Together they are devoted to acquiring, researching, conserving, and exhibiting Asian art. The Sackler Gallery, which opened to the public on September 28, 1987, has a practice of temporarily loaning or borrowing exhibitions. The Freer Gallery of Art uses and displays its collections as a basis for understanding the civilizations that produced them. According to the founder's will, the Freer may only exhibit in its Gallery items from its permanent collection.

For FY 1990, the Arthur M. Sackler Gallery requests 1 workyear and \$30,000 for a curatorial assistant; and the Freer Gallery of Art requests 2 workyears and \$205,000 for collections-storage equipment, furnishings, and equipment for its renovated Technical Laboratory and for two museum technicians who will handle the collections in the new, expanded collections-storage area.

ARTHUR M. SACKLER GALLERY

PROGRAM - The primary goal of the Arthur M. Sackler Gallery is to advance the scholarly appreciation and public knowledge of Asian art. Towards this end, Dr. Arthur M. Sackler donated a collection of nearly 1,000 objects in the fields of Chinese, Indian, Southeast Asian, Near Eastern, and Japanese art to the Smithsonian. This collection includes Chinese jades spanning a period from Neolithic times (5000 B.C.-1500 B.C.) into the 19th century; Chinese bronzes from the Shang (ca. 1523 B.C.-ca. 1028 B.C.) through the Han (206 B.C.-A.D. 220) dynasties; Chinese painting; Chinese lacquer, Near Eastern ceramics and metalwork, and sculpture from Cambodia, India, and Thailand.

Research - Research is the focus of the Sackler Gallery, providing the basis for exhibitions, publications, and collections acquisitions. Through collection research records and public lectures, the Sackler disseminates research results to the public. Monthly lectures by members of the curatorial staff of the Sackler and Freer Galleries include topics of current research by both museums; additional lectures by non-staff discuss topics related to Asian art and culture. Publications include not only

exhibition catalogues, but free gallery guides, papers, and articles. The research program involves both visiting scholars and the permanent curatorial staff.

The Gallery's publications program includes a quarterly magazine, Asian Art, intended for the general public and containing the results of the most recent research in the field. This publication, produced in cooperation with Oxford University Press, has color plates and informative text relating to various research activities, the permanent collection, recent acquisitions, and special exhibitions. The Gallery will produce the Asian art history journal Artibus Asiae, now totally funded by the Sackler Foundation, although its content is independent of the Sackler Gallery programs and collections. Exhibitions, exhibition catalogues, and lectures at the Gallery result from specific research projects. Free leaflets and gallery guides are available to the public.

Research in the area of conservation concentrates on the lead isotope ratio analysis of Chinese bronzes in the Sackler collections and on the extension of identification methods into the field of organic colorants in paintings.

Exhibitions - In the new building are displays of the initial Sackler gift together with other major objects on loan from the private collection of Dr. Arthur M. Sackler. The inaugural exhibitions include:

- "In Praise of Ancestors: Ritual Objects from China,"
- "Monsters, Myths and Minerals,"
- "Pavilions and Immortal Mountains: Chinese Decorative Art and Painting,"
- "Nomads and Nobility: Art from the Ancient Near East,"
- "Persian and Indian Paintings: Selections from a Recent Acquisition,"
- "Temple Sculptures of South and Southeast Asia,"
- "Chinese Buddhist and Daoist Imagery."

In addition to the inaugural exhibitions, several new exhibitions opened to the public. These included "Terracottas from South India," "The Chinese Scholar's Studio" -- the first traveling exhibition held by the museum -- and "The Art of India."

Future exhibitions will include those originated by the Gallery and traveling exhibitions organized elsewhere. Exhibitions will draw from international public and private collections and from the Sackler collection. Many Gallery-organized exhibitions will travel to other museums and institutions. Future exhibitions will include:

- "Recent Japanese Acquisitions,"
- "A Jeweler's Eye: Islamic Arts of the Book from the Vever Collection,"
- "Timur and the Princely Vision,"
- "Masterpieces of the Che School Painting,"
- "Mughal Gardens,"
- "Photographs by Raghubir Singh,"
- "Yokohama Prints,"
- "Paintings by Chang Dai-chien."

Under consideration for future exhibitions are Chinese mirrors, Ordos bronzes, Chinese lacquer, Indian and Southeast Asian sculpture, Chinese garment hooks, Sasanian metalwork, Chinese furniture, Near Eastern ceramics, Far Eastern ceramics, and Chinese sculpture. Research catalogues will accompany these exhibitions.

Conservation - The Sackler Gallery must protect and conserve the art objects under its purview. This responsibility includes the objects in the permanent collections, in loan exhibitions held in the Gallery, and in Sackler-organized traveling exhibitions. The Sackler conservation effort includes object research to understand the origin of objects and therefore better develop the proper treatment of them. Expansion of the conservation facilities in a renovated Freer building will accommodate the requirements of the Sackler programs. After the public opening of the museum in September 1987, the staff of the Conservation Laboratory concentrated on particular items for future exhibitions such as the Indian terracotta sculptures, a Japanese palanquin and Persian paintings. The Oriental art restoration studio, which conserves Sackler collections as well, is discussed in the Freer Gallery of Art section of this narrative.

Education - Besides the exhibition and publication programs, the Sackler Gallery attracts a large number of research scholars and will have an active program of research fellowships. Fellowship recipients work closely with curators on topics related to the collections. A grant from the Rockefeller Foundation made it possible to establish a Rockefeller Foundation Residency Program in the Humanities at the Smithsonian Institution. The grant, which supports residential fellowships in Asian and African art, has provided two to three post-doctoral appointments each year since 1985. The Rockefeller Residency Program differs from existing fellowship programs in that it allows the fellows to become directly involved in the plans and programs of the museums and to participate in symposia, exhibitions, and publications. Similar scholarly grant programs will advance the research and education programs based on Asian art collections and exhibitions at the Sackler.

The Sackler Gallery plans to use a classroom for local school, college, and university students. Programs will allow students at secondary, undergraduate, and graduate levels and visiting researchers to participate in symposia and seminars. They will also come into direct contact with major works of art and distinguished scholars and curators. Topics of such symposia and seminars may relate to current exhibitions or the Sackler collections but will concern some aspect of Asian art and culture.

Education programs during FY 1988 included weekly storytelling for children and adults, children's guides to exhibitions, hands-on experience in the galleries with non-collection items similar to exhibited art work, workshops for children, adults and teachers, special tours for specific age groups, films, musical concerts, lectures both in English and an Asian language, and other miscellaneous Asian cultural events. Gallery guides for every exhibition provided supplemental information to exhibition labels.

Educational outreach continued through a new education program for the elderly and the young. Slide sets were available for docents to speak to community groups. Pre-visit education packets sent to schools prior to their tours of the Sackler Gallery presented an introduction to specific areas of Asian art.

Collections Acquisition - The Sackler Gallery will continue to acquire art objects of central interest to the museum which will include the arts of Asia in its broadest terms, from Japan to the Near East. Objects acquired for the collection will be of high quality in terms of aesthetic standards, cultural history, and physical condition. The Museum acquires objects by gift, bequest, or purchase provided that the objects meet established acquisition criteria.

Gifts to the collection during FY 1988 included 126 20th-century Japanese woodblock prints, a 20th-century Japanese sculpture and pastel, a Chinese album of eight leaves by the Chinese artist Sun Kehong, an Indian painted fabric, ca. 1920 called a Pabuji Padh (Puppet Backdrop), a piece of gold jewelry from India, and six 15th-century Persian paintings. Museum purchases with proceeds from the Sackler Gallery museum shop included a 17th-century Indian Mughal drawing and four 20th-century Chinese hanging scrolls by Chang Dai-chien. The Women's Committee of the Smithsonian Associates helped with the purchase of a contemporary Japanese porcelain bowl. With the Major Acquisitions Fund the Sackler purchased a 17th-century Mughal mother-of-pearl box from India and a pair of 17th-century Japanese screens. The Gallery received 11 Japanese prints and three Indian illustrations from the Hirshhorn Museum and Sculpture Garden and twenty-one 20th-century Japanese prints from the National Museum of American Art.

FREER GALLERY OF ART

PROGRAM - The Freer Gallery of Art houses one of the most distinguished collections of Oriental art in the world. The collection consists of over 27,000 works of art from China, Japan, Korea, India, and the Near East and spans 5,000 years. Included in the collection are paintings, sculpture, Biblical manuscripts, and other objects in stone, wood, lacquer, jade, pottery, porcelain, bronze, gold, and silver. "The Peacock Room" by James McNeill Whistler portrays an outstanding collection of American art that Charles Lang Freer, the Gallery's founder, considered a bridge between the arts of the East and West.

Although the Freer will close to the public in the fall of 1988, research, conservation, collections management, authentication services, and other such activities will continue. Extensive renovation will affect the collections storage areas and the conservation laboratory and the exhibition galleries. The Freer will reopen in 1992, after the completion of the tunnel to the Sackler Gallery. During the renovation, collection items will be available for study by appointment in the temporary collection storage areas in the museum. Besides the collections, the Gallery shares with the Sackler Gallery a public library of approximately 40,000 volumes relating to the objects in the collections.

The unique Oriental collections in the Freer Gallery, together with notable holdings of American paintings, have made the museum a center for students, scholars, and the public on an increasing basis. Each year brings a steady increase in visitors, requests for museum tours, lengthy periods of advance bookings for authentication appointments, and the number of visiting scholars and dignitaries. With the Freer's reopening, museum tours, the Freer lecture series, and all other public programs will become available in an enhanced format as a result of the expanded and improved facilities the renovation makes possible.

Research - Freer Gallery research facilities, comprising the collections, curatorial staff, library, and technical conservation laboratories, form the nucleus of its specialized public service. Research findings are available to the public through exhibitions, catalogues of exhibitions, articles, free gallery leaflets, and public lectures at the Freer and at other similar institutions. Updating the research files on individual pieces in the collection will continue during the renovation. These files will be available to visiting scholars and students as well as the collections in storage during the renovation.

Although the results of curatorial research are most visible in the Gallery's exhibitions, the Freer disseminates additional research results to the public through collection research records, in lectures, and in published papers and books, activities which will continue even though the renovation will close all the exhibition galleries to the public.

Exhibitions - During the past fiscal year, while preparing for the renovation, the Freer exhibited a dozen of the its finest Chinese paintings; a selection of ceramics and bronzes, dating to the second millennium B.C.; and pieces of lacquerware. The installation of Japanese art offers an opportunity for visitors to compare objects in several media, because this exhibition includes a diverse group of 13 paintings, spanning the late 12th through the 19th centuries; 40 ceramic objects; two pieces of lacquerware, and two early bronzes. A selection of screens was on view in the screen gallery.

Paintings and a wide array of objects in silver, gold, ivory, jade, brass, steel, ceramic, and glass reflected the quality and diversity of the Freer's collection of Near Eastern art. Objects in the exhibition dated from the fifth century B.C. through the 18th century and come from North Africa, Egypt, Syria, Iraq, Iran, India, and Turkey.

Eleven sculptures of stone and bronze and five paintings filled the South and Southeast Asian gallery with representations of Buddhist and Hindu gods from the Indian subcontinent and Indonesia and spanned the second century B.C. through the 17th century. Among the highlights was the Freer's famous "Parvati," a 10th-century bronze representing the consort to Shiva, Hindu god of destruction. Another bronze, this one made in the 13th-14th century, was Nandi, the bull who was both "vahana" (vehicle) for and companion to Shiva.

Although the Freer is best known for its holdings in the arts of Asia and the Near East, it also houses a collection of works by American artists of the late 19th and early 20th centuries, including a major group of works by the expatriate artist James McNeill Whistler. The selection exhibited included 17 paintings by Whistler, Dwight William Tryon, Thomas Wilmer Dewing, and John Singer Sargent.

In addition, 19 paintings represented the American artist best known for his graceful representations of women. Dewing, born in Boston in 1851, studied art in Paris in the French academic tradition. Back in the United States in 1895, he helped to found a group called "The Ten American Painters," also known as the American Impressionists. Unlike his peers who found landscape painting the appropriate vehicle for expressing innovative ideas about light and color, Dewing used landscapes primarily as backgrounds for his elegant figural interpretations.

In 1973, the Freer published a catalogue, Chinese Figure Painting. This was the only study in this field, and it has been out of print for ten years. Revision of this text for publication required a comprehensive review of all literature written on the subject during the past fifteen years, including scholarly developments based upon the original publication.

Conservation - In addition to its reputation for conserving and restoring objects the Technical Laboratory of the Freer Gallery is a renowned research facility. A primary concern for the staff of the Technical Laboratory this past year was conserving the objects for the inaugural, in-house exhibitions and the traveling

exhibitions in the Sackler Gallery. Environmental control of the Sackler exhibition galleries and collection storage areas also required attention.

Conservation research identified particular organic colorants in paintings and tested Chinese bronzes for lead content to help determine their provenance. Specific Freer research examined:

- unusual copper-green pigments on Ukiyo-e paintings,
- lead-white on Japanese paintings,
- discoloration of lead white pigments on Persian paintings particularly in the Vever collection,
- pigment samples taken from excavated objects (dated to the 5th-8th centuries A.D.) in Korean museums,
- microscopic paper fibers from very small samples,
- metallurgy and properties of high-tin bronzes, including reconstructing the alloy and production methods used in making high-tin bronze mirrors from Aranmula, India.

In addition, an analytical project on Chinese Buddhist bronze sculpture (dated from the 3rd to the 16th centuries A.D.) began. Staff are studying the provenance and methods of manufacture of these bronzes and how they relate to the history of Chinese bronze metallurgy.

An expanded Oriental art painting conservation program also is planned. The Oriental art restoration studio takes a more traditional approach toward the conservation of East Asian paintings and screens than do Western conservation laboratories. Besides the work related to the Freer collections and exhibitions, the Studio also looks forward to a future program to train Americans in order to alleviate the critical shortage in this country of persons skilled in this specialized field. There are only three facilities in the United States capable of restoring and mounting rare Far Eastern paintings and screens, and they are occupied fully with the works in their respective museums.

Collections Acquisitions - Purchases for the collection with FY 1987 Freer nonappropriated trust funds included a pair of 17th-century Edo period Japanese handscrolls by Kano Yasunobu, a late 15th- early 16th-century Ottoman Turkish silver and gilt bowl, a Ch'ing dynasty calligraphy cuplet by the Chinese artist Quian Daxin (1728-1804), a Ch'ing dynasty calligraphy hanging scroll by the Chinese artist Chen Hongshu (1768-1822), and a Ming dynasty calligraphy hanging scroll by the Chinese artist Ni Yuan-lu (1593-1644).

Education - During FY 1988 the Freer Gallery carried out a wide range of research and scholarly activity which became available to the public through educational programs. Educational materials include a free introductory brochure for the visually impaired; the highly successful free exhibition leaflets introducing various aspects of the Gallery's collections; and the docent-led tours. In FY 1988, over 20,000 visitors joined the weekday and weekend tours given four times daily.

Specific education outreach programs met the needs of various groups, including the hearing and visually impaired. The Museum successfully sponsored a Japanese film series, an Indian film series, and a musical program. One very popular lecture series was on Chinese art, presented in Chinese. Customized slide sets are available to docents when speaking to community groups. Special pre-visit education packets are available to schools prior to their tours of the Freer Gallery. School and community

groups studying specific aspects of Asian art visited selected areas of the gallery on prearranged tours.

Renovation Project - Construction of the underground passage between the Freer Gallery of Art and the Arthur M. Sackler Gallery will begin in the fall of 1988. The Freer will close to the public during this period and reopen upon completion of the renovation in 1992. The expansion will:

- allow convenient access between the Freer and Sackler for visitors and for staff who oversee and use both museums' collections. The project will excavate the Freer courtyard and provide more functional space in the basement and sub-basement. Construction of a passenger elevator from a ground-level lobby on the south side of the building will improve access to the galleries for visitors with physical disabilities.

- triple space for conservation activities and technical study of Asian and Near Eastern art.

- expand collections-storage space for the Freer, since the collections have nearly doubled since the museum opened in 1923. The project will increase the Freer's collection storage area by 70 percent, to 11,500 square feet; provide 3,200 square feet of additional exhibition space in the Freer section of the passageway between the two buildings, and increase the conservation facilities on the Freer's ground level from 1,750 to 5,765 square feet.

EXPLANATION OF PROGRAM INCREASE:

Curatorial Assistant for Japanese Art (1 workyear and \$30,000) - The Museum must establish appropriate oversight of the nearly 4,000 objects in the Japanese art collection. It is a mandate of the Sackler Gallery to promote all Asian arts. While the curatorial departments at the Sackler and the Freer are all severely understaffed, the most seriously understaffed is the Japanese art department. Just as the Chinese and Near Eastern collections each have a curatorial assistant for their assistant curator and full curator, the museum requires a curatorial assistant to help the assistant curator and a full curator of Japanese art.

The curatorial assistant will provide research and other curatorial capabilities to allow senior staff to perform more substantive research. The assistant will gather background information for labels and catalogues, assist with exhibition planning, and answer letters of inquiry. Senior staff would then be able to devote the majority of their time to substantive research projects, public service activities, exhibition planning, and selecting and negotiating the purchase of works of art for the collection. The Museum requires a sufficient permanent staff to maintain the quality of research, exhibition planning, and successful acquisition program appropriate to the distinguished, world center of Asian art and culture.

Collections Management (2 workyears and \$205,000) - Current storage arrangements at the Freer Gallery now endanger objects. Often priceless objects are too close to each other. The expansion of the Freer Gallery storage facilities has been a priority since the 1960s. A renovation project will modernize and increase the Freer's collections-storage area by 70 percent and triple the space for conservation activities and technical study of Asian and Near Eastern art. The funds requested for FY 1990 will continue a program to acquire specialized collection storage equipment

and equipment for the much expanded technical laboratory and reinstate proper staff attention to the Freer collection.

The Museum must purchase custom storage cabinets for screens, textiles, and other delicate items. Other specialized cabinets will have customized compartments to protect fragile Egyptian glass beads. The special design of this storage equipment, planned for both the Sackler and Freer collections, allows the interchange of like components, such as drawers. The Museum will also purchase study tables with cork tops, scroll tables, and special object-viewing tables.

Exhibition galleries will close in fall 1988 and not reopen to the public until 1992. However, the staff will use the conservation laboratory long before the reopening to prepare objects for display. To continue the purchase of equipment for the technical laboratory, the Freer requests funds to purchase such items as: a cleaning room with special air handling devices and filters--which prepares and examines samples, \$25,000; a fourier--which analyzes organic material without removing material, \$90,000; and an inductively coupled plasma analyzer--which analyzes the inorganic composition of objects, \$70,000.

Two technicians, previously assigned to Freer collections, will work with the Sackler loan exhibitions while the Freer Gallery is closed. The Sackler Gallery's total technical staff of four will oversee its loan activities to include: crating objects; measuring, weighing and photographing objects; and transporting loan objects to the conservation laboratory and to the exhibition designers. The FY 1990 request for two more technicians will restore the Freer staff to three in time to prepare for the reopening of the Gallery. These technicians will enter and remove objects in storage, re-label, alter location records if an object is misgrouped, and help install collections for exhibition purposes.

The Institution is a world center for the study of Asian art and culture, in great part a result from the fine quality of its collections. These national treasures must have quality care to preserve and to store them. Improper storage and handling of collections heightens the risk of damage. Additional funding for FY 1990 will support the Freer's program to replace outdated storage and laboratory equipment and to increase staff, all of which will guarantee that this precious legacy will be available for many generations to share and enjoy.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Annual allotments to the Arthur M. Sackler Gallery provide funds to defray the costs of special events associated with the opening of new exhibitions and to cover the travel costs for members of the Sackler's Visiting Committee. These funds also support the position of coordinator for special programs for the Freer and Sackler Galleries. The proceeds from sales in the Sackler museum shop support the purchase of acquisitions, the publication of exhibition catalogues and gallery guides, and the operation of the Sackler museum shop. In FY 1988, through the Collections Acquisition Fund, the Sackler purchased an important 17th-century Mughal Indian box with inlaid mother-of-pearl and an exceptional pair of six-panel Japanese screens from the 17th century.

Annual allotments to the Freer Gallery provide funds to defray the costs of special events associated with the opening of new exhibitions and to cover the travel costs for members of the Freer's Visiting Committee.

Restricted Funds - These funds are contributions in the form of grants and gifts from individuals, foundations, organizations, or corporations for specific purposes.

The major portion of the nonappropriated Trust funds for the Freer come from the Charles Lang Freer bequest which restricts their use. The funds help finance the Freer's professional curatorial staff, administrative staff, acquisitions for the collection and library, the maintenance of the Freer's courtyard and the operation of the Freer museum shop. Funds from the Harold Stern Memorial Endowment support scholarly research in the field of Japanese art.

ARCHIVES OF AMERICAN ART

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	19	1,038	-	108	-	20	12	945	-	-
FY 1989 Estimate	20	1,100	-	98	-	-	12	823	-	-
FY 1990 Estimate	25	1,166	-	98	-	-	12	833	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Archives of American Art is a national research bureau with regional centers in New York, Boston, Detroit, San Francisco, and Los Angeles. The Archives is the Nation's largest repository of archival source materials relating to the history of the visual arts in the United States. It holds more than nine million documents, 400,000 photographs, 75,000 works of art on paper, and approximately 3,000 tape recorded oral and video interviews. The Institution houses original materials in Washington, D.C., with microfilm copies of many available in regional centers and through interlibrary loan across the country. Besides providing research materials for academic scholars, students, curators, collectors, and others studying the history of art, the Archives sponsors symposia, lectures, and other public programs; conducts an active membership program; and publishes a quarterly journal. For FY 1990, the Archives seeks an increase of 5 workyears and \$66,000 to enable it to maintain professional standards for the organization, description, control, and preservation of its growing collections.

PROGRAM - Founded in 1954 as a private institution in Detroit, the Archives became a bureau of the Smithsonian Institution in 1970. The Archives of American Art promotes the study of American art and cultural history by assembling and preserving an ever expanding collection of letters, diaries, sketchbooks, business records, photographs, drawings, prints, and oral and video interviews. In making these primary historical records available to researchers and the public, the Archives advances the scholarly study and interpretation of the arts in America.

Research - College and university faculty, museum curators, graduate students, art gallery staff, and independent art historians conduct most of the research at the Archives. In FY 1988, these Archives users paid 3500 research visits to the six Archives' regional centers. Interlibrary loans of 2500 rolls of microfilm reflect additional use of the collection. Acknowledgements and footnote citations to Archives' holdings appeared in more than two-hundred books, articles, exhibition catalogues, and dissertations published or completed during the year. The Archives of American Art Journal carried the results of work by the staff as well as by outside scholars.

Development of Collections - In 1988 the Archives successfully concluded a twenty-two-year campaign to acquire the Walter Pach papers, a collection of letters, diaries, sketchbooks, photographs, and rare exhibition catalogues. A painter and writer, Pach was a close associate of some of the major French and American artists and collectors who played a prominent role in early twentieth century modernism. Pach's correspondence with Matisse, Brancusi, Picabia, Duchamp, Arthur B. Davies, Robert Henri, John Quinn, and others fills a large gap in documenting the Armory Show and other modern art exhibitions of the time. Groups of letters from such figures as John Sloan, Diego Rivera, Bernard Berenson, and Van Wyck Brooks cover a later period. In 1989, a detailed inventory will describe the collection, which also contains books and periodicals reflecting Pach's wide-ranging interests.

Nineteenth century material received this year includes the papers of Alice Kellogg Tyler, a Chicago art student in Paris in the late 1880s; a diary kept by the sculptor Frederick MacMonnies in 1885 when he too studied in France; the papers of James L. Claghorn, a Philadelphia collector who corresponded with Frederic E. Church, John Kensett, Hiram Powers, and other painters and sculptors; and an important addition to the Francis Millet papers, comprising diaries and sketchbooks of the 1870s and letters from his sister describing visits from John Singer Sargent, Henry James, and Mark Twain. Useful collections of more recent date are a long series of letters (1934-1942) by the American painter Marsden Hartley, a larger group from Jean Dubuffet to Ralph Colin, and David Smith's correspondence with Kenneth Noland. Herbert Hemphill's records and an informative set of Grandma Moses' letters enhanced the Archives' growing strength in the folk art field. Additions to the Archives' oral history collection include taped interviews with the museum director John Coolidge, the folk art dealer Jeffrey Camp, and the artists Paul Cadmus, Janet Fish, Kenneth Noland, Chuck Close, Jennifer Bartlett, and, just before she died, Isabel Bishop.

Exhibitions - Several museum exhibitions benefited from documentary material in the collections. A showing of artists' illustrated letters at the Gray Gallery of New York University drew heavily on Archives' holdings. The University of Wisconsin borrowed Frank Lloyd Wright wallpaper designs, the Art Institute of Chicago used Raymond Hood architectural renderings, Bard College displayed a series of photographs in a J. Francis Murphy show, and the Hirshl and Adler Gallery exhibited 15 letters and sketches from American artists abroad. The Archives' own exhibition of documents commemorating the seventy-fifth anniversary of the Armory Show will be on view at its New York center from September through December. The Archives also installed a considerable number of Reginald Marsh sketches, drawings, and letters in the American Art/Portrait Gallery Library.

Public Education - The Archives organized three substantial and well attended symposia in 1988: "The Coming of Modernism to Chicago, 1900-1940" held at the Art Institute of Chicago; "Art for the Record: Issues of Documentation and Contemporary Art" held at the Huntington Library in San Marino, California; and "Earthquake to Albright: Modernism in Northern California, 1906-1945" held at the California Palace of the Legion of Honor in San Francisco. On a smaller scale, the Washington office sponsored eight lunchbag seminars devoted to discussions of research in progress by art historians and American Studies scholars. The Archives completed a video tape version of the film "From Reliable Sources" now available to museums, libraries, and college art history departments.

Conservation and Care of Collections - With the purchase this year of an encapsulator, a device for sealing damaged paper within sheets of mylar, the preservation of vulnerable items will proceed more rapidly than in the past. The

Archives sends particularly valuable objects requiring more sophisticated methods to a conservation center. In 1988 11 drawings, 16 photographs, and five rare publications received thoroughly professional treatment. The computerized inventory of the collections, a long-term congressionally mandated project, proceeded during the year. A three-person team devotes itself to this activity, and two other staff members concentrate on the organization of works on paper and photographs.

EXPLANATION OF PROGRAM INCREASE - For FY 1990, the Archives seeks an increase of 5 workyears and \$66,000 to enable it to maintain professional standards for the organization, description, control, and preservation of its growing collections.

Archivist (New York City) (1 workyear and \$30,000) - An Archivist for the New York Regional Center will eliminate an accumulated backlog of unprocessed collections and ensure that backlog does not recur. Inasmuch as New York remains the center of the American art world and despite tighter acquisition criteria, the New York City office receives more new materials than any other location, and nearly 50 percent of all the new acquisitions. Understandably, the New York City office requires adequate staff to meet its need.

The office has a large and growing backlog of important, but unorganized and inaccessible collections. Currently this backlog exceeds 200 cubic feet. In August, 1988, the Archives' New York Regional Center will move to a new location in the Equitable Center, a complex which also houses a branch of the Whitney Museum of American Art. The new facility provides space for additional staff members to process and manage large volumes of original materials.

Archivist (automation programs) (1 workyear and \$36,000) - A fully operational computerized catalogue will substantially increase the numbers of Archives users. Over the past five years, the Archives has made dramatic progress toward the objective of a fully automated catalogue of its collections.

In cooperation with other Smithsonian units and with major private grants, the Archives has developed internal procedures, acquired equipment, trained staff, and entered baseline information into an automated system. This system is now in operation in a testing phase using formats that are compatible with national information networks. In 1990, the Archives will participate in at least one network.

Continued progress in the application of computer technology depends on this additional position. This Archivist will provide necessary leadership in long-range planning for systems development, in systems testing, and in staff training. The office will serve as a liaison with national information networks. This liaison will make the Archives' catalogue available to researchers across the country.

Inventory Technicians (3 workyears) - Inventory Technicians support administration and control of the collections. They verify location and maintain records on the movement of collections for research and conservation purposes. Through such research and conservation efforts, and more than 30 years of active collecting, the Archives has assembled the world's largest documentation of the visual arts.

Inventory technicians will gather and enter additional data about the collections into the Archives' new on-line database; re-house fragile portions of the collections into proper archival containers; and prepare original papers for microfilming and retirement from active use. In FY 1990, the three requested workyears will allow for

three permanent inventory technicians. The Archives received a transfer of \$73,000 from the Institution's Collections Management/Inventory Program in FY 1988 which can be used in FY 1990 to pay for these positions.

Permanent inventory technicians will ensure continuous care of the collections and improve access AAA's its holdings.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Provided through annual allotments, these funds defray costs associated with special events, supplement travel expenses incurred by the Archives' Board of Trustees, and provide partial support for general operating costs. With support from the Research Opportunities Fund, the Archives will organize, inventory, and microfilm records the National Arts Club donated.

Restricted Funds - Fund-raising activities, gifts, foundation and corporation grants, and a membership program generate funds for the Archives. A substantial portion of this income supports the Archives' general operating expenses, its oral history program, and its publications program.

Foundation and corporate grants have provided the principal sources of support for special projects. The Archives of American Art's field collecting activities in Los Angeles and Philadelphia will continue through FY 1989 because of successful fund-raising in these geographic locations. Major grants from The J. Paul Getty Trust and The Andrew W. Mellon Foundation underwrite the costs of automating and refining the catalogue of the Archives of American Art collections. In addition, the Archives of American Art Board of Trustees continues to supplement income for the general operations of the Archives through its Wellin Taubman Reserve Fund established in FY 1986.

COOPER-HEWITT MUSEUM

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	30	1,074	19	861	7	1,266	1	737	-	50
FY 1989 Estimate	31	1,193	19	897	7	1,180	1	958	-	50
FY 1990 Estimate	32	1,313	18	933	7	1,185	1	2,666	-	50

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - Since its public debut in October 1976 as the Smithsonian Institution's National Museum of Design, the Cooper-Hewitt Museum has become an internationally-acclaimed pioneer in the innovative exploration of both the processes and the products of human design. The Cooper-Hewitt occupies an historic 1902 mansion built as the private residence of Andrew Carnegie. In 1972, the Carnegie Corporation gave the mansion and a small neighboring town house to the Smithsonian as a permanent home for the Museum and its collections. Wall coverings, decorative art objects, textiles, and prints and drawings constitute the nucleus of the world famous center for the study of design. For FY 1990, the Cooper-Hewitt Museum requests 1 workyear and \$120,000 for an assistant curator of decorative arts (1 workyear and \$35,000) and for building and facilities support (\$85,000).

PROGRAM - In 1897, the Hewitt sisters, granddaughters of Peter Cooper founder of the Cooper Union, established the Museum because of their personal interests in the education of America's designers. They saw it as a teaching laboratory, a working resource, freely available to as broad a public as possible. Struggling students, busy professionals, and the general public use the Museum's collections as guides, inspirations, and references for their own creativity.

Unlike a traditional art museum, Cooper-Hewitt prefers not to collect and display objects from the point of view of traditional aesthetic values only. Instead, the Museum seeks to document the complex nature of the design process, the products it generates at different times and in different places, and its continuing importance in the everyday lives of those who participate in it or are otherwise affected by it.

The Museum cares for more than 167,000 permanent collection items including: drawings, prints, wallcoverings, textiles, ceramics, glass, metalwork, jewelry, and related decorative arts from European, Asian, American, and other cultures and spanning 3,000 years. The Museum's specialized library of 50,000 volumes, includes

more than 5,000 rare books. Many consider the Museum's holdings among the finest of their kind in the world.

The Museum presents an average of 13 new exhibitions annually. Cooper-Hewitt staff and consulting curators create many of them entirely. The Cooper-Hewitt may also organize an exhibition with a co-sponsor and with a point of view and objects considered compatible with the Museum's interests. These events draw many visitors to the Museum. In the first three quarters of FY 1988, attendance totaled 102,074 visitors, an average of over 11,000 per month. Critics are overwhelmingly laudatory in their reviews of the exhibition program at the Cooper-Hewitt.

Four important exhibitions shown in FY 1988 devoted to contemporary architectural work include: the career in Vienna and New York City of Joseph Urban (1872-1933); celebratory arches recently commissioned for the city of Galveston, Texas from Eugene Aubrey, Michael Graves, Helmut Jahn, Charles Moore, Cesar Pelli, Boone Powell, Aldo Rossi, and Stanley Tigerman; and unbuilt projects conceived during the 1980s by more than two dozen leading architects for different American sites. The Museum will exhibit selected architectural drawings of Eric Mendelsohn (1887-1953) in October 1988.

Four other major exhibitions of FY 1988 addressed more historical themes. The Textiles Department organized "Color by the Yard, Printed Fabric 1760-1860," drawing heavily upon its own holdings. The Drawings and Prints Department likewise exhibited many superb examples of its own riches in "Honor and Glory: Monumental Arches," which appeared in conjunction with the Galveston designs mentioned above. The same department worked with colleagues at the National Museum of Sweden to produce "Versailles: The View from Sweden," a beautiful survey of French formal influences upon the Swedish royal court in the late 17th century. Boston's Museum of Fine Arts sent "The Art That Is Life: The Arts and Crafts Movement in America 1875-1920," for which Cooper-Hewitt's assistant curator of textiles served as a curatorial team member.

In the realm of more conventional decorative arts interests, the Museum's exhibition calendar for FY 1988 included: "The Triumph of Simplicity: 350 Years of Swedish Silver," lent by the Swedish National Museum and Royal Family; colorful, inexpensive household ceramics from Nuremberg's Germanisches Museum manufactured in Germany between the World Wars; and "The Countess's Gems: The Burghley House Collection," an extraordinary group of precious objects dating back, in some cases, to the late 16th century. These survived as the private treasure of a single noble family in Tudor England.

For those interested in theater design, the Museum offered the colorful exhibition, "Paris Opera on Stage: Designs, Costumes, Jewels." "Surprise, Surprise: Pop Ups and Moveable Books" and "Annual Reports" drew attention to graphic design and book arts for very different audiences. Young and old visitors alike enjoyed the "The Outdoor Chair," an amusing and provocative series of one-of-a-kind works by contemporary artists and landscape architects. This was a hands-on exhibition displayed throughout the summer in the Museum's garden.

The Museum publishes with private funds exclusively. Of the FY 1988 exhibitions, Cooper-Hewitt documented "Color by the Yard" with a modest collection handbook, "Arches for Galveston" with a brochure, and "Versailles: The View from Sweden" with a full-scale catalogue which the University of Chicago Press will distribute. American Art Pottery is a thoroughly informative catalogue of the 76

piece collection donated to the Museum several years ago by William and Marcia Goodman. The catalogue emerged from the Decorative Arts Department in FY 1987, and the University of Washington Press will distribute it nationally. Cooper-Hewitt exhibited this collection in FY 1985. The show toured the country under the auspices of SITES since then and went on view at the Renwick Gallery in FY 1987.

Publications in progress now include: a full catalogue for Courts and Colonies: The William and Mary Style in Holland, England, and America, due in November 1988. Editorial work also continues on both The Catalan Spirit: Gaudi and His Contemporaries, inspired by the Museum's FY 1987 exhibition; and Housing: Symbol, Sites, Structure, a project of Director Emeritus Lisa M. Taylor.

Future exhibition and publication plans also include, "What Then Remains...Legacies of Design." This exhibition will survey a broad range of creative cultural responses to the universal experience of death. Another exhibition tentatively titled, "Hiding Out" is an imaginative investigation of certain protective kinds of human design activity. A thematic publication, L'Art de Vivre: Decorative Arts and Design in France, 1789 - 1989, will accompany an exhibition of the same name, in March 1989. "L'Art de Vivre: Decorative Arts and Design in France, 1789-1989" will fill the main exhibition galleries for much of 1989 and should be one of the most important American observances of the bicentennial anniversary of the beginning of the French Revolution. Cooper-Hewitt was also fortunate during FY 1987 to obtain an agreement from cultural authorities in Prague which will permit the creation of "Czech Architecture and Design 1900-1950." This is an official exchange exhibition scheduled to open in New York in July 1990. The project is a joint undertaking with The National Museum of Technology in Prague, as organizing lender, and the Canadian Center for Architecture, Montreal. It may appear at one other venue, yet to be determined, in North America.

In addition to those visitors who enjoy Cooper-Hewitt exhibitions and publications, the Museum serves a large and diverse group of people who enroll for lectures, courses, symposia, workshops, and tours organized throughout the year by the Programs Department. These audiences, some of whom receive undergraduate college credit from Parsons/New School for completed course work at the Museum, annually average 5,000-6,000 in number. During FY 1988, courses from which they could select according to their interests and needs included:

- surveys of Byzantine art and architecture, French decorative arts from 1650 to 1790, and English decorative arts between 1660 and 1760;
- Italian architecture of the 20th century, contemporary graphic design, baroque and rococo textiles, and Russian architecture and 20th century Japanese folk art and architecture; and
- seminars on advertising and the culture of consumption, industrial design for global markets, and interviews with avant garde architects Elizabeth Dillard and Billie Tsien, among others.

The Programs Department also organized tours to Miami, Florida and Venice, Italy while planning future study opportunities in eastern and central Europe and The Netherlands for FY 1989.

The Cooper-Hewitt/Parsons New School Graduate Studies Program in the History of the Decorative Arts sponsored a study course in England during the summer of 1988.

The Graduate Program is the first academic degree-granting program ever offered by the Smithsonian Institution. Each year, since 1982, a group of 15 to 20 students enroll for a two-year period of class work, field trips, and independent study in various areas of the history of design and decorative arts. Accredited by the New York State Board of Regents, the Program awards a Master of Arts degree upon acceptance of a satisfactory thesis.

Much of the Cooper-Hewitt's year-round activity depends wholly or substantially upon the support received from approximately 5,500 members, individual or foundation benefactors, and corporate sponsors and patrons. The Museum hosted several special events during FY 1988 at which major corporate patrons celebrated Cooper-Hewitt's work and their own interest in the design arts. Firms including Sony, Laura Ashley, Mitchell Energy and Development Corporation, Gerald D. Hines Interests, Hearst Magazines, Potlatch Corporation, and the National Tabletop Association are several which assisted the Museum in its work. At one of the largest special events of FY 1988, officials of Philip Morris International and the Museum jointly welcomed Their Majesties King Carl XVI Gustaf and Queen Silvia of Sweden to a reception and private tours of the Swedish silver and Versailles drawings exhibitions.

Over 1,200 members enjoyed the annual June Garden Party. More than 7,000 New Yorkers toured the Museum during the single-evening celebration of the Tenth Anniversary of New York City's Museum Mile. Mayor Edward I. Koch delivered the opening remarks for the evening in the garden. A series of six free musical concerts sustained the festive mood throughout the summer season.

Private support for Cooper-Hewitt is essential to survive the intensely competitive cultural marketplace of New York City. Although the Capital Campaign for an improved and expanded physical plant continued to await the appointment of a new director, the Museum made important progress in the campaign to raise \$400,000 to match a recent challenge grant of \$200,000 from the Andrew W. Mellon Foundation for a permanent research endowment. Gifts and pledges received in the first eight months of a three-year drive tallied \$100,879. Other significant fundraising accomplishments which culminated in FY 1988 included a \$650,000 grant for "L'Art de Vivre" from the Comite Colbert; \$300,000 from several benefactors for "Courts and Colonies;" \$40,000 from the Port Royal Foundation for the Versailles: The View From Sweden catalogue; \$60,000 from Mobil to offset the cost of free public admissions on Tuesday evenings; and \$20,000 each from Potlatch Corporation for "Annual Reports" and The J.M. Kaplan Fund for "Eric Mendelsohn," as well as 30,000 Deutschmarks from the German government in partial support of the Mendelsohn show; and numerous other grants and in-kind gifts or donated services. While this impressive scale of special project support is vital to the Museum's activities, it cannot replace the federal appropriation allotment and the Institution's continuing allowance of unrestricted trust funds.

Among the Smithsonian's art museums, Cooper-Hewitt has a tradition of being one of the most active collectors, borrowers, and lenders. In the first three-quarters of FY 1988, the Museum acquired over 460 items (78 by purchase and 383 by gift); lent 44 to 13 other museums and borrowed 507 from 43 lenders.

The most significant purchase of FY 1988 was an enormous group of Wiener Werkstätte Archive designs for textiles and wallcoverings which represent an exhibition and study resource absolutely unique outside of Vienna. More than 250 designs by over 50 designers represent over 1,488 pattern variations. The Regents Special Acquisition Fund provided most of the funding for this historic acquisition. The balance came from the Museum's Trust funds.

Plans to deaccession items remain an important part of modern collection management activity at Cooper-Hewitt. During FY 1988, the Museum prepared to deaccession substantial groups of unneeded and inappropriate textiles, old master prints (donated expressly for eventual sale), and paintings.

EXPLANATION OF PROGRAM INCREASE - For FY 1990, the Cooper-Hewitt Museum requests 1 workyear and \$120,000 for an assistant curator of decorative arts (1 workyear and \$35,000) and for building and facilities support (\$85,000).

Assistant Curator of Decorative Arts (1 workyear and \$35,000) - There is only one permanent curator on the Cooper-Hewitt staff in the Decorative Arts Department. An assistant curator would provide complementary expertise and would inspire new approaches and insights to the collection in terms of research, education, and public outreach.

A second permanent museum professional in the department will assist in the management of the decorative arts collections, including approval of loan requests, fielding of public inquiries, identifying objects for acquisition and deaccessioning, cataloguing the collection, and liaising with craft and decorative arts collections elsewhere within the Smithsonian Institution. The assistant would also assume collections management responsibilities now performed by senior staff. Additional staff time will permit the curators to undertake in-depth studies, such as the phenomenon of revivalist styles to the 19th century and studies of the ichnography of marine life forms found in the decorative arts. In addition, the assistant curator will develop new courses for the graduate degree program and other outreach initiatives.

Although the decorative arts collection, which numbers 15,000 objects, is considerable smaller than the drawing and print collection, it is a working collection used by many design professionals and crafts persons for ideas and inspiration. The collections include objects of many different materials and types. In addition to objects of glass, ceramics, wood, and metal, there are architectural embellishments, objects of use, jewelry, and furniture. An assistant curator aiding researchers will ensure greater access to the research collections, such access in turn encouraging exhibition and publication endeavors.

Building and Facilities Support (\$85,000) - The Museum's plant consists of two separate structures, one of which is a national landmark; a small conservatory; garden; and parking lot. The Museum seeks funds to maintain properly public portions of the buildings and in areas occupied by staff. Over the past years daily attendance, special events, membership, and evening program uses of the Carnegie Mansion continue to flourish, and this increased usage places added stress and demands on the Museum's facilities.

The Museum will reinstate and upgrade present service contracts and initiate new service contracts for cleaning and other essential building and grounds maintenance. The Museum will upgrade the following service contracts: trash removal, uniform laundry service, routine window washing, pest control, horticultural services, and scheduled painting on nonexhibition gallery interior spaces. Maintenance activities for this urban complex must include a variety of functions performed by the Museum's small maintenance staff and outside contractors. These include: graffiti and snow removal; continuous minor fence and sidewalk repair; cleaning, repair, and replacement of carpet; preventive maintenance plastering and painting programs; lighting

replacement; and standard janitorial services for offices and specialized cleaning of exhibition and collection storage areas.

The use of service contracts for a portion of janitorial work began in FY 1988 as a result of a highly competitive local labor market and turnover rate among facilities staff. This pilot experiment was very successful. The absence of inflationary allowances, moreover, has exacerbated the effect of increased prices set by vendors in New York City, over whom the Museum often has no bargaining control and to whom the Museum has no practical alternatives for lower-cost service. The cost of trash removal increased 10 percent in FY 1988 over the cost in FY 1987 and will increase another 25-30 percent in FY 1989.

It has been over ten years since Cooper-Hewitt has received increased Federal support for building-related expenses. Additional funds are necessary to maintain this facility in a manner befitting an historic landmark and national museum of design.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - The Museum obtains these funds from a variety of sources including museum shop sales, product development, membership and admissions fees, donations, fundraising events, and allotments. The allotments support salaries of the director, administrative officer, and various staff members and help defray expenses associated with special events such as exhibition openings. Special Purpose Funds support educational programs, exhibitions and publications for the Museum.

Restricted Funds - Designated for specific purposes, these funds derive from grants, bequests, and other donations from individuals, organizations, and corporations. In FY 1989 and FY 1990, these funds support exhibitions such as "Courts and Colonies: The William and Mary Style in Holland, England, and America," "L'Art de Vivre: Decorative Arts and Design in France, 1789-1989," and assorted smaller projects.

Government Grants and Contracts - Various government agencies and departments provide these funds for specific program support. The Museum annually seeks funding in varying amounts from the New York State Council on the Arts for a small number of exhibition support and other programs.

NATIONAL MUSEUM OF AFRICAN ART

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	55	3,385	1	74	3	265	-	313	-	-
FY 1989 Estimate	58	3,535	1	47	3	258	-	43	-	-
FY 1990 Estimate	59	3,665	1	51	3	119	-	35	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The National Museum of African Art (NMAfA) is the only museum in the United States devoted to the collection, preservation, research, exhibition, and interpretation of the visual arts of sub-Saharan Africa. Founded in 1964 as a private non-profit institution, the Museum became a bureau of the Smithsonian Institution in August 1979 following the enactment of Public Law 95-414. In December 1986, the Museum moved from its original Capitol Hill location to its new facilities on the Mall as a part of the Quadrangle complex, which opened to the public in September 1987. For FY 1990, the Institution requests an increase of 1 workyear and \$130,000 for Collection's Acquisition (\$100,000) and to hire one assistant editor (1 workyear and \$30,000).

PROGRAM - The NMAfA endeavors to instill an appreciation and understanding of the diverse cultures in Africa south of the Sahara. Although the Museum's primary emphasis is on the traditional cultures of the sub-Saharan region, it also studies and exhibits the ancient and contemporary arts of the entire continent. The Museum develops and presents a variety of interpretive programs including exhibitions, lectures, gallery tours, classes, workshops, audio-visual presentations, and publications. The aesthetics of traditional African art motivate each program, and the Museum actively cooperates and coordinates its activities with those organizations and institutions whose purposes are complementary.

The Museum opened its new facility on the Mall on September 28, 1987. By the end of FY 1988, its first full year of operation in the new building, the museum expects attendance to total over 750,000. This is more than 15 times the annual attendance in the former Capitol Hill location. Funding provided in FY 1988 and FY 1989 enabled the Museum to strengthen its staff and expand its programs in order to serve this increased audience.

Research - The Museum continued its program of scholarly publications which complemented a new cycle of exhibitions that opened in FY 1988. A monograph entitled Images from Bamum accompanied an exhibition of German colonial photography at the court of King Njoya of the Cameroon, 1902-15. Dr. Christraud Geary, guest curator for the exhibition and previously a Rockefeller Fellow in residence at the Museum, wrote

the text. This book is a significant contribution to the study and use of early photographs from Africa in art historical research. A monograph and a gallery brochure are currently in production to accompany an exhibition of Kalabari ancestral screens which will open in early FY 1989. Also in FY 1989, the Museum plans a catalogue and exhibition devoted to the sculpture of the contemporary Nigerian artist, Sokari Douglas Camp. Dr. Herbert Cole, the Museum's most recent Rockefeller Fellow in residence, is continuing his research on "Archetypes: Five Themes in the Visual Arts of Africa," an exhibition scheduled to open in the fall of 1989. A scholarly publication that illustrates all the exhibited works of art and explores the related imagery and ideas will accompany this exhibit.

Research and planning for future major exhibitions include a ground-breaking initiative on the art and architecture of African nomads. The Museum received a grant from The Rockefeller Foundation for a working conference which set the parameters for this exhibition. The Rockefeller Foundation also gave NMAfA a planning grant in FY 1988 for this exhibition.

Preparations are underway for hosting the VIII Triennial Symposium of the Arts Council of the African Studies Association (ACASA) in June 1989. This conference is the most important meeting of African art specialists worldwide. The Museum is committed to ensuring maximum participation from Africa as well as the U.S., Canada, and Europe.

In FY 1988, the Museum hired an assistant curator for Central African art. With this position filled, the Museum now has curatorial specialization for the major sub-Saharan geographic/cultural regions represented in the Museum's collection.

The Eliot Elisofon Archives, a major research component of the National Museum of African Art, is one of the largest archives in existence on African art, culture, and environment. Its holdings now include approximately 152,000 color slides, 76,500 black and white photographs, and over 120,500 feet of motion picture film and video tape. During FY 1988, the Archives focused on the acquisition of vintage 19th and early 20th century photographs which provide an invaluable resource for research and publication. Among the most important of these recent acquisitions are 728 prints taken by the White Fathers Mission in Ruanda and Burundi, ca. 1903-1905; three original album prints of Zulu warriors and a Zulu chief, ca. 1889; 121 postcards, dated 1900-1930, of the Congo region, Dahomey, Nigeria, Zanzibar, and East and South Africa.

Scholars throughout the world, as well as support staff, make extensive and increasing use of the Museum's archival holdings. In FY 1988, for example, the two archive employees processed over 600 requests for slides and prints and also provided research assistance for exhibitions and publications. The Museum requested funds in FY 1989 to hire an archivist with specialized knowledge in the art history of Africa to continue this research. This archivist will develop and establish catalogue procedures that will provide more efficient access to the collection and will also explore the use of current computer and videodisc technology to develop the Archives further.

The National Museum of African Art Branch of the Smithsonian Institution Libraries (SIL) system, as one of the major African art library collections in the world, provides bibliographic reference and research support not only for the staff of the Museum but for national and international scholars, including those from Africa. As a result of a major multi-year acquisition program, the library collections

exceeded a projected level of 15,000 volumes and approximately 300 periodical titles in FY 1988. The Library continues to develop its collection to serve the expanded research needs of the Museum. The Library also continues an active outreach program through the publication and distribution (free of charge) of the monthly Library Acquisitions List now distributed to about 500 individuals and institutions worldwide.

Collections Management - During FY 1988, the collections management staff completed the computer entry of object condition reports and location data for the entire collection. With this information in place, staff then developed a computer system for the retrieval of collection information.

The conservation staff continued its analysis of the collection to determine, in priority order, those objects needing treatment. In FY 1988, staff completed treatment of eight major pieces in the permanent collection and began treatment to stabilize other collection objects. During this same period, staff examined and treated objects on loan to the Museum as well as 21 NMAfA collection objects lent for other exhibitions.

The staff of the conservation lab engages in ongoing research projects as well. Current projects include:

- Researching and testing a cleaning system for particularly fragile surfaces. When developed, such a system will be applicable to many conservation problems and art materials.
- Examining and testing exhibition construction materials to determine those that could cause damage, such as corrosion, to art objects. Staff will test paints, lacquers, adhesives, and a number of other building materials to identify potential problems.

With funds requested in FY 1989, the Museum will add an assistant conservator to the present staff of two. This will ensure that systematic treatment of the entire permanent collection proceeds at a reasonable pace. This additional funding will enable the Museum to acquire specialized equipment for use in mounting samples of metals for microscopic analysis. With this equipment and the contract assistance of metallographic conservation experts, work will begin first on the analysis of the Museum's collection of Benin (Nigeria) copper alloy objects and then on the analysis of Nigerian metalwork for a proposed exhibition co-organized with the British Museum.

Exhibitions - In mid-1988, the Museum opened "Images from Bamum: German Colonial Photography at the Court of King Njoya." The NMAfA, with guest curator Dr. Christraud Geary, Research Associate, African Studies Center of Boston University, organized this exhibition of photographs taken in the Cameroon, West Africa, from 1902-15. The exhibition "Shoowa Textiles," a major collection of Zairian textiles from European private collections, circulated by the University of Michigan Art Museum, Ann Arbor, also opened in the spring of 1988.

The Museum's FY 1989 schedule will begin with a major loan exhibition and publication devoted to ancestral screens of the Kalabari people of the Niger Delta. The Museum plans to open simultaneously an exhibition of contemporary sculpture by the Nigerian (Kalabari) artist Sokari Douglas Camp. Also in FY 1989, the Museum plans to present "African Gold," a collection of West African objects from the Barbier Mueller Museum collection, Geneva, Switzerland, circulated in the United States by the American Federation of Arts; "The Essential Gourd: Art and History in Northern

Nigeria," organized by the Museum of Cultural History, University of California; and "African Musical Instruments," organized and circulated by the American Federation of Arts.

Dr. Herbert Cole, Professor of Art History, University of California, Santa Barbara, and recent Rockefeller Fellow in residence at NMAfA, will guest curate a major loan exhibition on the theme of "Archetypes: Five Themes in the Visual Arts of Africa," in early FY 1990. The Museum also plans to present in FY 1990 "Yoruba: Nine Hundred Years of African Art and Thought," organized by the Center for African Art, and "Portraits of Sierra Leonean Paramount Chiefs," photographs by Vera Viditz-Ward.

Development of Collections - The Museum continued to strengthen its collections by the acquisition of works of art of high aesthetic quality. An ongoing and active acquisitions program, through purchases and gifts, remains one of the Museum's highest priorities. The collection is the basis for research, exhibition, and public programs.

Noteworthy gifts received in FY 1988 include a Senufo female figure and a Fulani strip-woven cloth from Guinea-Bissau. Through purchase, the Museum acquired a Bassa mask, two mats, and eleven textiles from the Kuba peoples. A combination of Federal and private donated funds made possible the acquisition of a Mangbetu terra-cotta vessel. A grant from the James Smithson Society supplemented Federal funds to make possible the acquisition of an extraordinary Hongwe reliquary guardian figure from Gabon. With special funds provided by the Collections Acquisition Program of the Board of Regents, the Museum was able to acquire a superb figurative Yoruba Shango staff. This exceptional work is a major addition to the national collection of African art that the Museum is selectively building.

Education - The National Museum of African Art develops and presents a variety of programs to increase public awareness and understanding of African art. Interpretive programs such as lectures, films, gallery talks, and workshops supplement information provided by exhibitions. Such programs offer a range of opportunities and incentives for learning about Africa and its artistic heritage.

In FY 1988, the first year in its new location, the Museum offered more than 1,600 public programs, serving more than 43,000 visitors. An additional 3,000 individuals in senior care centers and hospitals participated in the Museum's various outreach programs. A newly developed lending program makes available, on request, slides, films, and videotapes on African art.

Beginning in FY 1989, the Museum's very successful Teacher's Workshop Series will be available, on request, to all teachers throughout the school year. This program, which began on a limited basis in 1988, helps teachers integrate museum tours and the study of African visual traditions into their classroom activities. The Museum also continues to sponsor classes and lectures on African art each year in conjunction with other Smithsonian programs, universities, and outside organizations.

The Museum participated in the spring 1988 Career Awareness Program coordinated by the Office of Elementary and Secondary Education. This program gave eight minority high school students an opportunity to learn about museology by observing and working with the staff.

In FY 1989, a new program, "African Art for High School Students," will begin. A grant from the Smithsonian Women's Committee funds this ten-week pilot program. It

will provide 14 students, one from each D.C. high school, an opportunity to study African art in the Museum. To encourage students to complete the program, the Museum will provide instructional materials, African art publications, and transportation.

The Museum's docent training program ensures that knowledgeable volunteer guides are available to conduct tours and other Museum programs. During FY 1988, more than 18,000 visitors participated in docent-led general gallery tours and specific collection tours. During FY 1989, the Museum plans to recruit and train approximately 50 new docents to serve this growing audience.

Automation - By the end of FY 1988, each department of the Museum will have basic automation capability, with a total of 36 workstations in place. The computer specialist who will join the staff in FY 1988 will establish and monitor a cyclical replacement program for automation equipment and assist in selecting and developing specialized software for all departments of the Museum.

EXPLANATION OF PROGRAM INCREASE - For FY 1990 the NMAfA requests an increase of 1 workyear and \$130,000 for Collections Acquisition (\$100,000) and to hire an assistant editor (1 workyear and \$30,000).

Collections Acquisition (\$100,000) - NMAfA would acquire important works of art before prices escalate to colossal heights. The finest African Art is scarce and expensive as competition increases for works of aesthetic quality. African sculpture available for three or four figures in the 1950's and 60's are now in the five and six figure range. NMAfA is the only museum in the United States devoted to the collection, preservation, research, exhibition, and interpretation of the visual arts of Africa. To achieve collection excellence, NMAfA must be an active participant in the market to ensure that dealers and collectors offer the Museum fine pieces when they first become available. A stronger national collection also benefits scholarly research, public education, and public appreciation.

Further, European private collectors and museums now capture some of the finest offerings in the African art market. At a May 1988 auction in New York, French and Belgian collectors acquired: a Benin mirror case (\$41,000); a Luba headrest (\$190,000); and a Makere bark box (\$48,000). Any one of these objects would have enriched the collections of the National Museum of African Art, and NMAfA could have acquired two of them if its Federal acquisitions base had been slightly more. The Museum had already committed its base funds for FY 1988 to the acquisition of an extraordinary Hongwe reliquary figure for \$140,000. In addition, competition between U.S. museums contributes to price increases. The NMAfA could not compete with a Louisiana museum for a very important Fang figure that sold in 1985 for \$200,000.

In FY 1988, the National Museum of African Art turned down several important pieces because the Museum had already committed its modest acquisitions base of \$130,000. Each piece would have filled a serious gap in the collection. Some were available for reasonable prices: a pair of Fang arm bands (\$22,000); an Ekoi headdress (\$85,000); a Kuba textile (\$16,000); a Kongo staff (\$45,000); and a Kuba box (\$9,000). Likewise at the upper end of the market, NMAfA could not consider a Guro mask (\$125,000), a Dan mask (\$100,000), a Fang reliquary head (\$250,000), or a Bamana figure (\$600,000). Each of these pieces would have added considerable strength to the collection. All were exemplary of the finest aesthetic quality.

Assistant Editor (1 workyear and \$30,000) - The addition of this position will reduce the need for contract editorial help. It will also strengthen and expand the

Museum's publication program to increase cultural awareness, widen educational outreach, and enhance visitor experiences.

Publications about African art are complex and highly technical, requiring skillful, careful, and knowledgeable editing. Since 1987, the one editor on staff required constant assistance from contract editors, each of whom needed training in terminology and concepts in order to keep pace with the Museum's current publication program. An assistant editor will help the Museum maintain and expand this program with publications such as: 1) informative pamphlets on materials and techniques used to create African art; 2) articles about works of art in the permanent collection; 3) scholarly monographs; and 4) exhibition catalogues.

These proposed formats address the need for enhanced public understanding, on all levels, of the visual traditions and cultures of Africa. With the requested funding, NMAfA will begin to expand this scholarly publication program that will be a major contribution to the discipline of African art studies and will promote greater understanding of other cultures.

NON-APPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds come from the Museum's share of net proceeds from the museum shop, courses conducted in cooperation with Washington metropolitan area public education institutions, and allotments. The NMAfA uses these funds to provide additional support for the Museum's education and collections acquisition programs, exhibition openings, and travel costs associated with meetings of the Museum's Commission. In FY 1989, an allotment also will support the salary costs of one employee.

Restricted Funds - Individuals, foundations, organizations, and corporations contribute these funds in the form of grants and gifts for specific purposes. A grant from the Shell Oil Company Foundation in FY 1988 will support costs associated with the VIII Triennial Symposium on African Art which the Museum will host in 1989. A generous private donation will augment the Museum's publication efforts over a five year period beginning in FY 1988. A grant from the James Smithson Society supplemented appropriated funds to make possible the acquisition of an exceptional Hongwe reliquary guardian figure from Gabon. Also in FY 1988, the Rockefeller Foundation provided a planning grant for a future exhibition on the art and architecture of African nomads. Funds are available from the Smithsonian's Collection Acquisition and Special Exhibition Funds to support research and exhibition projects. In addition, a grant from the Women's Committee of the Smithsonian National Associates Program will fund a pilot education program on African art for fourteen D.C. high school students.

The Museum will continue to seek additional funds from private sources to strengthen the permanent collection.

THE ANACOSTIA MUSEUM

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	19	929	1	44	-	-	-	-	-	-
FY 1989 Estimate	21	1,016	1	44	-	-	-	-	-	-
FY 1990 Estimate	22	1,146	1	47	-	-	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - Located at Fort Stanton Park in southeast Washington, D.C., approximately six miles from the Mall, the Anacostia Museum is a national resource on black history and culture in America. The Museum's exhibitions, scholarly and applied research, historical documentation, and interpretive and educational programs offer scholars and the public the opportunity to study the history and culture of black America from a unique multi-ethnic perspective. For FY 1990, the Institution requests an increase of 1 workyear and \$130,000 to establish a collections acquisition program (\$100,000) and to hire an audio-visual specialist (1 workyear and \$30,000).

PROGRAM - The Anacostia Museum is a national prototype for scholarly and applied research, historical documentation, exhibitions, and educational programs that interpret the experiences of black Americans and their contributions to science, history, and the arts to the public. The Anacostia Museum collaborates with other Smithsonian museums and programs, when possible, to conduct research and develop exhibitions on subjects related to black history and culture.

Established in 1967 as a cultural resource for the people of Anacostia, the Museum has developed into a museum on Afro-American history and culture. It is a valuable source of materials on black American history for other museums and organizations. It has developed innovative ways for introducing nontraditional museum audiences to the worlds of science, history, and the arts. The Museum is an active member in several professional museum associations. These include the American Association of Museums and the African American Museums Association. The Anacostia Museum works with other museums and research institutions, universities, and archives throughout the United States to enhance the awareness and appreciation of the historical and cultural contributions of blacks to American society.

Research - Since its founding in 1967, the Anacostia Museum has documented the history and culture of black Americans and their significant contributions to the heritage of this nation. During the past few years, the Museum has strengthened its research capabilities and expanded its exhibition program. It must now expand and professionalize its related support. With funding requested for FY 1989, the Museum will reinforce its research support by hiring a professional registrar and librarian.

Research continues on a major exhibition scheduled to open in FY 1989, "The Real McCoy: Afro-American Invention and Innovation, 1619-1930." The exhibit and its catalogue will focus on black craftsmen's role in developing technology; the innovative techniques they brought to their work; and the social and cultural context within which they worked. The exhibition's catalogue will break new intellectual ground as the first published social history of Afro-American invention. Research thus far has revealed a treasure trove of relevant information on the contributions of black Americans to technological innovation, including:

- The contributions of Elijah McCoy's invention of the earliest marketable hydrostatic engine lubricator in 1872 (Not only did the invention indicate technological improvements for other heavy machinery and railroad locomotives, it also is one of the possible explanations for the origin of the term "the real McCoy.");
- African iron and steel smelting techniques and African technological influences on colonial North America;
- The impact of Norbert Rillieux's sugar refining process;
- The roles of black inventors Granville Woods and Louis Latimer in the invention of the induction telegraph and the electric light bulb, respectively; and
- The importance of Garrett Morgan's invention of the first automatic traffic signal in 1923 to the expanded use of the automobile in 20th-century America.

During FY 1988, Anacostia Museum staff completed the exhibit script, identified artifacts for the exhibit, and began exhibition design work. An original patent model from the Cliff Petersen collection and two full-scale demonstration models of a stop light and a gas mask invented by one of the foremost black inventors, Garrett Morgan, are among the several outstanding artifacts already identified. During FY 1988, the Museum also awarded the contract for the exhibit production work. The Museum has scheduled the exhibition to open in May 1989.

During FY 1988, the Museum also conducted research on three other exhibitions scheduled for FY 1990 and FY 1991:

- "P.H. Polk: The Man and His Work," scheduled to open in early 1990, will feature Prentice H. Polk's photographic depiction of 20th-century southern folk life. It will include vintage and signed prints from the P.H. Polk estate, Tuskegee University archives, and private lenders and galleries. Born in 1898, Polk was a photographer whose documentation of southern folklife extended for more than half-a-century. He gained national recognition during the last decade of his life prior to his death in 1985. The use of videotape excerpts of television interviews with Polk conducted by NBC, CBS, and MetroMedia News will also allow visitors to learn more about the man himself, as well as his work. Louise D. Hutchinson, former director of research at the Anacostia Museum, will be the guest curator.
- "Health Problems of the Black Community," scheduled to open in October 1990, will be a social history of the health problems, from pellagra and

tuberculosis to sickle cell anemia, that devastated slaves and post-slavery southern farmers, and that continue to plague the contemporary black community. It also will present new information on African cures and remedies.

- "Black Washington: Culture and Conflict in Historical Perspective," scheduled to open in 1991, will highlight the pivotal roles that blacks have played in shaping the culture of the Nation's Capital within the context of the city's economic, educational, political, and residential conflicts. The exhibition will be part of the city's observance of the 200th anniversary of its original survey. It will provide a social and cultural history of Washington since the late 18th century.

Collections Management - During FY 1988, the Museum made great progress in developing a stronger collections management capability. Anacostia's small but valuable collection, consisting of books, letters, photographs, and art work, has grown over the past twenty years primarily as the Museum acquired artifacts to display in an exhibition or as it received donations. However, the Museum had never developed a comprehensive collections management policy. Within the Smithsonian, the development and approval of such a policy is an essential prerequisite for a museum to receive full authority to establish permanent collections. The Anacostia Museum will complete a comprehensive Collections Management Policy Statement and an inventory of its current collection in FY 1988.

Exhibitions at the Museum - "Climbing Jacob's Ladder: The Rise of Black Churches in Eastern American Cities, 1740-1877," has had over 30,000 visitors since it opened in October 1987. Because of the enthusiastic response of this record number of visitors to the exhibition, the Museum has extended its run through October 1988. Historian Edward Smith unearthed a history rich in artifacts, chronicling the black separation from racist congregations in the late 18th and early 19th centuries. The exhibit showed black churches as arenas of self-pride and rejuvenation for communities bereft of mainstream social service institutions.

With original church pews, hymnals, photographs, and the tattered frocks of itinerant preachers, Smith recreated the struggles and pathos of one of America's foremost institutions. The exhibition presents approximately 150 artifacts ranging in size from church pews to tiny hymn books. It includes:

- a pulpit belonging to Lott Carey, a Virginia slave who became an early 19th-century missionary to West Africa (from the First African Baptist Church of Richmond, Virginia);
- a reed organ of rare construction dating from 1864 (from the Bethel A.M.E. Church in Baltimore -- one of the oldest black congregations in America);
- and an extremely rare 19th-century hymn book (from the United Library of Garrett-Seabury Theological Seminaries at Evanston, Illinois), which was the first hymn book compiled by a black American (Rev. Richard Allen) and the first hymn book compiled specifically for a black congregation (the Mother Bethel Church in Philadelphia).

The Smithsonian Institution Press published a catalogue replete with color photographs of the artifacts. The catalogue not only was a beautiful companion to the

exhibition but also remains a contribution to the scholarly body of Afro-American religious history.

Also in FY 1989, the Museum has scheduled "Inspiration: 1961-1989," a retrospective showing of art created by some 35 members of the District of Columbia Art Association, to open in January 1989.

Traveling Exhibitions - The Anacostia Museum has produced several traveling exhibitions related to the history, culture, and achievements of black Americans. These include "Out of Africa"; "The Frederick Douglass Years"; "Black Women: Achievements Against the Odds"; and "Mary McLeod Bethune and Roosevelt's 'Black Cabinet'." These traveling exhibitions, circulated by the Museum and by the Smithsonian Institution Traveling Exhibition Service (SITES), allow the Museum to reach a diverse national audience. SITES also distributes a brochure, "Black History and Ethnic Studies Exhibitions from the Smithsonian Institution." The brochure highlights 16 SITES exhibitions currently available for travel, including "Black Women" and "Out of Africa," that are of particular interest to institutions looking for traveling exhibitions in these fields.

"Black Women: Achievements Against the Odds" profiles the lives, careers, and accomplishments of 200 black women. Among them are: Madame C.J. Walker (America's first black millionaire), Edomonia Lewis (one of the first black female American artists to gain international recognition), activist Rosa Parks, performer Bessie Smith, and former Congresswoman Barbara Jordan. During FY 1988, five locations exhibited "Black Women." These included the American Women's Heritage Society in Philadelphia; Alpha Kappa Alpha in Springfield, Illinois; and Valencia Community College in Orlando, Florida.

"Out of Africa" documents the early chapters of black history. It addresses the trans-Atlantic slave trade from Africa, slave life in the American colonies, the abolition movement, and colonization efforts by free blacks in West Africa. Five sites presented "Out of Africa," including the Seattle Public Library in Seattle, Washington; Delta College in University Center, Michigan; and the African American Museum in Hempstead, New York.

SITES has selected both "Climbing Jacob's Ladder" and "The Real McCoy" to be traveling exhibitions. "Climbing Jacob's Ladder" will go on tour as early as April 1990. Anacostia is currently redesigning three other traveling exhibitions: "Out of Africa," "The Frederick Douglass Years" and "Mary McLeod Bethune and Roosevelt's 'Black Cabinet'." These lightweight redesigns will be suitable for community centers, schools, and other nontraditional sites for Smithsonian exhibits.

Public Education and Orientation - During FY 1988, the Museum presented a number of public programs to complement the "Climbing Jacob's Ladder" exhibition, which the Museum's visitors and the community received enthusiastically. Capacity crowds attended a series of programs held at Our Lady of Perpetual Help Church. Two of these were Toshi Reagon's "Tribute to Dr. Martin Luther King, Jr.: Songs of the Civil Rights Movement" and a concert by D.C.'s award-winning Eastern Senior High School choir, which later won second place at the International Youth and Music Festival in Vienna, Austria, in July 1988. Hundreds of senior citizens enjoyed "The Life and Times of Richard Allen," presented jointly by the Museum and the National Museum of American History. The Museum also presented the program at Savoy Elementary School and at Eastern Senior High School for elementary and senior high school social studies teachers and community residents.

During the year, the Museum sponsored many other public programs, including:

- "Poetry in the Spiritual," by singer and performance poet Kweli Smith;
- A Lunch Bag Forum slide lecture by Richard Powell of the Washington Project for the Arts on "Religion and Afro-American Art";
- A storytelling session featuring tales in the Black folktale tradition by Lorr (sic) Lorenzo Calender II;
- A concert and lecture by noted scholar and musician Pearl Williams-Jones on "Climbing Jacob's Ladder: The Evolution of the Spiritual in Black Worship";
- A concert of black sacred music presented by The Brothers, Inc.; and,
- A second Lunch Bag Forum presenting "A Parting of the Ways: The Conservative/Progressive Controversy and the Post-Bellum Black Church" by Dr. Clarence G. Newsome, assistant dean of the Howard University School of Divinity.

The Museum's concern with preserving Afro-American artifacts led to a seminar on conservation in February 1988. More than 50 people, mostly representing black churches and other institutions, met at nearby Emmanuel Baptist Church. A historian from the Smithsonian Institution Archives and conservators from the Conservation Analytical Laboratory, the National Museum of American History (NMAH), and the National Museum of African Art (NMAfA) provided assistance to the seminar participants. Since the initial meeting, seminar group members have continued to meet for monthly discussions at the Museum. They also have participated in a workshop on paper conservation conducted by a NMAH staff member.

Some 200 children and adults will participate in a series of summer aerospace workshops sponsored jointly by the Anacostia Museum and the National Air and Space Museum. These intergenerational workshops offered young people the opportunity to build and launch kites, hot air balloons, and rockets. While participants came from all over the city, most were neighborhood residents.

Future Space Development of the Museum - In May 1987, the Anacostia Museum opened its new public exhibition and education facilities at Fort Stanton Park. The expanded facility provides better visitor services including off-street parking and houses formerly dispersed museum programs. The Museum soon will initiate a master plan to determine the long-range space needs for its research, exhibition, and public service programs. This plan would reflect long-range requirements for artifact storage and space for exhibitions and staff. It will also assess the need for an auditorium to accommodate the large numbers of people who attend the Museum's educational programs. Based on the master plan, the Museum will evaluate different alternatives for future facilities development. Among them would be the relocation of the Museum to National Park Service land at Poplar Point, near the future Anacostia Metrorail Station on the Green Line.

EXPLANATION OF PROGRAM INCREASE - For FY 1990, the Institution requests an increase of 1 workyear and \$130,000 to establish a collections acquisition program (\$100,000) and to hire an audio-visual specialist (1 workyear and \$30,000).

Collections Acquisition (\$100,000) - Afro-American museums, libraries, and research centers throughout the nation have embarked on an aggressive program to collect and preserve artifacts of Afro-American life and culture because they are disappearing rapidly. The Anacostia Museum will actively seek to preserve the material culture of black American history, both within the Smithsonian and in other institutions.

Anacostia's current collection developed over the past 20 years through gifts, donations, and one-time purchases of individual artifacts. With its new museum facilities at Fort Stanton Park and with the hiring of a registrar, the Museum will develop a more comprehensive collection representing black American history. The Museum will develop plans to prevent the thoughtless disposal of privately owned artifacts and historical documents upon the owner's death. As an example, the Anacostia Museum was instrumental in the acquisition of the Duke Ellington Collection by the National Museum of American History.

The Museum will use the requested funding to acquire artifacts. The Museum will use these objects in future exhibitions, instead of relying on loaned items. Among its first acquisitions, the Museum will collect materials for its scheduled exhibition, "Black Washington: Culture and Conflict in Historical Perspective."

An acquisition program would permit the Museum to purchase high quality museum artifacts, manuscripts, photographs, and books. This program will ensure that the black American heritage will not slip away inadvertently from future generations.

Audio-Visual Specialist (1 workyear and \$30,000) - Audio-visual programming enhances understanding of various concepts, especially for nontraditional audiences. Limited space at the Anacostia Museum is an impediment to presenting comprehensive three-dimensional exhibits. Anacostia Museum plans to increase the use of audio-visual programs in order to expand the number of topics it can present and strengthen the visitor's learning experience.

The requested audio-visual specialist would assist the Museum's sole exhibit designer. A full-time specialist would install and maintain equipment; perform daily inspections of equipment; and coordinate all audio-visual production activities, including serving as liaison with the Smithsonian Office of Telecommunications and script-writing contractors.

The Anacostia Museum must establish a permanent audio-visual program capability supported by regular maintenance and upkeep. An audio-visual specialist will ensure that the Museum offers its constituency a meaningful learning experience on a wider variety of topics.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - An annual allotment supports the salary costs of a woodcrafter. During FY 1988, the woodcrafter completed new exhibit cases and other display materials for the exhibition "Climbing Jacob's Ladder."

Additional funds derived from donations and exhibition rentals purchase supplies and materials to support the Museum's programs.

Restricted Funds - These are gifts which organizations and individuals have designated to support specific Museum programs.

CONSERVATION ANALYTICAL LABORATORY

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	41	2,409	-	-	-	21	1	46	-	-
FY 1989 Estimate	41	2,456	-	-	-	43	1	47	-	17
FY 1990 Estimate	42	2,500	-	-	-	50	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Conservation Analytical Laboratory is the Smithsonian's specialized research facility for wide-ranging aspects of the conservation and technical study of museum objects. CAL advises and assists Smithsonian and other museums in the study, preservation and conservation of objects of artistic, scientific, cultural, and historical importance. CAL performs research on the conservation-related properties of these materials, the improvement of conservation treatment technology, and the extraction of historical information from the technical record of these materials. CAL applies the knowledge gained from scientific research is applied directly to the actual treatment of objects, while the diversity and the wide variety in the state of preservation of these objects provides the overview needed to define directions in conservation research. Experience with a large range of materials and broad expertise in analytical and technological studies enable CAL to engage successfully in a wide spectrum of interactive and collaborative research with anthropologists and art historians.

CAL conducts a conservation training program which includes basic and advanced conservation training, supports and organizes workshops and seminars, and disseminates the latest knowledge in the field of conservation and cultural materials research to museums and research professionals throughout the United States and the world.

The resources contained in the CAL line-item for the hiring of an art historian reflect 1 workyear and \$44,000 associated with the Institution's strengthened affirmative action plan. Justification for these resources appears in the Central Affirmative Action section of this budget.

PROGRAM - Archaeometry - In the field of archaeometry, CAL scientists develop or apply methods of chemical and physical analyses of museum objects and related materials, and integrate the results of such analyses with archeological, anthropological, or art historical data on the same materials. These analyses provide data concerning materials, dates, provenances, attributions, and historical technologies, which, in combination with contextual information and typological and stylistic analyses, help answer questions on the history of these cultures.

CAL scientists generate analytical data on archeological ceramics and clay resources as a major endeavor. They analyze materials from major culture areas in the Old and New Worlds for chemical and mineralogical constituents in order to identify place of origin and directions of trade. They design and execute these projects in collaboration with scholars representing institutions from all over the world. For example, in the American Southwest, they have conducted research on Hopi pottery. This research has resulted in over 1000 analyses useful in developing models of socioeconomic obligations and reciprocity in pottery production and trade between A.D. 1300-1890. Investigators use their knowledge of the technical variability seen in the Hopi yellow wares to trace the changes that occurred before and after the Spanish arrived in 1540. In a second phase, they are examining this Spanish influence by incorporating ethnohistory to gain a perspective on changes in style.

Scientists are conducting other New World projects in Mesoamerica and Central America involving the chemical characterization of ceramics. A CAL scientist involved in a long-term project in Greater Nicoya in Central America has recently received a research appointment to the University of Costa Rica in recognition of his work.

CAL is internationally active in a similar manner in projects involving the Old World. In a major study of production and distribution of Middle Eastern ceramics, researchers are summarizing their data while devoting a new effort to understanding the diffusion of early ceramic technologies. An Italian collaborator, who is spending a year at CAL as a Postdoctoral Materials Analysis Fellow, is a contributor to the latter. Staff have undertaken additional projects concerning the technological history of Far Eastern porcelains, stonewares, or glazes from Egypt, the Middle East, and Far East. In these projects, the staff supplement the data derived from chemical analysis with information obtained from such techniques as scanning electron microscopy and xeroradiography.

Using lead isotope analysis, CAL scientists also completed work on a project to identify Mexican ore sources, potentially used for lead glazes on Spanish-Colonial majolica ceramics, using lead isotope analysis. Thus they demonstrated the use of New World raw materials for glaze production in the 16th century complementing their other work identifying the clay sources used in this ware.

CAL recently hired an art historian to collaborate in the joint program with the National Bureau of Standards and the National Museum of American Art on autoradiographic studies of paintings. This is a technique that uniquely reveals areas of early paint application overlaid with a later paint film. The team has gained new insights regarding the painting techniques of two American artists, Thomas W. Dewing and Albert P. Ryder.

Conservation Science - CAL's conservation science program pursues research into the chemical and physical processes involved in the deterioration of materials in museum collections and into the parameters, both external and internal, which affect the rates of these processes. On the basis of specific Smithsonian requests, scientists perform chemical, physical, and other technical analyses for conservators and curators institution-wide.

As an example of a new research area, a materials research engineer has designed and constructed innovative testing equipment to determine variations in the strength of organic materials, such as paint layers and paper objects, under environmentally controlled conditions. In cooperation with conservators, he has established programs

to evaluate the effectiveness of lining treatments and materials used for fabric supported paintings. These programs also evaluate the changes seen in paper objects when using water in their treatment. In addition, these programs determine the effect of humidity, temperature, and aging on the mechanical properties of a range of materials. By using computer models, this research engineer has predicted the effect of these changes in selected real life situations.

Scientists continue the long-term project to evaluate accelerated aging tests for paper and other cellulosic materials. Short term tests must model long term effects if researchers worldwide are to introduce new treatments with confidence.

This year conservators and scientists initiated a joint program to study the effects of the various cleaning methods that conservators use to remove old varnish from paintings. They will examine the effects of different solvents on the paint layer in a project that has important implications for the conservation of paintings.

In joint programs with other institutions, CAL staff have established new ties with the Carnegie Institution to examine the organic phase of archeological bone for traces of ancient disease. This research will provide evidence of prehistoric diets and a methodology of preparing unadulterated microsamples from collagen-derived amino acids for carbon 14 dating. In another program with the Canadian Conservation Institute and the Getty Conservation Institute (GCI), organic chemists are nearing completion of an investigation on the effect of sulphuryl fluoride fumigant on a wide range of materials. CAL is investigating proteinaceous materials and textile dyes while the other laboratories study the rest of the materials range. GCI associated provides part of the financial support for this program.

A special committee for the new research program on the conservation of photographic materials advised on program directions and helped select a senior investigator. This photographic scientist joined CAL in late FY 1988 and will be investigating glass collodion negative plates, a significant part of Smithsonian and other photographic collections worldwide.

Conservation Treatment - CAL conservators pursue a variety of projects aimed at the development, improvement, and testing of treatment technology.

Paintings conservators are investigating lining adhesives and supports for use in the tropics, organic coatings for paintings, and the identification of pigment sections from paintings using the scanning electron microscope. CAL undertook paintings conservation for NMAH and the Cooper-Hewitt Museum.

The furniture conservators participated extensively in the Training Program but also assisted the National Gallery of Art, the White House, and the National Trust for Historic Preservation.

The textile conservator completed a research project on the stability of pigment printed textiles--now 70 percent of the American printed textile market--for museum conservators, continued research on the cause of silk flag deterioration, and devised a new method for displaying spacesuits at NASM. CAL conducted textile conservation for NASM and NMAH.

The objects conservators used various techniques (x-radiography, xeroradiography, scanning electron microscopy, x-ray diffraction and mechanical testing) to examine Chinese ceramic tomb figures; to determine the process for manufacturing 6000 BC

Near-Eastern plaster figures and to ascertain methods of strengthening these fragile objects; and to evaluate the effectiveness of a marble cleaning procedure. They worked on projects for the Sackler Collection, the Freer Gallery, NMAH, and NMNH. One conservator established an excavation site laboratory at Harappa, Pakistan and worked on objects from the site.

Paper conservators researched various wet bleaching treatments using light and tested for the effects of a range of aqueous and solvent treatments on the texture and strength of paper artifacts. Conservators and interns responded to requests from NMAH, SI Archives, NMNH, NMAA, and NASM.

CAL also made an agreement with the Department of State to write cooperatively a manual about the care of artistically and historically valuable embassy property.

Conservation Training - CAL increased the diversity of its Conservation Training Program activities in the last year. A committee of Smithsonian-wide chief conservators selected six individuals for CAL funded postgraduate internships to work in conservation laboratories throughout the Smithsonian. CAL also initiated a joint doctoral program with The Johns Hopkins University to train conservation scientists and matriculated two students funded by CAL into the program. CAL ensured continuing financial support for the three national graduate level conservation training programs by again allocating funds in support of their activities.

CAL's postgraduate Furniture Conservation Training Program is in its second year. With the completion next year of the formal training phase for the first class, CAL will be selecting a new group of students for the second one. All of the students who were interested in working in museums were able to find conservation position while attending the Program; the ready availability of positions itself proves the need for such training.

CAL conservators and scientists organized and taught, with the help of outside lecturers, ten advanced courses for practicing conservators. The topics included the identification of natural and of early synthetic dyes on historic textiles; coatings and colorants for furniture; the technology and history of ancient jewelry; and the deterioration and conservation of stone.

CAL supported a number of interns at various levels of experience and expertise. This continues previous years' sponsorships but at an increased level. Seven summer internships, two graduate internships, and two of the above-mentioned postgraduate internships are currently in the laboratories.

Information - CAL's information program provides specialized bibliographic and reference research support to professionals in the Smithsonian Institution and other museums. It maintains current information files on conservation and archaeometry literature, technical information, commercial products data, and internally generated reports. Users can access data on CAL Conservation Reports electronically through the Smithsonian Institution Bibliographic Information System. CAL maintains on-line access to the conservation literature data base of the Bibliographic Conservation Information Network (BCIN) which includes the Art and Archaeology Technical Abstracts (AATA). BCIN is a cooperative network founded by the Getty Conservation Institute in cooperation with CAL, the Canadian Conservation Institute, the International Center for Conservation (ICCROM) in Rome, the International Council on Museums (ICOM) in Paris and the International Council on Monuments and Structures (ICOMOS) also in Paris. CAL devotes considerable staff effort to combine these institutional data

bases which are available to conservators worldwide. New accessions further increased CAL's unique collection of reprints from the professional literature in conservation, archaeometry, and related subjects, and this resource now contains over 19,000 reprints.

The public information program continues to provide information in response to questions ranging from the general public to conservation professionals. On the average, CAL answers 60 questions from the general public and 25 from professionals each month. In addition, CAL has given out over 1,200 copies of their 165 page text Approaches to Pest Control in Museums in answer to questions and as supplements to courses since its publication in FY 1986.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These derive from the fees charged to participants in the advanced conservation specialist programs sponsored by CAL. These fees partially offset the expenses incurred in organizing these courses.

Restricted Funds - Funds provided in 1987 by the Getty Conservation Institute partially supported in 1988 a multiyear study on the effects of fumigants on materials in museum collections.

OFFICE OF EXHIBITS CENTRAL

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	46	1,830	-	-	-	151	-	-	-	-
FY 1989 Estimate	46	1,882	-	-	-	152	-	-	-	-
FY 1990 Estimate	50	2,002	-	-	-	152	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of Exhibits Central (OEC) is essential to the success of many Smithsonian exhibitions. OEC's specialists and up-to-date facilities offer Smithsonian units with little or no exhibition capability expertise in all phases of exhibit design and production. Most OEC projects are unique and involve the exhibition of objects from the Institution, other museums, and private collections.

OEC requests an increase of \$120,000 and 4 workyears to expand the exhibition production services it makes available to Smithsonian Museums and to manage exhibition spaces not attached to specific bureaus. Among these are the International Gallery in the S. Dillon Ripley Center, the Experimental Gallery in the A & I Building, and possibly Baldrige Hall in the Department of Commerce Building. With additional funds, OEC can improve the cost-effectiveness of exhibition production and increase the number of educational exhibitions available to the public.

PROGRAM - The Office of Exhibits Central provides comprehensive service and expertise in exhibition design and production. "King Herod's Dream: Caesarea on the Sea," produced in FY 1988 for the Smithsonian Institution Traveling Exhibition Service (SITES), provides a sample of the range of OEC work:

- Design. OEC designed every feature for the SITES' traveling exhibition and for the installation in the Evans Gallery at the Natural History Museum, from exhibit case details to typography for labels, and from selection of the wall colors in the gallery to the placement of objects in cases;
- Editing. OEC received large portions of the script in outline form. The OEC editor researched, using materials provided by the curators, and wrote or rewrote the majority of the copy. In addition to revising for accuracy, OEC edited the script to make it appropriate for a lay audience;
- Graphics. The graphics lab silk-screened labels, text panels, diagrams, and maps; mounted photographs; and mounted framed prints;

- Models. OEC built several models employing a variety of techniques, including: (1) a model of a merchant vessel from 100 C.E. (Common Era), using drawings of several shipwrecks and frequent consultations with the curator, (2) a scale model of a trench showing archaeologists at work as well as tools and equipment, (3) a full-size model of a balk, the earth wall of the excavation, and (4) a life-size reproduction of a Crusader burial;
- Brackets. OEC fabricated custom brackets for about 140 objects to secure them in position while on display and in some cases to secure them permanently for travel. Of particular note is the bracket for the tyche, a 1200-pound marble statue of the city's goddess. After consulting with conservators, OEC decided that the existing bracket might damage the statue during travel. A new bracket, designed and produced under OEC supervision, will protect the statue while it travels;
- Fabrication. OEC built all the components and furniture for the exhibit. This includes text and photo panels, wall-hung vitrines, free-standing exhibit cases, the colonnaded street, and pedestals for objects in cases as well as for large objects such as the tyche. OEC also built shipping containers with custom interiors which will ensure the safety of the objects during travel.

Although "King Herod's Dream" was the largest and most complex project in FY 1988, OEC completed more than 200 other projects. Projects produced for the Smithsonian Institution Traveling Exhibition Service include: "Field to Factory," a panel exhibition adapted from the American History Museum's exhibition; "Soundtracks," a children's exhibition about sounds in the environment with numerous inter-active components; "Victorian Gardens," produced in cooperation with the Office of Horticulture; and "Rainforests," for which OEC edited the script, created the 12-foot fig tree model, and made the life-size figures for the pygmy and rubber tapper dioramas.

OEC supports nearly every Smithsonian office and bureau each year. In FY 1988 projects included:

- Natural History Museum. OEC built more than 100 exhibit cases for "Crossroads" and made Devonian Era trees, bushes, and ground-cover plants for the "Conquest of Man" exhibition;
- American History Museum. OEC painted a mural for "A Material Culture" and designed an exhibition about Irving Berlin;
- Visitor Information and Reception Center. OEC designed new pylons to advertise summer hours at the museums;
- Folklife Festival. OEC fabricated panels, mounted photographs, and silk-screened text.

EXPLANATION OF PROGRAM INCREASE - OEC requests an increase of \$120,000 and 4 workyears to expand the exhibition production services it makes available to Smithsonian Museums and to manage exhibition spaces not attached to specific bureaus.

Expansion of Current Support for Exhibitions (2 workyears and \$60,000): More effective use of the Smithsonian's exhibition design resources will benefit the public and the Institution. The Smithsonian must have additional staff to design exhibitions for its museums at less costs. Additionally, an expanded exhibition capability will primarily benefit minority groups and smaller organizations that serve economically disadvantaged areas to enable them to enjoy Smithsonian exhibitions.

In FY 1988 the Office of Exhibits Central received a total of 220 requests for separate projects, most of which were exhibition-related. Of the total, 20 projects could not be accommodated for lack of staff. Projects that OEC turns away either fail to proceed according to schedule, thereby increasing their costs, or go to more expensive outside contractors. The number of project requests to OEC will increase for several reasons. First, SITES plans to increase the number of reasonably-priced exhibitions for small and medium-sized museums and historical organizations. Better service to these organizations is an important component of the Institution's goals to reach more culturally, ethnically, and economically diverse audiences. In order to keep the production costs (and, therefore, the participation fees) down, SITES will rely more heavily on OEC's services.

Secondly, the Office of the Assistant Secretary of Museums plans to study exhibition costs throughout the Institution, especially comparing the costs of exhibitions which the OEC generates versus those which outside contractors produce. If OEC exhibitions are significantly less expensive, then that fact will encourage bureaus to use OEC to a greater extent. Also, several spaces, such as the International Gallery, the New Experimental Gallery in the A&I Building, and possibly the Baldrige Hall in the Department of Commerce Building, will require expanded support from OEC, since no museums with production capabilities oversee these locations.

The requested resources will enable OEC to hire two new staff members. One position will be an exhibit specialist who will prepare labels and text panels and mount photographs and frame artwork. The other position will be a writer-editor to work on labels, texts, and brochures in addition to proofreading and specifying typography.

Both positions will allow OEC to respond to greater needs and contribute to greater cost-efficiency throughout the Institution.

Gallery Management (2 workyears and \$60,000): To better serve the public and international sponsors, the Smithsonian must coordinate exhibition space more effectively.

For instance, many of the exhibitions organized by SITES do not have a Washington venue. This problem is a potential embarrassment for international shows, and it could adversely affect the private sector funding which offsets participations fees. Also organizations often offer to share exhibitions with the Smithsonian which relate to Institutional priorities. However, Smithsonian museums cannot accommodate various exhibitions either due to scheduling, lack of space or an inability to undertake required exhibition support activities.

The International Gallery in the S. Dillon Ripley Center gives the Institution some flexibility. In addition, the Office of the Assistant Secretary for Museums has been negotiating with the Department of Commerce to waive rent for space available in Baldrige Hall, at the north end of the Department of Commerce Building. Like the

International Gallery, it would have pan-institutional use. However no museum oversees either the International Gallery or Baldrige Hall and, thus, no museum could provide staff for day-to-day operations and exhibition-related services for their venues. To provide the required oversight, OEC will undertake the additional function of managing these and other such gallery spaces.

Additional funds will hire a gallery director and an assistant to the director. Together they will devise a system for selecting exhibitions for the various spaces, coordinate installation and dismantling, supervise contracts, prepare budgets, participate in fundraising, coordinate security and housekeeping services, coordinate publicity, and develop appropriate public programming for each exhibition. In addition, they will oversee the new Experimental Gallery in the Arts and Industries Building, which will open to the public in FY 1989. The Experimental Gallery, administered by the Office of the Assistant Secretary for Museums, will be a place which can test new techniques for presenting information and objects to various types of audiences. The Experimental Gallery will feature four exhibitions annually, two developed by museums outside the Smithsonian and two by specially selected teams.

Additional staff at OEC will enable the Institution to provide support for gallery spaces that are pan-institutional and will primarily benefit the public who come for the enrichment of the many disciplines presented through exhibitions.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Proceeds from the sale of the OEC book A Freeze-Dry Manual through the Smithsonian Institution Press and reimbursements from internal Smithsonian units provide these funds. OEC uses the funds to purchase supplies, materials, and services in support of OEC activities; to defray costs associated with special events; and to supplement travel expense.

SMITHSONIAN INSTITUTION TRAVELING EXHIBITION SERVICE

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	15	620	8	300	23	1,806	1	858	-	19
FY 1989 Estimate	15	667	8	314	23	1,560	-	1,685	-	9
FY 1990 Estimate	20	869	8	314	20	1,881	-	1,643	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Smithsonian Institution Traveling Exhibition Service (SITES) offers carefully selected, well-designed, and widely circulated traveling exhibitions. The exhibitions draw upon the collections of the Smithsonian, United States and foreign museums, foreign governments, private individuals, and organizations throughout the world. The largest service of its kind in the United States, SITES provides a broad selection of exhibitions encompassing the diverse disciplines and subject matter represented in the collections of the Smithsonian, including the arts, natural history, design, archeology, anthropology, science and technology, decorative arts and crafts, and popular culture. A major goal of SITES is to share the resources of the Smithsonian at reasonable fees. SITES requests an increase in base program funding for FY 1990 of \$202,000 and 5 workyears, a sum that will enable SITES to reduce the amount of operating costs that SITES must recover from exhibitors through participation fees.

PROGRAM - The Smithsonian Institution Traveling Exhibition Service is the primary organizer of Smithsonian traveling exhibitions. For a participation fee which the exhibitor pays to SITES, the exhibitor receives an exhibition for four to eight weeks, one-way shipping costs, and comprehensive insurance through all phases of the exhibition, from the time the work leaves its lender's display until its return.

Along with the exhibition materials, SITES provides exhibitors with curatorial and registrarial information, handling instructions, technical information, publicity materials, suggested educational activities and public programs, and in most instances publications. SITES advises museum colleagues on various professional topics, such as shipping and insuring of artifacts, installation techniques, exhibition security, design and upgrading of exhibition space, and contract matters.

At any given time, over 120 exhibitions are circulating around the country or globe, or are in some stage of planning and production. An estimated five million people each year view SITES' productions at museums, galleries, and educational and cultural institutions around the world. Since its inception in 1952, over 110 million people have visited one of the Smithsonian's traveling shows in over 15,000 communities. The Smithsonian Magazine publicizes locations of certain SITES shows in

each issue, helping to increase the Smithsonian's national audience. SITES markets exhibitions directly to over 9,000 institutions and individuals in cultural organizations around the world every year through Update, SITES' annual catalogue of available exhibitions, and a quarterly newsletter Siteline.

During FY 1988, 98 SITES' exhibitions traveled in the United States to 202 cities in 43 states and the District of Columbia. Total exhibition bookings came to 333 in FY 1988, including 13 bookings outside the United States.

Alabama 4	Montana 1
Alaska 1	Nebraska 3
Arizona 2	Nevada 2
Arkansas 3	New Hampshire 2
California 24	New Jersey 1
Colorado 5	New Mexico 11
Connecticut 4	New York 26
Delaware 0	North Carolina 8
District of Columbia 6	North Dakota 0
Florida 26	Ohio 8
Georgia 10	Oklahoma 1
Hawaii 1	Oregon 5
Idaho 0	Pennsylvania 13
Illinois 11	Rhode Island 0
Indiana 7	South Carolina 2
Iowa 6	South Dakota 0
Kansas 8	Tennessee 10
Kentucky 5	Texas 24
Louisiana 0	Utah 6
Maine 1	Vermont 0
Maryland 8	Virginia 6
Massachusetts 9	Washington 7
Michigan 13	West Virginia 3
Minnesota 5	Wisconsin 12
Mississippi 3	Wyoming 0
Missouri 7	

SITES maintains an active international program, sharing collections from the Smithsonian and other sources in addition to exhibition expertise with millions of people outside the U.S. In FY 1988, SITES' exhibitions enjoyed 13 opportunities to reach audiences abroad. Four exhibitions traveled to Canada: "Twenty-five Years of Manned Space Flight" (two bookings); "Audubon: Science into Art"; "Beauties of the Coral Reef"; and "Athletes: Photographs, 1860-1986." Four other exhibitions toured in Israel, Luxembourg, Japan, and Puerto Rico, respectively: "Twenty-Five Years of Manned Space Flight"; "Beauties of the Coral Reef"; "Hollywood: Legend and Reality"; and "Diamonds Are Forever: Artists and Writers on Baseball." "New Horizons: American Painting, 1840-1910" visited four cities in the U.S.S.R.

Smaller museums and organizations look to SITES for light-weight, easily installed, low-cost exhibitions. SITES perfected this type of show during the 1970s. Another specialized exhibition format SITES developed is the poster panel exhibition. The four currently available for direct purchase range from black history to science. In FY 1987, SITES published the poster panel show "Diversity Endangered," treating the global problems of vanishing species and habitats. For the first time, SITES offers cardboard kiosk mounts for this show as well as an educational videotape.

Since moving to the S. Dillon Ripley Center in FY 1987, SITES hired an Education Workshop Coordinator to plan and host workshops for museum colleagues about various aspects of managing traveling exhibitions; planned for the proper outfitting and installation of exhibitions (two to date) in a small Introductory Gallery; worked closely with the International Center to produce "Generations"; installed the second major exhibition in the International Gallery, "Tropical Rainforests: A Disappearing Treasure"; and contributed to the international programs of the Smithsonian through Quincentenary exhibition planning.

SITES estimates that 53 new exhibitions will begin their tours during FY 1989 and FY 1990. Among the major new exhibitions for FY 1989 are: "American Art from the Cooper-Hewitt"; "Frank Lloyd Wright: Preserving an Architectural Heritage"; "Views of Rome: Watercolors and Drawings from the Collection of the Biblioteca Apostolica Vaticana"; "Voices of Hellenism: The Collection of the Benaki Museum"; "Climbing Jacob's Ladder"; and "Crossroads of Continents: Cultures of Siberia and Alaska." The number of new exhibitions each year fluctuates between 25 and 30. Each exhibition, whether from internal or external sources, requires approximately two years to develop and fabricate. In May 1988, the major SITES exhibition "Tropical Rainforests: A Disappearing Treasure" opened in the International Gallery of the S. Dillon Ripley Center.

SITES' top priority over the long range is two-fold: to develop more exhibitions that originate from Smithsonian collections and research and fulfill Smithsonian priorities; and to develop more exhibitions in the SITES program that address the cultural interests and contributions of minority audiences.

EXPLANATION OF PROGRAM INCREASE - Exhibitions play an important educational role. Cultural organizations throughout the world operate on this premise and see the Smithsonian as a leader in developing and offering quality educational exhibitions. As a traveling exhibition service, SITES has two goals. One is to educate the museum visitor and the other is to maintain affordable fees for exhibitors. In addition, exhibitors need to serve and attract minority audiences and to educate traditional museum audiences about the cultural contributions of minorities.

With the requested funds, SITES will develop more affordable exhibitions that are socially responsible, culturally and ethnically diverse, and appealing to cross-cultural audiences. This emphasis reflects the needs of exhibitors and the Institution's commitment to improving minority representation in museum management and programming.

SITES' total operating budget consists of two general categories: direct subsidies and recoverable costs. Direct subsidies represent non-reimbursable costs and receive support from three funding sources: a Federal appropriation; a limited amount of nonappropriated Trust fund support from the Institution; and outside grants and contracts. SITES must recover all remaining operating costs through participation (rental) fees charged to exhibitors. A program increase of \$202,000 will enable SITES to plan and develop exhibitions that are relevant to culturally and ethnically diverse audiences at reasonable fees. These funds will pay for current workyears whose cost SITES now recovers from exhibitors. These funds will support exhibitions of interest to minority or other under-served audiences. Sites will also use these funds to develop more affordable exhibitions and to reduce participation fees for smaller exhibitors. The more costs supported with Federal funds, the less SITES must recover through participation fees.

To the extent that SITES receives the resources to produce exhibitions that address under-served audiences, the Institution will increase minority representation in educational expressions of culture. Federal funding will make exhibitions more affordable and accessible to the thousands of cultural institutions and their minority audiences nationwide.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - The bulk of SITES' operating budget comes from participation fees collected from museums, universities, historical societies, and other recipients of traveling exhibitions. These funds, supplemented by an allotment, support exhibition development costs including salaries and benefits, exhibition production, publications, materials, outside specialists, and contractual services. The Institution supports SITES exhibitions on a selective basis with monies from the Special Exhibitions Fund. This was the case for "King Herod's Dream: Caesarea on the Sea" which opened at the National Museum of Natural History during spring 1988.

Restricted Funds - Individuals, organizations, and corporations donate gifts and foundation grants for specific SITES projects. During FY 1988, SITES received several grants: from the Goodwill Games for "Treasures from Moscow and the Kremlin"; from a private donor for "Views of Rome: Watercolors and Drawings from the Collection of the Biblioteca Apostolica Vaticana"; from Phillips Petroleum for "Ceramics of the Weimar Republic"; from American Express for "Diamonds are Forever: Artists and Writers on Baseball"; from the MacArthur Foundation, the Gund Foundation, and the Wrigley Foundation for "Tropical Rainforests: A Disappearing Treasure"; from United Technologies Pratt & Whitney for "Into the Sunlit Splendor: The Aviation Art of William S. Phillips"; from the Atlantic Bank of New York for "Voices of Hellenism: The Collection of the Benaki Museum"; and from the 28th International Geological Congress for "Inside Active Volcanoes: Kilauea and Mount St. Helens."

During FY 1989 and FY 1990 SITES plans to conduct major funding appeals for the following exhibitions: "German Medieval Painting and Sculpture"; "Great American Comics"; "In Splendor and Seclusion: Women in Art and Life in the Court of Benin"; "Stonehenge Observed"; and "Treasures from Moscow and the Kremlin."

Government Grants and Contracts - Various levels of government provide funds for support of specific exhibitions. For example, a contract with the U.S. Fish and Wildlife Service will enable SITES to circulate the National Museum of American History exhibition about duck stamps, entitled "The Legacy Endures."

ASSISTANT SECRETARY FOR PUBLIC SERVICE

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	23	1,267	42	2,540	-	76	-	43	-	-
FY 1989 Estimate	23	1,294	43	2,713	-	207	-	33	-	-
FY 1990 Estimate	25	1,372	46	2,926	-	79	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of the Assistant Secretary for Public Service encourages and supports the development of programs to advance the Institution's objectives in education, publication, information, electronic media, folklife programs, and the development of wider audiences. It advises the Secretary on general policy issues and program planning for Public Service activities. This line-item includes the Office of the Committee for A Wider Audience, the Office of Telecommunications, the Visitor Information and Associates' Reception Center, the Office of Conference Services, and the Office of Public Affairs.

For FY 1990, the Office of the Assistant Secretary requests an increase of 2 workyears and \$78,000 for clerical support (2 workyears and \$45,000), for public service announcements aimed at minority audiences (\$8,000), and for automation (\$25,000).

PROGRAM - I. The Office of the Assistant Secretary for Public Service: The Office of the Assistant Secretary for Public Service coordinates and supervises the Institution's educational and public service programs and advises the Secretary on the development of policies and activities for these programs. The bureaus and offices reporting to the Assistant Secretary include the Office of Telecommunications; the Visitor Information and Associates' Reception Center; the Office of Public Affairs; the Smithsonian Institution Press; Smithsonian magazine and Air and Space magazine; the Office of Folklife Programs; the Office of Interdisciplinary Studies; the Office of Elementary and Secondary Education; the Office of the Committee for A Wider Audience; the National Science Resources Center; and the Office of Conference Services.

II. Office of Telecommunications: The Office produces radio, film, and television programs on various Smithsonian research and scholarly activities. These wide-ranging programs, distributed nationwide and overseas, inform the public, and support the research, exhibitions, and educational goals of the Institution.

The Office produces two major program series. "Here at the Smithsonian..." an award-winning series of video features, launched its seventh season with 180 subscribing stations, reaching more than 50 percent of the prime-time viewing audience in the United States. "Radio Smithsonian," a weekly half-hour series, is broadcast on 90 stations nationally, with a potential weekly audience of 4 million people. Programs in the series focus on exhibitions, research, and performance activities throughout the Institution.

In FY 1988, the Office completed several film and video projects and laid the foundation for expanded national programming in several important areas. For the National Museum of American History (NMAH), the Office produced interactive video components for the major exhibition, "A Material World," demonstrating the selection and testing of materials for use in making familiar objects. Also for NMAH, the Office completed an exhibition videotape on the music of Irving Berlin, marking the composer's 100th birthday. The film, "Magnificent Voyagers," produced for the National Museum of Natural History, chronicles the U. S. Exploring Expedition of 1838-1842 (the Wilkes Expedition), which first gained worldwide attention for American science. "The Reel Jungle," a video program produced to accompany a Smithsonian Institution Traveling Exhibitions Service exhibition, shows the myths and misconceptions of tropical rainforests that artists and filmmakers created over many years. For the Museum Support Center, the Office produced a new 15-minute videotape, giving a comprehensive overview of the workings of this innovative facility. Like its predecessor, the tape acquaints museum professionals around the world with the latest techniques for collections management and preservation. "Building an Ocean: The Creation of a Model Biosphere," a one-hour film, depicts the exhaustive efforts of the Smithsonian's Marine Systems Laboratory to create model ecosystems of the Chesapeake Bay estuary and the Florida Everglades. The model improves research on the life cycles of these systems and helps in developing self-sustaining colonies in space.

The Office is producing two major components for the new Smithsonian Information Center, set to open in the "Castle" in July, 1989, under the auspices of the Visitor Information and Associates' Reception Center. One element is a 15- to 20-minute orientation program, which will run continuously in two identical theaters. The Office is overseeing development of an interactive videodisc program for visitor use at several kiosks in the Castle's Great Hall. Visitors will become familiar with basic facts about each Smithsonian museum, special attractions for children, tours, demonstrations, restaurants, and museum shops.

Also in FY 1988, the Office devoted considerable effort to launching the Smithsonian Video Collection, aimed at taking the museums to the people through programs specifically for home video. With financing from Eastman Kodak Company, the programs will explore Smithsonian collections and research. The Office will release the first three programs in the series early in 1989, with a minimum of 12 shows completed by the following December.

Looking to the future, the Office plans several projects intended to bring wider audiences in touch with the Smithsonian. In its continuing series, the Office has worked to present the widest possible cultural diversity, as reflected in the programs of Smithsonian museums. In addition, staff members joined with the Office of Interdisciplinary Studies to plan and produce a national live teleconference on "Afro-Americans and the Evolution of a Living Constitution." With the Office of the Committee for a Wider Audience and the Smithsonian magazine, the Office is planning a series of short radio features designed for Black commercial radio, to increase Black Americans' awareness of the Smithsonian and its programs. Recently, the Office

completed an extensive study of Hispanic television outlets in the United States and has proposed a series of Spanish-language TV features for this market. Working with other Smithsonian units, the Office will continue to explore new possibilities for wider-audience programming.

Development is moving forward on two large-scale projects. In FY 1988, the Office produced a pilot program for a new, expanded version of "Radio Smithsonian." This program, designed to provide a broader picture of the Institution, prominently features music and culture from around the world. The pilot has received high praise from many public radio programmers nationwide, and efforts are now under way to raise private funds for the series. With funding in place, the program could debut in early 1989. The Office is proceeding with a major project for children ages 9-12, combining an interactive videodisc and a videotape series on the years leading to and following Columbus' historic voyage. Developed with Bank Street College of Education, the project explores the uses of new technology to support a discovery learning approach and promotes critical and independent thinking among the nation's young people.

III. Visitor Information and Associates' Reception Center: The Visitor Information and Associates' Reception Center (VIARC) operates Institution-wide information and assistance programs for the public, Associate members, staff, volunteers, and interns.

A corps of more than 500 volunteer information specialists provides information services seven days-a-week. Services include staffing 16 information desks in 11 buildings; operating the Smithsonian Information Center in the Castle; and answering the Institution's public inquiry telephone lines. In 1987, staff and volunteers handled more than 430,000 telephone calls. VIARC provides daily recorded information on Dial-A-Museum and Dial-A-Phenomenon. In the past year, the staff received and responded to more than 55,000 public mail inquiries. VIARC regularly conducts behind-the-scenes tours of the Castle.

During the summer months, VIARC uses recently redesigned outdoor pylons to orient and inform visitors of extended museum hours. Summer information aides operate mobile information carts which make available 120,000 information leaflets to visitors on the Mall.

Also during the summer, VIARC began a pilot program, SI Shutterbugs. In bright yellow and white uniforms, volunteers station themselves at popular locations to help visitors by taking group photos using the visitors' cameras.

Other services include recruiting and placing volunteers, registering and orienting Smithsonian interns, operating a central housing assistance program for professional visitors, and operating an outreach program to promote pre-visit education and membership.

The Commission of Fine Arts, followed by the endorsement of the National Capital Planning Commission, approved design and materials for the Institution's Exterior Graphic Information System. The Information System will provide a consistent sign format to identify Smithsonian museums. VIARC and the National Park Service began work on one aspect of this project--the updating and refurbishing of the general information directories on the Mall.

The Institution projects that public information and reception services will

increase significantly with the continued promotion of membership and the opening of the new Smithsonian Information Center in the Castle.

IV. Office of Public Affairs: The Office of Public Affairs (OPA) acquaints the public with the programs and policies of the Institution.

The Smithsonian News Service provides some 2,500 daily and weekly newspapers with a free, monthly package of four feature-style articles on subjects in art, history, science, technology, and contemporary life. The News Service translates one of the four articles into Spanish. This translation accompanies the English versions to 100 Hispanic and bilingual newspapers in the United States (including Puerto Rico) and Canada and more than two dozen newspapers and publications in Latin America. In FY 1989, the News Service will emphasize more stories of particular interest to Hispanics and will expand its coverage further into Latin America.

In FY 1988, OPA substantially expanded its programs to reach a broader range of ethnic communities, including Afro-Americans and Hispanics. The program involves the coordinated preparation and distribution of news releases, brochures, public service announcements for radio and television, and direct media contact. The theme of this program is "The Smithsonian is for Everybody." In FY 1988, OPA produced media-related programs for the Afro-American community including two television public service announcements, radio, newspaper and magazine advertisements, a monthly calendar of events for Afro-American newspapers, and bus and subway posters. Besides the Spanish edition of Smithsonian News Service, OPA prepares news releases and radio public service announcements, a calendar of events, a television public service announcement, and a brochure of Latino resources. The staff produced two television public service announcements with a multi-heritage focus. The Office began an American Indian internship and increased direct-media contact with many ethnic communities.

OPA focuses on the communication of research activities to the media through direct contact with journalists, resulting in many major articles appearing in such national publications as The New York Times and The Washington Post. The circulation of Research Reports, a periodical devoted to reports on research in the arts, history, and science, reached a record in FY 1988 of nearly 55,000 readers, including the scholarly community, foundations, universities, and Smithsonian contributing members.

OPA conducts and coordinates extensive media campaigns on behalf of the Institution to publicize many events. In FY 1988, these included the observance of the fifth anniversary of the Museum Support Center, the exhibition, "Tropical Rainforests: A Disappearing Treasure," ethnic week celebrations, "Crossroads of Continents," and "Roots, Rights, and Responsibilities."

OPA also advises Smithsonian bureaus and offices on public information policies and programs. OPA monitors their public information materials, the Institution's many relations with corporate and other sponsors, and the advertising and promotional plans and materials of corporate sponsors. OPA produces a monthly staff newspaper, The Torch, and informs management of public and media attitudes and needs.

The Office prepares a wide variety of publications, including visitor brochures in English and six foreign languages, a guide for disabled visitors, a brochure for journalists on the Smithsonian, a monthly calendar of events, and flyers for various bureaus such as the Smithsonian Tropical Research Institute and the Anacostia Museum.

The Office continues to receive acclaim for the work of its staff from the National Association of Government Communicators and the Society for Technical Communications.

EXPLANATION OF PROGRAM INCREASE - For FY 1990, the Office of the Assistant Secretary requests an increase of 2 workyears and \$78,000 for clerical support (2 workyears and \$45,000), for public service announcements aimed at minority audiences (\$8,000) and for automation (\$25,000).

I. Assistant Secretary for Public Service - Clerical Support (1 workyear and \$25,000) - The Office requests an additional clerical position. A secretary will provide clerical services needed to implement the new initiatives of the Deputy Assistant Secretary for Media Affairs.

The Deputy Assistant Secretary for Media Affairs provides administrative oversight of public service programs, in particular, related financial and legal matters, and newly developing technology aspects of various Smithsonian print, audio, and video projects. These projects will require analysis of and written responses to actions taken by Smithsonian staff or vendors. The Deputy will monitor compliance with contract terms and donations received, and will provide legal advice to the Institution's public service bureaus.

This clerical position will allow the Deputy Assistant Secretary to carry out his duties expeditiously.

II. Visitor Information and Associates' Reception Center - Automation (\$25,000)- VIARC provides assistance services that visitors expect. As the Institution increases use of new technology, VIARC must keep pace to ensure effective and efficient service.

VIARC will establish a local area network in FY 1989. This automated system will extend information campus-wide by:

- linking the visitor centers in each museum;
- decreasing response time to public mail inquiries;
- increasing cooperative program efforts among bureaus with common interests (thereby reducing duplication of effort); and
- communicating changes in program activities to museum volunteers and staff.

The requested funding will provide preventive maintenance, parts, and technical support costs for office automation equipment. Initial equipment warranties/guarantees expire in 1990. Funding will assure continued access to computer data bases and recordkeeping programs.

Without funding for a regular maintenance and technical support program for hardware and software, computer problems will limit access to stored data bases and recordkeeping programs. Computer problems reduce productive staff time and restrict VIARC's ability to provide the quality and level of Institution-wide assistance activities audiences have come to rely upon.

III. Office of Public Affairs (1 workyear and \$28,000) - The Institution has launched special efforts to encourage more minorities to participate in Smithsonian activities. To achieve this goal, the Office of Public Affairs has implemented broad-based information programs directed toward Afro-American and Hispanic populations.

These programs communicate information to these groups about fellowship and research opportunities, exhibitions, and special events.

The next step is to expand these programs to reach more effectively Asian and Native American populations. The Office requires additional funds for public service announcements and clerical help. This increase will enable the Office of Public Affairs to reach these communities through the print and broadcast media.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - I. The Office of the Assistant Secretary for Public Service: Annual allotments provide for the salary, benefits, and support costs of staff members assigned to the immediate Office of the Assistant Secretary for Public Service, and consultants for electronic media activities. Trust funds also support expenses associated with the Office of the Committee for A Wider Audience, including the Cultural Education Committee, which fosters the development of pan-Institutional outreach efforts designed to attract diverse cultural audiences. A Special Purpose fund provides for the Educational Outreach Fund, which fosters research on improved, expanded, and innovative methods of outreach activity. While this Office administers the funds, the recipient organizations' accounts reflect the expenditures.

II. Office of Telecommunications: An annual operating allotment provides support for nine, full-time staff members and expenses associated with the production of educational and informational materials for television, film, and radio. Nominal subscription fees received for some programs help defray production and distribution costs. The sale of films and videotape programs provides additional funds. The Office produces two continuing series of programs which reach the American public regularly through radio and television. "Here at the Smithsonian..." is a series of television features, and "Radio Smithsonian" is a weekly, half-hour magazine program.

III. Visitor Information and Associates' Reception Center: An annual operating allotment supports the Center's work as the Institution's public service bureau responsible for the information and assistance activities described in the program statement.

IV. Office of Public Affairs: Allotments provide these funds which support public outreach activities such as publication of the Institution's Welcome brochure, The Washington Post calendar, and other advertisements, wider audience advertising with the Afro-American, Hispanic, American Indian, and Asian American media, and public service announcements for radio and television.

SMITHSONIAN INSTITUTION PRESS

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	29	1,192	37	13,195	-	5	-	-	-	-
FY 1989 Estimate	29	1,226	40	15,055	-	1	-	-	-	-
FY 1990 Estimate	31	1,292	40	19,490	-	-	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - A member of the Association of American University Presses since 1966, the Smithsonian Institution Press (SIP) is responsible for editing, designing, producing, and distributing books, sound recordings, and other printed materials prepared by staff scientists, historians, and curators, as well as scholars from educational institutions around the world. Such materials also include research monographs, technical and scientific series, exhibition catalogs for Smithsonian museums, educational pamphlets, and informational leaflets. For FY 1990, SIP requests an increase of 2 workyears and \$66,000 for electronic data publishing support.

PROGRAM - The Federal publication activity of the Press is a fundamental extension of the Smithsonian's basic research activities. The scientific, technological, and historical monographs the Press publishes propagate research of Smithsonian curators and staff experts to libraries, museums, research institutions, and interested members of the public throughout the United States and abroad. Because of the Smithsonian's extensive use of computers to compile research results, it is possible for the Press to assemble a wholly electronic typescript of each federally funded research monograph. The Press' Desktop Publishing equipment in the Press eliminates the cost of phototypesetting for all of these publications. The savings on typesetting costs in the first year of use (FY 1987) covered the cost of equipment. Continued savings in FY 1988 enabled sponsoring Smithsonian bureaus to restrain the escalation of their publications budgets without having to curtail their publishing programs. In addition to publishing research findings, the Press edits and designs exhibition catalogs, educational pamphlets, and informational leaflets that serve the millions of visitors to the Smithsonian in Washington, D.C., and the extensive programs conducted nationwide and worldwide.

Additionally, the Press acts as the official agent of the Smithsonian Institution in procuring services from the U.S. Government Printing Office to create government forms, museum guides, and instructions, as well as in providing professional assistance to Smithsonian authors upon request. The Press also edits, designs, and produces Smithsonian Year, the Institution's annual report to the Regents and the Congress.

Federally funded books published during FY 1988 include A Monograph of the Lichen Genus Parmelia. . ., by Mason E. Hale, Jr. (Smithsonian Contributions to Botany, #66); Hydrographic and Meteorological Studies of a Caribbean Fringing Reef at Punta Galeta, Panama. . ., by John D. Cubit et. al. (Smithsonian Contributions to the Marine Sciences, #32); The Cretaceous Birds of New Jersey, by Storrs L. Olson and David C. Parris (Smithsonian Contributions to Paleobiology, #63); A Survey of Internal Oral Features of Leptodactyloid Larvae (Amphibia: Anura), by Richard J. Wassersug and W. Ronald Heyer (Smithsonian Contributions to Zoology, #457); and Late Holocene Fossil Vertebrates from Burma Quarry, Antigua, Lesser Antilles, by Gregory K. Pregill et. al. (Smithsonian Contributions to Zoology, #463).

EXPLANATION OF PROGRAM INCREASE:

Electronic Data Publishing (2 workyears and \$66,000). With these resources, the Press will create an electronic publishing program to increase the accuracy of Smithsonian research databases. A highly developed technology now exists; and this increase guarantees that researchers will have better access to more timely information.

Conventional publication methods are no longer appropriate for the Smithsonian's extensive, continually updated research database. For example, in the time it takes to produce a printed copy and make it accessible to users, new information renders that publication obsolete. Further, electronically accessed data capable of being incorporated directly into the user's document is more valuable.

Electronic publication will use a variety of media: magnetic (tape or floppy disks), optical (CD-ROM, videodiscs, etc.), and on-line (telephone dial-up). The added staff will:

- establish distribution channels appropriate to the various electronic media, including cooperative relationships with other federal agencies and the Depository Library Program;
- help researchers to incorporate electronic publishing into the design of their research projects;
- advise researchers on the maintenance and development of databases slated for electronic publication;
- develop Smithsonian standards for protecting the integrity of Smithsonian databases; and
- oversee all arrangements for each federally funded electronic database publication, including contracting through GPO for necessary preparation and manufacturing services.

The Press proposes adding two staff members in FY 1990 to develop an electronic publishing program. These positions will provide the resources needed to disseminate Smithsonian research databases electronically.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - The sale of trust-funded books and recordings, royalties, and special publishing services produce these resources. The funds thus produced support the necessary services required to develop, market, warehouse, and distribute records and scholarly and general interest books, published in connection with the Institution's research collections, exhibitions, and other programs.

University Press Division - A priority publication of the Press in conjunction with the major international exhibition at the National Museum of Natural History is Crossroads of Continents: Cultures of Siberia and Alaska, by William W. Fitzhugh and Aron Crowell. Grass Systematics and Evolution, by Thomas R. Soderstrom et al. is a landmark work.

In 1988, the Smithsonian Institution Press book program continued to publish books acclaimed by critics and reviewers, such as Galapagos: Discovery on Darwin's Island, by David W. Steadman and Steven Zousmer, and Fragonard in the Universe of Painting, by the leading scholar and art critic Dore Ashton. The University Press division published an important book on Washington architectural and social history, Best Addresses: A Century of Washington's Distinguished Apartment Houses, by James M. Goode. The New Directions in American Art series published these new titles: Millennial Desire and the Apocalyptic Vision of Washington Allston, by David Bjelajac, Frederic Edwin Church and the National Landscape, by Franklin Kelly, and Plain Painters: Making Sense of American Folk Art, by John Michael Vlach. Among the Press's new titles in the sciences were North American Owls: Biology and Natural History, by Paul A. Johnsgard, The Bald Eagle: Haunts and Habits of a Wilderness Monarch, by Jon M. Gerrard and Gary R. Bortolotti. New books on aviation history included From the Ground Up: The Autobiography of an Aeronautical Engineer, by Fred E. Weick and James R. Hansen, Pacific Air Race, by Robert H. Scheppler, and Test Pilots: The Frontiersmen of Flight, by Richard P. Hallion.

The University Press division also inaugurated Exploring the American West, a series featuring reprints of rare and out-of-print reports, with two titles: Report of the Exploring Expedition to the Rocky Mountains in the Year 1842, by John C. Fremont, with a new introduction by Herman J. Viola and Ralph Ehrenburg, and Exploration and Survey of the Valley of the Great Salt Lake, by Howard Stansbury, with a new introduction by Don D. Fowler. A volume of special interest was on The Rise of Black Churches in Eastern American Cities, 1740-1877; the main title is Climbing Jacob's Ladder, by Edward D. Smith. Among the art history books produced were Giacometti, by Valerie J. Fletcher, in collaboration with the Hirshhorn Museum, and in collaboration with the National Museum of American Art, Paulanship, by Harry Rand. For the National Museum of African Art, the Press distributes The Art of West African Kingdoms, edited by Edward Lifschitz.

Three new titles published in the Smithsonian Series in Ethnographic Inquiry are: Raramuri Souls: Knowledge and Social Process in Northern Mexico, by William L. Merrill, Raiders & Refugees: Trends in Chamba Political Development, by Richard Fardon, and The Hold Life Has: Coca and Cultural Identity in an Andean Community, by Catherine Allen. Three titles debuted published in the Smithsonian Series in Archaeological Inquiry: Prehispanic Settlement Patterns in the Lower Santa Valley, Peru, by David J. Wilson, Status and Health in Prehistory: A Case Study of the Moundville Chiefdom, by Mary Lucas Powell, and Stylistic Boundaries among Mobile Hunter-Foragers, by C. Garth Sampson.

Smithsonian Collection of Recordings - This office publishes both popular recordings suitable for direct mail marketing to Smithsonian Associates and recordings of scholarly interest. During FY 1988, the Recordings program released Jump for Joy, a 1941 musical revue with music by Duke Ellington with program notes by Ellington scholar Patricia Willard. Another release was the six-disc Beethoven: Early Years through the "Erotica" performed by the Smithsonian String Quartet and the Smithsonian Chamber Orchestra, an original instruments recording. The Recordings program co-produced with the Indiana Historical Society The Classic Hoagy Carmichael, and with the German company Deutsche Harmonia Mundi Servais's Souvenirs and Caprices, Mozart's Concertante/Concertone, and Haydn's String Quartets, Opus 77 & 103. This year (as in 1985, 1986, and 1987) a Smithsonian Collection release, Singers and Soloists of the Swing Bands, programmed by Martin Williams with album notes written by Mark Tucker, received a nomination for a National Academy of Recording Arts and Sciences (NARAS) "Grammy" award in the categories of Best Historical Album and Best Album Notes. Jimmie Rodgers: America's Blue Yodeler, with notes written by Nolan Porterfield, also garnered a nomination for a Grammy for Best Album Notes and in addition received a Deems Taylor Award from ASCAP for the album notes.

Smithsonian Books - The "popular book" division of the Press, Smithsonian Books, publishes books for a general audience on subjects that relate to Smithsonian collections and research interests. These books, marketed primarily by direct mail to Smithsonian Associates and other lists, are also available to the general public through several trade publishers, including the sales force of the University Press division. Some of the titles currently available are In the Age of Mankind: A Smithsonian Book of Human Evolution; Exploring the West; The Smithsonian Book of Flight; The Smithsonian Book of North American Indians; Treasures of the Smithsonian; and The National Museum of Natural History. The goal of the program is to continue publishing well written, carefully researched, commercially successful, and critically well acclaimed books of general interest.

In fiscal year 1989, Smithsonian Books will begin publishing a 12-volume continuity series, Guides to Historic America; a book about birds entitled Lords of the Air; and a video production that accompanies the published book, The World's Whales.

INTERNATIONAL ACTIVITIES

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	13	787	10	654	-	150	-	160	-	-
FY 1989 Estimate	13	799	10	649	-	150	-	161	-	-
FY 1990 Estimate	18	1,119	11	692	-	150	-	103	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The International Center (formerly the Directorate of International Activities) monitors, coordinates, and enhances Smithsonian-wide endeavors in the international field. The Center provides Institution-wide support for the diverse range of Smithsonian international programs through the work of several independent activities: the Office of International Relations; the International Gallery; the Office of Quincentenary Planning; and the Office of Conference Services. Through the International Center, the Smithsonian also supports international research programs such as UNESCO's Man and the Biosphere Program and the Council of American Overseas Research Centers. For FY 1990, the Institution requests an increase of 5 workyears and \$320,000 to hire an additional international liaison officer and an information technician for the Office of International Relations (2 workyears and \$110,000); to provide support for the planning and development of exhibitions in the International Gallery (\$100,000); to increase central Smithsonian support for Institutional Quincentenary planning (1 workyear and \$52,000); and to establish a new Office of Conference Services (2 workyears and \$58,000).

PROGRAM - International programs have played an important role within the Smithsonian from its earliest days when Joseph Henry established his global network of correspondents. The Institution's international activities occur at many levels, from informal scholar-to-scholar correspondence to highly structured Institutional undertakings.

In FY 1985, the Smithsonian established the Directorate of International Activities to facilitate the Institution's international research, especially in the fields of the natural sciences; to encourage collaborative work involving individuals and institutions in other countries; and to advance the objectives of the Smithsonian's charter by serving as an example of international cooperation. During the later part of FY 1987, the Institution conducted an internal review of the operations of the Directorate. In April 1988, as a result of this review, the Institution reorganized the various parts of the former Directorate of International Activities into a new International Center. A new International Activities Council, consisting of the Assistant Secretaries for Research, Museums, Public Service, and External Affairs, will provide oversight and policy guidance for the International

Center and for the wide range of international programs sponsored throughout the Institution.

Located in the S. Dillon Ripley Center in the Quadrangle, the International Center provides a venue for discourse and exhibition on a wide array of international topics. A major objective of the Center is to assist the Institution in putting scholarly inquiry at the service of the general public's desire to understand a changing international scene. In this way, the Center's programs focus not merely on contemporary concerns but place them in historical context. Bureau-generated programs, facilitated by the International Center, include exhibitions, conferences, colloquia, performances, film showings, lecture-discussion meetings, seminars, symposia, and intensive workshops.

As a result of the reorganization, the Smithsonian created several new offices within the Center. Each conducts Institution-wide support functions and each reports directly to the appropriate Assistant Secretary. Under the Assistant Secretary for External Affairs, a new Office of International Relations combines the former Office of Service and Protocol and the Foreign Currency Program staff. Under the Assistant Secretary for Museums, the International Gallery will continue to sponsor the development and installation of exhibitions in the International Center. Under the Assistant Secretary for Research, the Office of Quincentenary Planning will continue to support the development of a wide range of programs to commemorate the 500th anniversary of Christopher Columbus' voyages of exploration. Under the Assistant Secretary for Public Service, a new Office of Conference Services schedules and coordinates conferences and workshops initiated by scholars and staff throughout the Institution. (Beginning in July 1988, the Smithsonian Institution Libraries has responsibility for the Smithsonian International Exchange Service, formerly known as the Office of Publications Exchange.)

Office of International Relations - The Office of International Relations provides the basic services necessary to coordinate the international aspects of Smithsonian research and museum programs. This includes:

- obtaining passports and visas for Smithsonian travelers,
- facilitating communications and logistical arrangements for research and participation in meetings abroad,
- assisting in the drafting and implementing of agreements relating to international cooperative programs,
- providing assistance to foreign dignitaries and scholars who participate in Smithsonian programs in the United States, and
- compiling and updating the "Summary Profile of Smithsonian International Activities."

The Office also manages the Smithsonian Foreign Currency Program and other international research exchange grants programs.

International Gallery - "Generations," a multidisciplinary, multicultural investigation of the art and rituals associated with birth from ancient times to the present, celebrated the opening of the International Center in September 1987. Developed by the Smithsonian Institution Traveling Exhibition Service (SITES), it links many diverse Smithsonian scholarly resources and collections in an exploration of the richness and diversity of cultures worldwide as they celebrate this milestone of human experience. Of particular importance in the exhibition is the interpretation of non-Western materials. The exhibition concentrates on the ways certain cultures

view this subject, how they incorporate it in their world view, how they deal with its reality as well as its symbolism, and how they express these ideas and concepts in material form.

A second major exhibition, "Tropical Rainforests: A Disappearing Treasure," also organized by SITES, opened in May 1988. This show again allows the Smithsonian to present the results of scientific research on the destruction of the world's tropical forests, the Earth's most biologically diverse habitat. The exhibition addresses this timely and vital problem with a cross-disciplinary approach and draws extensively upon research conducted at the Smithsonian Tropical Research Institute, the National Museum of Natural History, and the National Zoo as well as other international research centers. The goals of this exhibition are to alert the public to the problems confronting tropical ecosystems, especially forests, and to illustrate current programs in research and conservation that address tropical deforestation.

To derive the maximum potential for educating the public, the Institution is sponsoring a parallel series of outreach programs. These programs are an integral part of the tropical forest exhibition. They provide more comprehensive information on a variety of topics that are too complex for, or otherwise not easily translatable into, a museum exhibition. The programs assume three different formats -- a film series, a public lecture series, and scientific symposia and seminars -- to appeal to a broad audience. This programming, developed for use at the Smithsonian, will also serve as a model for programming for the traveling exhibition version scheduled for presentation in 12 other museums.

In FY 1989, the International Gallery will sponsor an exhibition organized by the St. Louis Art Museum entitled "Caribbean Festival Arts." The exhibition focuses on the arts of three pan-Caribbean festivals: a widespread masquerade commonly known as Jonkonnu, an Islamic festival commemorating the death of Husein, and the pre-Lenten Carnival culminating in Mardi Gras. It will explore the European, middle Eastern, and African sources for festival themes, costumes, and accoutrements; the development of these arts in the Caribbean; their present reality in the lives of Caribbean populations; and the diffusion of these festivals to sites such as New York, Toronto, Miami, New Orleans, and London. Ancillary programming for the public will be extensive and will include some activities, such as a Caribbean marketplace, in the open Concourse area of the Quadrangle. The Institution will emphasize the dissemination of information on the exhibition to the West Indian communities that have not routinely visited the Smithsonian.

Office of Quincentenary Planning - During the next few years, the attention of the Smithsonian and, indeed, the Nation will become increasingly focused on the commemoration of the 500th anniversary of Christopher Columbus' 1492 voyage to the Americas. For the Smithsonian Institution, this occasion offers an opportunity to take a closer look at the past, present, and future implications of this anniversary. The Institution has promoted the development of a centrally coordinated, pan-Institutional Quincentenary program that will reflect the diversity of Smithsonian research interests and provide the general public with the broadest understanding of the significance of the Columbian voyage. In the spring of 1988, the Institution sponsored a scholarly symposium entitled "Explorations, Encounters, and Identities: Musical Repercussions of 1492." Teachers, professors, students, and the interested public attended the all-day symposium. The Office plans many public programs for subsequent years. In 1989, the Office will co-sponsor with the University of Maryland a public symposium entitled "Violence and Resistance: The Legacy of Conquest." Planning for future Quincentenary symposia continues in FY 1989.

The Office of Quincentenary Programs coordinates and assists in the development of pan-institutional programs related to the commemoration of the 500th anniversary of the Columbian voyages to the New World. Because of the Quincentenary's potential hemispheric, if not global, impact, part of the Office's mission is to ensure that the Institution's Quincentenary activities explore and diffuse the breadth and complexity of the issues related to the encounter to the largest possible audience.

Office of Conference Services - The Smithsonian sponsors approximately 50 professional meetings each year, ranging from small workshops to major international conferences. Traditionally, the responsibility for handling all of the logistics of each meeting from the early conceptual stages through the actual implementation of the meeting has rested exclusively with the sponsoring research or curatorial department. With a large number of such meetings each year, however, a central office can more effectively and efficiently provide this logistical support. The new Office of Conference Services will work with the sponsoring bureau, offering, on a case by case basis, the necessary level of central support required for the specific type of meeting.

Support for International Research - In addition to the new offices established within the International Center, the Smithsonian will continue to support several programs in international research through the International Center. These programs include the Research Exchanges Program, the Institution's Man and the Biosphere Program, and affiliated independent organizations such as the Council of American Overseas Research Centers, and the International Union for the Conservation of Nature and Natural Resources.

Man and the Biosphere: In 1986 the Center, in cooperation with the National Museum of Natural History and the Man and the Biosphere-UNESCO Program, undertook development of a new international program on biological diversity inventory procedures. The sponsoring organizations designed the program to develop a high resolution data base management system. That system will provide, in time, nearly complete biological inventories of selected species-rich sites such as Biosphere Reserves, National Parks and Reserves, and other protected areas of developing countries. (A Biosphere Reserve is an area selected for protection and study because it is a representative example of one of the world's major ecosystems.) With such a methodology, comparative work can proceed more efficiently and accelerate the pace of understanding the scope and scale of biological diversity in the world.

One of the most important aspects of this new program is the training of biologists and other related professionals from developing countries. This training will permit them to conduct their own biological inventories and assist in cataloguing bio-resources within their respective countries. With support from the United States Agency for International Development, the World Heritage Program of UNESCO, and the Man and the Biosphere-UNESCO Program, the Institution conducted field training workshops in 1988 in Bolivia, Peru, and Puerto Rico. These workshops trained participants in the field in the methodology of conducting biological inventories and at the National Museum of Natural History in collections management and computer techniques. The Institution is presently negotiating with other national and international organizations to expand this program to other countries abroad. Within the Institution, the program complements the Biological Diversity in Latin America Program (BIOLAT), a research initiative of the National Museum of Natural History.

Council of American Overseas Research Centers: American overseas research centers are the recognized extensions of the advanced foreign research programs of major American universities and museums. They constitute the major channel through which current and historical research information about countries important to U.S. interests invigorates American academic institutions. Centers operating in Italy, Greece, Turkey, Cyprus, Tunisia, Morocco, Iran, Egypt, Jordan, Israel, Yemen, India, Pakistan, and Hong Kong have provided fellowship funds, access to local research resources, logistical support, liaison with host-country officials, and library and housing facilities to thousands of qualified American academics. Their physical facilities serve as the major point of contact for U.S. scholars and their host-country colleagues, and their publication and seminar programs disseminate research results abroad and throughout the U.S. The private structure of the centers and the unbiased research they promote make them respected foci of American academia in the countries in which they operate. As the result, they contribute considerably to a positive U.S. image abroad.

The Council of American Overseas Research Centers (CAORC) facilitates and coordinates the work of its 11 member institutions. Existing centers federated in 1981 to create a forum to identify and address common concerns. The Council links its members into a global network by facilitating the flow of information between member research centers, U.S. and foreign institutions, and between scholars here and abroad. CAORC fosters communication and collaboration among research centers to strengthen academic programs and administrative procedures; sponsors research projects across national boundaries; serves as an umbrella to publish and disseminate collective research information and to coordinate improvements in member services and operations; and establishes and intensifies liaison with agencies vital to the survival of member centers. CAORC undertakes the establishment of new centers in areas which need such institutions.

EXPLANATION OF PROGRAM INCREASE - For FY 1990, the Institution requests an increase of 5 workyears and \$320,000 to hire an additional international liaison officer and an information technician for the Office of International Relations (2 workyears and \$110,000); to provide support for the planning and development of exhibitions in the International Gallery (\$100,000); to increase central Smithsonian support for Institutional Quincentenary Planning (1 workyear and \$52,000); and to establish a funding base for the new Office of Conference Services (2 workyears and \$58,000).

Office of International Relations: Liaison and Information Staff (2 workyears and \$110,000) - Over the past eight years, the Smithsonian's international activities have expanded by about one-third. The Smithsonian must coordinate its staff initiatives abroad to avoid conflicts with other programs and achieve the best results for the Institution as a whole. Institution staff, and collaborators working abroad or cooperating with foreign colleagues, require the help of experienced international affairs staff. The Office of International Relations arranges diplomatic communications and logistical matters; obtains travel, customs, and immigration documents; and provides expert advice on how to establish official contacts abroad, obtain foreign research approvals, and negotiate agreements for international cooperative programs.

The Office of International Relations serves as a central point of contact at the Smithsonian for foreign museum professionals, scholars, and cultural or scientific officials. In order to serve the staff and programs of the Smithsonian, the

Institution urgently requires an additional liaison officer to arrange appropriate contacts for these foreign visitors. The Smithsonian also requests a sum of \$12,000 to purchase supplies and materials for the Office.

To keep track of the Institution's international interests and commitments, the OIR manually compiles and maintains a data base on the international activities of the Smithsonian. This duty has proven a time-consuming task, and the printed document has a limited function. In order to develop a computerized format that will make it more widely available on a more timely basis to those who need it, the Institution requests an information specialist position for this project.

Through the reorganization of the International Center and the creation of the Office of International Relations, the Smithsonian will strengthen its Institution-wide support for its international programs. Expanded support for the Office of International Relations in FY 1990 will enable the Institution to further reinforce its capabilities to support its growing international responsibilities.

International Gallery: Exhibition Support (\$100,000) - With the opening of the International Gallery in September 1987, the Smithsonian now has an important gallery for major exhibitions on significant national and international themes. Through these exhibitions, the Institution will present the results of scientific research, conducted by both the Smithsonian and other institutions, to the widest audience.

Since its opening, Institutional Trust funds (the Special Exhibition Fund and the Educational Outreach Fund) and outside private funds have provided primary support for exhibitions in the International Gallery. The first two exhibitions, "Generations" and "Tropical Rainforests," were products of the Smithsonian Institution Traveling Exhibition Service. The third exhibition will be "Caribbean Festival Arts," a traveling exhibition from the St. Louis Art Museum. SITES does not have the resources to program the Gallery, and its focus is on the production of traveling exhibitions rather than on running a gallery. Reorganization plans are underway so that the Office of Exhibits Central (OEC) can assume oversight responsibility for gallery spaces not attached to museums (such as the International Gallery, the A&I Building, and possibly Baldrige Hall at the Department of Commerce). OEC has requested funds (4 workyears and \$120,000) for FY 1990 to support this new function. The Institution is requesting additional funds (\$100,000) for the International Gallery to partially cover anticipated expenses for future exhibitions. These costs include the design, installation, and maintenance of various exhibitions scheduled annually; fees for traveling exhibitions not organized by the Smithsonian; ancillary public programs; exhibition catalogues and other publications; and publicity. Trust funds will continue to support part of these costs, as in the past, and the Institution will raise monies from private sources on a case-by-case basis.

The need for exhibition space outside the various museums has been apparent for many years. Often the Institution cannot accommodate important exhibitions organized within or outside the Institution either because museums have already committed available spaces or because the subject matter lies beyond the focus of individual Smithsonian museums. Many exhibitions SITES organizes do not have a Washington venue, and this lack of capital city exposure may handicap fundraising or may become a political embarrassment in the case of international exhibitions. International exhibitions are especially appropriate for the Gallery, given its proximity to the International Center and the potential for holding related conferences, lectures, and seminars in adjacent spaces. Expanded support for the International Gallery will permit the Institution to realize the potential of this new important gallery space.

Office of Quincentenary Planning: Central Support for Institutional Planning (1 workyear and \$52,000): In 1992, the world will commemorate the 500th anniversary of the voyages of exploration of Christopher Columbus. The Smithsonian began planning in 1985 to develop a wide range of programs to commemorate the Columbus Quincentenary. Through these programs, the Institution will contribute to a broader public understanding of the complexity of issues surrounding the 1492 landfall and the subsequent five centuries of interactions between European and indigenous cultures.

Sixteen bureaus and offices of the Smithsonian are planning programs in collaboration with scholars from throughout the United States and abroad. This interdisciplinary and international dimension will provide diverse perspectives upon the significance of the Columbian voyages and their consequences. To date, program plans range from scholarly and public symposia, publications, films and recordings to traveling and permanent exhibitions.

The Office of Quincentenary Planning will make the Institution's Quincentenary programs relevant to American Indian, Afro-American, Hispanic, and other minorities. The objective is to highlight the experiences and contributions of all peoples who felt the impact of Columbus' voyages of exploration. The Office is working with other Smithsonian bureaus, as well as representatives from these minority communities, to develop educational outreach materials.

The Office will continue to sponsor a series of scholarly and public symposia through 1992, exploring a diverse range of topics related to the European-indigenous Encounter. These programs will involve scholars from the Smithsonian, other U.S. institutions, and Latin America. The Institution will publish symposium proceedings and, in some instances, Smithsonian staff will develop thematically relevant educational materials for varying grade levels. For example, in 1989 the Office will complete, test, and distribute educational materials related to the symposium "Ice Age Origins." Through the Office of Quincentenary Planning, the Smithsonian will develop long-term collaborative initiatives with Latin American institutions on timely issues of mutual concern. Also, the Office, in conjunction with several Smithsonian bureaus, is planning a model program to incorporate Quincentenary themes into small traveling exhibitions for distribution to American Indian communities.

The pan-Institutional Quincentenary program will grow substantially until 1993, requiring the Office of Quincentenary Planning to coordinate these various activities. The Institution requests a secretary position to assist current staff. The Smithsonian seeks an increase of \$29,000 over the FY 1989 base of \$50,000 for the development of educational materials that will specifically engage minority communities.

The Columbus Quincentenary programs of the Smithsonian will not only commemorate the historic event, but also examine the cultural, historical, and scientific implications of the pan-hemispheric Encounter. Expanded support for the Office of Quincentenary Planning will enable the Smithsonian to provide central support for a wide range of programs and to present an alternative to the traditionally Eurocentric interpretations of the history of the Americas.

Office of Conference Services (2 workyears and \$58,000): Professional conferences, seminars and symposia, and workshops foster the national and international scholarly exchange of research results in the natural sciences, social sciences and the humanities. As a leading international research institution, the

Smithsonian sponsors a large number of these meetings each year. With the creation of the Office of Conference Services, the Smithsonian will establish a professional staff to assist the sponsoring research or curatorial department in planning and conducting these scholarly exchanges.

Conference planning and production require considerable time and effort. Prior to the establishment of the Office of Conference Services, a piecemeal approach to conference planning placed enormous strain on curators and research staff. These staff are unfamiliar with:

- required resources and procedures for booking meeting and sleeping rooms,
- preparing conference schedules, invitations, and programs,
- budgeting and arranging for support services, such as audio-visual and security,
- determining where and when they could hold the meeting,
- setting up a registration system and tracking registrations,
- preparing a budget for the conference and tracking costs,
- engaging translators, and
- recruiting and training volunteers.

Large conferences--such as the 1986 National Forum on BioDiversity and the 1987 World Food Colloquium--are particularly disruptive to the normal workload of an office. For example, each of these conferences required part-time attention of two professional staff members for over six months and their full-time attention for the three months immediately preceding each event. In each case, the organizing offices hired additional staff members on a temporary basis.

Now that there is a centralized conference office at the Institution, bureaus and offices can avoid disruptions of this type. In its first four months of existence, the Office of Conference Services received almost two dozen requests for assistance with meetings. Almost all of the requests were from curators or professional staff. In most instances, the researcher only is interested in and equipped to plan the content of the conference. With the Office of Conference Services to assist with arrangements, researchers now can plan and host a conference without significant interruption of their professional work.

It is now clear that the demand for conference services is sufficient to justify a full-time, permanent staff of individuals skilled and trained in conference management. Since the Institution established the Office, only a Trust-funded director and program assistant have staffed it. At times, the Office has hired staff on a temporary basis. For FY 1990, the Smithsonian requests two conference assistant positions for the Office of Conference Services. In addition, the Institution requests funding for supplies, materials and office equipment. As demand for conference services increases, the Smithsonian may need additional staff and funding for this office.

The establishment of base support for the new Office of Conference Services will enable the Institution to continue to foster national and international scholarly exchange and take advantage of economies of scale. This expansion of central support will also allow the Smithsonian to expand communication of research results.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Allotments provide these funds which support planning and development of research and exhibition programs for the International Center and for administration of the Quincentenary Commemoration. A special purpose fund provides stipend support for international scholarly exchanges aimed at strengthening the Smithsonian's institutional linkages.

Restricted Funds - Restricted funds consist of gifts, grants, and other donations from individuals, foundations, organizations, and corporations for specific purposes, such as mounting exhibitions and staging performances, film showings, and other public presentations in the International Center.

AMERICAN STUDIES AND FOLKLIFE PROGRAMS

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	8	794	15	854	-	73	-	440	-	1,499
FY 1989 Estimate	10	912	15	795	-	180	-	606	-	1,833
FY 1990 Estimate	11	997	15	795	-	117	-	2,332	-	2,908

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of American Studies conducts a graduate program in the field of American material culture. Through teaching, lecturing, and publishing, graduate students disseminate the knowledge acquired during course study and research performed at the Smithsonian. The Office of Folklife Programs (OFP) researches, conserves, and presents living folklife traditions found in the United States and abroad. Major activities include the annual Festival of American Folklife, Smithsonian Folkways Records, the Smithsonian Folklife Studies Series of publications and documentary films, research projects, museum exhibits, symposia, educational projects, and the Folklife and Folkways Archives. For FY 1990, the Office of Folklife Programs requests an increase of 1 workyear and \$85,000 for cultural conservation research (\$50,000) and to support the Office's plans to commemorate the Columbus Quincentenary (1 workyear and \$35,000).

PROGRAM - I. The Office of American Studies: The Office of American Studies sponsors a graduate program in American material culture in cooperation with various universities located in the Washington, D. C. area and in other cities. The director of the program and cooperating scholars teach three or four seminars a year for academic credit.

The graduate program in American material culture provides a means for scholars and students to pursue American studies utilizing the unique resources of personnel, objects, manuscripts, and books available in various bureaus of the Smithsonian. It provides opportunities for graduate students in American studies or American history departments of affiliated universities to undertake a program of formal course work at the Smithsonian.

II. Office of Folklife Programs: The Office of Folklife Program's curatorial staff researches American and worldwide folklife traditions and publishes and presents research to scholarly audiences. OFP conserves folklife traditions through documentary and archival collections of music, narrative, performance, and material culture. The annual Festival of American Folklife, held on the National Mall, provides national recognition to thousands of traditional musicians, crafts people, and other artists. The Festival encourages participants to maintain and transmit their cultures to future generations. Other OFP activities allow the public to learn

about diverse American cultures and cultures of other nations. OFP cooperates with other Federal and state agencies to advance the Nation's interest in folklife.

Research and Publications - OFP currently engages in research on folklife traditions in Massachusetts, Hawaii, Washington, D.C., and the Caribbean; the traditions of the elderly; immigrants from Jamaica and southeast Asia; Navajo music; Ojibwa wild rice culture; American Indian cultural resource issues; Creole and Cajun culture; Appalachian flat foot dancing; African epics; Indian puppetry; Soviet music; and Brazilian music and culture. OFP disseminates research through scholarly journals and presentations, Festival program book articles, Smithsonian Folkways Records, and the Smithsonian Folklife Studies Series. Series releases this year include the documentary film, "Kathputli: The Art of Indian Puppeteers" and the republication of Working Americans. Other projects include a book on Ojibwa culture; a book on the folklife of the elderly; and a radio series on American and world music traditions. Initial Smithsonian Folkways publications, including albums with scholarly notes, include Folkways: The Original Vision (Woody Guthrie and Leadbelly) and Musics of the Soviet Union.

Exhibitions and Public Programs - The Festival of American Folklife, held annually on the National Mall since 1967, has stimulated broad interest in traditional culture and provides a model for the research-based presentation of culture. In 1988 the Festival featured programs on "Ingenuity and Tradition in Massachusetts;" "Migration to Washington, D.C.;" "Music from the People of the Soviet Union;" "The Centennial of the American Folklore Society;" and a main stage featuring a range of American musics. The Festival drew an estimated 1.5 million visitors and generated massive media attention and critical acclaim. The Festival will have effects beyond the Mall: Massachusetts will restage the program in that state; area schools and community centers will use the D. C. migration materials; and the American Folklore Society will remount the folklore centennial program in Cambridge, Massachusetts. As part of a Smithsonian cultural exchange with the Soviet Ministry of Culture, American musical groups -- Indian, Cajun, Puerto Rican, Anglo-American, and Afro-American -- will traveled to Moscow to participate in the International Folklore Festival.

In FY 1989, OFP plans Festival programs with Hawaii and the Caribbean and demonstrations on how American Indians use natural resources to maintain their cultures. OFP plans future programs with the states of New Mexico and Missouri and with the Virgin Islands; the folklife traditions of the family farm; and the unofficial culture of government. OFP is discussing country programs with China, the Soviet Union, the Arab Gulf States, Thailand, Indonesia, Australia, Pakistan, Madagascar, Spain, and many Latin American nations.

OFP sponsored several public performance programs, a lecture series on the cultural consequences of apartheid in South Africa (which OFP is now editing for publication and radio broadcast), and the first in a series of Quincentenary symposia dealing with new world cropping systems and related cultural expressions. OFP through Smithsonian Institution Traveling Exhibition Service currently is touring "The Grand Generation," an exhibition on the folklife of the elderly. Future plans include museum and traveling exhibitions on southeast Asian immigrants and American Indian cultures.

Archives and Education - The Folklife and Folkways archives contain audio tapes, records, videotapes, photographic images and film, paper files, and books documenting folklife traditions from all parts of the United States and some 46 countries. Highlights of the collection include materials on occupational folklife, family

folklore, immigration stories, American musical traditions, and ethnic, Afro-American, and American Indian performance traditions.

The archive is a valuable resource for ongoing research. In FY 1988, visiting fellows used the archives to research Hispanic culture, Black American performance traditions, American Indian programs, southeast Asian immigrant folktales, and other topics. Major archival activities include accessioning of Folkways materials and conserving and systematizing Folklife materials.

Educational projects include folklife workshops and courses for area social studies teachers, using the Festival as a resource; the development of OFP materials for school room use around the country; and the initiation of a summer folklore institute for community based "amateur" researchers, particularly from minority groups.

EXPLANATION OF PROGRAM INCREASE - For FY 1990, the Office of Folklife Programs requests an increase of 1 workyear and \$85,000 for cultural conservation research (\$50,000) and to support the Office's plans to commemorate the Columbus Quincentenary (1 workyear and \$35,000).

Office of Folklife Programs: Cultural Conservation Research (\$50,000) -- Scholars, public officials, and communities have become aware of the threatened integrity and continuity of many traditional cultures. World patterns of economic control, environmental destruction, centralized media, and the spread of mass commercial culture continually affect and change long-lived traditions. Examples of current issues which require immediate attention are:

- the lack of available natural materials for the practice of traditional crafts and community life by Native American tribes and Southeast Asian immigrants in the United States;
- the destruction of natural and social environments and its effect upon Afro-American communities in rural areas, such as the low country of South Carolina and Georgia, and in inner-city neighborhoods;
- the linguistic insularity, language adaptation, and loss among Hispanics and its consequences in oral traditions.

The Office of Folklife Programs will research endangered cultural traditions, particularly those of minority communities. OFP scholars engaged in fieldwork around the world will continue to create a permanent historical record of these cultures before the traditions disappear into the mass culture. Published texts, videotapes, and audiotapes will document and present the results of this research.

Requested funding will support scholarly research of these cultures. Funds will pay for travel and per diem expenses necessary for extensive fieldwork. OFP also requires funds to contract with experts outside the Institution who have special skills and knowledge of specific cultures.

Cultural Conservation Research is both a research and a public service program. This program will address issues of importance for both disciplinary research and minority communities. OFP's activities encourage the continuity, integrity, and equity of these traditional but endangered cultures.

Columbus Quincentenary Project (1 workyear and \$35,000) - The Columbus Quincentenary is a once-in-a-lifetime opportunity for all Americans. During this

event, the indigenous peoples of North, Central, and South America will come to see the important contributions of their ancestors to modern mainstream American culture. Other Americans will come to understand how these diverse native traditions have influenced their own contemporary culture. By working together on the Smithsonian's Columbus Quincentenary Program, nations will develop a mutual appreciation and respect for their heritages.

Funds added to base resources and internally redirected resources will allow for research and the development of a living museum on the National Mall in 1991. OFP will evaluate practitioners, groups, and other possible participants for this exhibition. The presentation will examine the expressive culture, including occupational folklore, music, rituals, and crafts associated with the agricultural and subsistence activities of American Indians throughout the western hemisphere. Research will concentrate on traditional folklife associated with pre-Columbian agricultural systems which have survived, adapted, or changed over the past 500 years. OFP will conduct field research in selected but varied new world settings and employ scholars and experts from within the studied culture groups. Research will document:

- practitioners of indigenous ethnobotany and medicine;
- the occupational knowledge and skills associated with native hunting, gathering, and garden cultivating;
- craft, musical, ritual, and performance traditions associated with the production, distribution, and celebration of native foodstuffs (corn, potato, wild rice, animal horns and skins, and fish).

OFP requests these funds to hire a clerk typist and to support contract researchers, travel, and documentation expenses. Documentation will include audio, video, and written materials.

With the Columbus Quincentenary Program, Americans from several nations will enjoy a common celebration of their diverse cultures. Each participant will see not only the contribution of their own heritage to modern American culture, but also the impact of many nations' traditions, crafts, and skills on the American way of life.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds: I. Office of American Studies: OAS receives tuition reimbursement from cooperating universities, principally George Washington University and the University of Maryland, whose graduate students take courses offered by the Office of American Studies. The tuition reimbursement refunds the Smithsonian Institution for the use of its facilities by the students participating in Smithsonian classes and, in addition, provides honoraria and reimbursement for the services of outside experts participating in the program.

II. Office of Folklife Programs: Allotments and concessions at the Festival of American Folklife provide these funds, which support salaries and related program costs. The Institution's Educational Outreach Program, Special Exhibition Program, and Research Opportunity Funds provide funds for such projects as the lecture series on South Africa, D.C. community inreach, the planning of an exhibit on the experience of southeast Asian immigrants, and the conduct of scholarly research.

Restricted Funds - Individual gifts and grants from private foundations and corporations provide these funds, which OFP uses to fund specific programs or

components. Funds in FY 1988 provided partial support for the Metropolitan Washington, D.C. program, the American music program at the Festival of American Folklife, the sending of American music groups to Moscow, and the publication of Folkways Records.

Government Grants and Contracts - Various state and local governments provide these funds to support performances and programs at the annual Festival. In FY 1988, OFP received these funds to support the Massachusetts program. A grant from the State of Hawaii will support research and presentation of Hawaii's folklife at the 1989 Festival.

INTERNATIONAL ENVIRONMENTAL SCIENCE PROGRAM

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	13	750	-	-	-	-	-	-	-	-
FY 1989 Estimate	13	757	-	-	-	-	-	-	-	-
FY 1990 Estimate	13	757	-	-	-	-	-	-	-	-

* FTE = Full-time equivalent

** FTP = Full-time permanent

ABSTRACT - The International Environmental Science Program (IESP) is a multi-bureau interdisciplinary effort to coordinate the Institution's long-term monitoring and study of unique and significant ecosystems. The goal of the Program is to evaluate and eventually predict the impact of human activities and natural change on selected ecosystems. Research sponsored by the IESP occurs at two permanent Smithsonian sites -- the Tropical Research Institute (STRI) in Panama and the Environmental Research Center in Maryland -- and several non-permanent sites throughout the world. For FY 1990, the Smithsonian is not seeking funds for programmatic increases for the IESP Program.

PROGRAM - The International Environmental Science Program sponsors research to meet the urgent need for long-term studies of the world's ecosystems, especially in tropical and subtropical regions where the rapid rate of tropical deforestation, loss of suitable soil, and resulting threat to wildlife are of critical importance. The Program provides funds for teams of scientists to monitor natural variations in specific environments unspoiled by humans. Recent United States Government and international commissions have reemphasized the need to expand long-term monitoring activities to gain further insight into biological diversity and to help in the survival of rapidly disappearing ecosystems.

Scientists maintain permanent IESP research sites at the Rhode River Estuary at Edgewater, Maryland; the tropical lowland forest of Barro Colorado Island (BCI); and the Galeta Reef on the Atlantic side of the Isthmus of Panama. For over 15 years, scientists have developed a data base on the biological, physical, and chemical components of these ecosystems. Analyses of this data have produced speculations and verifiable hypotheses about long-term patterns in climate and about disturbances resulting from human activity.

Research sponsored by the IESP also occurs at non-permanent sites on Aldabra in the Seychelles and in Nepal, Venezuela, Brazil, and the Amazonian regions of Peru and Bolivia. Smithsonian scientists, with support from the host governments, are continuing their efforts at these sites to gather descriptive data that will aid in

the development of verifiable hypotheses about genetic diversity, animal management, and natural area management.

The following highlights IESP's research accomplishments for FY 1988 at the Program's permanent and non-permanent sites.

Edgewater, Maryland - The blue crab is important both as a commercial foodstuff and as a predator in the Chesapeake Bay. Direct observations of crab movements and feeding activity are impossible because visibility in these waters is poor. A cooperative project between the Smithsonian Environmental Research Center and North Carolina State University has developed and tested ultrasonic crab biotelemetry hardware. Researchers are able to track individual blue crabs to identify their location and determine their feeding activity. Each crab's telemetric unit transmits data at different defined frequencies for reception by underwater hydrophones. Electrodes, inserted in the crab's mandibular muscles, detect jaw activity during feeding. This represents the first study of blue crab movement patterns and feeding rates in their natural habitats.

After an 11 year study of the population dynamics of two woodland herbs common in Maryland forests, the summary of results is available. Among the findings, a major factor in the success of *Tipularia discolor*, a deciduous orchid, is the impact of the grazing by deer and small mammals. Few plants escape leaf removal by deer for more than two or three years. The deer usually remove all an individual plant's leaves; the removal affects the plant's future growth, delays flowering, and reduces the likelihood of reproduction. Small mammals increase plant mortality by eating underground plant growth. Grazing deer and small mammals killed two-thirds of the total plant population during the 11 year study. In contrast, *Cynoglossum virginianum*, commonly known as wild comfrey, has suffered very little mortality due to grazing animals. In areas where storms have downed individual canopy trees, the increased light intensity through the canopy gap has increased this species' sexual reproduction and resultingly its abundance threefold.

Researchers now monitor air quality continuously to determine ozone, sulfur dioxide, and nitrogen oxides levels and to provide information on potential environmental impacts of these pollutants. Data gathered suggests that ozone is present. Because ozone is one air pollutant that damages forest communities, this data is important in studying the effects of ozone on these communities. Researchers are developing improved methods of measuring dry and wet deposits in forests from the atmosphere. Researchers are testing several independent methods for measuring chemical components of the atmosphere and its transference to the earth's surface. Data from companion studies will help determine how atmospheric conditions effect ecological processes in forests. Researchers will use these data to study the effects of nutrients and toxic materials on terrestrial and aquatic ecosystems.

Aldabra - Surveys of the flora and fauna of the atoll continue. Funded by UNESCO, researchers completed the second phase of the feral goat control program on the atoll. Other completed milestones of this project include:

- sorting all the quantitative seagrass, reefcrest rubble, and sinkhole samples;
- collating various data for analysis from the marine surveys;
- assembling field notes and collecting data from all collectors of the first

five years of the current project to provide a central data base for specialists working on the many invertebrate and the few vertebrate groups represented;

--distributing specimens of polychaete worms, echinoderms, sipunculans, marine and terrestrial molluscs, and terrestrial isopods to specialists both in the U.S. and abroad.

Staff at Mount Desert Research Laboratory, Maine processed the shrimp collected from several sinkholes. The physiological data obtained deal with temperature tolerance and water and ion balance. Analysis of this data will explain how some organisms adapt so well to the fluctuating temperatures and salinities of the Aldabran sinkholes. Analysis of the algal mats lining the sinkholes' walls has yielded several new types of seaweeds for the Indian Ocean. This data revealed several previously unknown organisms inhabiting the algal mats, among these a new genus of abundant snail. A study on a representative sinkhole will report on the fecundity and abundance of shrimp and fish collected during previous expeditions.

Polychaete, crustacean, and paleontological studies continue on material collected over the last five years. The list of new isopod crustacean species now contains over 20. A report will incorporate these findings into a broad Indian Ocean review dealing with material from the granitic Seychelles, Mozambique, Chagos, and Diego Garcia. A major portion of a dissertation under examination at George Washington University deals with the fabriciine polychaete worms taken during the sinkhole study on Aldabra. Several of these worms are new species, and their existence has caused scientists to revise the hypothesis about the evolution and distribution of this abundant and ecologically important worldwide group. During 1988, the Smithsonian will publish proceedings of the International Aldabra Workshop held recently at the Institution.

Nepal - For the third consecutive year, scientists completed a population count of endangered Greater One-horned Rhinoceros in Royal Chitwan National Park. Researchers photographed, identified, and entered into a photo register nearly all the rhinos. Based on these data, scientists are analyzing the population viability analysis to determine the long-term survival of rhinos in Chitwan, Bardia, and the Dudhwa Wildlife Reserves. The Smithsonian/Nepal Terai Ecology Project supported relocation efforts at the latter two sites.

For the first time, researchers obtained data on the population genetics of free-ranging Greater One-horned Rhinoceros. The surprising results show that Chitwan rhinos have maintained high levels of genetic variability. Efforts are underway to obtain samples from zoo animals, which represent rhinos from the other large populations in Asia, the Kaziranga Reserve in Assam, India. The rapid turnover among breeding males maintains this high level of genetic variability in Chitwan rhinos.

The results of these studies will enable park managers to better conserve and manage these highly endangered species on the Asian subcontinent. The success of the Smithsonian program in Nepal has stimulated the interest of the Agency for International Development and the World Wildlife Fund in joining with the Institution, to expand the present research camp in FY 1990 into a regional wildlife research and training center.

Venezuela - During FY 1988, researchers conducted eight projects at the field site at Hato Masagural, Venezuela. Two of these projects were studies on the red howler monkey. By increasing the study population by 20 social groups, researchers

increased the scope of this long-term demographic study of this species because these social groups inhabited the gallery forest within the field site while the previous study population of 35 groups occupied the savannah woodland habitat. Researchers conduct monthly censuses on all groups comprising the study population in order to develop a data base for inter-habitat comparisons. The investigation of the red howler diet initially involved detailed field observations of feeding in several social groups. Subsequently, researchers captured all members of one social group and housed them in specially constructed cages.

Scientists conduct preliminary experiments on the captive animals to determine the total food intake, nutrient content, and the digestibility of certain plants the red howlers eat. Subsequent experiments will include using other food plants and more controlled conditions in the future. The research project on the Cebus, the other primate species found within the study area, included two separate investigations. One focused on the relative importance of demography, kinship, and dominance on social interactions within Cebus groups. The other dealt with behavioral responses of Cebus to the presence of predators in the environment.

Research continues on the snail kite, an endangered species in the United States. This study intends to determine why this highly specialized feeder has diversified its diet to include a substantial proportion of crabs in the Illanos of Venezuela. The research will include diet choice experiments, a study of seasonal changes in food abundance, and nutrient analysis of snail and crab meat. Nutritional analysis was also important in the investigations of the dietary ecology of the hoatzin, a bird which feeds upon several kinds of leaves red howlers also eat. This investigation provides an opportunity to compare how sympatric species, from unrelated taxa and with different life styles and gut morphology, contend with the digestive and nutritional problems of folivory. An ornithological project continues to monitor the long-term demographic and compositional changes in two Venezuelan bird communities.

Other studies included investigations on caimans and the local moths. The long-term demographic study of caimans involved the continued monitoring of nearly 400 individually identifiable animals. During this process, the data collected about the caimans included ranging patterns, reproductive biology, and growth rates. The research has important implications for the conservation and management of caimans, which is the most exploited genus of the world's crocodilians. The investigation of moths involved a short-term project including a taxonomy, distribution, and life history of certain species. National Museum of Natural History Entomologists are examining and identifying these moth specimens collected in Venezuela.

Brazil (Golden Lion Tamarin Project) - During FY 1988, scientists have been closely monitoring the released golden lion tamarins at and near the Poco das Antas Reserve in Brazil. Seven groups, totaling 30 animals, remain from the original animals released between FY 1984 and FY 1987. Released tamarins have borne a total of four litters from which five young survive. Major causes of death of released animals include predators and disease. An analysis of survival has revealed that younger animals survive better, especially if reintroduced within their family group. Scientists are releasing untrained family groups on non-Reserve property to involve local landowners directly in conservation and make preparation and training techniques less costly.

Other studies of wild golden lion tamarins continue. Although the vast majority of groups appear to contain a monogamous breeding pair, there are instances of polygyny and polyandry. Monitoring of the wild population continues so that

scientists can characterize the age and sex distribution of the species and the dispersal patterns of young over the long-term. Scientists have been able to follow the movements of seven young, five females, and two males. They have found that groups expel females more often than males and that tamarins may travel as far as four kilometers seeking mates. Smithsonian researchers are testing theoretical predictions about the genealogical relationships of adults that assist in rearing young to determine if "helpers" aid because of kin selection or reciprocal altruism. Researchers are continuing the genetic analysis of the tamarin population in the wild and captivity and have initiated a survey of small mammal densities and distribution, a study of tamarin energetics and an investigation of feeding ecology, diet, and nutrition in golden lion tamarins. Research continues to determine the impact on local attitudes toward conservation issues. Researchers have planned a manual for conservation education programs and conducted a workshop in FY 1987 for park and reserve education personnel. Additionally, by controlling hunters, squatters, and fires, scientists continue to monitor and protect this very endangered habitat with its unique fauna. Scientists conducted considerable research during FY 1988 which identified additional habitats, private land, suitable for the release of tamarins.

Panama - IESP-funded research on Barro Colorado Island (BCI) continues to provide important new information on how water and light determine forest structure and productivity, information of major significance to the development of techniques for agroforestry and reforestation. The BCI forest irrigation project is entering its fourth year. Over the past three dry seasons, experimental elimination of soil drought stress has provided fundamental insights into forest dynamics. Although several plant species altered growth and reproduction patterns in response to irrigation, many did not. Factors other than wetness of the soil, such as relative humidity and day length, influence climate-induced biology cycles. These results are important for applied forestry programs. Researchers used new portable instruments to measure plants' photosynthetic carbon gain and associated water loss in the field during the past dry season. These pioneering studies showed that forest plants can adjust the physiology of individual leaves to tolerate drought. Plants' ability to adapt to changing conditions helps to explain their lack of dramatic response to dry season irrigation.

Long-term monitoring of reef and mangrove communities is continuing at Galeta, providing invaluable background for analyses of the impact of the April 1986 oil spill on these areas. The IESP studies are supplemented by a \$3.0 million, five-year contract to STRI from the Mineral Management Services of the Department of the Interior. IESP received this contract because of its unequalled biological record at Galeta and because previous monitoring activities will continue indefinitely.

Work will continue at all Program sites for the next five years. Selected new initiatives scheduled for the future will improve the Institution's capabilities to monitor additional subtropical and tropical sites. The diminution of natural habitat in these areas makes it essential that researchers gather scientific data now on areas that may disappear and that researchers help develop plans to conserve other areas before those are lost.

ACADEMIC AND EDUCATIONAL PROGRAMS

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	22	976	11	708	-	2,017	-	47	-	-
FY 1989 Estimate	23	1,093	11	740	-	1,938	-	37	-	-
FY 1990 Estimate	26	1,235	12	913	-	2,047	-	27	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - Research and education are among the principal objectives of the Smithsonian. To attain these goals, the Institution promotes scholarly and academic ties with other learned institutions. The Smithsonian offers resources to the general public as well as the academic community. Scholarly and academic ties develop and flourish through competitive awards for research projects, programs in higher education, symposia and seminars, and learning opportunities at the elementary and secondary levels. This line item includes the Office of Fellowships and Grants (OFG), the Office of Interdisciplinary Studies (OIS), the Office of Elementary and Secondary Education (OESE), and the National Science Resources Center (NSRC). For FY 1990, Academic and Educational Programs requests an increase of 2 workyears and \$89,000. The additional funding will expand outreach efforts to the disabled (1 workyear and \$64,000) and provide clerical support for NSRC's resource collection (1 workyear and \$25,000).

Also contained in this line item is an increase of 1 workyear and \$53,000 associated with the Institution's strengthened affirmative action plan. Justification for these resources appears in the central Affirmative Action section of this budget.

PROGRAM - I. The Office of Fellowships and Grants - With base funding of 9 workyears and \$347,000, the office manages: centralized fellowship and internship programs, all other stipend appointments, and other programs which support research. Trust funds support most of these programs. These programs facilitate communication and collaboration between the Institution and universities, museums, and research centers. They also ensure the full use of Smithsonian resources. In particular, they strengthen international and minority participation in Smithsonian research.

A number of programs enable students and scholars to visit the Institution. In FY 1988, the Institution-wide program awarded 108 predoctoral and postdoctoral fellowships. Twenty-five of these recipients were foreign students and scholars from 16 countries. In addition, federal and trust funds, allotted to the bureaus for specific programs, supported twenty-four fellowships. Under the Short-Term Visitor Program, 138 persons came to the Institution. Seventy-four of the participants represented thirty-one countries. The Regents Program continues to bring eminent scholars to the Smithsonian. Two fellows began their residencies in FY 1988. Six

Smithsonian staff members received the James E. Webb Fellowship. The fellowships will allow recipients to further their specific administrative goals and promote excellence in management of cultural and scientific organizations. The Office also administered internship stipend awards for 145 students in FY 1988.

Several programs provide scholarly support to Smithsonian professional staff. Under the competitive Scholarly Studies program, 40 research proposals received grants. Some of these awards involved collaborative studies with scholars from other institutions. The Research Resources Program, established in FY 1988, supports archival projects. OFC awarded 7 grants. The workshop program provides funding for Smithsonian staff to organize seminars, symposia, and conferences. These activities bring together scholars from around the world to discuss a variety of subjects; 19 received support in FY 1988.

The Office administers a number of programs to increase minority participation in Smithsonian research. Forty-six students joined ongoing research and museum studies in the Minority Internship Program. In addition, three students received appointments under the Cooperative Education Program. Two former appointees returned to complete their tour-of-duty. The Native American Awards Program appointed 16 Native American students and scholars to work on Native American resources and activities at the Institution. A second session of a Howard University/Smithsonian field studies course occurred at the Smithsonian Environmental Research Center in Edgewater, Maryland. This program encourages minority students to consider careers in natural history. Six students and two faculty from Howard participated, and three faculty from other historically Black colleges also attended. Under the Faculty Fellowship Program, 6 minority faculty members received awards to conduct research in residence.

II. Office of Interdisciplinary Studies: With base funding of 3 workyears and \$118,000 OIS explores gaps in scholarship. The office presents findings of new research in the physical, natural, human sciences, and the humanities. Through symposia, colloquia and seminars, the Office raises questions about issues and trends in modern civilization and publishes books and other educational material based on these encounters. Thus it serves both internal and external audiences. It is a vital public service link between the Smithsonian and partners in the world of learning.

A major symposium in FY 1988 was "Afro-Americans and the Evolution of a Living Constitution". On March 15-16, 1988, this program assembled leading Constitutional scholars. Their pioneering work has advanced scholarship on the relationship of Afro-Americans to the United States Constitution. Present were prominent scholars, historians, political scientists, jurists, and public figures. The symposium's outreach efforts have touched a national audience. Efforts include a workshop for educators on "Teaching a Living Constitution"; a teleconference via satellite and cable television to colleges, universities, and the public. OIS developed a published summary of the symposium for distribution to 1,500 public and academic libraries across the nation; and produced educational materials tailored to junior high and high schools nationwide.

On May 5, 1988, OIS sponsored a colloquium, "Science Education: A Challenge for Excellence in America's Future." Held in the Hart Senate Office Building, it was part of a seminar series, "Voluntarism and the Public Interest." The colloquium featured the work of the Achievement Rewards for College Scientists Foundation. Issues addressed included: the challenges affecting the nation's scientific and technological development; motivating young people to pursue study in science and

mathematics; and the means to overcome shortages in minority and female recruits for scientific careers.

As an outgrowth of the May 1987 five-day international symposium "Constitutional Roots, Rights, and Responsibilities," a video-documentary is in production for use as supplementary instructional material in government and civics classes. The video entitled "Democracy and Rights: One Citizen's Challenge," explores the story of one citizen's pursuit of equal rights in the context of desegregation.

To commemorate the 200th anniversary of the French Revolution and the Declaration of the Rights of Man, OIS will present a major international symposium, in October, 1989. The Smithsonian with the National Academy of Sciences, in cooperation with the University of Virginia, will co-sponsor the symposium.

Consultation is under way in various parts of the United States and abroad, including Native American research and education institutions, for ideas to incorporate in the 1992 symposium, "Exploring the Unknown," as part of the Smithsonian's commemoration of the Columbus Quincentenary.

For FY 1990, OIS will expand its focus into a new dimension geared towards attracting a wider audience. Funds to support an additional position will allow the Office to develop two major programs: (1) a series of seminars entitled "Research on Contemporary Cultures and Civilizations;" and (2) a long-term plan of day-long educational programs focused on Martin Luther King and the civil rights movement. These programs will incorporate topics of interest to minorities and people of diverse cultures and, therefore, enhance minority participation in Smithsonian activities. In addition, the programs will provide the necessary vehicle for attracting a wider audience.

III. Office of Elementary and Secondary Education: With base funding of 7 workyears and \$396,000, the Office is the Smithsonian's central education office. As such, it designs, develops and effects Institution-wide programming in education. OESE disseminates the products of this programming locally, nationally, and internationally. It also develops Institution-wide policies and goals for education. National programs that exceed the scope of the individual museums and their respective education offices receive special attention.

The Office offers a number of programs to encourage cooperation and exchange of information between the Smithsonian and schools in the metropolitan D. C. area. Let's Go (a newsletter published five times a year) informs more than 11,000 Washington area educators about the variety of learning opportunities available at the Smithsonian. In addition, a multidisciplinary workshop and seminar program for teachers includes one-week courses on topics such as teaching life sciences through direct observation, using community resources to teach about the United States Constitution, and teaching American cultural history through art. Accredited by all of the metropolitan area school systems, these courses served more than 350 teachers and administrators in FY 1988.

To share these same teaching concepts with a national audience, the Office distributes ART TO ZOO. Since 1976, ART TO ZOO has been a highly regarded national publication and a staple of OESE programming. It represents a cost effective way of interpreting Smithsonian resources for a large and culturally diverse national constituency of teachers, students, and museum educators. Reaching over 25,000 schools and 100 museums, this publication costs less than 27 cents per issue, a very

low per teacher price. Free-of-charge, OESE circulates slide-loan-packages and curriculum kits, (advertised in ART TO ZOO) which reach an estimated 5,000 students yearly.

Throughout FY 1988, the Office continued its work to make Smithsonian programs accessible to disabled visitors. Interpreters were available at special events, lectures, and tours. OESE provided guidance to various Smithsonian museums seeking ways to improve programming for retarded, learning-disabled, hearing-impaired, and blind visitors. About 60 Smithsonian educators, guards, and other employees enrolled in OESE-sponsored sign language courses. In addition, the Office disseminated to more than 300 organizations a manual and videotape package designed to help museums, zoos, and historic sites across the country serve disabled people.

With the signing of the Rehabilitation Act of 1973, the Smithsonian became legally responsible for making its programs accessible to people with disabilities. OESE created a program of which the primary objective is making Smithsonian educational offerings accessible to students with hearing impairments. The program now serves as the central Smithsonian resource on museum access. The program offers staff and docent training sessions and programs for and about disabled individuals. It also provides sign language instruction for SI employees and sign language interpreters for a wide-range of Smithsonian programs.

Planning for future expansion will occur over the next five years. OESE will reach disabled individuals, who are also members of ethnic and racial minorities. The Office will sponsor seminars and symposia for SI staff on topics of accessible exhibition and publications design and emergency procedures for evacuating disabled visitors. OESE will continue to offer sign language classes and interpreter services, both of which are in ever-increasing demand. (Since 1983, the demand for interpreter services increased by 30%.)

IV. National Science Resources Center - With base funding of 4 workyears and \$228,000, the National Science Resources Center is a joint undertaking of the Smithsonian Institution and the National Academy of Sciences. Its mission is to improve the quality of science and mathematics teaching in the nation's schools. The NSRC identifies, develops, and disseminates science and mathematics teaching materials that are imaginative, classroom-tested, and scientifically up-to-date. The Center also organizes leadership development institutes for school system personnel. These institutes encourage the sharing of successful materials and programs and help build a talent pool to staff local program improvement efforts. The NSRC staff works with teachers, state and local school systems, research scientists, educational and scientific organizations, science museums, private foundations, and corporations. NSRC develops programs for school systems throughout the country.

In 1987, the Smithsonian Institution and the National Academy of Sciences established an Advisory Board for the National Science Resources Center. The membership of the NSRC Advisory Board includes representatives from several major corporations, eminent scientists, and educational leaders from throughout the country. The NSRC Advisory Board counsels the NSRC executive director on broad policy issues and helps prioritize the Center's programmatic activities.

There is a need to increase the scientific and technological literacy of young children. NSRC emphasizes the development of programs to improve the teaching of science in the nation's elementary schools. The NSRC has several projects under way in this area.

The NSRC has developed an Elementary Science Resource Collection and Computer Information Database for use by school systems and science museums that are initiating projects to improve the teaching of science in elementary school. The NSRC elementary science information database includes brief annotations, as well as bibliographic information, about the materials in the NSRC elementary science resource collection. A computer telecommunications network is making the database available to school systems across the nation.

NSRC will produce, in 1988, the elementary science resource database as a printed resource guide, entitled Science for Children: Resources for Teachers. In addition to information about the materials in the NSRC resource collection, this guide will include a directory of science museums and other organizations that provide "hands-on" science kits and assistance to elementary school teachers. NSRC will distribute copies of this guide to the nation's 16,000 superintendents of schools and to the members of the National Science Supervisors Association. The National Academy Press will publish Science for Children, thus making the guide available to teachers, principals, parents, and the general public.

Science and Technology for Children (STC) is a four year NSRC elementary science curriculum development project supported by a grant from the John D. and Catherine T. MacArthur Foundation. The STC project will develop curriculum units for grades 1 through 6 in the areas of physical science, life science, earth science, and technology.

The STC program will assist teachers to use simple, inexpensive materials that are easily maintainable in an elementary school setting. The units will link science to the broader curriculum through an emphasis on reading, writing, art, and mathematics. Classrooms across the country will field-test the STC units to refine and validate them.

NSRC is also developing an Elementary Science Network of teachers, scientists, science educators and school administrators who work to improve the teaching of elementary school science. The NSRC will sponsor leadership development institutes. This will prepare selected teachers, science supervisors, and principals to organize elementary science program improvement efforts in their school districts. The Center will also provide technical assistance to help school systems design effective in-service education programs, establish science materials support systems, and develop community support for their elementary science programs.

EXPLANATION OF PROGRAM INCREASES: For FY 1990, Academic and Educational programs request an increase of 2 workyears and \$89,000. The additional funding will expand outreach efforts to the disabled (1 workyear and \$64,000) and provide clerical support for NSRC's resource collection (1 workyear and \$25,000).

Also contained in this line item is an increase of 1 workyear and \$53,000 associated with the Institution's strengthened affirmative action plan. Justification for these resources appears in the central Affirmative Action section of this budget.

I. Office of Elementary and Secondary Education - Increase in Operating Costs-(1 workyear and \$64,000). The Office of Elementary and Secondary Education will expand outreach efforts. The office will emphasize outreach to the disabled and teachers and students in ethnically diverse communities.

OESE needs a Program Coordinator to augment the Accessibility Program. The lack of additional funding will hinder efforts to increase museum accessibility. With this position, OESE will provide continued services and develop a new audience. Services include providing interpreters for the hearing impaired, advertising the accessibility of Smithsonian programs to the disabled, and acting as an in house expert on how to make programs accessible.

Inadequate funding jeopardizes three OESE publications ART TO ZOO, Let's Go, and Smithsonian Spectrum (a brochure). These publications serve the Institution and inform local teachers about Smithsonian-wide resources. In FY 87 and 88, because of a lack of money, the Office had to discontinue Smithsonian Spectrum. OESE also requests additional funds for printing/reproduction of publications, purchasing of additional computer equipment, and maintaining the Office's computer equipment.

II. National Sciences Resources Center - Resource Collection and Information Database - (1 workyear and \$25,000). NSRC disseminates information about science and mathematics teaching resources to elementary and secondary school teachers across the nation. NSRC established a science and mathematics curriculum resource center that houses a large collection of printed materials, audiovisual resources, and computer software.

This NSRC service helps science and mathematics teachers find materials they need to improve their teaching. It is especially useful to urban school districts serving large minority populations, who need special help in identifying materials to improve science and mathematics teaching.

For FY 1990, NSRC seeks one secretarial position to catalog the resource materials in the NSRC resource collection and to help develop an annotated information database. This needed secretarial assistance will also respond to daily inquiries about the resource collection, quickly providing teachers and science supervisors with available and appropriate information for use in their classrooms.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - I. Office of Fellowships and Grants - These funds, provided from allotments, are primarily for the Institution-wide fellowship programs. Shorter visits by scholars and students also receive support. A program allotment supports a part of the administrative expenses of the Office of Fellowships and Grants. The Regents Fellowship program continues to bring distinguished visiting scholars to the Institution.

In addition, special purpose funds provide for: minority internships and faculty fellowships; minority students pursuing graduate degrees under the Education Fellowship Program; and the Native American Awards Program. The Scholarly Studies Program encourages research by Smithsonian staff in science, arts and the humanities. While OFG administers this competitive Program, the expenditures reflect the recipient organizations.

II. Office of Interdisciplinary Studies - Salaries and partial office support costs receive an annual allotment. In addition, the annual allotment supports certain program development costs including honoraria, publications, and travel costs for speakers appearing in the symposia and colloquia.

III. Office of Elementary and Secondary Education - As part of the Institution's affirmative action effort, a Career Awareness Program (CAP) for the District of Columbia Public Schools introduces minority young people to career opportunities at the Smithsonian. OESE plans and runs CAP with help from the various Smithsonian museums, whose staff members work directly with the students, providing first an overview and then more profound exposure to a wide variety of Smithsonian careers. Through the District's Summer Youth Employment Program, 50 CAP graduates from this and past years worked at the Smithsonian during the summer of 1988. In addition, 8 CAP graduates worked as junior interpreters at the National Museum of American History during the 1987/88 school year. The CAP-LET, a quarterly newsletter with a circulation of approximately 500, helps maintain the graduates' involvement in the program. Also, after extensive evaluation of CAP, plans are under way to extend the program nationally through development of a manual and curriculum package for use by teachers and museum educators. These materials, slated for publication in FY 1989, will enable local museums to institute programs that will interest minority young people in museums and museum careers.

In FY 1988, the Office continued to sponsor Regional Workshops in communities across the United States for the purpose of promoting the use of museums as educational resources. Among the regions to hold these one-day events in FY 1988 were Wilmington, North Carolina; Tucson, Arizona; and St. Louis, Missouri.

Now in its second year, an Internship Program for High School Teachers brought five teachers, from communities where Regional Workshops took place, to the Smithsonian for four weeks of thorough training. Designed to have a multiplier effect by training master teachers to serve as catalysts for the creation of more effective museum/school programming in their home communities, this program carries three graduate credits from the University of Virginia.

A High School Intern Program, now in its 13th year, gave 40 graduating seniors an opportunity to participate in a learning/service program at the Smithsonian, working behind the scenes with curators and other museum professionals. Young people from all 50 states and the District of Columbia are eligible to apply for admission to either of two, five-week sessions.

In April of 1988, the Office convened the second annual meeting of the Smithsonian Advisory Council on Education, embodying a panel of 5 outside experts to the Institution to advise about developing a wider audience. In a related effort, the Office convened monthly meetings of education staff from throughout the Institution to discuss issues of common concern.

IV. National Science Resources Center - An allotment from unrestricted funds provides partial funding for the core operations of the National Science Resources Center. These resources provide support for salaries and core support necessary for the development of program initiatives to attract further support from the private sector, with the assistance of the National Academy of Sciences.

Restricted Funds - I. Office of Fellowships and Grants - These funds consist of restricted endowments, gifts, and grants from individuals and foundations for a particular project. They include: an endowment from the Walter Rathbone Bacon Scholarship for research on fauna outside the U.S.; the James E. Webb Fellowship to promote excellence in the management of cultural and scientific organizations; and a Rockefeller Foundation Grant to support residency fellowships at the National Museum of African Art and the Center for Asian Art.

II. Office of Interdisciplinary Studies - Funds provided are in the form of restricted endowments which specify the use of donations or bequests and of gifts and foundation grants by individuals, organizations, or corporations for specific purposes. Example of these funds are the Sergei N. Grimm endowment, which finances research related to scientific urban planning, and the Barrick W. Groom endowment, which perpetuates both the interbureau and the interdisciplinary program. During FY 1988, OIS received grants from the Rockefeller Foundation, Gannett Foundation, and Ford Foundation for the symposium entitled, "Afro-Americans and the Evolution of a Living Constitution."

THE MUSEUM SUPPORT CENTER

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	36	4,475	-	-	-	-	-	-	-	-
FY 1989 Estimate	42	4,659	-	-	-	-	-	-	-	-
FY 1990 Estimate	44	4,706	-	-	-	-	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Museum Support Center (MSC), located in Suitland, Maryland, adjacent to the Institution's Suitland Facility, provides a state-of-the-art complex for the care, conservation, and storage of the Institution's collections. The conservation facilities at the MSC include the Conservation Analytical Laboratory and laboratories for the National Museum of Natural History/Museum of Man and the National Museum of American History. The collection storage area at the MSC occupies four discrete sections (or pods) and provides three types of storage space: "high-density" collections storage in cabinets; "wet" collections storage for biological specimens in alcohol; and "high-bay" storage for very large objects.

For FY 1990, a total amount of 44 workyears and \$4.706 million will permit the Institution to pursue several efforts related to the Museum Support Center, including purchasing collection storage cabinets and components (\$3.058 million); continuing the preparation and transfer of collections to the MSC (\$459,000); providing administrative and building management services at the MSC (38 workyears and \$1.039 million); and continuing the development of a program to evaluate the effectiveness of asbestos decontamination techniques used on museum objects prior to their move to the MSC (6 workyears and \$150,000). The FY 1990 level of funding for MSC operations reflects an increase of 2 workyears and \$47,000 to strengthen the facility maintenance and automated information management services.

PROGRAM - The Museum Support Center, located in Suitland, Maryland, provides a state-of-the-art facility for the storage of museum collections; the conservation and preservation of museum objects; and conservation training. The unique design of the MSC creates two "zig-zag" shaped wings (a laboratory wing and a storage wing) on either side of a central corridor. Conservation facilities occupy a significant portion of the laboratory wing, and their activities include conservation treatment, scientific analysis, and training. The Conservation Analytical Laboratory (CAL), the Anthropology Conservation Laboratory of the Museum of Natural History, and some of the facilities of the Division of Conservation of the Museum of American History are at the MSC. The Museum Support Center branch of the Smithsonian Institution Libraries system, one of five conservation libraries in the world and the only one in this

country that provides a reference service on conservation, maintains a collection of more than 15,000 books and 160 periodical titles.

The Smithsonian Oceanographic Sorting Center, a specialized research and service unit of the National Museum of Natural History, also occupies space in the laboratory wing. The Sorting Center sorts and classifies animals and plants which oceanographic expeditions collect, and then distributes these specimens to scientists around the world.

During FY 1988, the National Museum of Natural History established a new Molecular Systematics Laboratory at the Museum Support Center. This laboratory builds upon the Museum's broad expertise in systematic and evolutionary biology and incorporates historical and ecological perspectives. It will enable molecular study of the genetics of organisms by the largest single team of systematic biologists in the world. The laboratory will focus on three areas of molecular systematics and evolution: DNA molecular analysis, the isolation and characterization of biochemical constituents (natural products chemistry), and electrophoresis investigation of the electrical properties of different characteristics of proteins.

The storage wing consists of four storage pods, each approximately the size of a football field and 28 feet high. Collections stored in cabinets on three levels of concrete decks will occupy approximately five-eighths of the total storage space (Pods 1 and 2, and a portion of Pod 4). In addition, Pod 3 provides storage for "wet" collections (those in alcohol), and a portion of Pod 4 will allow "high-bay" storage for very large objects.

The move of millions of objects and specimens to the Museum Support Center is unprecedented in the museum world. The volume, characteristics and variety of the collections and the distance of the transfer pose special challenges. The preparation of collections for move to the MSC from the National Museum of Natural History/Museum of Man and the National Museum of American History began in FY 1983. Move efforts will continue at least through FY 1994.

Since FY 1983, museum technicians employed in temporary positions have prepared collections for the move. Their efforts range from cleaning and stabilizing the objects, to packing and moving them to staging areas and then to the MSC, and performing needed conservation treatment. The MSC Move staff has developed and follows a plan to coordinate each phase of the move using the "Critical Path Method" (CPM), a systematic planning technique for highly complex projects. The staff has automated information on relevant variables which affect the complex schedules and updates that information continuously. Simultaneously, MSC Move staff also decided upon the specific methods of packaging and modes of transport appropriate to the particular collections and objects involved.

Museum Support Center Collections Storage Equipment - Between FY 1981 and FY 1988, the Institution has obligated funds totaling approximately \$25 million to purchase and install storage equipment for both the "wet" storage (Pod 3) and the "high-density" storage areas (Pods 1, 2 and 4). In FY 1984, the Institution completed the installation of the "wet" collections storage equipment for the initial move. The move of alcohol-stored specimens followed the next year.

The Institution has been unable to realize the potential of the Museum Support Center because of the cumulative effect of various difficulties in purchasing and installing "high-density" storage equipment for the other three storage pods. These

difficulties have in turn delayed the permanent relocation of other collections to the Museum Support Center. The initial problems in the "high-density" storage equipment resulted from the inability of the three-level self-supporting collections storage system, as originally planned, to meet the requirements for a bug-free and airtight enclosure. The only alternative was to change to a more conventional collections storage system, consisting of pre-manufactured storage cabinets on three levels of concrete decks. However, the General Contractor's failure to make adequate progress in constructing the concrete decks and designing and manufacturing the storage cabinets continued to hamper the acquisition of this collection storage system. Finally, on July 15, 1987, the General Services Administration (GSA), in managing the construction contract for the MSC project, determined that the General Contractor's performance on this contract was unsatisfactory and terminated the contract for default.

Despite the setback resulting from the termination of the contract, GSA is currently proceeding to reprocure this storage equipment and recover the Institution's losses caused by the default, although recovery of funds may take several years. Approximately \$21.7 million, which the Smithsonian has transferred to GSA through FY 1988, is currently available for the reprocurement. An additional sum of \$3.058 million, requested in the FY 1989 budget, is also available. GSA plans to pursue reprocurement through a number of bid packages. One bid package would cover the general construction components, including the structural deck system and related work. Several separate packages would cover the reprocurement of the variety of types of collections storage cabinets and components.

Current Status of MSC Collections Storage Equipment Reprocurement (July 1988)- GSA has completed the reprocurement documents for the general construction work and anticipates awarding this contract in October 1988. GSA will split the reprocurement of the storage cabinets, compactor frames, and cantilever shelving for the initial move into several smaller packages in an attempt to reduce delivery time and to obtain the best pricing. GSA has also engaged a consultant to conduct a market survey of the storage industry and to advise it on the best type of procurement(s) for the storage equipment packages. In the near future, GSA, in consultation with the Institution, will make the final decisions on how to procure each type of storage equipment. GSA tentatively estimates that storage equipment contract awards will also begin by October 1988.

The Institution will need the FY 1990 funding, which continues the FY 1989 base level of \$3.058 million, to continue the purchase of collections storage cabinets and shelves for the initial move. GSA is now projecting far greater reprocurement costs than it did just after the termination of the contract. GSA currently estimates the total required to produce bid packages, construct, manufacture and install the decking, utilities, and storage cabinets for the initial move at \$27.7 million. This estimate includes:

- the additional costs resulting from the labor required to complete the design work;
- the repetitive labor required for a new contractor to set up site work and prepare shop drawings, as well as for the government to review new shop drawings; and
- the anticipated inflation through FY 1988 (estimated as high as 15-20 percent per year for storage cabinets).

However, the current estimate does not reflect the cumulative effects of future inflation (based on increases in the steel price index) that may occur between the present time and when the cabinets or components are actually manufactured.

Based on the current schedule of the procurement process, GSA estimates that construction in all three pods will be complete by the end of December 1989 and that final installation of all storage equipment will be complete by December 1992. The general construction contract will phase the work in order to complete Pod 1 first, then Pod 2, and finally Pod 4. This phasing will allow partial occupancy of a pod as soon as a sufficient number of cabinets are available.

The Institution has postponed the procurement of the "high-bay" collections storage equipment until FY 1991 or later. Both the Museums of Natural History and American History need this equipment critically to store very large objects, such as totem poles, whale skeletons, etc. However, the Institution's first priority is to urge GSA to complete the reprocurement of the "high-density" (three-level) storage equipment for the initial move. Present estimates are that, with escalation, the cost of the "high-bay" equipment will exceed \$2.0 million by FY 1991. Better estimates of the cost of this equipment will be available closer to the acquisition date. (Actual cost for the "high-bay" storage equipment may vary as the result of actual bids received at the time of procurement and the inflation rate in effect at the time of the bid for the city of the bidder.)

The Smithsonian currently expects to request a level of funding of \$8 million for FY 1991 through FY 1994 to purchase collections storage equipment for the MSC. The Institution will revise these future funding projections after the contract award of the different collection storage packages for the initial move, and will adjust the estimates in the Five-Year Prospectus, as appropriate. Escalation, in particular, may greatly increase the five-year estimates for the acquisition of collection storage equipment. (Actual costs for the collection storage equipment that the Institution will procure from FY 1991 through FY 1994 may vary as the result of actual bids received at the time of procurement and the inflation rate in effect at the time of the bid for the city of the bidder.)

Move of the Collections to the Museum Support Center - Between FY 1983 and FY 1988, the Institution has spent approximately \$2.8 million to prepare the collections for relocation; to move collections for which there is storage equipment; and to cover the salary costs of the temporary work force engaged in cleaning, packing, and moving collections. The Smithsonian completed the initial move of over 260,000 specimen lots into the "wet" collection storage equipment in Pod 3 in 1985. Since that time, the MSC Move staff has transferred more than 53,700 additional specimen lots to Pod 3.

While the problems in procuring the "high-density" storage equipment have delayed the permanent relocation of other collections to the MSC, the Institution has moved the following collections to temporary storage locations at the MSC until such time as their permanent storage space becomes available:

- over 195,500 archeological objects (representing 25 percent of those collections) and 17,500 ethnological objects from the Department of Anthropology;
- more than 3,814,000 insect specimens from the Department of Entomology;
- over 36,500 petrology and meteorite specimens from the Department of Mineral Sciences;

- 2,291,390 specimens from the Department of Paleobiology; and
- 132,000 specimens from the Department of Botany, including diatoms and algae.

The MSC Move staff has carefully inspected these objects for pests and conservation problems, and has properly stabilized all of these collections. The relocated collections are in less crowded and better controlled conditions than collections stored in most other Smithsonian storage areas. As a result, they have far greater potential for long term preservation and use. As the Move staff continues to prepare more collections, it will continue to transfer these objects to temporary storage in the MSC and the Mall buildings until their permanent storage locations are ready.

During FY 1988, MSC Move staff continued to prepare collections of the Museum of American History and the various departments of the Museum of Natural History, including Anthropology, Entomology, Mineral Sciences, Vertebrate Zoology, Botany, and Paleobiology, that will eventually occupy storage space in Pods 1, 2 and 4.

The funding base of \$459,000 requested for FY 1989 and FY 1990 will enable the Institution to continue to prepare these collections for relocation and then to move the collections to temporary storage at the MSC. This work can proceed despite the delay in the procurement of the storage equipment. Therefore, the Institution will be able to use effectively the time available prior to the installation of the "high-density" storage equipment. The Institution anticipates that future funding requirements to continue the move will total approximately \$2.3 million from FY 1991 through FY 1994.

Asbestos Decontamination Techniques - With funding requested in FY 1989, the Institution will initiate a program to evaluate the effectiveness of various asbestos decontamination techniques to clean museum objects prior to their move to the Museum Support Center. The decontamination is necessary because asbestos has contaminated these objects' present collections storage areas in the Museum of Natural History, the Museum of American History, and the Institution's Suitland Facility. An evaluation of various cleaning techniques will yield more conclusive evidence that the staff has effectively cleaned these collections and that they pose no health threat to researchers or the public when they are placed on display. The evaluation will utilize strict surface testing and air monitoring methods. These methods determine the level of contamination, both before and after cleaning. The Institution will continue this project through FY 1991, evaluating the variety of cleaning techniques used with the wide range of museum object types.

Administration and Facility Management - With base funding of 36 workyears and \$992,000, the Office of the Director of the Museum Support Center coordinates activities of the various user and support units; oversees the automated data processing center used for registration and collections management activities, including the move to the MSC; and arranges services to meet the research and informational requirements of the occupants. The Office also oversees the procedures established to control and account for the flow of collections into and out of the MSC and ensures the safety of the collections against pest infestations and other hazards. Under the general supervision of the MSC's Office of the Director, the facility manager is responsible for providing shipping and receiving services, moving equipment and objects, overseeing safety and security operations, and cleaning and maintaining all aspects of the building. Because of the need to maintain very strict

environmental standards, cleanliness is a fundamental requirement for the successful operation of a collections management facility.

EXPLANATION OF PROGRAM INCREASE:

Administration and Facility Management (2 workyears and \$47,000) - As custodian of the National Collections, the Smithsonian possesses more than 134 million art objects, natural history specimens, and artifacts. With the responsibility for preserving these collections for future generations of scholars and visitors, the Institution pays careful attention to the acquisition, conservation, and storage of these objects. A critical factor in ensuring the preservation of the National Collections is the development of facilities, such as the Museum Support Center, that provide the optimum conditions for collections storage. To guarantee the strict environmental controls for such a facility, the Institution must maintain extremely high levels of building management and support services.

The Office of the Director of the MSC ensures the required service levels for building management and related support. Especially at the MSC, which incorporated the latest in museum technology to provide optimum environmental conditions, the maintenance of a clean, pest-free, and properly controlled environment is essential to the preservation of the collections. MSC's custodial, labor, and maintenance staff must understand the precepts and concepts of collections management and preservation, as well as general building maintenance. This is particularly important because the level of contact that the building staff at the MSC has with the collections is much higher than at the Institution's other facilities. For instance, MSC building maintenance workers receive special training in the area of pest management for the collections.

As more personnel and collections relocate to the MSC, the level of support for management of the facility must increase in order to continue the highest level of services as the demand for these services expands. For FY 1990, the Office of the Director of the MSC requests an additional, properly trained, custodial worker (1 workyear and \$17,000) to assist in providing this maintenance.

As use of the MSC increases, MSC staff must also augment its ability to account for the objects, track various activities in the building, and predict future facilities and collections management requirements. Sophisticated facility management software, with the graphics packages in computer-aided design (CAD) systems, facilitate these management activities. With this software, MSC staff can monitor better all cleaning and pest-control activities, plan space use, control and record all building repairs, and maintain inventory control of the collections. Expanded computer support is essential to keep pace with the increased demands for these services to account for growing collections and to assist information management needs of scientists and conservators. For FY 1990, the Office of the Director requests an additional computer specialist (1 workyear and \$30,000) to assist in operating the MSC computer and facility management software and to coordinate resident collection management information systems with the Institution-wide Collections Information System (CIS).

In 1988, as the Institution celebrated the fifth anniversary of the opening of the Museum Support Center, it looked back at the accomplishments of MSC's first five years and looked forward to its full potential as a state-of-the-art facility for collections storage and conservation. As the MSC moves towards this future reality, the expanded level of support for building maintenance and automated information

management services will enable the Institution to better preserve the National Collections for future generations.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - An allotment has supported the purchase of special laboratory equipment for the Conservation Analytical Laboratory. CAL expects to complete the purchase of this equipment by the end of FY 1989.

ADMINISTRATION

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	294	21,751	203	12,773	20	3,115	-	215	-	-
FY 1989 Estimate	332	24,312	203	12,645	17	2,898	-	131	-	-
FY 1990 Estimate	389	25,249	213	14,755	17	2,555	-	126	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - Administration includes central management, planning, oversight and review provided by the Offices of the Secretary, Under Secretary, Assistant Secretary for Administration, General Counsel and Treasurer. It also covers a wide range of specialized administrative and technical offices, such as Audits and Investigations, Business Management, Congressional Liaison, Contracts, Equal Opportunity, Facilities Services (responsible for Design and Construction, Plant Services, Protection Services, Environmental Management and Safety Programs and Architectural History and Historic Preservation), Financial Management and Planning, Accounting and Financial Services and Risk Management. Other offices comprising this grouping include Information Resource Management, Management Analysis, Personnel Administration, Printing and Photographic Services, Programming and Budget, Procurement and Property Management and Travel Services. This heading includes the funding for the Workers' Compensation account. These organization units receive both appropriated funds and nonappropriated unrestricted Trust funds for their operating support in approximate balance to the overall funding of the Institution. However, Trust funds entirely support some offices, such as Business Management, Contracts, and Risk Management.

For FY 1990, the requested increase for Administrative units totals 47 workyears and \$2,100,000. The increase will enable the Institution to accomplish the following (itemized later in this section under "Explanation of Program Increases"): implementation of the new financial and accounting system (16 workyears and \$652,000); administration of the recently acquired, delegated examining authority and of the affirmative action program (9 workyears and \$356,000); continued development of the information architecture and collections information system, upgrading office automation in support of procurement and facilities management, and automating the health and safety program (16 workyears and \$849,000); and maintenance of an acceptable level of support in several administrative areas where the demand for services has increased considerably due to Institutional growth (6 workyears and \$243,000).

A decrease of \$530,000 offsets these increases. This decrease reflects nonrecurring expenditures in FY 1989 for the Payroll Personnel System (\$100,000), the

Financial Management System (\$400,000), and automation for the Office of Audits and Investigations (\$30,000).

In addition, the Institution requests an increase of 5 workyears and \$248,000 to increase representation of women and minorities in professional positions. The Office of the Assistant Secretary for Administration will be responsible for the resources until other bureaus and offices select candidates. The justification for this increase appears in the central Affirmative Action Employment section earlier in this document.

The Institution also requests funds totaling \$279,000 and 5 workyears for management and technical costs associated with the enhancement of the Smithsonian's repairs and restoration programs. These resources are for the Offices of Environmental Management and Safety (2 workyears and \$97,000) and Procurement and Property Management (3 workyears and \$182,000). The Repairs and Restoration section of this budget request contains the justification for these funds and other administrative costs.

PROGRAM - The Office of the Secretary, with the assistance of the Office of the Under Secretary, is responsible for management and administration. This includes policy determination, program planning, legislation, and oversight and performance evaluation of activities. The Office of the Assistant Secretary for Administration, with the assistance of the Director of Facilities Services, is responsible for administrative and facilities services.

The Office of Audits and Investigations (OAI) performs all internal and external audits and investigates any fraud, waste, abuse, or white collar criminal activity. OAI audits Federal programs as well as Trust-funded activities on a cyclical basis. The Office reports audit results and recommends measures to improve program administration. OAI also audits claims, cost proposals, and cost and pricing data arising from contracts, grants, and other financial agreements. OAI investigates allegations of criminal activities by employees or contractors. The results of these inquiries serve as the basis for appropriate criminal, civil or administrative remedies. OAI staff also investigate areas with the potential for fraud and abuse. The Smithsonian's public accountants consider the work of the Office in determining the nature, timing and extent of their audit procedures. The Institution provides reports on audits and investigations to the Audit and Review Committee of the Board of Regents.

The Office of the General Counsel provides counseling to the Smithsonian Board of Regents and the Secretary. The Office also advises other Institutional officers on pertinent legal matters; coordinates and oversees litigation and other adversarial proceedings; and reviews administrative claims arising out of Smithsonian operations. Generally, the Office monitors all aspects of Smithsonian activities for legal implications as new developments in the law affect the Institution.

The Office of the Treasurer oversees financial management and certain Institutional income producing activities. These include Museum Shops, Mail Order, Product Development and Licensing, and Concessions. Financial management duties rest in the Office of Financial Management and Planning, Office of Accounting and Financial Services, the Contracts Office, and the Office of Risk Management. These offices handle accounting, payroll, financial reporting, financial systems development, administration of grants and contracts, insurance matters, Treasury and bank relations, and investment management.

The Office of Congressional Liaison develops and maintains the Institution's relationships with the Congress; prepares and clears legislative materials; arranges Smithsonian participation at legislative hearings; and acts as central liaison with Federal agencies and organizations with related interests.

The Office of Equal Opportunity plans, conducts, and monitors a positive action program to ensure equality in employment practices and program activities. Major efforts include an affirmative action program, program and facility access for disabled persons, employee counseling and complaint processing, upward mobility, programs for women and Hispanics, and community outreach to minority and women's groups in Washington, D.C. and elsewhere.

The Office of Information Resource Management (OIRM) oversees planning for new automated systems and technologies; helps determine information resource management policy; ensures the integrity and security of Institutional data; applies modern computer and communications technology to the Smithsonian's scientific, scholarly and management information needs; ensures compatibility of hardware and software; and fosters user access information systems and computing power. OIRM acquires, develops, and maintains automated information processing and data communications systems; administers the Smithsonian's data processing cost centers; operates computer systems and voice and data communications networks; and offers pertinent training to users.

The Management Analysis Office provides advisory assistance to Smithsonian administrative operations. The Office studies organizations, systems, and procedures; prepares and distributes management's policy statements and operational guidelines; and oversees the Institution's forms management program.

The Office of Personnel Administration provides personnel services, advice, and assistance to managers and employees of the Institution. Within the laws, rules, and regulations of Federal oversight agencies and within the policies of the Institution, the Office oversees recruitment, staffing, and position classification; wage and salary administration; performance management and merit pay systems; employee relations; and benefits administration. The Office also is responsible for labor-management relations; training and career development; employee assistance; job and retirement counseling; workers' compensation; unemployment insurance; personnel policy development; personnel management evaluation; and records and data processing and maintenance.

The Office of Printing and Photographic Services offers technical advice, guidance, and photography and duplicating services to curatorial, scientific, technical, and administrative staff. Photographic services include studio and on-site photography, photographic copy restoration, printing, preservation of originals under archival conditions, the development and maintenance of an automated catalogue of photographs, the investigation and application of new photographic technologies, and sales of materials to the public.

The Office of Programming and Budget (OPB) formulates the Institution's consolidated Federal and nonappropriated Trust fund budgets and submits them for review and approval by the Secretary and the Board of Regents. OPB prepares justifications for approved budgets for submission to the Office of Management and Budget (OMB) and to the Congress. OPB serves as liaison with OMB and Congress on budgetary matters. OPB monitors appropriated budgets and nonappropriated Trust fund budgets to ensure that the Institution meets program needs, achieves budgetary goals,

and maintains accountability. The Office also coordinates Institution-wide long-range planning efforts and advises management on related matters. OPB prepares the Five-Year Prospectus. The Office maintains central financial information data bases for use in management reports, budgetary planning, and special analyses.

The Office of Facilities Services directs a wide range of security, operation, maintenance, and repair programs for Smithsonian facilities. It oversees modifications and improvements to the physical plant to support growth of programs and activities and conducts long-range planning for facilities development and utilization. Reporting to the Director of Facilities Services are the Office of Environmental Management and Safety (OEMS) and the Office of Architectural History and Historic Preservation (OAHHP). OEMS advises and assists Smithsonian bureaus concerning fire protection for their facilities and the National Collections. OEMS also monitors occupational safety and health, including industrial hygiene and hazardous materials control; and reviews, disseminates, and implements the requirements of all new fire, safety, health, and environmental laws, regulations, and standards. OAHHP compiles and updates the architectural history of the Smithsonian, advises on historic preservation issues, and oversees the Smithsonian furnishings collection.

The Office of Procurement and Property Management (OPPM) provides central logistical support and acquisition policy guidance. This is achieved through policy, planning, management, and coordination of the Procurement, Contracting, Property Management and Supply programs. As the Institution's principal acquisition service, OPPM procures supplies, materials, contractual services and equipment in support of research and educational programs. OPPM also acts as the Smithsonian's space-leasing agent. In addition, OPPM provides pre-acquisition policy guidance and administers contracts on behalf of various Smithsonian units. OPPM ensures that the performance of these functions is effective and conforms to Federal and Smithsonian policy, rules, and regulations.

The Travel Services Office makes travel arrangements at the lowest possible cost for Smithsonian employees to comply with Smithsonian and Federal travel regulations. The Office enforces the government contract carrier program and the Fly American Act. The Office works closely with other offices to develop and implement new and revised travel regulations and distributes announcements about pertinent changes.

Progress in Administrative and Technical Support - The Institution has placed major emphasis on administrative and support operations to ensure their responsiveness to needs. Noteworthy during FY 1988 and planned for FY 1989 are the following:

The Office of Audits and Investigations issued 14 internal audit reports during FY 1988. These reports encompassed such diverse operations as the transportation procurement process, small purchase order system, mail management at the Smithsonian, and cash receipts and procurements at the Festival of American Folklife. OAI provided audit reports to the Contracting Officer on 12 contracts which resulted in over \$300,000 in savings for the Institution. The investigations staff opened a total of 41 cases, 18 of which resulted from the Fraud Hotline. The Office referred an additional 13 Hotline complaints to other Smithsonian units for administrative action. Four ongoing surveys to look for fraud, waste, and abuse also began. OAI staff closed 34 cases during the fiscal year resulting in the recovery of funds and Smithsonian property. Seven employees received reprimands ranging from letters of caution to termination for misconduct. The Office referred two of the cases for prosecution, resulting in convictions in Federal court, and three additional cases are pending.

The Institution encounters an extensive range of legal questions and issues which require advisement by the Office of General Counsel. These include evolving areas of the law concerning hazardous waste management, sexual harassment/discrimination, drug testing, AIDS, and repatriation of Native American remains and artifacts. In addition, there are numerous ongoing issues concerning trust law, Constitutional law, intellectual property rights, cultural property laws and treaties, immigration, real property transactions, contracts, labor relations, endangered species regulations, civil rights, employee standards of conduct and ethics, estates, and tax laws. Ten attorneys (including the General Counsel) and seven support staff members handled over 1,300 individual cases in FY 1987.

The Office of Congressional Liaison oversaw the legislative activity surrounding a measure providing for the disposition of Native American skeletal remains. This issue eventually extended to American Indian Museum questions and to the development and accelerated focus on the repatriation matter. Repatriation and the museum debate are likely to dominate future activity. Taxation and environmental concerns, as well as proposals to build an extension to the National Air and Space Museum, have required attention this past year and will continue to do so. During the first session of the 101st Congress, the terms of two Smithsonian Regents will expire, requiring legislation providing for their reappointment or for the appointment of successors.

The Office of Programming and Budget conducted a retrospective analysis of changes to budget formulation procedures that the Institution implemented in 1987. The retrospective resulted in a number of procedural improvements. The Office also increased the use of automation from the collection of data to assembly of budget narratives; provided expanded analytical support to Assistant Secretaries during the FY 1990 budget formulation process; conducted a comparative analysis on the use of base resources in several bureaus; participated in development of the functional requirements for the proposed new accounting system; developed a requirements statement for a new automated personnel cost projection system; issued two releases of the first Smithsonian Institution Budget Manual; installed a local area network; and provided Institution-wide training on how to write budget justifications.

The Office of the Treasurer continues to focus on the improvement of accounting and financial management systems. The Smithsonian has contracted with the U. S. Department of Agriculture's National Finance Center to process both its Civil Service and Trust payrolls. Conversion occurred in November 1987. Beginning in April 1988, the Institution set up specifications for new accounting software as a first step in developing a new financial system. One of the goals of this project is to respond to the directives of the Office of Management and Budget. The Treasurer's Office is especially interested in using off-the-shelf software and in standardizing the Institution's general ledger consistent with government-wide efforts.

With the addition of another staff member in FY 1988, the Travel Services Office has improved its services and response time for travelers. The staff provided support for the growing number of conferences and workshops arranged through the Smithsonian ranging in size from 5 to 50 persons. There has been an average of two conferences or workshops per month. In FY 1988, the Office completed and distributed to bureaus and offices the revised Travel Handbook. This is the first comprehensive revision of this handbook in more than 11 years, and it incorporates the most recent changes in the government per diem system. The Office explored a possible relationship with a travel agency. Such a relationship would allow the Office to expand its capabilities and to provide certain financial benefits for the Smithsonian. The Office is realizing

additional benefit by using North Atlantic Travel Antitrust Litigation Settlement Coupons obtained through a recent U.S. Government legal action. During FY 1988 and FY 1989, the Office will save over \$5,000 on air fares to and from the United Kingdom.

The Office of Printing and Photographic Services (OPPS) initiated three projects of national importance. Since it opened almost six years ago, the cold storage facility has become one of the most successful and imitated photographic facilities of its type. OPPS has scheduled its expansion in early FY 1989 to keep pace with the increasing numbers of photographs maintained in the collection. Under a research program in applied photographic preservation, OPPS continues testing a new toning solution. The OPPS' use of the solution could eliminate a suspected carcinogen from Smithsonian photographic laboratories. OPPS modified its testing procedures to include newly developed hydrogen peroxide fuming equipment which will increase the validity of the project results. In its continuing experiments with still video systems for collections management projects, the Office is learning how to adapt photography to a new technology of electronic still imaging. These experiments will offer state-of-the-art techniques for capturing and using collection images for a wide range of applications. The Office has reached agreement with the School of Visual Communications, Ohio University to use electronic images experimentally for newspaper reproduction.

The Office of Information Resource Management, with staff from the Office of Procurement and Property Management, awarded a contract for a new integrated system to serve the two Associate membership programs. OIRM installed an on-line collection cataloging system on the Institution's IBM mainframe for the Department of Invertebrate Zoology as one step in implementing a new Collections Information System. The outcome of prototype-testing now underway will determine the Institution's options with respect to new accounting/budgeting/procurement software. The Institution should decide upon the software early in FY 1989. The Institution has completed the transfer of personnel/payroll functions to the National Finance Center (NFC), and NFC is developing reports drawing on that data base. The Institution has increasingly emphasized training so Smithsonian staff can fully utilize the growing number of microcomputers and the new mainframe applications. OIRM added eight new courses and trained about 1,000 staff in FY 1988. OIRM established a "Help Desk" to provide call-in help to computer users. The Desk handles about 300 calls each month.

The Office of Procurement and Property Management processed approximately 10,000 transactions amounting to approximately \$104,000,000. Contracting projects became more complex and the total dollar value and number of requisitions increased. OPPM acted upon all contracts for goods and services within 30 days and awarded most construction contracts within 45 days. OPPM delegates small purchasing authority throughout the Institution to eliminate the need to process large volumes of small dollar requisitions. Contractors completed construction of the National Air and Space Museum Restaurant in July, and the restaurant is now operational. Contract administration for the construction of the Tupper Research Facility and Conference Center in Panama and the Barro Colorado Island research facility improvements continue. The Smithsonian Information Center construction contract also continues. The Property Management Program continues to produce savings for the Institution. In FY 1987, only 0.5 percent of the total items of property were lost or stolen.

Major activity in the Office of Personnel Administration included the conversion to the National Finance Center personnel/payroll system. A substantial effort to inform and educate employees accompanied the conversion, including a hotline for

payroll problems. The Office reorganized to handle better the requirements of the new system.

The Office of Environmental Management and Safety revised the Smithsonian handbook on Safety and Environmental Management to expand its scope and current relevance. Additionally, working with the Office of Museum Programs, the Office conducted a three-day workshop for small domestic and foreign museums and other educational and cultural institutions. This unique workshop addressed program development and problem-solving for fire protection, disaster planning, occupational safety and health, and environmental management.

The Office of Architectural History and Historic Preservation researched the architectural history of the National Zoo and the National Museum of Natural History. The Office organized the architectural records and photographs and augmented those materials with records from the Smithsonian Archives. The Smithsonian Furnishings Collection of 3,000 furniture and decorative arts items, from the mid-19th to late-19th century, has grown. OAHHP is reproducing several pieces in the collection for sale by the Smithsonian Museum Shops as part of the "Smithsonian Collection." Royalties will allow the Institution to make future acquisitions for the collection.

EXPLANATION OF PROGRAM INCREASES - For FY 1990, the requested increase for administrative units totals 47 workyears and \$2,100,000 as follows:

<u>Administrative office</u>	<u>FTE</u>	<u>Amount</u>
Accounting and Financial Services:	15	\$601,000
Architectural History and Preservation:	1	\$39,000
Audits and Investigations:	1	\$39,000
Congressional Liaison:	1	\$60,000
Environmental Management and Safety:	1	\$99,000
Equal Opportunity:	2	\$58,000
Facilities Services:		\$15,000
General Counsel:	2	\$82,000
Information Resource Management:	14	\$674,000
Personnel Administration:	7	\$298,000
Printing and Photographic Services:	1	\$23,000
Procurement and Property Management:	1	\$61,000
Office of the Treasurer:	1	\$51,000

A decrease of \$530,000 associated with nonrecurring expenditures in FY 1989 offsets these increases. The expenditures include: the Payroll Personnel System (\$100,000); the Financial Management System (\$400,000); and an Office of Audits and Investigations Local Area Network (\$30,000).

Office of Accounting and Financial Services (OAFS) (15 workyears and \$601,000)- The requested resources will enhance Smithsonian financial accountability. The enhancement is part of the Institution's effort to improve management practices. The proposed new accounting system replaces the current 20-year-old system. Growth in the dollar volume of Federal appropriations and Trust funds and related transactions has exceeded the monitoring capacity of the old system. The current accounting system is only semi-automated, and it uses now obsolete equipment. Replacement parts for the computer it resides on are difficult to find and costly. The Institution completed the first step toward replacing its accounting system in FY 1988 when it converted to

payroll processing services by the National Finance Center of the Department of Agriculture.

The requested funding will pay costs to install new general ledger and accounts payable programs in FY 1990. Both programs will meet the requirements of the Federal Government's Joint Financial Management Improvement Program and will address deficiencies cited by internal and external auditors. The new program will permit the Institution to post transactions, pay bills, update accounts, access and retrieve data, and prepare financial reports in a more timely manner and with fewer opportunities for error. The Office will hire four accounting technicians, two system accountants, one accountant, one records clerk, and seven temporary accounting technicians to make a smooth transition from the old system to the new. Other related expenses include travel and training, system documentation, computer usage and communications, space renovations, and supplies.

The new accounting system will accommodate 20 years of transaction growth. The Institution will be able to provide more reliable financial reports for internal and external audits, thus improving financial accountability.

Office of Architectural History and Historic Preservation (1 workyear and \$39,000) - There is a growing interest in the architectural history of buildings that the Institution holds in trust for the Nation. The requested resources will permit increased attention to historic preservation and architectural history issues. The increase will also expand publication and education opportunities for the public.

The responsibilities of the Office have burgeoned in recent years with a greater need to adhere to historic preservation requirements. Because the Office has no administrative or secretarial support, the present staff of trained specialists must spend large amounts of time engaged in these support tasks. The Office must have an Administrative Assistant (1 workyear and \$30,000) to provide basic budget, personnel, procurement, and accounting expertise and to coordinate the routine daily activities of the Office. This position will allow professional staff to devote their full time to more substantive issues.

The remainder of the requested increase will pay for a permanent internship program in architectural history and will start a video recording program. The amount of \$4,000 provides stipends for research, publication, and education opportunities through internships with the Office. The remaining \$5,000 begins the video program documenting the historic preservation and furniture restoration activities of the Smithsonian.

The planned program will provide a better record of architectural history, give greater attention to historic preservation requirements, and offer training opportunities on these subjects.

Office of Audits and Investigations (1 workyear and \$39,000) - The requested increase will deter criminal activity and other forms of misconduct at the Institution. Increasing the number of comprehensive investigations will resolve more quickly a growing caseload.

The investigative function within the Office of Audits and Investigations is growing in scope and complexity. More requests to investigate suspected criminal activity or misconduct require staff hours that are currently unavailable. The inquiries often involve the need to follow leads in the private sector and throughout

the United States. Because of the growing confidence of employees in the Fraud Hotline, the number of referrals and requests for investigations continues to increase. The current resources that can be dedicated to the investigative function are marginal. Other audit activities cannot be halted to give increased attention to investigations. The requested position for a criminal investigator will meet a growing demand for investigative services.

Office of Congressional Liaison (1 workyear and \$60,000) - An act of Congress created the Smithsonian Institution, and Congress has overseen the Institution since its inception. As an establishment of the Federal government, the Institution must respond to the information needs of Congress. The requested increase will give Congress greater access to information about operations and programs at the Institution.

Congressional review requirements for proposed programs necessitate a thorough and timely presentation by the Institution. As the Institution has expanded existing and begun new programs, more questions have come from Congress. The requested resources will make liaison staff more available and responsive to these questions.

Office of Environmental Management and Safety (1 workyear and \$99,000) - The requested increase will bring Smithsonian operations into compliance with laws and regulations protecting facilities, staff, and visitors from safety and environmental hazards. These resources, as outlined below, guarantee better environmental protection, occupational health, hazard communication, radiation and fire protection, and safety training.

- Environmental Audit Program (\$52,000) - The environmental audit program will eliminate safety and health hazards through inspection and staff awareness.

All government agencies must prevent environmental pollution. The Smithsonian environmental audit program will increase compliance with all environmental regulations. The program will do the following:

- demonstrate present compliance status;
- test existing environmental management systems;
- discover potential liabilities; and
- develop control strategies to ensure compliance.

Audits build the foundation of a new environmental management program for the Institution. The expanded program will include periodic surveys at all Smithsonian museums/facilities. These assessments will encourage building managers to eliminate environmental program deficiencies and improve environmental management practices. Requested funding will permit audits at eight museums/facilities annually by experienced contractors. The expanded program also will educate Smithsonian staff in audit techniques and environmental control methods so that the staff may periodically survey all locations.

The Environmental Audit Program will bring Institutional operations into compliance with federal safety and health codes. This compliance will eliminate health and safety hazards to Smithsonian staff and visitors.

- Safety and Health Program Data Automation (1 workyear and \$47,000)- Accident and injury trends can change quickly. Automation of safety and health data will ensure timely and accurate analyses of the Smithsonian's accident and injury experience. Better information will enable safety and other specialists to respond with appropriate hazard prevention measures.

The Office of Environmental Management and Safety provides technical and professional support for occupational safety and health. The Office also maintains fire and environmental protection and compiles accident and injury data. The Office now gathers, tabulates, and analyzes such data manually. Automation of this data collection process would ensure effective use of the Institution's safety and health resources. The program will publish reports more regularly for management. These reports will show the status of the Smithsonian safety and occupational health program and will lead to an annual report for the Secretary of Labor. Automation will enhance regular and accurate program analyses.

The requested increase will provide a full-time safety and health data management specialist. The specialist will convert the present manual data-gathering process into a data-based tracking and reporting system. The reports generated by the system will support regular program analyses.

The requested increase will improve the Smithsonian's safety practices and procedures. The increase will also enhance the Institution's responsiveness to safety and health hazards. The improvement will protect employees, visitors, and property and reduce health and safety risks.

Office of Equal Opportunity (2 workyears and \$58,000) - The requested resources will ensure the success of the Smithsonian's new Affirmative Action programs. The resources will also expand the ethnic and women's celebrations this Office sponsors at the Smithsonian.

The OEO compiles race, sex and disability data for the Institution to identify program and workforce problems. Based on their findings, the OEO writes internal reports for the Board of Regents and the Secretary's Management Committee. The office also writes reports for Congress, the Equal Employment Opportunity Commission, and the Office of Federal Contract Compliance Programs. Better management of and access to this data is critical in identifying problem areas.

The Office of Equal Opportunity needs a data technician (1 workyear and \$25,000) to manage the affirmative action data. The technician will build and maintain a statistical data system and objective/action item monitoring system. These systems will enable OEO program managers to:

- assess action item implementation and results;
- analyze continuing problem areas;
- work with managers to design and implement alternative action items;
and
- respond quickly and accurately to inquiries.

OEO's workload will increase with new reports for the House and Senate on recent Affirmative Action initiatives and accomplishments. The new multi-year Affirmative Action Plan for women and minorities requires reports and needs clerical support as well (1 workyear and \$18,000).

OEO sponsors celebrations related to Blacks, Hispanics, Asians, and women. These various celebrations highlight past achievements and identify new directions for Smithsonian's diverse work force. The Office uses \$2,000 of Federal and \$3,000 of Trust funds to commemorate these events. An additional \$15,000 will strengthen these commemorative celebrations both qualitatively and quantitatively.

Office of Facilities Services (\$15,000) - The requested funding will improve efficiency of facilities management at the Institution. The Office of Facilities Services directs the Smithsonian's facilities management program which five subordinate organizations execute. Information sharing helps coordinate work effectively. Using an information network, facilities services organizations can avert logistical problems and conflicts with programmatic activities.

The organizations responsible for facilities management must share information among themselves and with client organizations on a regular basis. The information network will give participants automated access to information regarding plans for their buildings. Support organizations will also have access to the system.

Lapse savings in FY 1988 will fund initial purchases of equipment and software. Funding anticipated in FY 1989 (1 position and \$66,000) will hire a system administrator. The FY 1989 funding will also cover the costs of supplies, staff training, and software development. Recent discussions with vendors indicate that the annual cost of maintaining the system and replacing worn out equipment and software components will exceed the total funds available. The Institution requests \$15,000 to complete funding required to support this program.

A well maintained network and related automated programs will diminish logistical problems and will allow more efficient use of available resources.

Office of the General Counsel (2 workyears and \$82,000) - The requested resources will reduce the Institution's liability as inability to respond to requests for advice increases. Recent growth in the Institution's programs has led to an expanded number of complex legal matters which the Office must address.

Since the Office's last increase in Federal staff in 1974, the Institution's Federal budget has increased from approximately \$86 million to \$232 million, and the number of Federal employees, from 2,880 to 4,092. The Office of General Counsel is devoting an increasing amount of time in pre-trial preparation (discovery, pleadings preparation, and witness preparation); administrative hearings; contract negotiations, award protests, and disputes; and tort and personal property claims. The addition of one attorney and one legal assistant will meet the growing demand for these services.

Office of Information Resource Management (14 workyears and \$674,000) - The requested resources will reduce future costs of planning systems and ensure efficient use of computer technology. The requested resources will also ensure inventory control and expand scholarly access to the National Collections at the Institution. The requested increases appear below:

-- Information Architecture Development (2 workyears and \$100,000) - The requested increase will reduce future costs of planning systems. A complete Smithsonian information architecture will provide an accepted framework for future systems development. The benefits include:

- better defined systems requirements;
- the potential for more integrated systems;
- better management tools for assessing effectiveness of operations; and,
- better protection of automated systems against technological obsolescence.

With two additional full-time positions and \$100,000, the current program will proceed in a more timely manner and expand to include work postponed. Additionally, these positions will ensure that data administration staff are available to address the growing backlog and expected future demand for services.

The requested increase will allow future systems planning to proceed more efficiently and conform to established guidelines. Following accepted established guidelines will reduce costs.

-- User Support (2 workyears and \$96,000) - The requested increase will lead to more efficient use of the Institution's computer technology and will support the growing number of users of the Institution's micro and mainframe systems. Expanded personal computer use and widening demand for access to on-line data bases and information systems stimulates demand for support services. The lack of user-support staff has severely curtailed the Institution's efficiency in using this new technology.

The requested increase is essential to provide adequate support to users of new Smithsonian office automation and data base systems. The requested two workyears will also provide for training for Smithsonian staff. Efficient use of the Institution's automated systems will increase in proportion to the requested training resources.

-- Collections Information System (10 workyears and \$478,000) - The requested increase will ensure inventory control and expand scholarly access to the National Collections at the Institution. A fully integrated Collections Information System (CIS) will achieve these goals.

When CIS is fully operational, Smithsonian and non-Smithsonian researchers will be able to:

- quickly view all known data on any object in the collections;
- have a place to store research results;
- have the opportunity to combine imaging with textual data; and,
- have a means of extracting selected data for publishing, further research, and statistical processing.

Collection managers will be able to:

- know if objects are available and their location;
- enter new data on acquisitions;
- maintain data on existing objects with assurance that such data is non-redundant; and,
- maintain accuracy through rigorous edit checks.

This system will serve all Institutional personnel, visiting scholars, and the public at large. The requested increase will put two additional teams (5 workyears each) in place for developing systems for Cultural History and for Art.

The CIS will maintain an inventory of the collections the Institution holds in trust for the Nation. The system will allow greater accessibility to these collections for their study.

Office of Personnel Administration (7 workyears and \$298,000) - The Institution has often lost good job candidates for its various specialized positions because of the length of time to fulfill the hiring process. The Office of Personnel Management recently delegated the Institution examining authority for some of these positions. The requested increase will expedite the hiring process concurrent with efforts to recruit women and minorities in such positions.

The Smithsonian will fill vacancies for about 14 core occupations ranging from curators to animal keepers faster by integrating the civil service processes with the Institution's own search procedures. The requested increase will create an examining unit that will:

- publicize vacancies,
- accept applications,
- rate and rank applications,
- apply veterans preference,
- issue official certificates of eligibles,
- respond to public inquiries, and
- maintain records for the required period of time.

Five of the requested workyears and \$238,000 will establish an examining unit to administer the delegated authority for selected Smithsonian occupations. The Office will hire three professional examining specialists, one technician, and one clerical assistant who will help administer the authority. The remaining 2 workyears and \$60,000 requested will handle special requirements for targeted recruitment and will monitor the Institution's affirmative action program.

Delegated hiring authority will enable the Institution to target recruitment efforts to individuals who are highly qualified and available for vacancies. With this new authority, the Smithsonian will make more timely employment offers and, therefore, compete better with universities and the private sector.

Office of Printing and Photographic Services (1 workyear and \$23,000) - The recent purchase of high technology equipment requires skilled operators. The requested resources will improve efficiency and increase productivity.

The OPDS Duplicating Branch provides services to the widest variety of Institution bureaus and offices of any service unit. Since FY 1987, the branch has been able to maintain workflow by introducing high technology equipment. Workflow is now increasing.

The requested 1 workyear and \$23,000 would provide adequate staff to operate this equipment at its capacity. This additional position will help meet the dramatically increased duplicating requirements of numerous offices, especially Public Affairs and the Office of Personnel Administration.

Office of Procurement and Property Management (1 workyear and \$61,000) - The workload of OPPM has increased with the expansion of Smithsonian programs and facilities. Institutional emphasis on contracting out and awarding more time-consuming technical, professional, and service contracts has further increased the workload. Between FY 1984 and FY 1987, the number and value of transactions OPPM processed have increased by 80 percent and 33 percent respectively, while the procurement staff has increased by one clerk. The pace in FY 1988 is ahead of last year. Three or four peak periods throughout the year further intensify the base load. The small staff of the Procurement Division handled 700 specialized contracts during FY 1988. The staff has stretched its ability and productivity to the maximum to meet the Institution's current requirements. Any absenteeism or vacancy significantly disrupts schedules. The Institution must have one contract specialist to alleviate the pressure of the office workload.

The remaining funding will upgrade office automation in OPPM. The growth of Smithsonian activities makes automation necessary to:

- control expendable and nonexpendable inventories;
- record, compile, and report various configurations of contracting data in a timely manner;
- increase the flow of information between OPPM and requisitioning, receiving, and accounting activities; and,
- track the status of requisitions in a more timely manner.

Comprehensive automation requires assorted equipment. Acquiring this equipment will help OPPM to eventually interface with the new, Smithsonian-wide financial management system, and as OPPM utilizes the new system, the Office's efficiency will improve.

Office of the Treasurer (1 workyear and \$51,000) - The requested resources will further enhance Smithsonian financial accountability. The Office of the Treasurer will monitor the new financial accounting system to ensure accuracy.

The Treasurer needs the direct assistance of a financial analyst to obtain required data from the new system for statistical and financial analysis. As more financial data becomes available, it must be given closer scrutiny and be disseminated to management to ensure efficient use of resources.

The requested position will assist the Treasurer in monitoring the progress of the new system. The assistant will check the data for accuracy and distribute reports to appropriate organizations within the Institution.

The requested increase is part of a greater effort to improve financial accountability of the Institution. The Institution will achieve this goal by

replacing its current accounting system and hiring qualified staff to run the new system.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Funding of these centralized services from both appropriated and nonappropriated sources produces a ratio of Federal and Trust fund administrative support approximately in proportion to the operating program expenditures of the Institution as a whole. The amounts shown under Unrestricted General represent administrative expenditures for those units that are organizationally under Administration. Other units that receive administrative allotments appear in the appropriate section of the budget request. For example, administrative costs for the Smithsonian Astrophysical Observatory appear within its nonappropriated Trust funds section. This section also includes expenditures for producing, distributing and marketing photographic material and slide sets, and funds to help defray the costs of the Office of Printing and Photographic Services. The Office of Equal Opportunity receives a program allotment, which supports community outreach through exhibits and publications, specifically aimed at women and minorities. Funds also provide for the costs of the identification and implementation of new financial and administrative management systems. Special Purpose funds include gifts received through unrestricted bequests which in accordance with the Bylaws of the Board of Regents subsequently transfer to the endowment. Anticipated expenditures in the Special Purpose category include support of studies in ornithology, computer conversion costs, a computer cost center, and small amounts used for legal seminars, and research.

Restricted Funds - This category includes endowment bequests and foundation grants for scientific research publications and general research projects.

OFFICE OF DESIGN AND CONSTRUCTION

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	35	2,250	9	468	-	50	-	-	-	-
FY 1989 Estimate	48	2,920	9	447	-	12	-	-	-	-
FY 1990 Estimate	57	3,497	9	434	-	-	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of Design and Construction (ODC) provides professional architectural and engineering services to support the development, operation, maintenance, repair, and improvement of the Smithsonian's physical plant. These support services include: short- and long-range feasibility analyses, master plans, design and engineering studies, design development, contract document preparation, project management, contract administration, and preparation of cost estimates for budgets and construction. The ODC staff reviews contracts, plans interior design and space renovations, provides technical consulting support, and operates construction field offices. The requested increase for FY 1990 totals \$109,000 and 2 workyears. These funds will provide dedicated long-range planning for facilities development.

The Institution also requests for the Office of Design and Construction funds totaling \$468,000 and 7 workyears for management and technical costs associated with the enhancement of the Smithsonian's repairs and restoration programs. The Repairs and Restoration section of this budget request contains the justification for these funds and other administrative costs.

PROGRAM - The Office of Design and Construction staff consists of electrical, mechanical, structural, and civil engineers; architects and construction managers; planners, estimators, technicians, computer specialists, and administrative support. The main function of the Office of Design and Construction is to provide the expertise necessary to plan, design, construct, and administer a program for all construction, renovation, and repair projects for the Smithsonian buildings and museums. The buildings, museums, and research facilities serviced are primarily in the Washington metropolitan area. Other facilities serviced include: the Smithsonian Environmental Research Center near Edgewater, Maryland; the Whipple Observatory in Arizona; the Cooper-Hewitt Museum in New York; the Astrophysical Observatory in Massachusetts; and the Tropical Research Institute in Panama.

The Office's major responsibility is to administer the Repair and Restoration (R&R) and Construction programs. The R&R program preserves, repairs, rehabilitates, and corrects code violations of an aging physical plant. The office provides professional and technical support to guarantee a safe and proper environment for

visitors, staff, and the National Collections. The Office also assists exhibition and other projects requiring space modifications.

Smithsonian bureau and organization managers receive the expert services of ODC which require:

- preparing contract documents including: designs, specifications, and cost estimates for construction projects;
- preparing master facility plan studies and related analyses;
- planning for construction and facility development and physical plant utilization; and
- developing related budget, construction, and change order estimates for R&R and Construction Programs.

The Office maintains an extensive file system of technical specifications and drawings related to facility projects and programs which involve, with the exception of the National Zoo, all Smithsonian buildings and sites. ODC and other Smithsonian organizations use this source of information to support current and future work.

In FY 1987, funds committed totaled \$40,000,000 for various facilities and exhibition projects. These funds came from Construction, Repair and Restoration, Salaries and Expense appropriations, and Trust funds. The major construction, repair and restoration projects funded in FY 1987 and FY 1988 include:

- Air and Space Museum Terrace Restaurant;
- Quadrangle link to the Freer Gallery of Art;
- Additions and alterations to the Freer Gallery of Art;
- Arts and Industries building exterior renovation;
- Tupper Laboratory and Conference Center at Tropical Research Institute;
- Major Construction at Barro Colorado Island in Panama;
- Mathias Laboratory and Greenhouse at Environmental Research Center;
- Museum of American History exterior repairs and roof replacement;
- PCB transformer replacement at all existing locations;
- Asbestos removal from various facilities; and
- Repairs, including fire protection, disabled access, health and safety improvements for various buildings and museums.

In addition to current activity, ODC planners and design professionals prepared detailed and preliminary facility requirements data and planned projects for future years. The estimated construction cost for these projects is \$575,000,000. The detailed plans include the Whipple Observatory Base Camp construction and the Tropical Research Institute facility development. Preliminary plans include the possible expansion of the Hirshhorn Museum and construction at the Silver Hill collections storage facility.

During FY 1988, ODC's professional staff administered 120 construction contract services and 80 architectural and engineering service contracts. In addition, the staff reviewed 75 exhibit installation projects and supervised 50 interior design and space related projects.

EXPLANATION OF PROGRAM INCREASE:

Facilities Planning (2 workyears and \$109,000) - The Office of Design and Construction is responsible for meeting the planning, design, and construction needs

of the Institution. The increase will provide dedicated resources to plan a long-range facilities development program. It is in the Institution's interest to have accurate facility plans for longer-range requirements available for management action and decision making. The current planning capability of the office is of a more short-term project approach. With the combined capability of existing staff and the two new positions, ODC will develop budgetary and program plans in greater detail and with contingency considerations that currently are not available beyond a two or three year period.

The requested staff and support funds will contribute to and improve the Institution's long-range planning capability. With this funding, ODC will:

- address short-term needs more effectively;
- better identify planning needs on a long-term basis;
- improve long-range cost estimates; and
- assist management action and decision making.

To assist this process ODC will hire a facilities planner and a cost analyst to plan a long-range facilities development program. Other expenses will include computer equipment, software, printing, training, supplies, and space rental for the requested positions. ODC will need the funding on a permanent basis.

The planning process will involve long-range development of master plans and prospectuses identifying facilities requirements and presenting approaches and budget estimates in sufficient detail to permit informed management decisions.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - The funds provide salary and partial support costs as ODC services both Trust and federally funded programs.

OFFICE OF PROTECTION SERVICES

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	732	19,369	-	8	1	93	-	-	-	-
FY 1989 Estimate	757	20,717	-	8	1	80	-	-	-	-
FY 1990 Estimate	767	21,057	-	8	1	80	-	-	-	-

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of Protection Services (OPS) protects the visitors, staff, collections, and facilities of the Smithsonian Institution by providing guard, physical security, and medical services. The authority of OPS to provide these services derives from Public Law 82-206 and Public Law 88-391, both regarding the policing of Smithsonian buildings and grounds, and from Public Law 91-616, which relates to employee health. For FY 1990, OPS requests an increase of 10 workyears and \$340,000 for required security. Additional posts are essential to provide coverage for the Quadrangle building and the adjacent garden (10 workyears and \$215,000). The remainder (\$125,000) is for overtime to provide security on the sites of R & R construction projects, and the justification of this request is in the Repairs and Restoration section of this budget request.

PROGRAM - OPS is a support organization responsible for protecting the collections, facilities, and other property of the Smithsonian from damage, destruction, or loss from any cause and for creating and maintaining a safe environment for visitors and staff. This broad mission includes a responsibility to determine the protection requirements of Smithsonian facilities and to meet these requirements by operating a guard force; to procure, install, and maintain an alarm network and to respond to its signals; to install and maintain locks and other security hardware in Smithsonian facilities; to plan and provide health services for employees and to take appropriate action to eliminate health hazards from the workplace; and to provide emergency medical treatment for the injuries and sudden illnesses of visitors and staff.

OPS provides security management, guard, investigative, and occupational medical services for the major Smithsonian facilities in Washington, D.C., including 14 museums and art galleries, and to the Cooper-Hewitt Museum in New York City. OPS offers technical assistance and advisory services in security matters to all Smithsonian bureaus. To accomplish its mission, OPS employs a force of security officers and a staff of administrators, training specialists, alarm systems

specialists and technicians, investigators, museum security specialists, a medical officer, nurses, and emergency medical technicians.

The security force operates twenty-four hours a day, every day of the year, to patrol and provide access control at major facilities in or near Washington, D.C. and at the Cooper-Hewitt Museum in New York City. Uniformed guards, plainclothes officers, and K-9 officers patrol galleries inside and grounds around Smithsonian buildings day and night. They respond to emergencies; operate and respond to the signals of an alarms network that covers all SI facilities, including the National Zoological Park, and the Smithsonian Mail Order Center in Springfield, Virginia; conduct security and fire patrols after the museum buildings close to the public; investigate accidents; report fire and safety hazards and malfunctions associated with mechanical and electrical equipment; and provide information to museum visitors. The Office coordinates protection arrangements, especially those related to VIP visits and exhibitions of international interest, with and supported by the State Department, the Secret Service, the U.S. Park Police, and other federal and local agencies. In recent years OPS has concentrated on reducing the number of thefts committed in SI facilities. Plainclothes officers are in areas of high crime rate, and OPS intensively trains its officers in police methods and security practices. Also, OPS thoroughly investigates incidents. The increase in reported incidents (FY 1984, 179; FY 1985, 204; FY 1986, 263; and FY 1987, 327) in the last four years has prompted this action.

The training of museum security officers is a specialized area that OPS takes pride in and in which has gained renown in the museum community. Training staff instructs all new guards (including K-9), prepares guards for higher level officer positions, and conducts refresher courses for the force. OPS training includes internal along with outreach protection education. Over the past several years, the staff has trained K-9 teams from Fairfax and Loudoun Counties and Falls Church, Virginia; Kanawa County, West Virginia, and the Annapolis, Maryland, Police Department, as well as guards and guard supervisors from Detroit Institute of Art, The Museum of New Mexico, Virginia Museum of Fine Arts, U. S. Air Force Museum, Amon Carter Museum of Art of Fort Worth, High Museum of Art in Atlanta, National Aquarium of Baltimore, Bishop Museum of Hawaii, and others across the U. S. OPS assists the Institution's Office of Museum Programs in providing security training for small museums across the U.S. Every year OPS hosts a large museum security conference that has attracted international participants. OPS plays a leading role in improving security of cultural objects.

An expansive network of locks, alarms, and other devices is necessary to control access to and provide protection for SI facilities and property. OPS advises curators and exhibitors on appropriate security systems and plans, designs, acquires, installs, and maintains security systems in SI facilities in the Washington metropolitan area. In addition, OPS provides advice on security systems for facility, exhibit, and collection protection to SI organizations outside Washington and to museums, libraries, churches, historic sites, and corporations.

OPS has been developing a proprietary security system (SIPSS) to provide complete internal control of the equipment used in and the information provided by its security systems, to improve the timeliness of OPS response to the signals received from its alarms, and to control the costs associated with operating a security system. All Washington-area facilities have SIPSS installed, with the remainder converted over the next year.

OPS conducts or arranges for security management surveys to determine protection requirements of Smithsonian facilities, investigates alleged and actual violations of the law occurring on Smithsonian premises, and escorts many shipments of valuable objects to and from the Smithsonian. The investigative program resolves collection losses, thefts, and other serious internal matters. Successful resolution of collection losses and thefts requires coordination with the United States Attorney, the Department of Justice, and the court system.

OPS provides occupational medical services and counselling for Smithsonian employees. The medical officer, occupational health nurses, employee assistance counselors and emergency medical technicians assist in identifying and eliminating hazardous work environments, monitor the health of employees exposed to occupational hazards, and provide first aid for on-the-job injuries of employees. Major program elements include general protection and monitoring of employees exposed to various specific hazards (e.g., asbestos, loud noise, pesticides, and other toxic chemicals); medical evaluation of individuals selected for certain hazardous jobs or for certain job duties or functions (e.g., underwater diving evaluations [97], operating motor vehicles, etc. evaluations [19]); employee counseling to deal with substance abuse and emotional problems; routine medical treatments (e.g., allergy shots [1,126], flu shots [647], and dressing changes) provided by an employee's private physician to reduce the amount of time employees miss from work for simple health care; required immunizations for SI employees on official travel (362); and health education, major disease screening programs, and CPR (263) and first aid training for employees (127), including special first aid training for scientific expedition members (26) traveling in medically remote areas. OPS provides these occupational medical services at the Washington-area facilities and at major remote facilities as well.

The occupational medicine program has expanded rapidly since April, 1983, when OPS appointed its first full-time medical officer. Occupational health units operate in NMAH, NMNH, NASM, NZP, MSC, and HMSG and health services are available in other facilities during regular visits by health staff members. OPS has acquired new equipment and developed a new examination program for the increasing number of employees identified as being at risk from exposure to asbestos and other toxic substances. OPS gave audiometric examinations (459) to employees requiring a hearing conservation program and provided hearing protection devices. OPS will continue to develop its current occupational health programs and will undertake additional required programs when the space needed to administer these programs becomes available. The programs expected to grow most rapidly are employee counseling, monitoring of employees exposed to toxic chemical, diabetes screening, glaucoma testing, cholesterol testing, and pre-employment physicals. There is also a need to promote all types of voluntary screening programs to increase employee participation. In FY 1987, OPS health personnel completed 5,952 screening examinations.

In September, 1983, OPS expanded its counselling program for employees with alcohol, drug abuse, or emotional problems which affect work performance bringing OPS into full compliance with the requirements of Public Law 91-616. The OPS staff consisting of two certified counselors is available to employees on a full-time basis. The number of referrals is increasing dramatically as the existence of this service becomes publicized more widely to employees and supervisors.

In discharging its responsibility to ensure employment safety, OPS held meetings with Smithsonian divers to explain the new regulations in accordance with the standards of the Undersea and Hyperbaric Medical Society, the National Oceanic and Atmospheric Administration, and the American Academy of Underwater Sciences. OPS

reviews medical qualifications of those planning to dive, performs physical examinations of divers, represents SI on appropriate committees of national diving organizations especially with regard to scientific diving, and provides liaison on medical aspects of scientific diving with Federal agencies, legislative committees, and scientific societies. The medical officer has accompanied several research expeditions to the Caribbean to observe and evaluate medical conditions and requirements.

OPS is now conducting stringent inspections of all SI and NZP food service facilities and requires testing of all food handlers for tuberculosis.

EXPLANATION OF PROGRAM INCREASE - For FY 1990, OPS requests an increase of 10 workyears and \$340,000 for required security. Additional posts are essential to provide adequate security coverage for the Quadrangle and the Enid A. Haupt Garden (10 workyears and \$215,000). The remainder (\$125,000) is to pay overtime costs for on-site security for R & R construction projects, and the justification of this request is in the Repair and Restoration section of this budget request.

Quadrangle Staffing Requirements - (10 workyears and \$215,000) - With additional security coverage in the Quadrangle building and the adjacent garden, the Institution will reduce the risk of theft of or damage to the collections. Accordingly, the staff and public will benefit from a more secure environment.

The Kiosk, located between the Smithsonian Institution Building and the Freer Gallery of Art on the Mall, provides access to the S. Dillon Ripley Center. OPS based the original request for Quadrangle guard staff solely on day time use of the Kiosk entrance. Additional security personnel will monitor early morning and late evening activities of staff and class participants. Three positions would provide the required extended coverage seven-days-a-week, and allow time for breaks, lunch, leave, and training.

The Enid A. Haupt Garden contains numerous valuable antique benches, urns, and flower stands. These items, though serving a functional purpose, belong to the National Collections. Additionally, the horticultural exhibit in the Garden represents a typical 19th-century layout. This layout limits the field of vision. The Garden requires two duty posts to keep all areas under continuous surveillance from 7:00 a.m. to 8:15 p.m. Five guard positions will provide seven-day-a-week coverage to the entire Garden.

These 8 new positions, along with the 10 related positions requested in FY 1989 for the Quadrangle building, require supervision. Two additional supervisory guard positions will meet this need.

Many factors determine the number of required posts. Crowd conditions, value of objects on display, the vulnerability of those objects to accidental damage, vandalism, or theft, and the field of vision of the assigned protection personnel are some of the factors. The requested guards will secure the Quadrangle and the Enid A. Haupt Garden which are now at an unnecessary level of risk.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds -- The use of guard services at special events and lectures at Smithsonian facilities provide allotments and reimbursements. These funds purchase supplies, materials, and equipment.

OFFICE OF PLANT SERVICES

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1988 Estimate	490	36,026	6	989	-	56	-	-	-	-
FY 1989 Estimate	503	37,654	6	964	-	76	-	-	-	-
FY 1990 Estimate	523	38,578	6	1,214	-	74	-	-	-	-

* FTE = Full-time equivalent

** FTP = Full-time permanent

ABSTRACT - The Office of Plant Services (OPlantS) operates, maintains, and repairs 14 museums and art gallery buildings and a number of other work and collection storage areas located in the Washington metropolitan area and New York City. In support of research, exhibitions, education, and other public programs, OPlantS provides utilities, transportation, mail services, exhibits renovation, and other program services. OPlantS provides technical service and assistance to several Smithsonian units located outside the Washington metropolitan area. These units include the Tropical Research Institute in Panama, the Whipple Observatory in Arizona, and the Environmental Research Center in Maryland.

The Offices of Horticulture, South Group Building Management, and Quadrangle Facility Management are a part of this line item also. The Office of Horticulture manages the Smithsonian grounds and provides horticultural assistance to Smithsonian bureaus. A greenhouse-nursery supports the horticultural needs of the Smithsonian. Lectures, seminars, and horticultural exhibitions constitute educational outreach. South Group Building Management offers a full range of maintenance services for the Arts and Industries and Smithsonian Institution Buildings. Quadrangle Facility Management offers a variety of administrative and maintenance support services for the Arthur M. Sackler Gallery, the National Museum of African Art, and the S. Dillon Ripley Center, located in the Quadrangle complex.

For FY 1990, the Smithsonian requests a program increase of 20 workyears and \$600,000 for: the Office of Plant Services to enhance facilities management (8 workyears and \$205,000); the Office of Horticulture for daily grounds and interior plant maintenance (4 workyears and \$230,000); South Group Building Management to augment labor support (2 workyears and \$36,000); and Quadrangle Facility Management to provide support for the S. Dillon Ripley Education Center (6 workyears and \$129,000). An increase of \$324,000 justified in the Uncontrollable Increases section of this budget will support the Institution's utilities, postage, rent, and communications costs.

PROGRAM - I. The Office of Plant Services - The Office of Plant Services operates, maintains, and repairs over 5.1 million net usable square feet in museums

and art galleries in Washington, D. C. and New York City. The Office provides maintenance of building interiors and exteriors; elevators, escalators, mechanical and electrical equipment; and lighting and refrigeration components, as well as oversight of emergency property repairs accomplished by service contracts. Trade and craft support includes plumbing, electrical, woodcrafting, and plastering efforts. In addition to furthering research projects and office relocations and modifications, OPlantS provides these services to support exhibition installations and public events throughout all Smithsonian facilities.

The automated Facility Monitoring System continually analyzes and controls mechanical equipment throughout the Institution. This system monitors areas of buildings requiring stable humidity and temperature control and alerts a control center when deviations from normal conditions occur. Because this automated system identifies abnormalities so quickly, immediate adjustments allow the Smithsonian to avoid costly repairs and prevent damage to the collections. The automated Preventive Maintenance System ensures increased reliability, decreased repair costs, and longer life, by scheduling regular preventive maintenance on building operating systems. This system schedules preventive maintenance for fire prevention systems, guard stations, and automatic lighting, as well as roofing systems and heating, ventilating, and air conditioning systems in all museums and the Environmental Research Center.

The Office maintains and operates a supply warehouse to stock and distribute frequently used supplies and materials. To obtain the best prices, OPlantS purchases materials in bulk and stores them for future distribution. In addition to supporting office relocations and modifications, OPlantS offers packing, crating, warehousing, and moving services for museum objects and collections. The Office also provides a full range of transportation services for the Institution, as well as mail services and postage monitoring.

In FY 1988, OPlantS continued providing program support to museums and other Smithsonian organizations. This support included: preparing halls for new exhibitions; renovating office space to accommodate changing program needs; and installing additional automated exhibit lighting systems. The building inspection program continued to ensure that OPlantS personnel identified and promptly attended to facility repair needs. Automated equipment continued monitoring temperature and humidity conditions in major museums; the Institution installed fire detection and suppression systems; and occupancy of the Quadrangle took place.

Significant accomplishments in FY 1988 include providing trade and craft services such as electrical, plumbing, machine, woodcrafting, and painting in support of more than 80 exhibit projects. Notable among these were: "King Herod's Dream" and "Crossroads of Continents" at the Natural History Museum; "Tropical Rainforests" at the International Gallery in the Quadrangle; "Different Drummer" at the Hirshhorn Museum; and "Clay Revisions" at the Renwick. Other exhibits supported by OPlantS were "Frank Lloyd Wright" at the American History Museum; "Aerospace Computing" at the Air and Space Museum; and "Portraits From Gripsholm" and "The Artist's Mother" at the American Arts/Portrait Gallery.

II. The Office of Horticulture - The Office of Horticulture (OH) applies the discipline of horticulture in educational, scientific, research, exhibition, and display activities throughout the Smithsonian. There are more than 100,000 plants and artifacts in OH's collections and much of the plant material is used in Smithsonian museum interior and exterior displays. Garden furnishings from the collections and plants propagated and grown at the Smithsonian greenhouse-nursery are also used in

landscape design. Grounds management personnel install and maintain the plants. OH units extensively use sources within the Horticulture Branch Library to support these programs. Exterior pest control, removal of trash from the gardens, and snow and ice removal are also the responsibility of this Office.

The Smithsonian Women's Committee contributed \$12,000 for the preparation of the east garden beside the Arts and Industries building. The Smithsonian dedicated this area on May 25, 1988 to honor Mary Livingston Ripley, for her contributions to the Smithsonian and as the founder of the Women's Committee. These funds included a stipend for an intern for three months to assist in planning the Mary Livingston Ripley Garden.

The Smithsonian Society provided \$17,900 to buy a freeze-drying chamber. OH will use this chamber to prepare for a FY 1989 exhibition which will feature dried plant material. This state-of-the-art machine, which preserves flowers and plants for long-term display and scientific study, will be available to Smithsonian researchers.

In FY 1988, the Office of Product Development and Licensing (OPDL) selected artifacts from the OH collections for reproduction and marketing. OPDL selected cast iron and cast aluminum furniture, and in 1988, Brown Jordan, a major American furniture manufacturer, introduced "The Smithsonian Collection." This Collection includes two patterns, "Day Lily" and "Fern Leaf," to be produced in cast aluminum, and the "Palm Court" pattern fabricated in wicker and based on a design documented in the Smithsonian Institution Archives Center.

The OH participated in the 1988 Philadelphia Flower Show and won the Pennsylvania Horticulture Society's Emile H. Geshick Memorial Award. The exhibit featured 250 orchids, 150 tropical plants, and cast iron artifacts from the OH collections. The basis of the exhibit was the Horticultural Hall on the grounds of the 1876 Centennial Exposition in Philadelphia. The background was a 12' x 50' photographic reproduction of the Hall (enlarged from a stereograph view in the OH collection).

With the Smithsonian Institution Traveling Exhibition Service, the OH researched and designed an exhibition entitled "Victorian Gardens: A Horticultural Extravaganza." This exhibition traces horticulture's rise between the years 1835 to 1900 to "its paramount place in commerce, landscape design, the decorative arts, and costume." This exhibition will visit 15 cities during the next three years.

The OH provides and cares for plant material in all the local Smithsonian museums for use in exhibitions and special events. In FY 1988, various exhibitions used over 2,400 plants. These exhibitions included "Indian Terra Cotta," "Chinese Scholars Studio," "Tropical Rainforest," "Frank L. Wright House," "Russian and Soviet Paintings, 1900-1930," and the "Folklife Festival."

The Office of Horticulture's exhibition, "Native American Flora," a salute to former First Lady, Lady Bird Johnson, opened on April 29, 1988 in the Arts & Industries Building. This exhibition focused on the preservation, conservation, and landscape use of wild flowers and included some 100 species of native plants.

OH mounted the 12th annual "Trees of Christmas" exhibition in the National Museum of American History. Unusual, handcrafted ornaments were on all 12 trees. OH based the selection on appropriateness of theme, execution of design, and quality of construction. All of these ornaments became part of the OH collections at the conclusion of the exhibition.

The opening of the Enid A. Haupt and the Mary Livingston Ripley Gardens has prompted requests for guided tours. In response to this demand, the Institution has organized a docent program and has trained ten docents. Two interns worked at OH during FY 1988. One assisted with historic research on 19th century horticulture for the "Victorian Gardens" traveling exhibition, and the other designed the garden and drafted and completed a detailed rendering of the Enid A. Haupt Garden.

Frances Jones Poetker donated a collection of some 250 American and European 19th- and early 20th-century posy-holders. Other gifts include a unique, late 19th-century serpentine cast iron settee from Mrs. Horace Peters. This bench has special significance because of its rare, excellent condition, sophisticated design, provenance, and manufacturer.

III. South Group Building Management - The South Group Building Management is responsible for cleaning, minor maintenance, labor services, relamping, craft services, shipping and receiving, and special events. This Office contracts for and coordinates maintenance, trash removal, pest control, and renovation projects for the Arts and Industries and Smithsonian Institution Buildings.

IV. The Office of Quadrangle Facility Management - The Office of Quadrangle Facility Management provides a wide variety of support services to the Education Center of the S. Dillon Ripley Center, Museum of African Art, Arthur M. Sackler Gallery, Resident Associate Program, National Associate Program, Smithsonian Institution Traveling Exhibition Service, and the International Center. These services include space-scheduling, custodial, labor, rigging, minor maintenance, lamping, shipping and receiving, and other related services. The automated scheduling and maintenance program greatly enhances the reliability and effectiveness of housekeeping, public events, and related support services.

EXPLANATION OF PROGRAM INCREASE - For FY 1990, the Smithsonian requests a program increase of 20 workyears and \$600,000 for:

- the Office of Plant Services to strengthen facilities management (8 workyears and \$205,000);
- the Office of Horticulture for daily grounds and interior plant maintenance and to establish base funds in support of tree and major equipment replacement (4 workyears and \$230,000);
- South Group Building Management to strengthen and expand labor support (2 workyears and \$36,000); and,
- Quadrangle Facility Management to provide support for the S. Dillon Ripley Education Center (6 workyears and \$129,000).

I. Office of Plant Services - Facilities Maintenance Program (8 workyears and \$250,000) - Increased attention to maintenance and building repairs will ensure long-term preservation of all Smithsonian facilities, more energy efficient operations, and more accurate environmental control for the Institution's aging physical plant. Additional benefits of this program will include improved public appearance, a safer environment for visitors and staff, and better control of facilities costs.

Funds requested for FY 1990 (6 workyears and \$210,000) will support the second phase of a five-year program, started in FY 1989, to fund facilities maintenance and repair. Increased resources will provide one computer specialist and one data entry clerk to manage an automated preventive maintenance system. Lacking computer capability, the Institution in the past depended on contracts for automated support for its preventive maintenance program. The additional personnel and in-house system will cost considerably less than the annual contract cost of approximately \$200,000. Additionally, the in-house system will provide more accurate and timely feedback to managers and supervisors.

The additional resources will also provide one electrical engineer to ensure that the design and operation of electrical systems in existing facilities are energy efficient. This engineer will also assist in the annual inspection of all Smithsonian buildings. Finally, the resources will provide three additional maintenance mechanics to begin necessary repairs more quickly, lessening the chances of much larger, and more expensive, repairs in the future.

The remaining funds (2 workyears and \$40,000) will provide one administrative assistant and one programmer to support other automated systems in the Office of Plant Services. These additional personnel will help maintain vital automated activities such as: project scheduling, maintenance service order status, reimbursements, accounting, and personnel management; and assist in developing new automated systems applications. They will also maintain an inventory of hardware, software, and computer component equipment; determine solutions to information management requirements; and locate and eliminate problems relating to computer programming.

The funds and workyears requested for FY 1990 will improve overall efficiency and increase the Institution's ability to provide the maintenance and repair services needed for the five million square feet of Smithsonian facilities.

II. Office of Horticulture - Grounds and Interior Plant Maintenance, Tree, and Equipment Replacement (4 workyears and \$230,000) - The Office of Horticulture manages the grounds and gardens to ensure healthy, safe, and attractive surroundings for Smithsonian buildings in the greater Washington, D.C. area. Visitation to Smithsonian museums has increased in the past year and one-half due, in part, to the completion of the Quadrangle complex. The Mary Livingston Ripley and Enid A. Haupt Gardens provide a respite to visitors and serve an educational purpose also. In order to maintain adequately all the properties, additional staffing and equipment are necessary to maintain past levels of service.

The requested additional resources will augment primary daily care and provide specialized care and attention to the grounds, gardens, and public interior spaces of the buildings. The Office of Horticulture maintains 42 acres of grounds on the Mall, elsewhere in the city, and in Suitland, Maryland. It provides and maintains plant material for exhibitions and public displays throughout the Smithsonian buildings and other public areas. Staff propagate and rejuvenate plants at an off-site greenhouse at the Old Soldier's Home in Northeast D.C. Staff care includes lawn cutting, pruning, fertilizing, and watering several hundred trees, shrubs, and flowers in special gardens and landscaped areas around buildings.

Care also includes watering, feeding, grooming, rotation, transportation (from the greenhouse to the site), and set-up time for plants in interior displays. The OH Grounds Maintenance, Interior Plant, and Greenhouse Departments have 29 permanent staff. In comparison, the National Gallery of Art has a staff of 12 full-time

gardeners to provide services to one set of programs a single director oversees, two linked buildings with adjacent greenhouses, and about seven acres of turf and landscaping with no special gardens. Two of the new gardeners requested for FY 1990 will augment the exterior plant program, the other two will work with the interior plant program which currently has only two assigned staff members.

Over the years, the Institution has lost mature trees to disease, pollution, and other "natural" causes. Additional funds requested for FY 1990 will establish a funding base for critical tree and equipment replacement programs. While the Office cannot hope to replace mature trees with like sizes, OH would gradually replace, for example, cherry trees around the Hirshhorn, magnolias and a copper beech around Natural History, and oaks around the Air and Space Museum.

Just as scientific equipment requires periodic replacement because of wear and tear, landscaping equipment has similar needs. The Smithsonian needs to install or replace sprinkler systems throughout the grounds. Installation of sprinklers around the Air and Space Museum will cost approximately \$30,000; replacement of the Freer sprinklers, \$20,000. Equipment such as tractors with loader-backhoe (cost: \$35,000), motorized carts (cost: \$10,000), and various riding and hand mowers (minimum cost: \$1,200) require periodic replacement. In order to maintain the grounds at the Smithsonian, staff must use top-quality, commercial grade equipment, which is much more expensive than equipment designed for residential purposes.

This increased funding will help ensure the continued success of all OH's endeavors, and strengthen a most popular program as evidenced, in part by the size of attendance at the Institution's gardens.

III. South Group Building Management - Buildings Maintenance (2 workyears and \$36,000) - South Group's buildings maintenance staff respond to the needs of the two oldest and most historic buildings of the Smithsonian. The Arts and Industries and the Castle buildings have an annual visitor count of nearly 2.5 million. When the new Visitors' Information Center opens in the Castle in July 1989, it will see an estimated three million visitors a year, an increase of 155 percent from 1987. The required housekeeping resulting from these levels of visitors will be extremely demanding.

The two requested positions will help maintain the non-public spaces of the two buildings, the exhibition areas, and also the high traffic areas of the newly renovated Visitors' Center. The new Center will add two entrances to the Great Hall of the Castle. The expanded visitor service program will increase attendance by: opening the Great Hall to the public one hour earlier; showing films and providing automated information systems on Smithsonian related programs; and an outreach program targeting tour and travel groups bused directly to the Castle. Expanded visitor traffic will increase building maintenance requirements due to: the greater number of hours the building will be open to the public, the additional dirt, grime, and gravel tracked on carpets and tile, and increased use of public sanitary facilities.

These additional positions also will help provide housekeeping services resulting from special public events held in the Arts and Industries and Castle buildings. Sixty-two percent more special event functions occurred in 1987 than in 1986. Expectations are that this level of activity will continue, if not increase, due to the buildings' proximity to the popular Quadrangle and Haupt Garden areas.

The requested funding and workyears for FY 1990 will help ensure prompt buildings maintenance services for those facilities under South Group's care and a pleasant, comfortable environment for staff and the many visitors to the Smithsonian.

IV. Quadrangle Facility Management - Support Services for Education Center (6 workyears and \$129,000) - Based on the first year of operations in the Quadrangle, Education Center events will generate a higher level activity than was expected in earlier planning. In order to meet this higher than expected demand, the Quadrangle Building Management is requesting additional staff.

The Education Center of the S. Dillon Ripley Center, located in the Quadrangle, provides classroom and lecture hall facilities for educational programs and other meetings. The Education Center is a multi-user meeting location, with frequent changes required in room arrangements and greater demand for building management services. For example, during calendar year 1987, various offices held 3,000 events at the Education Center and adjacent areas, including the Concourse.

During calendar year 1988, this active schedule continued, with total number of events to be held in the Education Center estimated to be 5,000. These events will range from craft, art, photographic, and cultural presentations to specialized programs on art, music, history, and conservation. Statistics show the popularity of these events. For example, during the run of the "Generations" exhibition in the International Gallery, the International Center sponsored a "Family Day" in the Concourse, which 5,000 people attended.

In the planning for the initial staffing requirements for the Quadrangle Building Management, the Smithsonian did not include any additional staff to support the then projected low-maintenance requirements for the Education Center. Furthermore, the initial projections of staffing assumed a shorter daily public schedule (from 10:00 a.m. to 5:30 p.m.) than the facility is actually open. During FY 1988, the Quadrangle Building Management met the higher demand for its services through overtime, by deferring some lower priority requests building occupants made, and by reassigning some tasks to the program bureaus located in the Quadrangle.

The Quadrangle Building Management requests an increase of 6 workyears and \$129,000 for FY 1990 to hire five laborer positions (5 workyears and \$99,000) to support the growing demand of building management services for the Education Center. An events scheduler (1 workyear and \$25,000) will coordinate a work schedule and process the paperwork required for scheduling room setups. Remaining funds will provide supplies and materials and other services costs, including Quadrangle signage needs.

In addition to the actual classroom and lecture hall facilities in the Education Center, the Concourse space has become a focal point for an increasing number of large public events because of its size and location between the Education Center and the International Gallery. The Quadrangle Facility Management strives to support all these activities with the highest level of efficiency in order to ensure that each visitor leaves with a positive lasting impression.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Allotments provide Unrestricted Trust funds to cover salaries and support costs in the Office of Plant Services. These allotments also provide the Trust fund share of space rental costs for administrative activities located at L'Enfant Plaza. Reimbursements from Trust-funded client organizations provide Special Purpose funds for support services offered by OPlantS. These funds purchase supplies, services, equipment, and landscaping materials.

CONSTRUCTION

1988 Appropriation.....	\$ 1,315,000
1989 Estimate.....	\$10,150,000
1990 Estimate.....	\$13,985,000

The FY 1990 request for funding in the Construction account represents an investment in the Institution's long-range program goals. In order to maintain vitality in the Institution's far reaching programs in research, collections management, exhibitions, education, and public service, it is essential to develop adequate facilities. Although the backlog of deferred maintenance and repairs is a priority, the Smithsonian also must provide appropriate space in which its varied programs can function effectively.

For FY 1990, the Institution requests \$3,000,000 for renovation design for the General Post Office Building; \$4,000,000 to continue development of research facilities at the Tropical Research Institute in Panama; \$5,985,000 for 31 projects in the Minor Construction, Alterations, and Modifications category; and \$1,000,000 to continue the identification and planning of future facility development requirements.

GENERAL POST OFFICE BUILDING

Since 1958, when the Institution acquired the Patent Office Building, the Institution has also been interested in obtaining the General Post Office Building. This building is bounded by 7th, 8th, E and F Streets in northwest Washington, D. C. The original wing of the General Post Office Building is the work of America's first native-born professional architect, Robert Mills of South Carolina. Mills designed the Patent Office Building, the Washington Monument, and the Treasury Building.

On October 19, 1984, the President signed Public Law 98-523 authorizing transfer of the General Post Office Building from the General Services Administration to the Smithsonian Institution without reimbursement. The International Trade Commission has now moved out of the building, and the General Services Administration will transfer custodianship of the building to the Smithsonian. The Institution intends to complete the plans for the building's use and to develop cost estimates and schedules for the restoration, using construction planning funds. Beginning in FY 1989, the Smithsonian will operate the building in a caretaker status until construction commences. No Smithsonian program activities will occupy the building until the building undergoes modifications.

Presently, the General Post Office Building is in very poor condition. Exposed plumbing, is wrapped in asbestos insulation in almost every space throughout the building. Because the drinking water is unsafe for consumption, previous occupants used bottled water. Other conditions include:

- an oversubscribed electrical system in poor condition is a potential fire hazard;
- an unreliable steam heating system includes corroded and heat leaking exchanger tanks;
- old pumps and other mechanical equipment in poor condition;

- window air conditioners, in various states of repair, provide most of the summer cooling; and
- the Library and Hearing rooms use very old central units that are in unreliable and poor condition.

The building does not contain fire safety systems, such as water sprinklers and smoke detectors. The existing fire alarm system is an old and unreliable pull station local alarm system. The building has two small passenger elevators. One is automatic and reportedly has several safety deficiencies, and the other requires an operator. Both are very old and reportedly subject to frequent breakdown. Recent roof repairs did not replace the rain gutters and interior down spouts, and these are subject to intermittent failure, causing leaks in the building. Window frames have dry rotted, and the poor condition of the exterior stone facade contributes to interior water problems. The interior courtyard, a paved parking area over a wooden structure, may be structurally unsound. The overall assessment is that the building is not safe for continued occupancy in its present deteriorated condition.

The Smithsonian must renovate the building before it can make use of it. The Institution proposes a comprehensive program to preserve the historic nature of the building and convert it for program use. The planned work includes:

- restoring all of the original interior and exterior architectural finishes;
- replacing the windows with double glazed panes;
- modernizing all electrical and plumbing systems;
- providing new insulation, a vapor barrier, and a heating and air conditioning system with industrial quality controls;
- installing appropriate lighting with ultraviolet screening; and
- installing smoke detection and sprinkler systems along with other security equipment.

The estimated cost of the renovation program is in excess of \$40 million. For FY 1990, the Smithsonian requests \$3,000,000 to design the required renovations.

The proposed renovations will ensure preservation of the building for future generations and will provide an energy efficient, safe, and secure environment for the collections, staff, and visitors. Failure to make the most urgent improvements would prevent the Smithsonian from using the building, even in the most basic way. Minimum requirements to provide conditions necessary for program occupancy include: repairs to the facade of the building; replacement of the heating, ventilating, air conditioning, electrical, and plumbing systems; and installation of fire protection and security systems. Modernizing the building to include energy conservation will allow more efficient and effective operation. Changes in the architectural finishes will return building spaces to public use and to their early appearance.

The Smithsonian must make the General Post Office Building habitable without delay to alleviate staff overcrowding in other buildings. Concern over the continued preservation of this architecturally important building also argues for early renovation. Even if the Institution receives design funds in FY 1990 and construction

funds in FY 1991, the Institution cannot complete renovation before FY 1993. Continued delay will adversely affect the public programs of the Institution. In addition, further delays will require increased resources even to maintain the building in its present, deteriorated state.

SMITHSONIAN TROPICAL RESEARCH INSTITUTE

In 1986, the Smithsonian received under Public Law 99-423 Congressional authorization to plan and construct additional research and dormitory facilities at various sites of the Smithsonian Tropical Research Institute (STRI) in Panama. This authorization culminated over a decade of efforts to improve STRI's research facilities. For FY 1990, the Institution requests \$4,000,000 to continue development of the STRI master plan of 1986, with construction of laboratory and support facilities on the Atlantic coast and in the San Blas region off the coast in the Caribbean Sea.

The Tropical Research Institute is the world's premier center for tropical biological research. STRI's location in Panama affords a unique opportunity to undertake comparative studies of the marine environments of between the Atlantic and Pacific Oceans. At present, the two major research stations on the Atlantic side have inadequate temporary field facilities. In the past, few field studies required elaborate equipment or technical support. However, research requirements have changed dramatically over the last 15 years. STRI must now provide facilities commensurate with the changing demands of field-oriented marine biology if it is to maintain its leadership role in marine research.

STRI research at Punta Galeta began in 1967, and STRI established a long-term marine environmental monitoring program in the early 1970s. In this time, more than 150 formal scientific publications have resulted from research at Galeta. In 1986, a major rupture of an oil refinery tank near Galeta resulted in one of the largest oil spills in the Caribbean. With a grant from the Minerals Management Service of the U.S. Department of the Interior, STRI staff are now analyzing the effects of this oil spill on the Galeta reef and adjacent habitats.

Most of the research work at STRI is field oriented due to lack of space and laboratory facilities. The one laboratory building is of temporary World War II construction, and lacks adequate space, utilities, running seawater, dockage, diving, maintenance, and residence facilities. The abandoned Coco Solo U. S. Naval facility, several miles away, provides housing. This housing is not secure, and STRI cannot be certain of indefinite occupancy. Thus, STRI needs an on-site residence.

The Institution requests \$3.1 million for design and construction of new laboratory and support facilities to serve the research programs at Galeta. These plans would include:

- a two-story, 3,200 square foot laboratory,
- 1,000 square foot seawater pavilion and seawater system,
- maintenance shop,
- emergency generator,
- dive locker,

- pier with boat ramp and storage,
- apartment and laundry facilities for three to six resident and visiting scientists, and
- new sewage collection.

The second major research station on the Atlantic side is in the San Blas archipelago whose reefs possess fish populations absent at the Galeta site. STRI-sponsored researchers began working in the Comarca de San Blas in the early 1970s. STRI rents the existing site from the Kuna Nation. The site is a very small artificial island situated on top of a coral reef. In the past 15 years, about 155 formal scientific publications have resulted from STRI-sponsored research in the Comarca. The station is famous for pioneering studies of the ecology, behavior, and life history of fishes and serves as a center for more than a dozen research programs, none of which present facilities can properly accommodate.

The construction of the present station is a modified traditional native design built out over water from a small man-made cay about 40 feet across. There are no utilities; kerosene lanterns provide light; drums store rainwater for drinking purposes; untreated sewage drains into the shallow water surrounding the reef; and the staff uses bottled gas for cooking and refrigeration. There is no regular electricity supply for scientific work, and the only "laboratory" is an open wooden shed. The site is remote, but has scheduled light-airplane service to Panama City and coastal freight delivery.

The Institution requests the amount of \$900,000 in FY 1990 to relocate the field station and upgrade the facilities available for research in the area. Relocation is necessary because of current human impact on reefs in the area of the existing facility, and to provide enhanced access to more diverse reef habitats. The largest complex of offshore reefs and sparsely populated islands on the Caribbean coast of Panama (the Chichime and Hollandes Keys) begin about five kilometers to the east of the existing station. These islands meet several critical requirements, including proximity to the local airport and the existing long-term research sites. They offer a large diversity and area of reef habitats with low human impact. The Kuna Indian leadership, who administer this area under a self-autonomy agreement with the Republic of Panama, is receptive to the idea of locating a new lab in the region and the creation of a biological reserve to protect the site for research.

The proposed facilities will consist of:

- a small air-conditioned laboratory building to house sensitive instruments,
- a seawater pavilion with a running seawater system to maintain experimental organisms,
- a maintenance building with two electrical generators to ensure a continuous power supply for research activities, and
- a diving support building and pier capable of receiving STRI's research vessel.

Basic housing will accommodate 20 scientists and support personnel. Utilities will include solar power and hot water for domestic use, rainwater catchment with elevated storage, and radio communications.

CONSTRUCTION PLANNING

An essential part of an effective facilities development program for any government agency is the ability to assess requirements and make long-range plans in appropriate detail. Long-range planning capability for the Institution can identify all issues affecting the project including program needs, spatial concepts, and preliminary costs estimates. Long-range planning is necessary for Smithsonian management decision-making, and review commission and Congressional approval. The Institution's current construction planning process results in requests for major construction projects whose estimated cost exceeds \$1 million without the benefit of such refined planning. This situation can result in approximations of project requirements, including physical requirements such as space or configuration, construction or operational costs, and environmental or logistical factors. Also, the lack of resources with which to identify and assess fully all potential physical plant requirements results in capital improvement planning that lacks cohesiveness.

The Smithsonian requests the amount of \$1,000,000 for FY 1990 to continue development of a comprehensive long-range capital improvement program. Better defined plans for future year construction projects prior to authorization and budget requests will result. A recent estimate of facilities expansion or improvement requirements totals in excess of \$900,000,000. Specific projects include:

- development of an extension for the Air and Space Museum at a nearby airport,
- construction of administrative and support facilities to replace leased buildings at 1111 North Capital Street and L'Enfant Plaza, and
- expansion of the Cooper-Hewitt and Hirshhorn museums.

In addition, the Institution will consider off-Mall facilities for collections storage as a solution for overcrowded conditions at nearly all Smithsonian museums. If the Smithsonian's average actual planning cost of 2 percent is applied to the \$900 million construction projection, the total cost of detailed planning for these projects totals \$18 million.

Annual resources of \$1 to \$1.5 million will provide continued feasibility studies, planning, and conceptual designs upon which to base precise work and cost estimates for construction, establish operating and logistical support requirements, and make required environmental impact assessments for other critical capital improvement projects.

MINOR CONSTRUCTION, ALTERATIONS AND MODIFICATIONS

Projects in this category include:

- minor new construction (under \$1,000,000 in estimated cost), and
- alterations and modifications to existing buildings required to meet

programmatic objectives in the areas of research, collections management, exhibitions, and public services.

For FY 1990, the Smithsonian requests \$5,895,000 for the projects described below.

American History Building (\$700,000) - For FY 1990, the Institution requests funds for two projects in the American History Building: continued mezzanine installation in exhibit halls, and the renovation of basement space.

The long-range exhibit reorganization plan for the National Museum of American History calls for construction of a mezzanine system in various galleries on the first through third floors of the building. The mezzanines will create space for study galleries in key exhibits. This will permit the public to view museum artifacts not normally on exhibit because of inadequate space. The Institution requests the amount of \$400,000 in FY 1990 for design and construction of a mezzanine in the first floor "Information" exhibit area. The work will include fabrication and construction of basic steel and concrete galleries around the perimeter of the exhibit hall, along with necessary stairs, handicapped lifts, and railings. On the east side of the third floor and with \$103,000 received in FY 1987, the Museum constructed a mezzanine for the exhibit commemorating the Bicentennial of the Constitution. The Research Center in the present Dibner Library on the first floor is under construction with funds appropriated in FY 1988 (\$300,000) and anticipated in FY 1989 (\$370,000). The Institution will request additional funding for a mezzanine in the third floor "Music" area in a future year.

Renovations in FY 1989 and FY 1990 to the ventilation system serving the basement of the American History Building will provide a safer, healthier environment for staff working in the area and appropriate climatic conditions for collections stored there. Problems exist with the current system as far as its air quality, and circulation, efficiency of workshop exhaust units, and reliability of temperature and humidity control in collection storage spaces. The Institution has initiated a study to assess the present and future ventilation requirements for the basement. One solution is to modify the area to allow consolidation of programmatic spaces with similar circulation, exhaust, or climatic requirements, or to provide additional space for expanded activities. The Smithsonian requests \$300,000 for FY 1990 to implement these programmatic alterations to the basement.

Natural History Building (\$1,955,000) - The Institution requests funding for seven projects at the Natural History Building, including:

- miscellaneous modifications to spaces freed by the move of artifacts to the Museum Support Center,
- demolition of three exhibit halls to prepare for reinstallation planned by the Museum,
- improvements to the public checkroom,
- construction of a mezzanine in two basement rooms, and
- construction of a space suitable for receiving visiting dignitaries.

The removal of collections now stored in the Natural History Building presents an opportunity to reorganize the space within the building. This reorganization will

allow consolidation of program functions presently located in scattered areas. It will also return to public use exhibit halls long used for office space. The Institution requests \$600,000 in FY 1990 to alter space and install telephones and other utilities. An additional amount (\$140,000) will fund the demolition of two office areas to renovate the space for exhibitions. The removal of mezzanines, wall partitions, doors, duct work, and electrical systems in Halls 27 and 30 will enable the Museum to install exhibits which it is designing.

The Smithsonian requests \$50,000 for demolition of Hall 10, used for special exhibits. The Museum will replace the current exhibit, entitled "Evolution" with an exhibit commemorating the 500th anniversary of the discovery of America by Christopher Columbus. The space must be ready in 1990 for the new exhibit to open in 1992.

The present size of the public checkroom at the south entrance of the Natural History Building is inadequate to accommodate the Museum's many visitors. The checkroom is approximately 210 square feet. An electronic rack system will increase the storage capacity of the space and the modified entry will allow better traffic flow. The Smithsonian requests \$15,000 for FY 1990 to complete this project.

The Institution requests \$165,000 for FY 1990 for construction of mezzanines in rooms 11-E and 10-C in the Natural History Building. The microprep laboratory of the Department of Mineralogy is currently in a distant part of the building. A mezzanine in Room 11-E will provide space for the laboratory next to other Departmental activities. In addition, a mezzanine planned in Room 10-C will expand space available for the Building Management Department staff and supply storage, relieving currently overcrowded conditions.

As a result of a 1987 management study to assess its strengths and weaknesses and to identify ways to ensure its preeminence and success in the future, the Museum will integrate and strengthen its research, education, and exhibitions programs. A national advisory board will provide guidance to this effort, and the Museum will hire staff to initiate and bring to fruition the planning, funding, and construction of updated exhibits. These exhibits will replace decades-old ones in the Museum and will include related interactive educational activities. For FY 1990, the Smithsonian requests \$985,000 to renovate space for the new development, outreach, and advisory functions of the Museum. In addition to staff offices, the project includes a conference room, kitchen, dining room, and rest rooms. Unlike other major Smithsonian museums, the Museum of Natural History has never had a conference suite to accommodate distinguished national and international visitors and scholars, and other public and staff gatherings. This project is essential to the Museum's expanded public outreach goals.

Smithsonian Institution Building (\$50,000) - The Smithsonian Institution Building houses the Office of the Secretary and other senior management of the Institution. These offices must be altered and modified in minor ways to accommodate recent changes in use of the building. The Institution requests the amount of \$50,000 in FY 1990 for this work.

Arts and Industries Building (\$600,000) - The Arts and Industries Building houses four major exhibition halls. The building also houses essential program and administrative activities on the Mall, particularly those activities which require public access, such as Public Affairs, Museum Programs, Elementary and Secondary Education, and the National Science Resources Center. Other central support organizations located in this building include: Protection Services, Information Resources Management, Equal

Opportunity, and Personnel Administration. Having decided that the Woodrow Wilson Center will not move into the A & I Building, the Institution does not plan a major change in the use of the building in the near future. There is a continuing and immediate need, however, to renovate space within the building. Renovated space will offer more functional work areas for current administrative and program requirements. The Institution will use funds available in FY 1988 and FY 1989 to begin renovation of space and acquisition of modular furniture. The Smithsonian requests \$600,000 for FY 1990 to modify approximately 10,000 square feet of additional space. Some of this funding will be used to modify space to house an occupational health clinic extension. The main Health Unit is currently located on the other side of the Mall in the American History Building.

American Art and Portrait Gallery Building (\$100,000) - The Institution requests \$100,000 to finish modifying the attic of the Museum of American Art begun in FY 1988. Urgently needed additional space with properly controlled temperature and humidity for storage of sculptures and paintings will result. The space formerly was unusable for collections storage purposes because it lacked environmental control. Duct work on the floor also hampered access to the space. Construction rerouted the ducts across the ceiling, allowing more effective utilization of the space. AA/PG will use the amount requested for FY 1990 for construction of framing required for installation of storage racks.

Air and Space Building (\$140,000) - The Institution requests funds to finish renovating the vacated public cafeteria on the third floor and to study the requirements for electrical power distribution at the Air and Space Building.

The Smithsonian requests \$80,000 to renovate the space on the east wing of the third floor. The opening of the new National Air and Space Museum restaurant on the east terrace in August 1988 will free this space for other activities to use. The Museum plans to move the Center for Earth and Planetary Studies into this space. The Center has grown significantly in recent years responding to Museum and other researchers and the U. S. Government for information. The Museum will also consolidate in the third floor space public affairs, curatorial, and registrarial functions now scattered throughout the building. The Institution will use \$520,000 anticipated in FY 1989 for design and construction required to provide more efficient work space for these activities. The additional amount of \$80,000 will complete and equip an employee cafeteria which the Museum will relocate in the area.

The Institution requests the remaining \$60,000 to study the building's power distribution system to determine future power needs. Demands for electrical power have increased with more widespread use of computers and other electronic equipment in the Museum.

Freer Gallery Building (\$400,000) - The opening of the Kiosk entrance to the S. Dillon Ripley Center in the Quadrangle Building resulted in an increase in pedestrian traffic in the area between the Freer and the Smithsonian Institution Building. The Institution requests \$400,000 in FY 1990 to design and modify the pedestrian circulation there. Changes will include redirecting or upgrading the driveway and the walkways around the building and installing better signage for pedestrians. Landscaping improvements will provide better visual interplay between the Freer and the Castle.

Silver Hill Facility (\$325,000) - Building 17 at the Paul E. Garber Facility in Suitland, Maryland, provides critical collection storage for the Museum of American

History. The artifacts stored in the building do not require carefully controlled climatic conditions. The building, however, needs some improvements to ensure secure storage. The proposed work involves repair and insulating walls and roof, upgrading electrical wiring and fixtures, installing new space heaters, and installing smoke detection and sprinkler systems. The Institution is using \$500,000 provided in FY 1986 to remove asbestos insulation in the building and to construct an asbestos decontamination chamber outside the building for use in cleaning artifacts now stored there. The building is large enough to allow workmen to undertake the construction in two phases. The collection can be stored in one-half of the building while the other half undergoes renovation. In FY 1991, the Institution will request additional funding to complete the project.

Museum Support Center (\$285,000) - The loading dock at the Museum Support Center opens directly outdoors. This entrance is the sole access for most collections transferred from other locations for storage. The Institution requests \$285,000 in FY 1990 to construct an airlock enclosure around the loading dock area and the entrance to Pod 4. This enclosure will protect artifacts delivered to or loaded from the Center from exposure to outside weather conditions. Also, the controlled environment within the enclosure will reduce the change in temperature and humidity within Pod 4 that now occurs each time the door to the pod is opened.

Smithsonian Environmental Research Center (\$275,000) - The Institution requests funding for two projects at the Smithsonian Environmental Research Center in Edgewater, Maryland: construction of a greenhouse and a general storage building.

The Smithsonian plans to construct, at an estimated cost of \$100,000, a greenhouse addition to the Mathias Laboratory now under construction. The greenhouse will provide controlled growing conditions for research involving botanical specimens.

The Institution also requests \$175,000 for construction of a pre-fabricated metal storage building at the Center. The new building will replace five badly deteriorating trailers. Staff currently use these trailers for storage of materials used for daily operations and research purposes which are insensitive to relative humidity conditions. The proposed structure will be approximately 3,200 square feet with insulated walls and roof on a concrete slab and foundation. Construction will include minimal heating, lighting, exhaust, and dehumidification along with sprinkler and smoke detection systems. A large sliding door and loading dock will allow access for delivery of materials. A flexible shelf system will provide efficient use of the space.

Anacostia Museum (\$20,000) - The Institution requests \$20,000 to install a new lighting system in the exhibit gallery of the Anacostia Museum. The new system will combine fluorescent and incandescent lights with edge lighting around the perimeter of the space. Museum personnel can adjust the proposed system to meet the lighting needs of different exhibits which they install in the space. The present lighting system does not provide this flexibility.

Cooper-Hewitt Museum (\$45,000) - The Smithsonian requests funds for a space planning study of the Miller House and to install a vestibule in the Carnegie Mansion of the Cooper-Hewitt Museum in New York City.

The Miller House is a five-story brownstone townhouse used mainly for Museum offices and collections storage. The building requires extensive repair, which the Institution will perform over the next several years. In addition, Cooper-Hewitt must

modify the space to permit more effective use of the building for its programmatic activities. A space use study will outline the required space changes in a logical sequence with the established repair schedule to the building's physical plant. The estimated cost of this space study is \$35,000. The Institution will request additional funds in future years for construction.

The Institution seeks an additional \$10,000 to install a vestibule at the staff entrance to the Carnegie Mansion. The door currently opens directly to the outside. This exposes employees in adjacent areas to the elements and allows the rapid loss of heated or cooled air.

Smithsonian Tropical Research Institute (\$220,000) - The Institution proposes three projects at the Tropical Research Institute in Panama to continue development of research facilities at the Naos and Barro Colorado sites.

The Aquarium Building at the Naos research site contains large seawater tanks used for marine animal experiments. The building must be modified to meet current research needs. The project involves improvements to the electrical system, replacement of deteriorated roofing, and replacement of the exterior siding with a wire fabric exterior. The Institution requests \$25,000 for design of these renovations and will request additional funds in a future year for construction.

The Smithsonian also requests \$30,000 for improvements to the Naos site. The Institution will construct better pedestrian pathways and additional parking between the buildings. A covered walkway will link the Seawater Table Pavilion and the Laboratory Building for weather protection on this heavily traveled pathway. Landscaping will make the site visually distinct as well.

The Institution requests \$165,000 to renovate the existing boat house on Barro Colorado Island. A new dock complex is under construction with funding provided in FY 1988. The new dock will serve the larger vessels used for the daily transport of scientists and workers, with attendant freight, between the mainland and the Island. The existing boat house will serve as a docking and boat storage area for the many small boats used by scientists and game wardens. This boat house has deteriorated badly, however, and STRI must replace piers, decking, and roofing once the new dock is in operation.

Smithsonian Astrophysical Observatory (\$270,000) - The Institution requests funding for three projects at the Fred L. Whipple Observatory in Arizona. They are construction of a shelter for snow plow equipment, an enclosure for the Commons Building, and design of an enclosure for the 10-meter reflector.

The Smithsonian has several major scientific instruments and support facilities on a half-mile-long ridge of Mt. Hopkins, at an elevation of approximately 7,600 feet. In an average year, snow covers this area and the access road to it from November through April. Staff keep equipment on the mountain for snow removal and for winter road maintenance. Shelter is not available for storing this equipment, leaving it subject to water exposure and freezing. Mechanics conduct routine maintenance on these vehicles without shelter from the elements. The Institution proposes a 2,000 square foot garage to house the snow plows and to serve as vehicle maintenance space as well and requests \$200,000 for design and construction in FY 1990.

The Smithsonian also requests \$40,000 to enclose the space under the Commons Building built in 1981. This building is the dining and recreation facility located

just below the Multiple Mirror Telescope. Completely enclosing the space beneath the building would provide additional storage as well as a staging area for the Multiple Mirror Telescope Conversion and other projects.

Scientists use the 10-meter optical reflector on Mt. Hopkins to study cosmic radiation. The reflector acts as a "light bucket" composed of 248 individually adjustable spherical glass mirrors. The original construction, completed in 1968, did not include a dome over the reflector because planners did not know whether the telescope would have a long useful life. The instrument has proved exceedingly effective, however, and it will remain in use for the foreseeable future. A removable shelter will protect the mirror surfaces from damage by sand and weather, reducing maintenance costs of the equipment. The design of the proposed enclosure will cost \$30,000. The Institution requests this amount in FY 1990 and will request funding for construction in a future year.

Photographic Services (\$200,000) - The Institution requests \$200,000 for expansion of a refrigerated storage room. This room houses the collection of photographic negatives maintained by the Office of Photographic Services in the American History Building. Long-term preservation of the collection requires controlled temperature and humidity conditions. The present film vault, located in the basement of the building, is no longer large enough to accommodate the growing collection of negatives. The Institution will install a prefabricated "Bally" type structure and expand the vault into the adjoining corridor.

Smithsonian Institution Libraries (\$150,000) - The Libraries presently use conventional fixed shelving in most of the branch library locations on the Mall. A number of locations are now filled to capacity, and the collections of books and library materials continue to grow. Use of compact storage will save up to 50 percent of the book storage space. Such shelving will be lockable and more secure, and it will seal out dust and light and prolong the life of the materials. The Institution requests \$150,000 in FY 1990 to install compact shelving in the Dibner Library area in the American History Building. The Smithsonian will request funding in future years to install compact shelving at several other locations.

Conservation Analytical Laboratory (\$250,000) - The Conservation Analytical Laboratory (CAL) has undergone staff growth in the past few years. CAL plans to add other professional staff, fellows, and interns in the near future. The present space at the Museum Support Center is inadequate for the additional people. Conversion of the current seminar room and a portion of the auditorium area will provide the laboratory and office space for the new staff. The Institution requests \$250,000 for FY 1990 for this work.

CONSTRUCTION AND IMPROVEMENTS
NATIONAL ZOOLOGICAL PARK

1988 Appropriation.....	\$8,150,000
1989 Estimate.....	\$5,305,000
1990 Estimate.....	\$8,100,000

Appropriations for this account provide funding for:

- repairs, alterations, and improvements to plant property;
- additions to existing facilities and minor new facilities including exhibits;
- plans and specifications for construction;
- and for renovating, restoring, and constructing new facilities outlined in the Master Plan initially approved in FY 1973 by the Commission of Fine Arts and the National Capital Planning Commission.

The Zoo complex includes 163 acres in the Rock Creek Valley of Washington, D.C., and a 3,150-acre Conservation and Research Center located at Front Royal, Virginia. The Zoo contracts for most construction and improvement projects. If contractors' estimates are above acceptable cost levels, a more economical alternative is to hire permanent or temporary labor to accomplish the work. The account also funds related expenses such as relocating animals due to facility construction and major grounds maintenance resulting from storm damage.

Status of the Construction Program - By virtue of its 1889 charter, the National Zoological Park endeavors to "administer and improve" the Zoo for "the advancement of science and instruction and recreation of the people" (20 U.S.C. 81). The Zoo administers two permanent facilities. Since 1890 the center of the exhibition and public educational functions rests in the Rock Creek Valley portion of the National Zoological Park, while the conservation, research, and breeding functions occur both at Rock Creek and at the Conservation and Research Center, a 3,150-acre site near Front Royal, Virginia. Since 1975, the Conservation Research Center has been the primary Zoo site to save threatened and endangered animal species.

The National Zoo's Rock Creek Facilities undergo major renovations and improvements through implementation of the Master Plan. The Congress appropriated a total of \$50,130,000 over the past 15 years to provide new or rebuilt exhibits and for facilities conforming to the Master Plan. In November 1986, a revised Master Plan incorporated changes in exhibit concepts. Implementation of the revised Master Plan will place the Park among the world's finest zoos.

Master Plan Construction

Aquatic Habitats - Phase II (Amazonia Exhibit) \$5,500,000 - The Amazon is the most diverse freshwater habitat in the world in species numbers, hydrology and ecology. It is also almost totally interlinked with the rain forests through which it flows. A very substantial part of the foods for the extraordinary array of Amazonian fishes comes directly from the surrounding, overhanging and enclosing forest. Thus an Amazon exhibit is inevitably a forest exhibit that draws, from the flora and fauna of the largest continuous area of forest in the world, an unparalleled diversity of life. The new Amazonia Exhibit will highlight all these themes.

The Zoo, with funds provided in FY 1988, will modify the existing structural core of the former polar bear exhibit to form the Amazonia Exhibit. In FY 1990, Phase II of the project will concentrate on the actual exhibit construction. The exhibit will display a wide variety of aquatic animals concentrating on fishes and include seldom-seen amphibians, reptiles, birds, and mammals. Visitors will view these animals from above-ground and underwater viewing stations. The exhibit setting, a tropical rain forest, will illustrate the predominant features of tropical biology and emphasize complexity, specialization, and species interactions. Among the aquatic animals that may join this exhibit are giant otters, snakebirds, freshwater sharks, and hundreds of species of Amazon fishes.

Renovation, Repairs, and Improvements

Rock Creek - \$1,800,000 - The Zoo is responsible for the repair and preventive maintenance of existing facilities. The Zoo strives to maintain a safe environment for its visiting public and staff, to provide ecologically suitable and comfortable enclosures for the animals, and to maintain new buildings in good condition. Funding for FY 1990 will help ensure that the Zoo's future will not include a large backlog of major repairs.

The 163 acres of land in Rock Creek contain over 450,000 square feet of building and more than 160,000 square feet of roofs. Along with the Park's perimeter fence measuring 10,564 lineal feet, the Zoo's in-ground utility distribution system includes over 4,600 lineal feet of high voltage electrical lines, approximately 4,000 lineal feet of medium voltage electrical lines, 16,000 lineal feet of water mains, 6,000 lineal feet of gas mains, 28,000 lineal feet of sewer lines, and 14,000 lineal feet of storm drains. The Zoo's maintenance program includes the care of these utility systems to ensure safe operation of the facilities. The extensive system of pedestrian paths and vehicle roadways require regular maintenance. The projects planned for FY 1990 for the Rock Creek Park facility include:

- HVAC repair;
- roof repairs to the Bird House, Lion and Tiger building, Reptile House, and the Panda House;
- repairs and replacing skylights in the Small Mammal building;
- bridge repairs and painting;
- repairs to rock work;
- repairs and replacing guard rails;
- and glass replacement.

The Zoo requests \$1,800,000 to continue the program of renovation, repair, and preventive maintenance of existing Rock Creek facilities. Funding at this level will enable the Zoo to implement its full FY 1990 program.

Front Royal - \$800,000 - The Conservation and Research Center is a non-public facility devoted to breeding endangered wildlife species and associated conservation and research efforts. Funding in FY 1990 will enable the Zoo to perform the required maintenance for the upkeep of the 3,150-acre facility.

The Center has 89 facilities of various types, containing approximately 236,000 square feet of interior space. The property has two and one-half miles of paved roads, 20 miles of jeep trails, and over 30 miles of fences. The Center must maintain all of these to provide for the safety of the animal collection. The projects scheduled for FY 1990 at Front Royal include:

- the deer stable and hoofed stock sheds;
- the east wing of Small Animal Facility;
- the interior and exterior of building #32;
- fence in Rockhill pasture;
- hoofed stock sheds at Meade #2;
- non-skid flooring material in veterinary hospital;
- and roof repairs in mechanic shop and supply building.

The \$800,000 the Zoo request for FY 1990 will extend the Center's preventive maintenance program. The funds will help to reduce potentially more costly future repairs at this very important facility.

REPAIR AND RESTORATION OF BUILDINGS

1988 Appropriation.....	\$19,254,000
1989 Estimate.....	\$20,835,000
1990 Estimate.....	\$35,000,000

Smithsonian facilities include 14 museums and gallery buildings in Washington, D. C. and New York City and total over 5.5 million square feet of building space. These museum buildings house research and collections management activities and a wide range of exhibitions in the fields of science, history, technology, and art. The Institution also operates and maintains restoration, storage, aircraft, and spacecraft display facilities and the Museum Support Center at Suitland, Maryland; centers for biological research, conservation, and education in Panama and on the Chesapeake Bay near Edgewater, Maryland; a center for astrophysics in Cambridge, Massachusetts; and the Whipple Observatory on Mt. Hopkins in Arizona. These facilities range in age from new to 130 years, and many appear on the registers of historic landmarks.

The Repair and Restoration of Buildings (R&R) account pays the cost of repairs, corrective measures to meet life safety and health regulations, and replacement or renovation of major building components or equipment. This budget document discusses the repairs and renovations at the National Zoological Park as a separate justification.

The heavy public use of buildings, and the demands on building equipment and systems for constant temperature and humidity levels to protect the National Collections exacerbate the natural aging process of building materials. Eventually, even effective preventive maintenance and minor repair programs cannot keep the machinery components of building systems running. The Institution must overhaul heating, ventilation, and air conditioning (HVAC), electrical and plumbing systems periodically to replace deteriorated equipment, wires, ducts, and pipes. Contractors must repair exterior elements of buildings to correct the effects of weather and guard against interior damage. In addition, the enactment of new life safety and health codes and regulations call for building modifications to ensure a safe environment for visitors and staff.

In recent years funding levels for maintenance, repair, and preservation of the buildings have not kept pace with the rate of deterioration. A substantial backlog of essential repair work exists. These repairs are essential to ensure continued functionality of building equipment and systems, long-term preservation of the buildings, or compliance with life safety and health codes and standards. The current estimate of the backlog of projects is \$197 million.

Major funding will reduce this backlog and preserve buildings for continued use by future generations. Annual funding at the "current services" level in the Repair and Restoration of Buildings program is not sufficient to support the work required. Some of the work is, in fact, more urgent today because inadequate funding in the past prevented the timely repair or replacement of building systems and components.

The Smithsonian categorizes projects under the R&R program into two categories and accordingly it requests funding in two sub-accounts. The first sub-account within the R&R account, called "Major Capital Renewal," includes funds for the cyclical replacement of major building systems and equipment and major renovation projects required to assure long-term preservation of the buildings. These projects are different from ongoing restoration work, preventive maintenance projects, or repairs undertaken when a piece of equipment fails. Their magnitude, expense, and planning

complexity distinguish them from more routine repair work. More than half of the identified backlog consists of these major replacement requirements for HVAC and electrical systems at the Natural History, American History, Arts and Industries, and American Art and Portrait Gallery buildings.

The second R&R sub-account is Repairs, Restoration and Code Compliance. Funding requested through this sub-account will eliminate over time the remainder of the backlog of needed repairs and other work to meet safety and health requirements. This sub-account encompasses six categories of routine maintenance and repair projects, such as:

- general repairs;
- facade, roof and terrace repairs;
- fire detection and suppression projects;
- access, safety and security projects;
- utility repairs; and
- advanced planning and inspection for such projects.

The request presents an aggregate amount for each of the six categories above, with a description of the kinds of work planned.

This justification also describes resource requirements to manage effectively the phased elimination of the backlog of deferred repairs. Although the Institution requests administrative resources in the Salaries and Expenses account, with other operating costs, it describes them here. The Institution treats the discussion in this manner because of the inextricable relationship between expanded project funding and project management.

The composition of this year's R&R budget request follows:

REPAIR AND RESTORATION OF BUILDINGS

MAJOR CAPITAL RENEWAL	\$15,835,000
REPAIRS, RESTORATION AND CODE COMPLIANCE	
General Repairs	3,390,000
Facade, Roof and Terrace Repairs	7,325,000
Access, Safety, and Security	2,605,000
Fire Detection and Suppression	805,000
Utility Systems Repairs	4,000,000
Advanced Planning and Inspection	<u>1,040,000</u>
Subtotal	19,165,000
TOTAL REQUEST	\$35,000,000

Following the narrative description of the program for FY 1990, a listing appears showing by building and by category, all planned FY 1990 R&R projects.

MAJOR CAPITAL RENEWAL

Projects in this category include replacing HVAC and related systems, modifying building envelope, replacing single-glazed windows, installing air locks at entrances and loading docks, installing exhaust air systems and improving automatic temperature control systems, emergency replacement of electrical and HVAC equipment for one

museum, relocating staff and collections, and developing design and construction specifications. For FY 1990, the Smithsonian requests \$15,835,000 for the projects listed below.

American History Building (\$3,675,000) - A 1982 study of the HVAC system of the 25-year old American History Building recommended replacement of the deteriorated heating, ventilation, air conditioning, and refrigeration equipment systems and controls. Replacement of these systems will ensure the provision of required environmental conditions in an energy efficient manner. The study also recommended modifications to the building to increase energy efficiency. To complete window and roof replacement and facade repairs, the Museum is using an amount of \$2.8 million provided in FY 1985 and FY 1986 (supplemented with \$1.4 million reprogrammed from the HVAC project at the American Art and Portrait Gallery Building).

The 1986 Master Coordination Plan established a detailed schedule for replacing the HVAC and related systems. This plan also incorporated anticipated fire protection and asbestos removal work in such a way that workmen could isolate vertical portions of the building, and accomplish all work required in each segment at the same time. This scheduling of complex but interrelated projects will result in less disruption to the Museum's activities and save money by allowing an award of a single contract for the entire project.

Work in each vertical quadrant includes replacing the mixing boxes, controls and air-handling equipment; installing new sprinkler and smoke detection systems and other fire protection improvements originally outlined in the Fire Protection Master Plan; and removing asbestos present in mechanical rooms and other areas of the building. The Museum is coordinating this project with its exhibit renewal program. The project includes the cost of relocating artifacts and personnel displaced in the course of the work.

The first phase of this project began with funding received in FY 1987 (\$1.2 million) and includes all work required in the east quadrant of the building. Funding received in FY 1988 (\$1.6 million) and anticipated in FY 1989 (\$2.1 million) will fund Phases II and III and will cover the west central and west quadrants, respectively. Of the \$3,675,000 requested for FY 1990, funds will support work for Phase IV conducted in the east central quadrant, (\$3,200,000); design costs for the final phase of the project on the fourth floor, (\$275,000); and relocate staff and collections displaced by the work in progress, (\$200,000).

Natural History Building (\$12,160,000) - Over the past several years the Institution undertook a number of separate studies to address energy conservation, fire protection and suppression, communications, security upgrading, asbestos abatement, and other remedies to building deficiencies, especially in the HVAC system and the electrical systems. The Institution initiated a Master Implementation Plan once staff realized the magnitude of the work required to keep the building in operational condition. Work will be scheduled to limit major disruption within the building to one period of time in order to take advantage of costs saved by grouping tasks together.

Guided by a Fire Protection Master Plan developed in 1979, fire protection improvements and asbestos removal and containment work is well underway. However, the replacement of the HVAC and critical electrical equipment determines the importance of this project and dictates the work schedule. The majority of the HVAC equipment is 25 years old and requires replacement to avoid system failure. The automatic temperature control system is obsolete and does not operate satisfactorily. The age of 90 percent

of the electrical lighting and power panels in the building is in excess of 20 years. Some of the electrical panels date from 1910 and present a potential safety hazard. Other panels installed in the 1960s are not UL (Underwriters Laboratory) approved as meeting established safety standards, and replacement circuit breakers are no longer available. The main high-voltage switchgear equipment, which serves all the transformers for the Natural History, as well as the Freer Gallery, Arts and Industries, and Smithsonian Institution buildings, is approximately 40 years old. The Smithsonian must completely replace these components and other related electrical equipment because repair parts are no longer available.

Upon completion of the detailed plan for the replacement of building systems at the Natural History Building, the Institution will spread the work over a number of years to provide the most cost effective construction sequence, to avoid major disruption of programs, and to obviate Museum closings. The scope of work includes: replacing the HVAC system with a new centralized system located in new penthouses over the east and west wings; modifying the building envelope, specifically, by installing roof insulation, by replacing single-glazed windows with triple-glazed windows, and by installing air locks or vestibules at entrances and loading docks; centralization of laboratories with new exhaust air systems; improving the automatic temperature control system; and connecting a central control and monitoring system.

The project will incorporate fire protection work originally planned under the Master Plan. Work will also include removing or encapsulating asbestos insulation located in the attics and attached to equipment, duct work and piping throughout the building. During this planning phase the Institution will complete an estimate by the end of 1988 which will show the costs of the entire project.

Funds appropriated in FY 1986 (\$235,000) supported the Master Implementation Plan and the evaluation of the potential requirements for interim measures and to keep the facility operational. Amounts of \$100,000 and \$475,000 received in FY 1987 and FY 1988 respectively, and \$1,000,000 anticipated in FY 1989, will complete planning and begin preparing the design and specifications for the initial phase of work, and planning for the relocation of staff and collections affected by the first stages of construction.

For FY 1990, the Institution requests \$12,160,000 as follows: for the first phase of construction (\$10,000,000); for emergency replacement of electrical and HVAC equipment not expected to remain operative throughout the construction period, (\$1,060,000); for relocating staff and collections, (\$500,000); and for preparing design and specification documents for the next phase of construction, (\$600,000).

REPAIRS, RESTORATION AND CODE COMPLIANCE

Projects in this category include minor, unscheduled, but essential repairs to sidewalks, roads, parking lots, waterproofing, correcting electrical and lighting problems and correcting deteriorated plaster walls and cracked marble floors; repairs to roofs, facades and window frames; asbestos abatement, renovating elevators, correcting exhaust problems, installing an electrical generator system, installing handrails, improving access for the disabled, installing an elevator and lift, and installing surveillance equipment at various Mall buildings; installing heat and smoke detection systems, sprinkler and chemical suppression systems, fire doors and walls and improving exit capability; repairing and upgrading HVAC systems, plumbing, electrical and communications systems; and advanced design of future year projects and

long-range planning. For FY 1990, the Smithsonian requests \$19,165,000 for the projects listed below.

General Repairs (\$3,390,000) - Funds requested in this category support a wide variety of projects. These funds provide resources for minor unscheduled, but essential, repairs which the Institution cannot anticipate specifically or which do not fit into one discrete category. For FY 1990, the Institution requests \$3,390,000 for such projects as repair or replacement of the roll-up door to Pod 4 at the Museum Support Center; repair and modification of the public rest room facilities at the Air and Space Building; repairs and restoration of the lower level of the Old Dominion Building and repairs to the water tower at the Smithsonian Environmental Research Center; structural repairs to the Smithsonian Institution Building; repairs to sidewalks, parking lots, and roads at various locations; general repairs at off-Mall facilities; and emergency repairs required throughout the Smithsonian. In addition, the funds will allow the completion of several projects begun in FY 1989. These projects include a waterproofing project at the American Art and Portrait Gallery Building; modification of the parapet and exterior walls of the Hirshhorn Building to control water condensation on interior gallery walls; renovation and repair of the galleries of the Freer Gallery Building to correct electrical and lighting problems and to replace or recover badly deteriorated plaster walls and cracked marble floors; and repair and waterproofing of the pedestrian tunnel between the Smithsonian and the Arts and Industries buildings.

Facade, Roof and Terrace Repairs (\$7,325,000) - Maintaining the integrity of the exteriors of all Smithsonian buildings is critical. This maintenance will prevent major structural and interior damage and deterioration due to age, water intrusion, and weathering. Proper care will ensure a safe environment for visitors, staff, and collections. Energy conservation also demands weather-tight exteriors. Work in this category includes a variety of projects accomplished cyclically and is dependent on the life of the materials used. For example, roofs need replacing nearly every 20 years; facade joints need recaulking and repointing about every ten years; and window frames and other exterior trim need repainting every five years. Several Smithsonian buildings now require large-scale restoration. The Institution plans to offer additional protection for building exteriors through an enhanced preventive maintenance and repair program.

For FY 1990, the Institution requests \$7,325,000 for facade, roof, and terrace repairs. Planned projects include roof inspection, repair, or replacement at the American Art and Portrait Gallery Building, the Air and Space Building, the Natural History Building, the Renwick Gallery Building, the Silver Hill Facility, and the Smithsonian Tropical Research Institute. Funding will support projects at the Air and Space Building to correct original building deficiencies and water intrusion problems by replacing the skylights and windows. Work will continue at the Smithsonian Institution Building to restore the windows and the facade stones and to repoint the building's facade masonry. The resurfacing of the plaza at the Hirshhorn Building will continue in order to replace deteriorated paving materials and correct a water intrusion problem in the building spaces below the plaza. Other projects funded from this sub-account include exterior painting at the Arts and Industries Building to ensure long-term preservation of the recently restored painted facade elements; repairing, restoring, and painting the fence at the Cooper-Hewitt Museum; facade pointing and exterior lighting repair at the Freer Gallery Building; repairing the sills of the inner court window walls at the Hirshhorn Building to correct moisture intrusion problems; and repairing and painting wooden and metal facades and building elements at a variety of locations.

Access, Safety and Security (\$2,605,000) - The Institution continues to emphasize correcting facility conditions to improve the security of the National Collections, to promote improved environmental conditions for the health and safety of visitors and staff, and to provide better access for disabled persons to Smithsonian buildings.

For FY 1990, the Institution requests \$2,605,000 for a number of important projects in these areas. Among the projects planned for correction of hazardous conditions are: continuing the asbestos abatement program; modifying the paint spray booth exhaust duct at the Hirshhorn Building to meet Occupational Safety and Health Administration standards; modifying the elevator controls in the American History Building to provide emergency recall in the event of fire; renovating elevators at the Natural History Building to ensure safe operation; and modifying the special contaminated waste water holding tank at the Museum Support Center to meet Washington Suburban Sanitary Commission regulations. Other safety-related projects which will continue include: correcting the fume hood exhaust problems at the Museum Support Center; replacing the tile floor in the Great Hall of the American Art and Portrait Gallery Building; installing an emergency electrical generator system at several facilities; and installing and refurbishing handrailings on interior stairways in the Natural History Building. Also, this request for FY 1990 will fund projects to improve access for disabled persons in order to meet current code requirements: renovating staff rest rooms at the American History Building; redesigning the stairs and installing an elevator and lift for access to the mezzanine in Hall 16 of the Natural History Building, which houses the "Life at Sea" exhibit; modifying the South Tower entrance to the Smithsonian Institution Building and the North entrance to the Arts and Industries Building; and modifying entrance and interior walkways to the Cooper-Hewitt Museum for full accessibility.

Projects for FY 1990 to improve security of the collections, staff and visitors include: installing internal barriers in the Numismatics vault at the American History Building; modifying the entrance of the Smithsonian Libraries at the Natural History Building to limit unauthorized access; and installing perimeter barriers and surveillance equipment at various Mall buildings.

Fire Detection and Suppression (\$805,000) - A major Institutional priority is to provide the best fire protection and safety measures available under today's standards and with state-of-the-art technology. The following have fire protection master plans: the Natural History, American History, Air and Space, American Art and Portrait Gallery, and Smithsonian Institution buildings. For FY 1990, the request of \$805,000 will continue fire protection master plan work in these buildings and make other fire protection improvements at the Smithsonian Environmental Research Center in Maryland, the Oak Ridge Observatory of the Smithsonian Astrophysical Observatory in Massachusetts, and the Smithsonian Institution Service Center in northeast Washington. Work will include the installation of heat and smoke detection systems; sprinkler and chemical suppression systems; fire doors and walls; and improvement of exit capability.

Utility Repairs (\$4,000,000) - Funds in this category will maintain, repair, and upgrade the heating, ventilating, and air conditioning systems, and plumbing, electrical and communications systems throughout the Institution's facilities. Ongoing renovations, repairs, and replacements of deteriorated equipment components are essential for increasing energy efficiency. The long-term preservation of the National Collections is dependent upon stable temperature and humidity conditions.

Energy conservation remains a high priority at the Smithsonian. The most significant energy savings will result from upgrading HVAC systems, replacing obsolete equipment, and improving the efficiency of environmental zones. The Institution modifies existing HVAC systems to accommodate: programmatic growth; changes in the functional use of the building; and the collections' environmental needs as they become better understood. An integrated approach to renovations and modifications has now evolved to plan for long-range, systematic HVAC improvements that will meet museum environmental requirements in an energy efficient manner.

Comprehensive HVAC studies and energy audits for most of the buildings assist the planning of future improvements. The scope of the HVAC studies included field investigations of age, condition, and performance of existing equipment, controls, and current operating conditions; reviews of existing drawings, specifications, operating manuals, and hygrothermograph records; an analysis of the relationship between the building structures and the HVAC systems; and an assessment of programmatic needs for environmental control. The data gathered by these studies provides a basis for determining redesign or replacement needs of existing HVAC systems; develops construction cost estimates; and establishes priorities for the repair, replacement or modification of such equipment components as air handling units, chillers, condensers, compressors, cooling towers, automatic temperature and humidity controls, pumps, pipes, fans, filters, duct work, and related electrical and plumbing systems. At the same time, energy audits investigate all factors relating to energy use, such as power-consuming equipment and building conditions (doors, windows, insulation, floors, and partitions). After evaluating costs and potential energy savings and identifying energy conservation opportunities, plans will guide the renovation and improvement work. This process identified a number of major system replacements which the Major Capital Renewal sub-account will fund in addition to more minor repairs and renovations requested in the Utility Repairs category.

Funding of \$4,000,000 requested in FY 1990 in this category will support routine repair, replacement, and modification projects. These projects include miscellaneous HVAC repairs for the Arts and Industries Building, the Hirshhorn Building, the Anacostia Museum, and the Museum Support Center. Other repairs include replacement of water mains at the American Art and Portrait Gallery Building; modification of the electrical distribution system to ensure continuity of power to the Air and Space Building; and renovation of the electrical system at the Miller House of the Cooper-Hewitt Museum. Several planned utility improvement projects include: modification of ventilation systems at the American Art and Portrait Gallery and the American History Buildings; continuation of energy conservation measures at the Cooper-Hewitt Museum; installation of a new electrical substation at the Freer Gallery Building; and increasing the emergency water supply at the Museum Support Center. In addition, the project to install cabling in the Mall master raceway system will continue.

Advanced Planning and Inspection (\$1,040,000) - Funds provided in this category will support projects to inspect and plan long-range facilities repair and restoration needs and to accomplish advanced design of future year projects. A vital component of a comprehensive facilities management program is the ability to plan ahead. Through an active inspection program and a continuing master planning process, the Institution identifies present and future repair and restoration requirements. The amount of \$1,040,000 requested in FY 1990 will complete an integrated master plan for all facilities, prepare a coordinated plan for correcting deficiencies at the Air and Space Building, and update the master plan of the Smithsonian Environmental Research Center. In addition, the Smithsonian will continue to use these funds to complete the design of smaller, single year projects before receipt of construction appropriations,

in order to develop accurate cost estimates and to take advantage of significant cost savings in escalation.

ADMINISTRATIVE COSTS

The Institution requests an amount of 12 workyears and \$872,000 for 12 permanent positions required to manage the increased Repair and Restoration of Buildings (R&R) and Minor Construction, Alterations, and Modifications (A&M) programs. In FY 1989 the Institution anticipates Congress will fund the FY 1989 R&R program at the \$20.8 million level, and the A&M program will total \$3.2 million. The Institution expects to receive resources (26 workyears and \$1,330,000) to support these programs at these levels. The FY 1990 requests for R&R and A&M total \$40.9 million, and the Smithsonian will require additional staff in the offices with major responsibilities for management and support of these programs, if the Institution is to fully utilize these much needed resources. The additional resources sought represent an overhead rate of only five percent of the \$16.9 million increase in these programs over the FY 1989 levels. Considering the large number of individual projects that make up the Smithsonian's R&R program and the inherent complexity of construction in museum buildings, where personnel must maintain stable environmental conditions 24 hours-a-day and must schedule construction around ongoing public activities, this rate compares very favorably with overhead costs incurred by such organizations as the General Services Administration and the U. S. Army Corps of Engineers.

The Office of Design and Construction (ODC) bears the major responsibility for management of the R&R and A&M programs. In addition to preliminary planning of projects, ODC prepares and supervises the development of detailed scopes of work and cost estimates; drawings, and specifications required to bid the projects; and supervises, inspects, and coordinates all construction projects. For FY 1990, funding will support seven positions (7 workyears and \$468,000): a facilities planner to identify and enunciate future facility repair requirements and develop budgetary needs; a supervisory engineer/architect and a mechanical engineer to develop or oversee development of project plans and specifications for contracted construction services; a construction cost estimator to develop detailed government estimates of construction projects; an engineering technician to support the professional planning and design functions; and two clerical positions for typing and administrative support for all functional areas. Plans for these additional positions include appropriate office space. Funding will support other needs such as travel, supplies and materials, and training. Contractual services will supplement staff expertise, particularly when there is a need for highly specialized disciplines which does not require full-time staff and when workload exceeds in-house design capacity.

The Office of Procurement and Property Management (OPPM) also has extensive responsibilities related to the R&R program. At various stages in the life of most projects, OPPM must solicit bids for, negotiate, award and administer contracts. OPPM requests three positions (3 workyears and \$182,000) for FY 1990 to provide support for the expanded R&R and programs funded from the Alterations and Modifications category of the Construction account. These positions include two contract specialists and one contract technician for architectural/engineering and construction contract negotiation and administration. Funding will also provide appropriate office space for the additional staff and other support costs.

In addition, the Smithsonian seeks resources for two other offices to ensure the essential level of support for the R&R program. The Office of Environmental Management and Safety requests two fire protection engineers (2 workyears and \$97,000)

to review project designs and specifications to ensure that the Institution meets all applicable life safety and health codes and to assure code compliance and safety on construction sites. An amount of \$125,000 for the Office of Protection Services will fund overtime costs for guards detailed to construction projects. Because many construction activities take place in non-public areas of the museum buildings or during the time when staff and visitors are not in the building to avoid disruption to ongoing activities, security escorts are necessary during these times to protect collections and property from theft or damage during construction. Based on projected FY 1988 costs for guard overtime, the Institution anticipates that approximately 8,000 hours of overtime will be needed in FY 1990.

REPAIR AND RESTORATION OF BUILDINGS

Detail of FY 1990 Request by Building

<u>FACILITY, ACCOUNT AND PROJECT TITLE</u>	<u>SUBCATEGORY</u>	<u>ESTIMATED COST</u>
<u>American History Building</u>		
MAJOR CAPITAL RENEWAL		
Master Coordination Plan, Phase IV		3,200,000
Design Costs, Phase IV		275,000
Relocation Costs		<u>200,000</u>
SUBTOTAL		3,675,000
REPAIR, RESTORATION AND CODE COMPLIANCE		
Elevator Modifications	Access	225,000
Modifications for Disabled Access	Access	120,000
Numismatics Security Study/Implementation	Access	50,000
Dust Collection System, AB070	Utility	75,000
Basement Ventilation Implementation	Utility	<u>200,000</u>
SUBTOTAL		670,000
TOTAL FOR FACILITY		4,345,000
<u>Natural History Building</u>		
MAJOR CAPITAL RENEWAL		
Master Plan Improvements		11,060,000
Design Costs		600,000
Relocation Costs		<u>500,000</u>
SUBTOTAL		12,160,000
REPAIR, RESTORATION AND CODE COMPLIANCE		
Roof Repair	Facade	100,000
Fire Protection Master Plan Implementation	Fire	100,000
New Interior Handrails	Access	95,000
Elevator Repairs	Access	85,000
Hall 16 Disabled Access	Access	<u>120,000</u>
SUBTOTAL		500,000
TOTAL FOR FACILITY		12,660,000
<u>Smithsonian Institution Building</u>		
REPAIR, RESTORATION AND CODE COMPLIANCE		
Tunnel Repair and Waterproofing	General	350,000
Structural Inspection/Study Implementation	General	500,000
Facade Restoration	Facade	50,000
Window Restoration	Facade	800,000
Repointing of SI Building Facade	Facade	250,000
Smoke Detection/Sprinklers/Fire Zones	Fire	250,000
Handicapped Accessibility, South Tower	Access	<u>100,000</u>
TOTAL FOR FACILITY		2,300,000

Arts and Industries Building

REPAIR, RESTORATION AND CODE COMPLIANCE

Exterior Painting	Facade	100,000
North Entrance Handicapped Accessibility	Access	75,000
Cooling Tower # 1 Repairs/Replacement	Utility	70,000
HVAC Energy Conservation/Chiller Alternatives	AdvPlan	<u>50,000</u>

TOTAL FOR FACILITY		295,000
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American Art and Portrait Gallery Building

REPAIR, RESTORATION AND CODE COMPLIANCE

Waterproofing & Detection, Phase II	General	350,000
Roof Moisture Study/Repair	Facade	10,000
Fire Protection Improvements	Fire	200,000
Tile Floor Repair, Great Hall	Access	30,000
Ventilation Study/Implementation	Utility	100,000
Water Pipe Replacement	Utility	<u>200,000</u>

TOTAL FOR FACILITY		890,000
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Air and Space Building

REPAIR, RESTORATION AND CODE COMPLIANCE

Public Restroom Modifications	General	120,000
Roof Repairs	Facade	900,000
Skylight Replacement	Facade	1,500,000
Window Replacement	Facade	600,000
Fire Protection Master Plan Implementation	Fire	100,000
Electrical Reliability Improvements	Utility	1,400,000
Master Facility Plan	AdvPlan	<u>200,000</u>

TOTAL FOR FACILITY		4,820,000
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Renwick Gallery Building

REPAIR, RESTORATION AND CODE COMPLIANCE

Roof Repairs	Facade	435,000
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Freer Gallery Building

REPAIR, RESTORATION AND CODE COMPLIANCE

Gallery Renovation	General	300,000
Facade Pointing and Lighting Repair	Facade	500,000
New Electrical Substation	Utility	<u>600,000</u>

TOTAL FOR FACILITY		1,400,000
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Silver Hill Facility

REPAIR, RESTORATION AND CODE COMPLIANCE

Roof & Structure Repairs, All Buildings	Facade	50,000
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Museum Support Center

REPAIR, RESTORATION AND CODE COMPLIANCE

Door Repair/Replacement, Pod # 4	General	35,000
Modifications to Holding Tank	Access	30,000
Fume Hood Modifications	Access	100,000
Increase Emergency Water Supply	Utility	100,000
Cooling Tower Renovation & Inspection	Utility	<u>40,000</u>

TOTAL FOR FACILITY		305,000
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Smithsonian Environmental Research Center

REPAIR, RESTORATION AND CODE COMPLIANCE

General Repairs	General	45,000
Water Tower Repairs	General	30,000
Renovation of Lower Level, Old Dominion Bldg.	General	300,000
Miscellaneous Fire Protection Improvements	Fire	20,000
Master Plan Update	AdvPlan	<u>100,000</u>

TOTAL FOR FACILITY		495,000
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Hirshhorn Museum and Sculpture Garden

REPAIR, RESTORATION AND CODE COMPLIANCE

Parapet & Wall Ventilation	General	450,000
Court Sill	Facade	265,000
Plaza Resurfacing	Facade	1,500,000
Paint Spray Booth Modifications	Access	100,000
Miscellaneous HVAC Projects	Utility	380,000
Relocation & Replacement of Condensate Pumps	Utility	<u>100,000</u>

TOTAL FOR FACILITY		2,795,000
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Anacostia Museum

REPAIR, RESTORATION AND CODE COMPLIANCE

General Repairs	General	20,000
Miscellaneous HVAC System Repairs	Utility	<u>150,000</u>

TOTAL FOR FACILITY		170,000
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Cooper-Hewitt Museum

REPAIR, RESTORATION AND CODE COMPLIANCE

General Repairs	General	20,000
Fence Repair & Painting/Restoration Study	Facade	10,000
Handicapped Access	Access	200,000
Energy Study Implementation	Utility	400,000
Electrical Renovation, Miller House	Utility	<u>60,000</u>

TOTAL FOR FACILITY		690,000
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Smithsonian Tropical Research Institute

REPAIR, RESTORATION AND CODE COMPLIANCE

General Repairs	General	100,000
Roof Repairs, Various Sites	Facade	<u>55,000</u>

TOTAL FOR FACILITY		155,000
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Smithsonian Astrophysical Observatory

REPAIR, RESTORATION AND CODE COMPLIANCE

Road Repairs and Improvements	General	400,000
General Repairs - Whipple	General	50,000
General Repairs - Oak Ridge	General	30,000
General Repairs - Cambridge	General	15,000
Fire Detection/Security System - Oak Ridge	Fire	<u>40,000</u>

TOTAL FOR FACILITY		535,000
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Miscellaneous Locations

REPAIR, RESTORATION AND CODE COMPLIANCE

Grounds, Sidewalk & Parking Lot Repairs	General	75,000
Emergency Repairs Throughout SI	General	200,000
General Facade Renovations	Facade	200,000
SISC Smoke Detection/Emergency Door Mods.	Fire	95,000
Asbestos Abatement	Access	500,000
Emergency Power Study/Design	Access	450,000
Security Requirements	Access	300,000
SIL Security Modifications	Access	25,000
Mall Master Raceway System	Utility	125,000
Advanced Planning & Design	AdvPlan	450,000
Mall Master Site Plan	AdvPlan	<u>240,000</u>

TOTAL MISCELLANEOUS		2,660,000
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TOTAL REQUEST, REPAIR AND RESTORATION OF BUILDINGS		35,000,000
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COLUMBUS QUINCENTENARY PROGRAMS

The Smithsonian's Columbus Quincentenary Program will commemorate the voyages of Columbus and the subsequent encounter between European and indigenous peoples. Through a program of exhibitions, scholarly and public symposia, and publications, the Smithsonian will examine the cultural, historical, and scientific implications of the pan-hemispheric encounter.

One of the major goals of the Institution's program will be to highlight the experiences and contributions of all peoples touched by the Columbus landfall. For example, a five-part public television production will focus on the encounter in Latin America exploring the origins of Hispanic culture in the Americas. Through the multidisciplinary perspectives of various bureaus taking part in Quincentenary programs, the Smithsonian will offer a broader interpretation of the history of the Americas than the traditional Euro-centric one.

The Smithsonian began planning in 1985 for the commemoration of the 500th anniversary of Christopher Columbus' voyages of exploration. The International Center's Office of Quincentenary Planning is coordinating Institution-wide planning for the wide range of programs that will commemorate this important international anniversary. Thirteen bureaus have requested additional funding to develop special programs for the Quincentenary. The Institution has requested funding of 4.5 workyears and \$613,000 in the FY 1989 budget request for Quincentenary programs. For FY 1990, seven Smithsonian bureaus are seeking an increase of 7 workyears and \$1,123,000 over the FY 1989 level to continue developing these programs.

Columbus Quincentenary Request

Page Ref.		FY 1989 Base		Increase		FY 1990 Request	
		FTE	\$000s	FTE	\$000s	FTE	\$000s
44	Tropical Research Institute	0	0	1	40	1	40
84	Museum of Natural History	1	130	1	585		715
98	Air and Space Museum	1	41		6	1	47
108	Museum of American History	2	125	2	385	4	510
116	Museum of American Art		25	1	20	1	45
124	National Portrait Gallery		15		0		15
132	Hirshhorn Museum	0.5	20		0	0.5	20
149	Cooper-Hewitt Museum		24		0		24
177	Traveling Exhibition Service		55		0		55
191	Office of Quincentenary Plan.		50	1	52	1	102
200	Office of Folklife Programs		90	1	35	1	125
210	Office of Elem. & Sec. Educ.		38		0		38
TOTAL, QUINCENTENARY PROGRAMS		4.5	613	7	1,123	9.5	1,736

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

1988 Appropriation.....	-0-	—		
1989 Appropriation.....	-0-			-- Equivalent in Excess
1990 Estimate.....	-0-	—		Foreign Currencies

PROGRAM OF GRANTS FOR RESEARCH

The Smithsonian Institution, through its Special Foreign Currency Program, makes grants to United States universities, museums, and other institutions of higher learning, including the Smithsonian itself, primarily for research and advanced professional training in fields of traditional Smithsonian competence.

Excess currencies appropriations directly funded this program through FY 1986. Outlays from the budget authority appropriated through FY 1986 will continue through at least FY 1992, with outlays from the Forward-Funded Reserve for the American Institute of Indian Studies continuing into the 1990s. In addition, beginning in FY 1986, the Smithsonian has received allocations of U.S.-owned Indian rupees from the funds appropriated to the Department of State in FY 1985 for the establishment of the U.S.-India Fund for Educational, Cultural, and Scientific Cooperation. (OMB Bulletin 88-8, issued on January 15, 1988, indicates that the Secretary of the Treasury has designated Burma as an excess currency country for FY 1989.)

For more than 20 years, the Smithsonian program has been a major source of support for research carried out by United States institutions in those countries for which excess foreign currencies are available. The full responsibility for the design, execution, and publication of research results rests with a scholar working within the program of a United States institution. Smithsonian foreign currency grants strengthen the research and training activities of collaborating institutions abroad, since most projects directly involve host country institutions and scholars. Enduring professional ties, which result from joint efforts and scholarly exchange, contribute to the strongest form of United States cultural relations with other nations. Also, these ties contribute to the integration of the worldwide advancement of science. Accordingly, these ties narrow the gap between the industrial and the developing nations.

The rapid growth of world population and technological development have significantly affected the natural environment and society. Research sponsored by the Smithsonian through this Program, aims, in part, at improving understanding of the environment and improving the management and conservation of scarce natural and cultural resources.

In FY 1988, ongoing research supported by these grants included the following projects of special interest:

Archeological and geomorphic studies at Harappa in Pakistan are providing new information on the pre-historic settlements of the Lower Indus valley;

An ongoing exchange between Indian and United States astronomers is elucidating questions on applications of nuclear, elementary, and relativistic physics to astrophysics;

Comparative studies of dance orientation and vision in Asian honey bees is providing new perspectives on how bees and other insects process visual information in orienting their movements;

An exchange between United States and Pakistani folklorists, anthropologists, and linguists is providing Pakistani researchers with access to current Western research techniques in music, foodways, language, and art;

Examination of archeological sites in Burma is elucidating the importance of Burma in the early formation of regional styles of art and architecture in Southeast Asia.

Further, with emphasis on information exchange through small workshops, symposia, and field conferences, the Smithsonian is encouraging international research in specialized areas. In FY 1988, for example, United States scholars received support for participation in exchanges on the subjects of environmental education, astronomy, sociology, soil zoology, visual anthropology, Rajasthani studies, and zoo management.

FORWARD-FUNDED RESERVE FOR THE AMERICAN INSTITUTE OF INDIAN STUDIES

Since 1967, the Smithsonian has provided annual funding through the Special Foreign Currency Program to the American Institute of Indian Studies (AIIS) for its fellowships, research, symposia, and publications programs, as well as its administrative costs. The Smithsonian has helped sustain this Institute and other American research centers abroad for the last 20 years because of their significant contributions to scholarship and science without regard for national boundaries and their special service to American scholars.

With Special Foreign Currency Program funding received from FY 1980 through FY 1985, the Smithsonian established a forward-funded reserve of \$7,170,000 equivalent in rupees. This reserve enabled the AIIS to sustain its programs after the removal of India three years ago from the excess currency list. Beginning in FY 1986, the AIIS, with oversight from the Smithsonian, has drawn upon the funds from this reserve for its fellowship program and administration costs in India. The Institution continues to examine annual proposals through its peer review system before releasing funding from the reserve account to AIIS. The reserve should support AIIS programs through the 1990s in conjunction with continued support from the U.S.-India Fund.

U.S. - INDIA FUND FOR EDUCATIONAL, CULTURAL, AND SCIENTIFIC COOPERATION

In FY 1985, Congress appropriated \$110 million equivalent in U.S.-owned Indian rupees to the Department of State to establish the U.S.-India Fund for Educational, Cultural, and Scientific Cooperation. Beginning in FY 1986, the Smithsonian has received allocations from this fund to continue programs in India similar to those administered under the Special Foreign Currency Program, which would have ended otherwise when India lost excess currency status in 1985. The Institution received an amount of \$1.4 million in FY 1986, \$1.5 million in FY 1987, and \$1.8 million in FY 1988. The Smithsonian expects an amount of \$2 million for FY 1989.

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