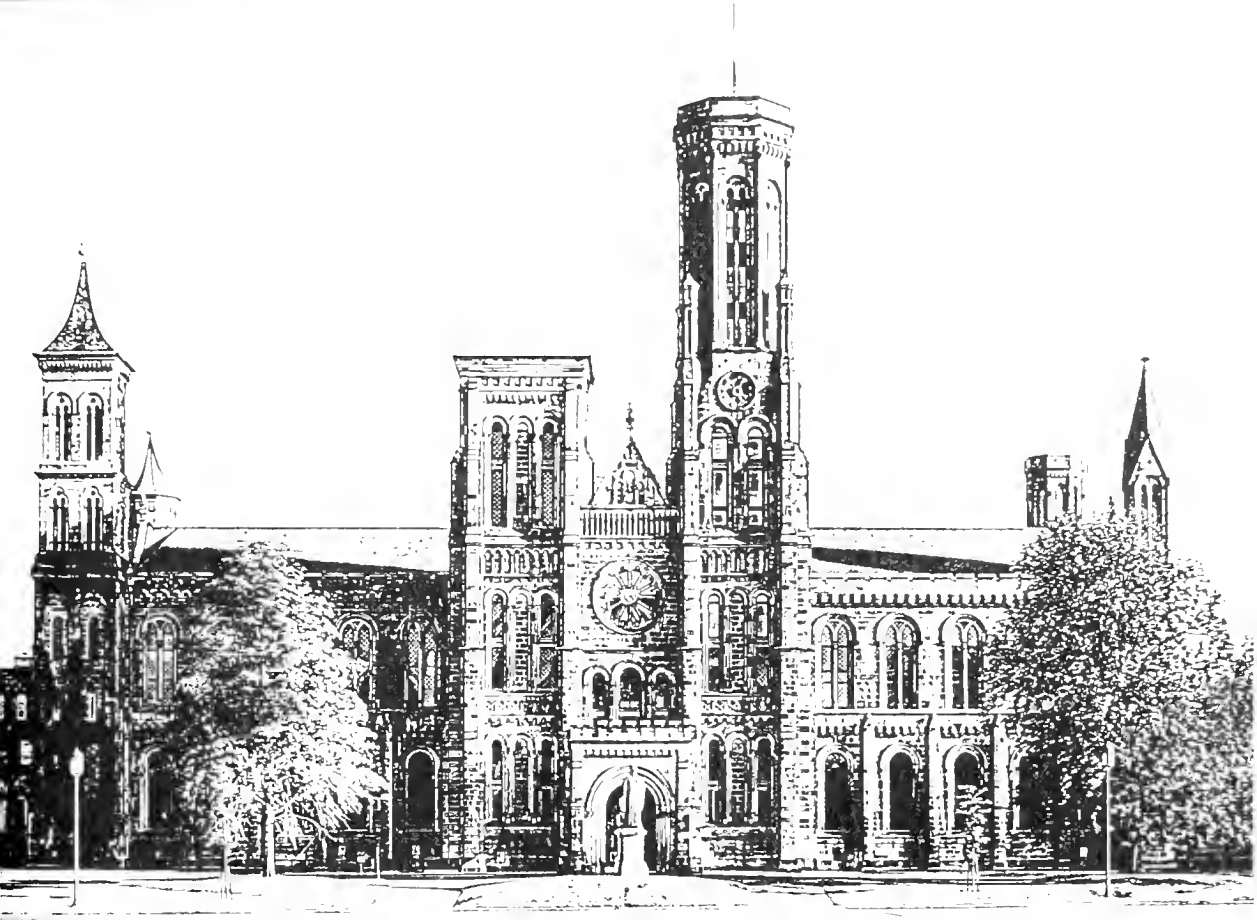

Smithsonian Year

1970

ANNUAL REPORT OF
THE SMITHSONIAN INSTITUTION
FOR THE YEAR ENDED 30 JUNE 1970

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The Smithsonian Institution

The Smithsonian Institution was created by act of Congress in 1846 in accordance with the terms of the will of James Smithson of England, who in 1826 bequeathed his property to the United States of America "to found at Washington, under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge among men." In receiving the property and accepting the trust, Congress determined that the federal government was without authority to administer the trust directly, and, therefore, constituted an "establishment," whose statutory members are "the President, the Vice President, the Chief Justice, and the heads of the executive departments."

The Establishment

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SPIRO T. AGNEW, Vice President of the United States
WARREN E. BURGER, Chief Justice of the United States
WILLIAM P. ROGERS, Secretary of State
DAVID M. KENNEDY, Secretary of the Treasury
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MAURICE H. STANS, Secretary of Commerce
GEORGE P. SHULTZ, Secretary of Labor
ROBERT H. FINCH, Secretary of Health, Education, and Welfare
GEORGE W. ROMNEY, Secretary of Housing and Urban Development
JOHN A. VOLPE, Secretary of Transportation

Board of Regents and Secretary

30 June 1970

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Regents of the Institution	WARREN E. BURGER, Chief Justice of the United States, Chancellor
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	CLINTON P. ANDERSON
	CARYL P. HASKINS (Chairman ad interim)
	JAMES E. WEBB
The Secretary	S. DILLON RIPLEY
Under Secretary	JAMES BRADLEY
Assistant Secretaries	SIDNEY R. GALLER, Assistant Secretary (Science)
	CHARLES BLITZER, Assistant Secretary (History and Art)
	WILLIAM W. WARNER, Assistant Secretary (Public Service)

A listing of the professional staff of the Smithsonian Institution, its bureaus, and its offices appears in Appendix 4.

[1]Died 27 July 1970.

Contents

STATEMENT BY THE SECRETARY

Statement by the Secretary

S. Dillon Ripley

This past year has been one of measured progress for the enterprises of the Smithsonian Institution. Where many of the prospects of the nation at large seem fraught with dissent and division, where the path of education has become obscured by the divisiveness which has beset the academies, the smaller private institutions of learning, lacking tuition-paying students as well as football teams, seem to have survived so far relatively unscathed.

Sometimes it seems to us that the Smithsonian and other research institutions are rather like monasteries in medieval times, removed from the warfare that surges round about and insulated from the dissensions that rage throughout our public life. Our "monasteries" are not fortified as were those in the middle ages and we have not so far had to defend the scholars writing in their libraries and attempting to preserve individual research and learning. Rather our monasteries are open havens where the public comes and goes as it will, and we hope that something of value to all our people will brush off in the process. A notable example of the latter was the second peace demonstration and moratorium march on 15 November 1969 when, in the cold, and with tear gas on Constitution Avenue some 81,000 persons crowded into the Museum of History and Technology, cheek by jowl, to rest awhile and look at the objects displayed therein. That the exercise was not purely one of rest and relaxation was witnessed by the many letters and telephone calls received from all over the country afterward which expressed thanks and grateful appreciation for the hospitality offered by the Museum, and concern and active interest in the displays that were on view. So some benefits can be derived even from such confrontations.

Like other institutions concerned with research and study, however, the Smithsonian suffered in the past year from the general decline in grants and subventions to science as well as to related areas of study. Our problem with the declining government budgets for the support of basic science has been compounded by the tax reform act of last year which produced a serious paralysis of will on the part of the foundations. Drawing back from giving while they attempted to reassess the legal complications of the tax bill, foundations in general

have still not recovered entirely from the shock of the great tax reform act. The path ahead for foundations and for philanthropy in general is a thorny and difficult one. It appears for the moment as if the populist theoreticians in government have won a kind of victory and that once more the concept of the private accumulation of wealth is cast into an atmosphere of discredit in the public mind. Whether this trend on the part of the legislators represents a true feeling in the country at large remains to be discerned. It seems at this stage highly unlikely that the public tax-derived dollar will replace foundation giving to the extent or with anywhere near the potential versatility that the record of private philanthropy has demonstrated. All of this remains for the future, however. At least it would seem as if foundations will be somewhat more limited in the cycle of their growth and the number of years in which they continue to operate. It seems as if a term had been put to the age of any foundation and one can only hope that in the long run this will not prove to be a serious or crippling blow.

One of the encouraging developments for the Institution this year was the series of fruitful discussions held during the summer and autumn with the Bureau of the Budget on methods of structuring the federal part of our budget and the annual appeal for appropriations to the Congress of the United States. For the first time the Bureau of the Budget recognized the concept which we have continually emphasized, that Smithsonian activities represent a kind of unity. In spite of the many bureaus, some of them incorporated in large buildings on the Mall and others tucked away in laboratories here and there, there are a series of unifying themes which run through the Institution's activities. Our concerns remain united around the general subjects of history, history of art, science and technology, and the delineation of these histories through public exhibition. In addition, our science activities revolve generally around the compilation of statistics, information, and research about the biosphere and space. Our classical concerns in natural history and in astrophysics have come full circle so that today we can proudly claim our work to be of vital importance in the new sciences of the study of the environment on the one hand and of outer space on the other. Within these common themes there are overriding considerations for the public good. Education and public exhibition are of paramount concern for all our main buildings and for the curators and the research staff who inhabit them. Education through research and publication remains paramount in the other bureaus whose activities are not contained in the large public buildings. In addition, Joseph Henry's initial concern

with bringing scholars together with colleagues in foreign countries continues to be developed and encouraged through our foreign currency program as well as research activities both here and abroad.

We are proud of the incorporation this year of the first program for developing studies by the Woodrow Wilson International Center for Scholars and pleased that we shall be able to give the Woodrow Wilson Center houseroom in the old Smithsonian building for a temporary period of time until new quarters are found for them. It is symbolic of the activities to which that building was dedicated in the formative years of the Smithsonian that we should now have advanced scholars concerned with common themes of study housed in the red sandstone castle on the Mall. We hope that the first two broad areas of study of the Center scholars—the international law of the sea with its implication on planning for the appropriate and best uses of the sea, and the broad areas of social biology—will be illuminated by the Center's scholars. Their studies will reflect out, I am sure, into many of the scholarly workings of the Institution itself.

The Bureau of the Budget has encouraged us during the past year to develop an interbureau program pointing toward the celebration of the American Revolution Bicentennial in 1976 and subsequent years, and for this the Congress, impressed by the goals toward which we strive, has appropriated some funds this year for the Institution.

The second general theme approved by the Bureau is that of environmental studies, in so many aspects of which the Smithsonian has pioneered. We believe that the Congress will listen with interest to our discussions in this regard and will furnish us with some funds to begin laying out long-range plans for ecological assessments in both the New World temperate and tropical zones and perhaps in the Old World. Within such programs many of our scientists can find themselves at home and with the potential of resources to add to their critically needed funds for research. Like researchers in the field of the natural and physical sciences everywhere we have deep legitimate concerns for the great problems of our time. We are uniquely equipped through possessing and working with the national collections to contribute to solutions but we are pitifully undersupported in order to make these vital concerns effective. If the science fraternity across the land cares, we wish they would let us know and seek ways to help.

Additionally, the events of last summer, when the Apollo 11 flight first successfully explored the moon, prompted us to raise with the administration whether the time might not be ripe to proceed with the plans for the National Air and Space Museum. The language of

the 1966 authorization was, "appropriations should not be requested pursuant to H.R. 6125 unless and until there is a substantial reduction in our military expenditures in Vietnam." In the interim since 1966, it has been our thought that the original plans for the National Air and Space Museum, first begun in the 1950s, have through the lapse of time become obsolescent. Museum building plans can become as dated in their own way as the designs for an airplane engine, provided no mock-up is constructed, no prototype tested. In the ensuing years since the National Air and Space Museum's plans were first drawn up, many new concepts of exhibits as well as new thoughts about the research potential of the Museum itself have evolved. At the same time construction costs have escalated steadily and in an arithmetic manner, so that today one is faced with the possibility of an annual increment to such costs of up to 12 percent. This means that an Air and Space Museum authorized in 1966 "not to exceed approximately $50,000,000 in costs" may now be envisaged to cost by the mid '70s something in the order of $65,000,000 to $70,000,000.

The Smithsonian administration should not rest in its efforts to make prudent use of the dollars which may be appropriated to us by the Congress. It seems wise, therefore, to restudy the whole original design and to set exhibit and research needs against costs in such a way as to attempt to hold the line financially in any request to the Congress for a firm budget. Last autumn we asked the Bureau of the Budget for study funds, but this was unfortunately cut out of the President's budget for the 1970 session of the second session of the 91st Congress. We hope to go back to the Bureau of the Budget again this year and request funds for appropriate studies of the project. There will be only one National Air and Space Museum and we had better make sure that it is going to be the best one that can be feasibly obtained as well as a prudent and efficient use of government funds. Fortunately, the cooperation of NASA, the continued cooperation of the Air and Space Museum, and the perseverance of our budgetarily limited staff have combined to make sure that those objects as well as the documents incorporated in the eventual building will be of the highest quality and caliber. It is now up to us to produce the finest building that can be constructed. Happily, Mr. Gyo Obata of the firm of Hellmuth, Obata and Kassabaum has consented to restudy and redesign the building for what we hope will be an appropriate cost, and this concept the Regents have approved.

In spite of the generous actions of the Congress in giving the Smithsonian limited increases each year, which have averaged somewhere between 6 and 8 percent, it is sad to recall that costs in the

nation at large have continued to escalate so much that our scientists' work and our research and exhibits potential have been seriously slowed and potentially threatened in their appropriate and meritorious growth. We have just been able to keep up with the continued national rate of inflation. It allows little for growth, expansion, and change, so necessary for a healthy concern, be it a corporation, university, or a research and museum complex. Examples of such needs are continuing additions to art, history, and science collections, modern inventory computerization for these collections, development of new experimental ideas and fields of study—a neighborhood museum, environmental research at our Chesapeake Bay Center and our Tropical Research Laboratory in Panama, support for the new Center for Short-Lived Phenomena—to name but a few of a seemingly endless list of worthy projects.

Thus there is a definite and increasingly severe confrontation between the clamor on the one hand to pursue creative ideas in pursuit of our mandate to increase and diffuse knowledge, and on the other hand the support of funds to permit such work to be carried out.

While vigorously seeking additional support from Congress for these purposes, we are at the same time carrying out a program of self-examination of the use of our total resources with the objective of reducing or eliminating outmoded or low-priority activities. The results of this program will be a painful but necessary and healthy exercise.

In the case of our private finances the pressures are no less severe. Failure to maintain a healthy balance between income and expenditures could produce a serious threat to the future of the Institution. Those unfamiliar with the Smithsonian may not realize that it was founded by Congress as a private institution and operated without any federal support for nine years until 1855, when at the insistence of the government it took over the management and exhibition of the National Museum collections. Since then, of course, the continued accessions of magnificent collections plus growth of other federally related activities have brought about an enlargement of this federal support. The growth of federal support combined in recent years with an alarming degree of inflation unmatched by growth of income from our private endowment funds has reduced our private fund support to less than 10 percent of our total, although research grants and contracts awarded to the Smithsonian added to our private income constitute about 32 percent of our total operating budget.

The fact that the Smithsonian is basically a private institution, although federally supported, is of immense importance to its ability to

occupy its long-established and unique position. Its nonpolitical character allows us to maintain our objectivity and our contacts and scholarly investigations in virtually all nations. The Smithsonian is a national showplace partially supported by but not of the government, and this attracts a continuing flow of valuable collections which would not otherwise be available in the nation's capital for the millions of annual visitors.

Today it is not too much to say that the private nature of the Smithsonian is threatened by the inflationary advances in costs without commensurate increase in private resources. While the Smithsonian private endowment funds total about thirty million dollars, only about one quarter of this amount is of an unrestricted nature and the annual income from these unrestricted endowment funds is less than $400,000, pitifully small in relation to a total annual budget of nearly fifty million dollars. During the fiscal year 1970 alone, the need to match for private employees the salary increases legislated for all United States government employees, boosted private roll salary payments by 15 percent. It will be literally impossible to keep up such a heavy pace in the future unless a commensurate increase in private resources can be achieved.

We are now making strenuous efforts to cope with this threat to the future of the Institution. As in the case of federal funds, we are also currently examining all of our private activities to eliminate the unnecessary or less important. At the same time we are striving vigorously to increase income from our various private activities such as our Museum Shops and our Associates organizations. In addition, we have launched a national campaign to build up our private endowment funds to assure a substantially greater private income in the future. To this end, an Office of Development was formed in September 1969 with Mr. Lynford E. Kautz as Director. Under his guidance a new national associates program has been launched with Mr. Thomas J. Watson, Jr., a Regent, serving as Chairman. The key to the success of the operation, is of course, our new *Smithsonian* magazine, launched in April 1970 and already showing great promise. It is anticipated that this program will have far-reaching benefits to the Institution. Besides serving as a giant step forward in carrying out our mandate to increase and diffuse knowledge among men, it can at the same time serve as the foundation for building a national counseling organization which will serve to attract the financial support which we so sorely need.

In the area of publications in general, however, our funds for assuring an appropriate stream of the products of research have been

as seriously curtailed as they were in this Institution during the years of World War II. In spite of appeals for additional research funds for our scholars, Congress has not been able to award us any increase. In spite of continued appeals to foundations and government-granting agencies the level of funding for our research has decreased due to stringencies and shortages elsewhere in the government.

Under these circumstances we have been pushed to the limit to account for the dollars made available for specific purposes by the Congress. This year particularly we were threatened with a potential deficit in our annual operations which at one time assumed menacing proportions. Searching and stringent action on the part of the fiscal and personnel offices of the Smithsonian has resulted in a pruning down of expenditures so that we have been able to balance our books at the end of the year. But it has been a trying and difficult year for everyone and in this sense we have reflected some of the mood of the nation at large. It is a great credit to our research and administrative staff as well as to the staff of the exhibits department and manifold supporting activities of the Institution that they have borne these trials with patience and understanding. In the past year or two it is as if indeed we have been placed on truly monastic fare, bread and water. It is a tribute to the understanding of the staff and their sharing of these burdens that we have come through so far with morale preserved and with cheerful good humor. In our exhibits and in aspects of our research we can at least emphasize the positive in America and in the American experience. Particularly in our historical exhibits this can be a countervailing current to much of the general mood of uncertainty and self-pity which prevails today.

In Joseph Henry's view the Smithsonian existed to stimulate research in pursuit of new truths and to make these truths available to both the public and to professionals, in the arts, sciences, and cultural history. His favorite phrase to describe the Institution's ultimate aim was a "College of Discoverers." I still feel that this is the unifying force, the common factor in all the diverse bureaus and museums of the Smithsonian—the Institution as a "College of Discoverers" which

- First, keeps records of knowledge through its collections;
- Second, serves as a stimulus to research, largely through its collections;
- Third, and perhaps most important, uses the collections and the results of research for public education.

These three elements may be found to a greater or lesser degree in all the bureaus of the Smithsonian, as they are today. What then

is the record of our most recent objectives and our present management program?

When I returned to the Smithsonian as Secretary in 1964, the Institution was completing a major cycle of facilities development undertaken to increase its capacity as a research institution. The National Collection of Fine Arts and National Portrait Gallery were readying new quarters with ample study space, in addition to new exhibition and storage spaces. A renovation of the historic Smithsonian Institution Building was in prospect. Fourteen halls of modern research and collection storage space were being completed for the National Museum of Natural History. The splendid new National Museum of History and Technology had just opened, with two floors of scholarly studies and collection storage areas. A research building was being considered as a step in the ten-year construction program of the National Zoological Park. The staff of our tropical research laboratory was preparing to move from restricted quarters on Barro Colorado Island onto the mainland and to establish strategically situated marine biology facilities as their sphere of inquiry widened to include the diverse habitats of Panama and the tropics as a whole. But the administrative and fiscal requirements for the expanded research efforts allowed by physical expansion had barely begun and there was little understanding within the wider community of the character and extent of the Smithsonian's interests in research. I felt then that our first efforts should be to deepen the Institution's emphasis on research, in order to attain the advantages of the building program so successfully carried forward by my predecessor, Dr. Carmichael. So our professional research staff on fulltime appointments has grown, from 243 in 1965 to 310 today. Of course without strong support from technical assistants and support divisions such an expansion of the research effort could not be effective since all of these necessary functions would otherwise have to be borne on the shoulders of the research staff, and here faltering government budget support has held back our appropriate growth.

I have been deeply concerned about the scale of services available from the Smithsonian Institution Libraries, an indispensable auxiliary of all of our research. A distinguished librarian, Dr. Russell Shank, was recruited in September 1967 from the forefront of the library profession, given senior standing and a pledge of continued support until our libraries could be judged adequate to the needs of the research enterprise. That day still seems far off, for the constriction in federal funding and freezes on employment, worsened by steadily rising costs for subscriptions and monographs, continues to limit severe-

ly the service capacity of our libraries. This must serve only to double our determination. The Smithsonian Institution Libraries are unique reference systems in specialized areas not duplicated elsewhere, closely related to the national collections which they complement.

We have sought to increase research support in the form of technicians in our research laboratories and support for field investigations. The oceanography support group, ably led by Dr. I. Eugene Wallen, has been notably successful in expanding opportunities for staff members to go to sea, helping to overcome a very serious lack of ship time which severely hampered our unique effort in marine biology. An automatic data-processing support group has been built up in both Washington and Cambridge to meet needs for computation and information storage.

Scientists and scholars can only be appropriately treated as professionals; they must be accorded latitude in order to act responsibly as masters of their domains of subject matter knowledge. One of my first aims as Secretary was to provide that department chairmen serve in rotation "from the ranks" so to speak, and for limited terms, in order to minimize the hazard of an internal seniority system that might block initiative and convert scientists into permanent administrators. Research support is made available to staff members in the form of grants and from appropriated funds, so that they will act responsibly as principal investigators treating scarce resources as wisely as they would funds of their own. I put an end to pre-publication review of professional publications by the Secretary, preferring to read them as reprints from colleagues rather than submissions for administrative clearance. We canceled a burdensome annual report required of each staff member about his research because it served unnecessary and merely administrative purposes. Burdensome formal reporting can be no substitute for consultation and constant awareness by supervisors. Evaluation of professional accomplishment is now conducted by committees of peers formed in the major research units, known as "Professional Accomplishment Evaluation Committees." Staff members have been encouraged to teach in universities on official time (without added compensation) and to request changes of their duty stations at intervals so as to be able to spend a year in study and research without the distractions of daily office routine, an equivalent to a university sabbatical. Travel to professional meetings has been encouraged.

The Bicentennial of the birth of James Smithson in 1965 took the form of an academic convocation, which we still repeat upon convening our occasional international symposia, conspicuously celebrating

our character as a community of scholars. The Smithsonian Institution Press has been reconstituted as a scholarly publishing arm for the Institution and more effective formats were chosen for the serials in which staff members' papers are published. Most important of all, among our bureau directors and professional staff members, we have sought to maintain shared respect for the individual pursuit of excellence, whether in research, collection development, or the presentation of knowledge to the public. The professionalization of our research community is manifested in many ways and, of course, constitutes one of the greatest strengths of the Institution.

In keeping with the professional character of our staff and in a spirit of service to the nation, we have sought closer ties with the universities. We have inaugurated programs whereby students and other qualified investigators are freely given access to Smithsonian facilities to conduct their own investigations. Younger visitors and PhD candidates receive supervision from professional staff members. Direct budgetary support for stipends for visiting scholars has been secured for the first time from federal appropriations to the Institution. An advisory council, drawn mostly from the universities, was constituted in 1965 to serve as a visiting committee to advise on the development of general Institution-wide policies affecting basic research and higher education. Control of stipend awards was delegated to committees of professional staff members. These efforts, carefully designed to be cooperative rather than competitive, do not duplicate the efforts of universities but serve to make our facilities and staff capabilities available to them to the extent that funding permits. A strong program of higher education contributes to our research environment and invigorates our institutional life through lively exchanges with universities. The specialized areas of knowledge represented by our highly skilled staff are thus guaranteed survival at a time when a number of these disciplines of general concern have been neglected by most colleges and universities.

We have not allowed ourselves to rest with static presentations of objects in our collections. In order to be successful in conveying knowledge to the wider public, exhibits must involve the viewer actively, reward curiosity, invite exploration. We have sought to raise our standards for the effectiveness of exhibits, to guard against being content merely to show an object and to seek instead to elicit from more of our visitors those active responses and attentive regard that betray a more affirmative understanding or comprehension of the context of the object and its meaning for the citizen. Programs of school tours have been expanded. The number of children on escorted

tours has grown from less than 25,000 in 1967 to about 75,000 this year and our corps of volunteer docents has tripled in size. The experimental development of a neighborhood museum in Anacostia has shown that museum-like operations may be carried out in the crucible of the inner city, that children may learn with delight and advantage, and that the residents of the area will treat with respect what they regard as their own center for learning and recreation.

We have held annual conferences on the use of museums as educational resources. Through our membership organization, the Smithsonian Society of Associates, more people may participate far more directly in the offerings of our museums such as popular study and craft courses, special events, and guided field trips. In 1968 we commissioned the first general survey of visitors to our museums. Much more, needless to say, remains to be done, but unless museums ask of themselves what their visitors have learned they will have no way to gauge their effectiveness. Internal dissatisfaction with the educational impact of our exhibits is healthy and serves to increase our determination to improve them.

A well-informed public is the best source of constructive criticism, which we encourage to insure that the Institution does not become insulated from the public it serves.

We have changed the annual report from a collection of articles written by others, often interesting but not informative about the Institution itself, into a full and detailed statement about all of our activities, the publications of staff members, the results of research, and the expenditure of funds—full disclosure, if you will—in a manner intended to allow any reader of the report to form his own opinion of our effectiveness and objectives. We have established a public information office to facilitate inquiries from external sources. We have had numerous activities reviewed by *ad hoc* committees drawn from outside the Institution. We have encouraged visits by Members of Congress and others to become informed about the Institution. An example that comes to mind was an evening open house in 1965 to which we invited the entire Congress to view the exhibits presented in the National Museum of History and Technology. Our new magazine *Smithsonian,* mentioned earlier, will function as an educational benefit of membership in the Society of Associates and also serve the vital function of helping to inform the public about the purposes and operations of the Institution.

With the increase in responsibilities and higher performance standards has come a need for strengthened management. To enter personnel and payroll information or address lists on our computer was

an obvious step, but one which took some years of intensive effort. We have created the office of General Counsel for the first time in the Institution's history and constituted the office of the Treasurer at the senior level. Service divisions have been brought into closer relation with the units they support. Here is another area where our own dissatisfaction with ourselves is the surest safeguard of the public interest. In a period of complex growth we may have given insufficient attention to certain kinds of procedures simply because they showed less sign of strain. I have been enormously pleased by the cooperation we have received from the Office of Management and Budget, the Civil Service Commission, the General Accounting Office, the General Services Administration, this and other Committees of the Congress, and a host of helpful advisors. We need all the help we can get.

At the same time, technical procedures are no substitute for a shared and intense dedication to the public good, through a system of management wherein management responsibility is vested in the very best people one can find, operating with clear warrants to seek and produce the best results attainable. We have sought to develop a concept of shared responsibility rather than to second-guess our bureau and program directors up an endless hierarchy. I have been strongly concerned about the quality of our decision-making and have sought ways to create shared judgments through the establishment of our Secretariat (meeting weekly) and council of bureau directors (meeting monthly).

One of the most important aspects of our programs is its international character. The pathways followed by knowledge and culture do not observe national boundaries. The quality of research, collection development, and education cannot be maintained without regard to the work of kindred institutions overseas, just as our investigations must be prosecuted around the globe. We inaugurated a major program in 1965 to apply excess currencies to the needs of scholarship and field research abroad in continuation of the original efforts of Joseph Henry. We created an Office of International Activities to foster cooperation with scholars and institutions in other nations, aided by a Travel Services Office to help staff members in their overseas pursuits. The effects of this renewed international emphasis in our programs of education, conservation, and research have been salutary, and have included 219 grants to 57 American institutions and universities for foreign research using counterpart funds.

The establishment of the Woodrow Wilson International Center for Scholars is perhaps a further realization of the Congress' recogni-

tion of the Smithsonian's international role. The tragic failures of international understanding which so mar the recent history of our world surely call for a redoubling of effort by all institutions to seek to increase international understanding through scholarly exchanges and cooperation.

We have attempted to be mindful of our responsibilities as an establishment in a troubled urban area, through services to schools and the Anacostia neighborhood experiment. The annual Festival of American Folklife serves as an example of an inspiring presentation that appeals to young and old alike. Groups that confront one another angrily in other settings enjoy the experience of a common heritage side by side. I believe it is incumbent upon the Smithsonian to take seriously its obligations as a good citizen of the District of Columbia and to be increasingly mindful of a public service responsibility to educational and governmental programs underway here.

Another objective of management, which has become increasingly well established, is to maintain strong cooperative links to those programs of major government agencies that the Smithsonian can assist as a performer of research or provider of services. The Satellite Tracking Program conducted on behalf of NASA by our Astrophysical Observatory is a noteworthy instance, or the scientific advisory services we provided the Corps of Engineers regarding pollution in New York Harbor. We have assisted the Atlantic-Pacific Interoceanic Sea Level Canal Commission in ecological studies related to plans for a new sea-level canal. The Fish and Wildlife Service and the Bureau of Sport Fisheries, as well as the Geological Survey and entomology division of the Department of Agriculture, are alloted office space and collection storage facilities in the Natural History Building. Cooperative projects offer an excellent format for the attainment of timely or urgent objectives without our having to build a permanent staff which might outlive the aims of the program under which they had been drawn together.

In all this, planning is of the utmost importance. Growth must be brought into effective relation to the availability of resources, especially for an establishment such as ours with more than forty line items in our federal budget, each of which could very readily be expanded to meet some external or internal need. We recently constituted an executive steering committee of our Secretariat to guide the development of the planning function within the Institution and consider ways to maintain a balance between our pattern of commitments and the resources we may expect. It was my judgment in 1964 that the Institution would have to inaugurate some

new programs and achieve order-of-magnitude increases in some support activities in order to function successfully for the 1970s, and to be judged worthy of more financial support from the Congress and private sources. While we have had some very considerable success much remains to be done. In 1964, our federal budget was able to meet only 70 percent of basic research and support needs. Now it meets more than 90 percent, but the elimination of remaining shortages is a priority objective in planning. What then could be said of our plans for the next decade?

The central concerns of the Smithsonian represent national needs for the kind of sustained commitment that can be made only by an institution with a strong sense of continuity, tradition, and concentrated purpose. We believe that our first responsibility is to continue the general lines of endeavor to which my predecessors, with the support of the Congress, have committed the Institution: basic research in selected areas of national interest; development and maintenance of the national collections in biology, anthropology, history, and the arts; and enlightenment of the public through exhibitions and related activities.

In all this an overriding concern should continue to be the quality of the professional staff effort within the Smithsonian and, I cannot too strongly emphasize, the achievement of an adequate level of support of that effort. We have repeatedly appealed to the President and Congress to remedy deficiencies in support of research and scholarly programs. While virtually half of the growth in appropriations since 1964 has been devoted to staffing and operating new facilities authorized by the Congress, an equal effort has been made to sustain the basic scholarly program: support for fieldwork, instruments, libraries and again libraries, automatic data processing, improved personnel procedures, technician support, related higher education activities, better access to colleagues through scholarly publishing, and unremitting emphasis on the professional character of staff appointments, all against a background of increasing costs. Much remains to be done on this score. We are now documenting the character and extent of these support shortages in even greater detail for the President's budget in the future. Our budget henceforth will proceed on two tracks, the first a phased elimination of these shortages and the second to provide for the continued development of programs entrusted to us by the Congress.

There are a number of courses we should avoid. We repeatedly decline requests to assume responsibilities which we believe to be too extensive. The Institution is an establishment, somewhat akin to

a university or research academy, not a public program agency with massive national operations, field offices, or extensive granting programs. For example, it was once suggested that the Institution assume management of international educational and cultural exchanges funded by the government, but we could not agree. The Board of Regents has followed a consistent policy against distant museum operations such as regional museums or national museums in cities other than the Capital. Professor Henry's principle, that the Smithsonian should not bear responsibilities that others are willing to assume, still applies today. While cooperating with universities we should not seek to assume their distinctive functions of general instruction or degree-granting. While cooperating with museums elsewhere we should not interpose this Institution in their relations with one another or with the national government.

Without infringing on the autonomy of our bureaus and their distinctive objectives we shall seek the advantages of existence as a community of scholars where scientists and scholars learn from one another. Whether by tracing biochemical relations from one group of organisms to another or studying the behavior of a group of vertebrates first in the tropics and then in the setting of the zoo, followed with close anatomical and distributional studies in museum collections, we benefit from association with our colleagues. Similarly scholars working with portraits, genre painting, lithographs, and historical objects can pursue together their mutual interests in the documents of the American past. Our desire to maintain unity of outlook and professional endeavor suggests that the Smithsonian should always avoid program developments that do not in some way reinforce some of our other activities.

The museum as an institution in society is one focus for Smithsonian concern; the other focus is on the vigorous prosecution of lines of study which, if left to themselves, would not receive the attention that the national interest requires. Sometimes we move beyond the museum setting to develop laboratory investigations. When we constitute a museum it is with due emphasis upon its scholarly responsibilities in adding to the store of man's knowledge. These two foci of concern should continue to determine the Smithsonian's course, rather as two points generate an ellipse: neither museums without scholarship nor scholarship without concern for communicating with the public at large, but as in the beginning the *increase* and the *diffusion* of knowledge.

Beginning this year the observance of the bicentennial of the American Revolution will become a predominant factor in the devel-

opment of Smithsonian programs. Within the settings of our history and art museums members of the public may seek a reappraisal of our national experience with due reference to its international setting. Fresh insights of historians should be interwoven with superb offerings of objects and art works that portray our nation's course over the past two centuries and suggest paths for our continued development.

From the studies of the sources of energy and means for its use by living systems to the explanation of biological diversity, the Smithsonian represents an unexcelled multidisciplinary array of information resources and professional scientists which bear upon critical needs to improve our understanding of the physical environment upon which human society depends. We anticipate increasing demands upon our efforts in systematic biology, anthropology, astrophysics, and environmental studies as important resources for the national effort in environmental improvement.

One of the most important unfulfilled hopes for the Smithsonian is that a great national museum might be developed on the authorized space on the Mall between Fourth and Seventh Streets along Independence Avenue to recreate the experience of man's greatest adventure: flight and space exploration. We also aspire to present insights about the significance of the space age for everyday life and to communicate an understanding of the scientific discoveries originating from space exploration. Thus we are coming to appreciate that it is not only machines, or relics of the past, or evidences of the skills of craftsmen that concern us, but man himself. Thus we propose also to continue to study the idea of a museum of man which could perhaps convey something of the ever-widening insight into man and society that characterizes the progress of knowledge today.

The birthright of today's citizen is an understanding of the forces shaping himself and his world. It is to museums that many people look for access to the works of artists, an appreciation of the past, an awareness of the scientific view of nature, and for portents of the future. All museums must experiment with new techniques of exhibition and embark upon research aimed at improving their effectiveness in popular education. The quality of our response to this democratic vista will continue to be a matter of overriding concern to the Smithsonian in years to come.

From the amassing of great national collections will arise difficult questions about how to guarantee access to the information they contain. This will call for innovative designs of indexes, catalogs, and ways to manage vast resources of information. Perhaps some of the techniques developed for the management of voluminous flows

of data from satellite observations or oceanographic stations may be adapted to the needs of the future. If man is not to be engulfed by a rising tide of reports, paper, data, computer printout, and memorabilia, organizations such as the Smithsonian must pioneer in winnowing and selecting this material from the spate of messages that now fill the communications channels of our advanced technological civilization. I wonder if the Smithsonian does not occupy a salient or point of vantage from which this concern figures very prominently. In our role as custodian of the nation's collections we must try to serve the public interest in improved management of scientific and scholarly information.

In eras of decisive historical change all institutions undergo trials: the challenge of changes in purpose, efforts to adapt to changing circumstances, and perhaps even lapses of confidence from within or without. This is a time of testing and trial for the university, for the museum, indeed, for our society as a whole. The Smithsonian is not immune from searching inquiry into its objectives and character. Without such inquiry and without audacious questioning of any of our comfortable suppositions, the Smithsonian would lose its value to the people and to future generations. Every institution must be receptive to change, to new patterns of communication, to the concerns of new groupings in society, and to new expectations.

If the Smithsonian is to deepen its services to our society we must continue to strengthen our administrative structure, to seek new sources of support, to enlist men and women of principle and insight as officers and staff members, and to hold our performance to ever higher standards of quality and meaningfulness. I would submit that the Institution must increase its ability to adapt to changing circumstances, shifting patterns of public needs, widening horizons of leadership within the Congress and the Executive Branch. We are confident that only in this way can we strengthen the Institution to meet the future of the decade.

BOARD OF REGENTS

The first of a newly scheduled fall meeting of the Board of Regents was held on 5 November 1969 at the National Zoological Park. Such additional meetings are planned in order to give the Regents an opportunity to consider a series of presentations on the various programs of the Institution. Emphasis at this meeting was on the National Zoological Park. Talks were given by Dr. Theodore Reed on the status of Zoo construction and by Dr. John Eisenberg concerning the Ceylon-Smithsonian elephant research program.

The Regents had an opportunity to visit a number of the Zoo buildings, including the bird house where arrangements had been made to exhibit the moonrock from the Apollo 11 mission. Also on exhibit was the Crown-of-Thorns starfish (*Acanthaster planci*), currently the subject of research into its effect on coral reefs, particularly in the Pacific Ocean.

The winter meeting of the Board of Regents was held at Hillwood, the estate of Mrs. Marjorie Merriweather Post, on 28 January 1970. Chief Justice Warren E. Burger had been elected earlier by mail ballot as Chancellor of the Smithsonian Institution. It was recognized that Mr. Thomas J. Watson, Jr., had been designated a Regent by Public Law 91-30, dated 17 June 1969.

The actions of the Board were reported in a statement released to the Press, which is summarized as follows:

> Plans for a Smithsonian monthly magazine were approved. The Board approved a study of the advisability of establishing a unified investment program for the Institution's private endowments. This program, if ultimately adopted, would not involve any transfer of collections, capital funds, or income from any existing fund to any other. The Board expressed satisfaction with the Institution's plans for improvement of operating procedures and of the internal auditing of its financial affairs.

The spring meeting of the Board of Regents was held in the Freer Gallery of Art on 20 May 1970. The Chancellor welcomed Vice President Spiro T. Agnew to the meeting of the Board and also welcomed the new Regent, Mr. James E. Webb, whose appointment was approved by Public Law 91-255 on 18 May 1970.

In addition to discussing matters of policy, programs, legislation, and finances, the Regents elected Regent James E. Webb to be a Member of the Executive Committee (Permanent Committee). The Board approved the Secretary's recommendation that Assistant Secretary James Bradley be appointed to the position of Under Secretary of the Smithsonian Institution.

At the conclusion of the meeting the Chancellor, on behalf of the Board of Regents and the Secretary, presented a scroll to Mrs. Agnes E. Meyer for her more than fifty years of devotion and service to the Freer Gallery of Art.

FINANCIAL REPORT

During the fiscal year ending 30 June 1970 private and federal fund finances continued to be adversely affected by inflationary conditions and the need to maintain vital commitments within a framework of restricted income support.

Sources of financial support for our operating expenses in fiscal year 1970 as compared with fiscal year 1969 are as follows:

	FY 1970	FY 1969
Federal appropriations		
Salaries and Expenses—operating funds	$29,965,000	$26,443,000
Special Foreign Currency Program	2,316,000	2,316,000
District of Columbia—operations of the National Zoo	2,802,000	2,528,000
Research grants and contracts (federal and private)	10,600,000	11,400,000
Private funds		
Gifts (excluding gifts to endowment funds; entire amount restricted to specific projects and hence unavailable for general operating expenses)	2,000,000	1,987,000
Income from endowments and current fund investments	1,400,000	1,365,000
Total	$49,083,000	$46,039,000

In addition, federal appropriations to finance construction projects were received as follows:

	FY 1970	FY 1969
National Zoological Park	$ 600,000	$ 300,000
Restoration and renovation of buildings	525,000	400,000
Toward construction of the Joseph H. Hirshhorn Museum and Sculpture Garden	3,500,000	2,000,000
Total	$4,625,000	$2,700,000

Federal Operating Funds

As may be seen above, the federal appropriations provided by Congress for fiscal year 1970 totaled $29,965,000, including supplemental appropriations arising from federally legislated wage and salary increases during the year. This was 13 percent more than the $26,443,000 provided in fiscal year 1969. An 11 percent increase was received through the District of Columbia to provide for operations of the National Zoo. Support for the Smithsonian Foreign Currency Program, however, was continued at the same level as in the previous year, namely, $2,316,000; these funds are used to administer a program of grants to more than fifty museums and universities in the United States for the purpose of carrying on research in the related foreign currency countries.

The increase in the federal appropriation is indeed beneficial. It must be realized, however, that nearly two thirds of the increase granted is required to cover merely the two salary increases plus the

wage scale adjustment legislated by Congress in fiscal year 1970. Most of the remainder of the increase is required to cover the mounting cost of goods and services in this inflationary period. Yet on top of providing for these expanded costs the Smithsonian has been in the position during the past year of carrying out a number of important prior commitments including the transfer of the Radiation Biology Laboratory to new quarters; stepped-up preparations for the future opening of the Hirshhorn Museum and Sculpture Garden; funding of a portion of the requirements of the Archives of American Art which became a part of the Smithsonian this year; and support for the newly formed Center for Short-Lived Phenomena, a program which is attracting worldwide attention in the scientific community. Providing for these new requirements while at the same time trying to meet the legitimate demands for expansion of our long-established activities to absorb, for example, new national biological or mineralogical collections, to intensify research in the growing fields of ecology and oceanography, simply could not be carried out in a manner which would be satisfactory to all parties within the limitations of the funds available. Financial planning, furthermore, was made all the more difficult by the fact that the Congressional appropriations for fiscal year 1970 were not voted until more than three months after the beginning of the year. The result is that there is no question that many of our departments and projects are suffering shortages, particularly since the current year stringencies merely add to those which have been growing over the past several years.

Under these circumstances, the Institution has embarked on a thorough analysis of all federally supported activities with the aim of reducing or eliminating activities that are of a lower priority or have become marginal. This will do much to reallocate our resources so that high-priority programs can be supported more adequately. There should be a reflection of this study in our next year's disbursements and in our request for Congressional appropriations for fiscal year 1972.

Research, Grants, and Contracts

As shown above, grants and contracts awarded to the Smithsonian in fiscal year 1970 declined from those of the previous year. Primarily this reflected cutbacks by NASA, especially for the satellite-tracking program at our Smithsonian Astrophysical Observatory. The full extent of these cutbacks will not be realized until fiscal year 1971. They have, however, caused a drastic reduction in forces at the

Observatory. At the same time the tight money conditions affecting the government granting agencies have been further evidenced by delays in contract payments and advances. This in turn has forced the Smithsonian to increase its working capital investment in these contracts by over $1,000,000 in the past twelve months, severely reducing our cash balances.

Private Operating Funds

Financial statements for the private funds, as audited by independent public accountants, are shown in Appendix 9, page 212. While the squeeze on funds in the federal funds sector has been severe, it is in the private funds area that the most difficulty has been experienced during fiscal year 1970. Income from endowment funds and from current investments increased only slightly, yet costs were affected by the same inflationary influences, particularly the need to match for our privately funded employees the increase in salaries and wages given federally funded employees.

Income from the Institution's endowment funds and current investments is largely dedicated to restricted purposes. The Freer Gallery, for example, received nearly half of the total endowment fund income in fiscal year 1970, with other restricted funds taking an additional one-quarter. Thus, the total unrestricted private-fund income from endowments and current fund investments amounted to only about $340,000 for the year, and this must be largely used to buttress our shortages on the federal side, a most unfair strain on these resources.

Disbursements of private unrestricted funds exceeded this income by more than $1,000,000 in fiscal year 1970. The largest single factor in this result was the start-up expenses relating to our new *Smithsonian* magazine. It is expected that a good portion of these unusual start-up costs may be recovered from private donations from those interested in the Smithsonian's effort to widen greatly its educational efforts. For the future, furthermore, there are present indications that the new magazine and membership program will be able to pay their own way. The cost of subsidizing other private-fund activities, notably the Smithsonian Institution Press and the Division of Performing Arts, also rose substantially during the past year. Thus the combined costs of magazine start-up and subsidies to the various activities were well in excess of unrestricted private-fund income and produced the large loss of funds previously referred to. This loss in the operating account, together with the tying up of an additional $1,000,000 of unrestricted funds in the carrying out of grant and contract projects, acted to

reduce cash balances severely. The cash position was restored at year end by the influx of magazine subscription monies. Other cash drains, hopefully less severe than those of fiscal year 1970, may be experienced for temporary periods in the future.

As in the case of federal funds, strong efforts are now being made to prevent a recurrence of deficits in the private-fund sector. Expenses are being reduced where possible with the elimination of low-priority projects or the release of employees. At the same time, increasing management attention is being given to our revenue-producing activities such as the Museum Shops, the Press, and the Division of Performing Arts. At year end a restudy of our entire accounting system was being carried out to permit improved management reports and possibly less costly fiscal operations in the future.

Finally, the groundwork has been laid for a major fund-raising effort through the establishment in September 1969 of a Development Office, and the subsequent launching of our Smithsonian Associates national membership campaign. Through these efforts we plan to raise sufficient funds to complete our purchase program for the Chesapeake Bay Center and certain other immediate needs; over the next five- to ten-year period it is hoped that unrestricted endowment funds can be increased very substantially to restore a better balance between private-fund and federal-fund support. As Joseph Henry pointed out years ago, our private funds must be protected in order to accomplish our goals of research and instruction and *not* used, like plugs in a dyke, to underwrite gaps in our federal support.

A separate but major fund-raising activity is also being undertaken on behalf of the Cooper-Hewitt Museum of Design and Decorative Arts. Several million dollars will be required within the next few years to allow this museum to complete the renovation of the Carnegie Mansion in New York City to become the new home for the Cooper-Hewitt collections and art courses.

Gifts Received

The Smithsonian continued during the year to be most fortunate in attracting substantial donations for specific purposes related to its established fields of activity. The most outstanding have been two gifts totaling $6,000,000 to support an expanded program of underwater oceanography. The donors wish to remain anonymous, but we are pleased to express again here our deep appreciation.

In addition, gifts for current projects were received in the amount of $2,000,000. Our program for the purchase of additional land areas

at our Chesapeake Bay Center for Environmental Sciences has made excellent progress thanks to $575,000 of contributions from the Richard K. Mellon Foundation, the Scaife Foundation, Old Dominion Foundation, the Andrew W. Mellon Foundation, Laurel Foundation, and Prospect Hill Foundation. For these and for the host of other gifts by persons and organizations we are deeply grateful.

Endowment Funds

The addition of the $6,000,000 of oceanographic support funds, the bequest of $291,000 from the George F. Becker estate for the advancement of geophysics, and the transfer of about $30,000 in endowment funds of the Archives of American Art, raised the book value of our total endowment funds to $32,600,000 as of 30 June 1970. The market value of these funds, has, of course, been severely affected by the sharp decline in stock values during the past year; income from the funds, however, has continued to increase, albeit slowly; total value at year end was approximately $33,000,000.

The Smithsonian Institution gratefully acknowledges gifts and bequests received from the following:

$100,000 or more:

George F. Becker Estate
J. Seward Johnson
Richard King Mellon Foundation

$10,000 or more:

American Federation of Information Processing Society
Andreas Foundation
State of Arkansas
Asia Foundation
Charles and Rosanna Batchelor Memorial, Inc.
Battele-Memorial Institute
Morris and Gwendolyn Cafritz Foundation
Consolidated Fine Arts, Ltd.
Corporation for Public Broadcasting
William H. Crocker
Martin L. Ehrmann Company
L. A. Fleishman
The Ford Foundation
J. Paul Getty
The Daniel and Florence Guggenheim Foundation
George Gund Foundation
Interdisciplinary Communication Associates
International Business Machines Corporation
J.D.R. 3rd Fund, Inc.

James E. Jones, Jr.
Junior League of Washington
Chas. F. Kettering Foundation
Laurel Foundation
Edwin A. Link
H. Bradley Martin Charitable Foundation
Massachusetts Institute of Technology
Eugene and Agnes E. Meyer Foundation
National Geographic Society
National Home Library Foundation
The Marjorie Merriweather Post Foundation of D.C.
Prospect Hill Foundation
Hattie M. Strong Foundation
Tai Ping Foundation
Thomas J. Watson, Jr.
Wenner-Gren Foundation

$1,000 or more:

John Wyatt Gregg Allerton
American Sheep Council
American Society of Civil Engineers
Atlantic Richfield Company
Barra Foundation, Inc.
The William Benton Foundation
The Brook Foundation
David Bruce
Cincinnati Inquirer Foundation
Louise. Crane Foundation
Mrs. Priscella Cunningham
Bruce Dowling
Educational Service Programs, Inc.
General Electric Foundation
General Foods Corporation
The Grant Foundation, Inc.
Mary Livingston Grigg and
Mary Griggs Burke Foundation
Grossman Publications, Inc.
Winston Guest
William & Elsie Knight Foundation
Irene Lewisohn
Eli Lilly
Charles A. Lindbergh
Harold Linder
Link Foundation
Marriott Foundation
Ingraham Merrill Foundation
Morton D. May, Jr.
Mobil Oil Company
Mrs. Irene Morden
Galerie-Verein Munchen
National Area Council, Inc.
The New World Foundation
Mrs. John Newington
Nilon Brothers
Occidental International Corporation
Oklahoma Society
Oliver Foundation
Olympia Airways
Ozark Regional Commission
Reader's Digest Foundation
Mrs. Augustus Riggs IV
Sidney Printing & Publishing Company
C.R. Smith
Southeast Asia Advisory Group
E.R. Squibb & Sons, Inc.
Standard Oil Co.
Taiwan Government
Tecumseh Products Company
University of Michigan
United States Steel Foundation, Inc.
Ellen Bayard Weedon Foundation
William C. Whitney Foundation
Wilkie Brothers Foundation
Thomas Williams

$500 or more:

American Philosophical Society
Mrs. Cicely D' A. Angleton
Arrow, Inc.
Clay P. Bedford
Bell & Howell Foundation
Jacob Blaumstein
Chrysler Art Museum
E.H. Walker
Earth Science Imports
International Association for Geodsey
Donald Karshan
Dorothy V. Lee
Motion Picture Association
Olin Corporation Trust
Ralph Rinzler
David Rockefeller
Mr. and Mrs. Richard Rogers
Ann Sayen
Roger Stevens
Mrs. Kamiyo Tamesa
Yonderbrook Foundation

We also gratefully acknowledge other contributions in the amount of $14,616.24 received from 302 persons during 1970.

SCIENCE

IF THERE IS A COMMON BOND OF INTEREST among all the activities of the Smithsonian Institution—Science, History, Art, the Humanities —it is a common concern with development, the development of human behavior (as shown in man's response to his physical and sociological environment, and historically, as shown by his artifacts and productivity) and the development of nonhuman organisms and their relationship to their environment, both terrestrial and cosmic. The history and development of natural phenomena and the characterization of natural events as an indirect influence on these developments fills out our sphere of interest in a way that is most likely to provide us with an understanding of man and his universe.

Within the scientific portion of this sphere, the activities of the Smithsonian Institution are focused primarily on what may properly be called natural history. This term, once pejorative, encompasses a breadth of interest now recognized as necessary to an understanding of our total environment. We are attempting to elucidate the interrelationships between whole organisms, communities, and populations with the physical, chemical, and geological factors which play a role in the total ecology of the earth, now and in past ages. We are concerned also with the impact on these relationships of extraterrestrial phenomena. Ionizing and non-ionizing radiation and solar effects are perhaps the most easily recognized. Astrophysical investigations which in their purest form consist of theoretical physics and mathematics are carried out in attempts to explain the mechanics of the universe. The contribution to our knowledge from these investigations, moreover, helps us to understand the geophysical events on earth that in turn improve our understanding of their effects on living systems over time and space. We hope that by moving on a broad intellectual front we can take advantage of all new techniques and information gained through a naturally related group of disciplines. The Smithsonian Institution is fortunate and perhaps unique in having this range of competence and in being sufficiently free of specifically assigned "missions" that we can permit ourselves this broad goal.

National Museum of Natural History

Research projects continued or concluded; plans were evolved and carried out; expeditions departed and returned; collections were loaned and received again; but it was not a year of "business as usual." These and countless other activities were accomplished against a background fabric of increasing tension, woven of uncertainties. If ivory towers existed here earlier, they have long since crumbled, spilling their occupants into the midst of the concerns that involve us all. During the year a number of the staff participated in radio programs and television presentations designed to increase awareness of the great national issues and to provide a free, open forum for discussion of them by the citizenry.

Decreasing resources in the past few years for carrying forward research-curation-education programs in the Museum became a major preoccupation in the latter half of the year. Reductions in "buying power," caused by near-level funding, inflation, and general pay raises, have been met in recent years by progressive reorganization in many of the Museum departments (resulting in greater efficiency of operations), but also by unfortunate postponements of expenditures. Unless relief is provided, the present slowing of progress in the increase and diffusion of knowledge of the natural world and in the care of the national collections will be further evidenced in the years ahead.

In spite of such difficulties, it was a year characterized by a large volume of research publications, some of which received national attention by special awards, and the continued evolution of interdisciplinary, interdepartmental investigations that reflect the deepening relevancy of the natural sciences to today's troubled world. Although it was a productive period, only the most significant accomplishments can be recorded in the following pages.

Only a portion of the funds ordinarily allotted to the Office of Systematics was actually available, but partial support was provided, among other things, for initiating two experimental behavior projects, for assisting with the further development of electronic data-processing applications in the Museum, and to stage the annual Summer Institute in Systematics. This year's Institute brought together botanical and zoological systematists to discuss the full panoply of systematic biology, with joint sponsorship of the American Society of Plant Taxonomists and the Society of Systematic Zoology.

RESEARCH

Within days after the beginning of the new fiscal year, millions of television viewers saw the first footprint in the surface dust of the moon. In the Department of Mineral Sciences, after many years of research on randomly acquired extraterrestrial rocks—meteorites—the sight of the astronauts bagging the first lunar rocks had a significance even beyond that for most viewers. Now, the preceding man-years of thought, training, and experimentation were to be put to the ultimate challenge of elucidating the history and evolution of the moon from these samples.

Preparations to meet this challenge have been steadily accelerated in recent years by the addition of staff and equipment, and by the intensive investigation of possible meteoritic and terrestrial analogs of lunar materials. Techniques for sampling and sectioning such rare and unique specimens have been carefully developed in this department. Indeed, the first member of our team to actually handle the Apollo 11 collections was chief preparator Grover C. Moreland, who was called upon by the National Aeronautics and Space Administration to oversee the sectioning laboratory at the Lunar Receiving Laboratory, and who made some of the first sections after the rocks were released from quarantine. Samples of Apollo 11 materials were received at the Museum in mid-September, and since then virtually everyone in the department has been actively involved in this integrated research effort. Samples from the Apollo 12 mission began arriving in April and are still being received. Thanks to the breadth of our scientific capability, we have been able to plan and execute a truly comprehensive investigation of the lunar materials—their chemical and mineralogical composition, and the interpretation of these data—to provide a tentative account of their petrologic history and evolution.

Although the samples we received were small (totaling less than an ounce), we were able to extract from them a remarkable variety of rock and mineral fragments. Among these was a unique object, a small metallic spheroid four millimeters in diameter. It evidently formed as a droplet of nickel-iron from a metallic meteorite which crashed on the moon. The surface of this spheroid is spotted with small craters, the product of impacts of lunar particles traveling at supersonic velocities. In its shape and surface features it mimics the moon itself, so we have called it our "mini-moon." A photograph of this object was chosen for the front cover of the issue of *Science* (30 January 1970) devoted to the initial reports on the Apollo 11 investigations.

On 27 April, Dr. Edward P. Henderson, who led the departmental

team's study of the "mini-moon," received the National Academy of Sciences' Lawrence Smith Medal for nearly forty years of distinguished contributions to meteorite research.

The study of the microscopic anatomy of bone has the potential of providing valuable metabolic data on human skeletal populations, and has led to new areas of research, such as the ecological influences on bone metabolism in two or more populations. There are two fundamental facts that allow bone biology to be used in studies of life processes: (1) Although the primary function of bone is structural, it is also importantly involved in metabolic processes by providing a source of calcium and phosphate; and (2) living bone responds to both structural and physiological stresses by a continuous process of remodeling. Because bone microstructure follows a developmental sequence during the entire life of an individual, it can provide a most useful means for studying aging and disease. Recent studies of polished

A nickel-iron spheroid, 4 mm in diameter, from the Apollo 11 material, which epitomizes much of lunar history. A meteorite crashed into the moon, being melted by the impact and producing a rain of liquid droplets, of which this is one. It has been abraded by lunar dust and struck by high-velocity lunar particles, producing the remarkable craters on its surface.

thin sections of tibia bones of normal, diseased, and alcoholic individuals demonstrated statistically significant differences between the normal and abnormal bone.

Comparative studies of fossil organisms and their modern counterparts continue to be a fruitful approach to understanding paleo-ecology, functional morphology, and ultimately the evolutionary relationships upon which a valid classification can be erected. Among numerous staff contributions to our knowledge of the evolution of fossil Recent groups, an especially important one was concerned with the radiation of Cenozoic planktonic Foraminifera. Through analysis of morphotypic groups, rather than through the traditional taxa, it was shown that the planktonic Foraminifera underwent two major radiations during the Cenozoic. The first began in the Paleocene, was completed by Eocene, and ended with extinction of all groups except the globigerines by Oligocene. The second radiation began in the Miocene and the groups evolved are still extant. Distribution patterns of the radiation were repetitive; in both cases similar complex morphotypic groups appeared while the simpler globigerine group persisted throughout the Cenozoic. By analogy with studies of planktonic Foraminifera in modern oceans over a period of years, it was concluded that the repetitive patterns are probably due to major changes in the structure of water masses during the Cenozoic.

Investigations of living invertebrate animals involved principally aquatic organisms, both marine and freshwater groups. The completion of a monograph on the entocytherid ostracods of Mexico and Cuba is noteworthy because the entocytherids occur in association with crayfishes, and an understanding of their distribution patterns, as well as those of their crayfish hosts, and of the ecological interrelationships of both groups are required for an understanding of the orgin and evolution of these common freshwater animals.

The littorinid snails, common inhabitants of the intertidal zone, were the subject of another monograph completed during the year; part one included the subfamily Littorininae in the Indo-Pacific region. Basic information on this widely distributed group had been scattered in the literature and was not generally available to the nonspecialist. The author combined a literature survey, studies of old collections, and extensive field work to produce a work that will be the standard reference for malacologists and ecologists interested in the organisms of the intertidal zone.

A museum is not only a place in which scientists study preserved specimens, but also where it is entirely possible to conduct valuable research on living plants and animals. Although the facilities required are still very limited, behavioral studies are underway on two major

groups of vertebrate animals. Earlier systematic investigations of many fish groups were based exclusively on morphological and, to a lesser extent, on anatomical data. Aquaria are now in operation in the Museum for studying the behavior of some of the smaller fishes with the hope that it may provide additional systematic characteristics to differentiate species.

Similar observations are being made on locomotion in frogs, based on anatomical and skeletal materials and on controlled experiments with living amphibians. Jumping and climbing adaptations are receiving particular attention by the use of motion-picture analysis, on the assumption that different species will have not only structural differences but behavioral ones as well.

Botanical research spanned highly diverse projects, from floristics to cytology, monographs to evolutionary anatomy. Geographically, there is still a preponderance of concern for the plants of the tropics; contributions were completed or greatly advanced for floras of Venezuela, Costa Rica and Panama, Ceylon, Mexico, Santa Catarina (Brazil), Dominica, and the islands of the Pacific.

The temperate latitudes were not neglected, for the Flora North America Project, midway in its planning phase, will bring a new era to floristic research and practice. Although the program is administratively centered at the Smithsonian, North American botanists generally are cooperating in a massive long-term effort, aimed at bringing together existing knowledge of the flowering plants of this continent in an encyclopedic, computerized data bank. The existence of such a data base has obvious, direct application to current and future ecologic research for environmental enhancement, but it could also provide printouts of floras of the whole continent or any part of it in the future. The National Science Foundation granted funds to the American Institute of Biological Sciences for support of the project development, particularly the employment of a highly qualified systems development manager.

The usefulness of plant anatomy for defining evolutionary pathways is unquestionable, but an especially valuable example was published during the year. Because there is scanty fossil evidence for one or the other view of the origin and evolution of flower form and structure, much of the thinking has been speculative and at times highly controversial. The origin of the inferior ovary, for example, has been assumed by most botanists to have occurred evolutionarily from the superior ovary by adnation of surrounding flower parts. A recent anatomical study of the floral anatomy of one of the Ginseng family showed, among other things, that the ovary in this group of plants has

undergone an evolutionary reversal from the inferior to the superior position, a reversal never previously reported in any plant family.

In spite of considerable loss of time for moving back into the Museum, the Department of Entomology and associated Department of Agriculture entomologists are again housed with the rest of the natural sciences, and research continued at a high level. The sixth and seventh volumes of a long-term study of Edward Meyrick's types at the British Museum were published this year. Meyrick was a very prolific describer of new species and genera of microlepidoptera; but because he failed to provide either adequate descriptions or illustrations, it has been almost impossible to place his taxa in modern systems of classification. This multivolume work is an invaluable asset to systematic entomologists, including as it does original references, redescriptions, and photographs of the wings and genitalia.

In addition to numerous individual research efforts, a departmental project on the biosystematics of Ceylonese insects was initiated with a grant of excess-currency funds and the approval of the cosponsoring National Museums of Ceylon and other government agencies. The first field party carried out life history studies, obtained behavioral and ecological data, and returned after three months with 150,000 specimens. The Ceylon project affords the opportunity to broaden the similar studies that have been carried out in the New World tropics in past years. The Ceylonese will benefit by receiving ecological and life history information, and identified specimens that will have great potential significance for improvements in agriculture and public health.

COLLECTIONS

Specimens, samples of the natural world, are biological standards, the documentation for what we know about the kinds of organisms now and in the geologic past, their geographic distribution, their variability, and their evolutionary history. Together with the literature of more than two hundred years, collections are the basic tool without which systematic biology may not proceed soundly.

There is a growing awareness now that these standards are also critical for any ecological research aimed at improving environmental quality. Collections and their associated data permit serious consideration of restoring quality because they provide the most authoritative information on *what* grew *where* and *when* and under *what* conditions. And so the national collections of natural history objects continue, as they must, to increase, but under restraints that assure the most sig-

nificant additions. For example, one need only review the large growth-areas—mammals and insects. As a part of a much larger program, 7,500 small mammals were collected by a staff team in Morocco along with data on habitat preferences, reproductive biology, food habits, and their ectoparasites. Nearly 100,000 collections of water beetles were made by one staff researcher during the year in support of his project to understand the biology of these pollution-indicator organisms. Collections are rarely purchased, and then they must meet very exacting criteria. The largest museum collection is not perforce the best, and even with adequate space and technical assistance, neither of which is more than minimal, a high degree of organizational skill and judgment is required to meet problems of caring for such large numbers of collections.

The concept of a centralized specimen-processing laboratory, first implemented by the anthropologists, has now been adopted in other departments as resources and attitudes permit. In March the Herbarium Services Unit was established by the botanists with one of their number serving as the first supervisor for all the technical assistants. The entomologists have concentrated support services in an Entomology Preparation Laboratory that carries on many of the curatorial activities of the department.

While these efforts are still evolving, it is possible to be helpful to other collections centers in such matters. In fact, one of the outstanding events of the year was a cooperative training program involving George Metcalf, supervisor of the Anthropology Processing Laboratory. Metcalf, who was later awarded an honorary doctorate degree by Luther College, spent two weeks in the new Archeological Museum at the college setting up a cataloging and accessioning system with a group of enthusiastic students who now are able to organize the museum's collections.

The twin problems of collections space and curatorial assistance to manage them must be solved if the national collections are to continue to be useful biological standards in the future. Over the years methods for organizing data about and from collections have been developed, but the data are collected by hand and then made available in such forms as cards, catalogs, and check lists. Retrieval of data in such form is slow, inflexible, and inadequate for the kinds of research being organized and initiated.

Given the wide availability of computers and their ability to store and retrieve endless quantities of information, it is the responsibility of collections managers to study the potential of this tool and chart cooperative programs for putting it to the service of museums and science generally. Initial consideration must be given to the kinds and quanti-

ties of information the collections contain and the ways in which computers can handle it. Then, agreement must be reached on a level of effort at which to attack the volume and complexity of the potential data base. Every precaution must be taken to assure that the data organized at this stage are automatically transferrable to the next level of attack where more complete information may be added later.

A three-year pilot project to initiate and test flexible, open-ended storage and retrieval programs was concluded at the end of the year. The results were sufficiently successful to encourage at least the larger systematic museums to begin very deliberate cooperative planning. For highly practical reasons, the first efforts in the Museum have been and for a time will continue to be at the level of incoming collections. That is, data from new materials will be captured and stored in the system. Retrospective capture of data from older collections will initially be largely limited to type specimens, except as special needs arise for which fiscal support is available.

The next step for museums is to agree among themselves on (1) what curatorial data will be input to our common data base, (2) the format for recording these data elements, (3) the terminology to describe geography, geological periods, scientific names, etc., and (4) the means by which all scientists can gain free access to the data in the common base. The National Museum of Natural History is working closely with the other important systematic collections centers in the evolution of long-term, feasible plans for meeting present and future data-transfer problems.

Within the Museum several units are already in the source data-capturing stage with respect to newly received materials—marine invertebrates, oceanic rocks, mammals, and sea birds. A project on the botanical type collections is underway in the National Herbarium in cooperation with four other major plant-collection centers. As an example of the prospects for data-processing techniques to improve curatorial management, the new procedures in handling paleontological specimens involve the recording of data by machines on standard catalog sheets at the initial processing of the incoming specimens. Machine operation then automatically processes the data to provide labels of two sizes, other records as needed, and then stores the data on tape for later transfer to the data banks. The program increases the capabilities of the supportive staff and will lessen enormous backlogs of unprocessed specimens.

These are starts toward the long-range goal of making the collections more significant to today's issues. If the national collections are truly biological standards, we who are the keepers must be prepared to discard traditional practices when they no longer adequately meet

needs. If the standards fail to provide the information needed to solve problems, they will cease to have importance to anyone but ourselves.

EXHIBITS

Museums generally are hesitating at an exhibits crossroads; dissatisfaction with what exists is widespread at all levels; but the course of other, better routes remains undefined except in general terms. With exhibits funds already deficient, experimentaion cannot be afforded. Consequently, very little was accomplished with respect to long-term exhibit halls, but several temporary exhibitions of timely subjects were presented—a photographic story of volcanoes, installation in the Life in the Sea Hall of an aquarium containing two Crown-of-Thorns starfish, and a small exhibit of some of the natural history of Malaya in celebration of Alfred Wallace's studies in that region.

One of the more exciting events during the year was the placing on exhibit of an incredibly large Indian tiger. This splendid gift of David J. Hasinger of Philadelphia was beautifully mounted and prepared for exhibition by noted taxidermist-artist Louis Jonas. The display depicts the great cat in mid-air pursuit of a small Axis deer, and the accompanying labels stress the endangered-species status of the tiger.

In midyear an Air Force plane arrived in Washington with a block of earth eight feet long, weighing about two tons. Encased within that block are the remains of an ancient man recovered from a cave in northern Spain last year. Handling such a block posed great problems for the local Spanish museum, so the Smithsonian offered to apply the proper conservation techniques as a contribution to international science, in return for the privilege of exhibiting it for the first time. Study and preparation are underway to put this ancient burial on exhibit in the new year.

SCIENTIFIC SERVICES

There are at least two general ways by which scientific assistance can be provided to the public and to other scientists. Formerly, there was great emphasis given to the direct route, which consisted of the staff occupying major parts of its time to provide identifications of anything from everywhere, literally by the thousands each year. Now there is a deliberate effort made to answer such needs on a priority basis, depending largely on the use to which the information will be put, and most of the scientists' time goes into research that is designed

to provide more and better answers to larger and more significant questions of society.

During the past few years a population explosion of the poisonous starfish *Acanthaster planci,* which feeds on living coral, has occurred in the Pacific. These infestations were first noticed on the Great Barrier Reef of Australia and have now been found at Guam as well as other islands within the United States Trust Territory. Many square miles of coral reefs are known to have been destroyed by this starfish. Coral reefs not only form a living protective barrier for these islands but also provide the foundation of the marine ecology that supports the reef fish, the main source of protein for the residents of the islands. This protection and food supply are now being threatened. Staff scientists participated in surveys to determine the extent of the infestation in the Territory islands in order to obtain information needed to plan for research into the causes of the population increase, its short- and long-term effects on coral reefs, and to develop control measures.

The results of scientific research are not always readily useable by nonspecialists or the layman, so semipopular/semitechnical field identification manuals are published. The *Catalogue of Neotropical Squamata* is a good example of such service publications. Simple keys, descriptions, synonymies, and geographic distribution in both English and Spanish enable anyone interested in reptiles of the neotropics to

Thomas Phelan injecting the coral-eating Crown-of-Thorns *(Acanthaster planci)* with formalin at Eniwetok Atoll.

recognize species encountered in field studies and achieve some understanding of their biology.

Similarly, interest on the part of public and military health authorities in South Asia has resulted in illustrated identification manuals to the mammals and to the snakes of Vietnam. Published by the Smithsonian Institution Press with assistance from the Department of Navy, both volumes are intended for the serious student rather than the layman.

Scientists from several departments also collaborated in the preparation of material for a deck of cards on which is printed survival information for personnel in Southeast Asia. One surface of each card depicts in color a dangerous or useful species of animal, and the other side gives specific points for recognition, hints for eating, if edible, etc. The cards were produced under a contract with the Department of Navy as a service.

National Air and Space Museum

The year 1969 witnessed the retirement of two valued and important officials of the Museum: Director S. Paul Johnston, and Assistant Director and Senior Historian Paul Edward Garber.

Mr. Johnston retired 31 August 1969 after serving five years as Director. His skill at planning and organization was applied successfully to planning the new building to house the National Air and Space Museum on the Mall in Washington. Several important legislative steps toward the construction of the new building were accomplished during his five years of service, culminating in Congressional action authorizing the construction. Mr. Johnston organized and directed well-conceived programs for preservation of the collection and their management for research and study. The program for the selection, acquisition, and circulation of significant space craft and materiel, which will have far-reaching consequences for the Museum, was instituted under Mr. Johnston's direction. He was a dedicated advocate of a high priority for the rapid development of the new building and the programs of the Museum.

Mr. Garber retired 28 February 1969, after forty-nine years of service at the Smithsonian Institution dedicated to the aircraft collection and the National Air and Space Museum. He is widely known and respected for his lectures and his deep knowledge of the history of

aircraft and flight, as well as for his success in making this history meaningful in scholarship at all levels of education. The Museum's collection of aircraft, the most comprehensive in the world, is a monument to his accomplishment. As a collector without equal he performed prodigious feats of enlisting the volunteer support of the Armed Services and many other public and private agencies in providing facilities and services for the collection when the resources of the Smithsonian could not keep up with his success. Mr. Garber continues his service to the Museum as a Ramsey research associate and trustee of the Admiral and Mrs. DeWitt Clinton Ramsey Fund.

Following the policy of the past several years, the major effort of the Preservation and Restoration Division was devoted to the maintenance of the collections. The great increase in the astronautics collections, however, and the demand to exhibit these artifacts throughout the world, made it necessary to devote considerable time to restoration.

The time devoted to the various types of work performed was divided as follows: collection maintenance 50 percent, restoration 39 percent, exhibits in the Museum 8 percent, and miscellaneous services 3 percent.

Approximately 3500 new specimens were received, 85 percent of which concerned astronautics, and 15 percent aeronautics. A total of 775 specimens were processed through inventory, identification, cataloging, and warehousing.

Among the highlights of the year was the initiation of a trial series of student seminars at the Preservation and Restoration Division with the cooperation of the Department of Academic Programs. About 90 secondary-level students from three representative schools took part in this program, which visually illustrated the evolution of propulsion systems, aircraft, rockets, and space-craft by using the actual hardware from the study collections set up and arranged for close examination and discussion. There are now approximately 75 major specimens from the study collection available for curatorial study, educational programs, and the use of visiting researchers.

The Aeronautics Department was active in experimental education projects utilizing the collection, in collaboration with the Smithsonian Associates ("Introduction to Flight") and the University of Maryland. The year's major acquisition was the Hawker Hurricane from the Royal Air Force, in commemoration of the Battle of Britain Day, 15 September 1969.

Mr. Paul Edward Garber's retirement further reduced the professional staff. The activities of the remaining two professionals are

Restoration shops of the National Air and Space Museum, preservation and restoration facility. Specimens shown are part of the study collection and are assembled for restoration and study programs.

limited to servicing day-to-day correspondence and short-range projects. One of the major projects during the year was the preparation, shipment, and installation of the Lockheed Sirius aircraft in a special exhibit building at Osaka, Japan, for Expo '70. The aircraft is the one in which Charles and Ann Morrow Lindbergh surveyed the Arctic air route to the Orient.

The department has continued its program of loaning specimens under controlled conditions beneficial to both the Museum and the loanee. An interesting exchange brought a Packard B-12 engine into the collection in exchange for 1300 photos of Plains Indians (obtained through the cooperation of the National Museum of Natural History).

The Department of Astronautics has two major responsibilities: (1) determining and authenticating the history of rockets and spaceflight, and (2) acquiring, restoring, and exhibiting specimens.

The Museum's research material in astronautics is probably the largest available in the United States, and now includes the unique reference files for the Congreve and Hale rockets plus life-saving and whaling rockets. Historical photographs have been received and cata-

Lockheed Sirius flown by Colonel Charles A. and Anne Morrow Lindbergh on their historic "North to the Orient" air-route survey in 1931. Shown in "Wings Across the Pacific" Building in the American Park, Expo '70, Osaka, Japan.

loged along with the acquisition of a sound-tape collection, from which the "To The Moon" (Time Life Records) set of records was drawn. Containing tapes of all manned flights through Apollo 11, this collection of more than 1500 reels is one of the largest and most complete in the world.

Through the NASA-Smithsonian agreement most of the Mercury and Gemini and four of the Apollo spacecraft have come to the Museum, along with some fifteen spacesuits, rocket motors, engineering mockups, and hundreds of component parts. Loans were made during the past year to the U. S. Information Agency, Department of Commerce, and Department of Labor for overseas exhibits. Expo '70 at Osaka, among others, displayed the Apollo 8 command module, Gemini 12 spacecraft, Lunar Orbitor, spacesuits, and a Goddard rocket. An exhibit now touring in Europe includes the Apollo 10 command module, Gemini 10, Aldrin's lunar visor, lunar glove, Collin's coveralls, Schirra's and Ander's Apollo spacesuits, all from the Museum's collections. More than thirty tons of space artifacts were received this year, much of which forms part of the "study and reference collection."

During the Apollo 11 flight in July, both major networks used the Arts and Industries Building for interviews and historical background, for which purposes the building was permitted to remain open over-

Apollo 11 astronauts, left to right, Edwin E. Aldrin, Jr., Michael Collins, and Neil Armstrong, at presentation of Lunar sample to the Smithsonian Institution, 16 September 1969.

night. In September NASA Administrator Thomas Paine and the Apollo 11 astronauts presented the 1.1-pound specimen of lunar rock to the Museum. Consequently, attendance tripled in the next months and exceeded two million by the end of the fiscal year.

The Department of Astronautics received hundreds of letters requesting information concerning its specimens. Courses on the history of astronautics and the national space program were taught by the staff to youngsters of Smithsonian associates members. Frank H. Winter was awarded the Robert Goddard Historical Essay award for his paper on William Hale.

In the vicinity of Washington, D.C., there exist the largest holdings of air and space documentation in the world. The primary responsibility of the Information and Education Department is to support the

curatorial staff with the documentation needed to select, authenticate, and restore the artifacts needed to portray the evolutionary development of air and space technology. To supplement the NASM Historical Research Center's extensive holdings, major documentation collections in the field of air and space technology are available from many other government and educational agencies.

The second major responsibility of the Information and Education Department is serving the interested public, which encompasses the model builder, author, technologist, and other museums. The following figures show a comparison of this year's activities with last year's:

	FY 1970	FY 1969
Requests answered	4000	5400
Visitors	1300	2100
Donations (which include a large collection from Curtiss Wright Corporation of photographs)	62	61
Photo orders processed	637	467
New library titles received	132	69
Total volumes received	194	119

Over 10,000 items of correspondence were received during FY 1970.

Smithsonian Astrophysical Observatory

To meet the new scientific concerns of the 1970s, research at the Smithsonian Astrophysical Observatory (SAO) has been organized into three major program areas—the Earth as a Planet, the Solar System, and Energetic Phenomena in the Universe. These areas reflect not only the overall goals of the Observatory's investigations but also the interrelationships of many once-separate fields that now are seen as concerned with the "total environment of man." Within these general areas, however, some sixty investigators still pursue a broad range of individual projects, thus ensuring that the Observatory will maintain the optimum balance between diversity and concentration.

Studies of the earth as a planet extend from the outer reaches of its atmosphere and magnetosphere to its inner regions, with emphasis on the structure, composition, and gravity field of the earth and on the composition and physical processes of the atmosphere.

During the past year, the Observatory published one major international reference. *The 1969 Smithsonian Standard Earth (II),* and contributed significantly to another, *The International Reference Atmosphere.*

The first refines the representation of the earth's size, shape, and gravitational field issued by SAO in 1966 and since widely used as a model. The new Standard Earth shows that our planet has an intricate pattern of "highs and lows" in the earth's mean sea level relative to the spheroid; these are more widespread than the recognizable topographical features usually associated with continental masses and ocean beds. The existence of these anomalies has been revealed by computer analysis of certain perturbations in the orbits of artificial satellites. The refinement was made possible by data from the new laser tracking systems at several SAO stations and from deep-space probes, as well as by photographic and other data.

Much of what is known about the earth's atmosphere above 200 kilometers is based on Smithsonian analysis of satellite orbital data gathered over the past decade. Observatory scientists have shown that density variations in the atmosphere respond to a number of separate, but related, geophysical and solar factors. For example, Observatory scientists have found a correlation between satellite drag and solar activity. The latter heats the earth's upper atmosphere, thus increasing its density and resistance to the satellite motion.

Observatory scientists also have discovered that diurnal heating of the upper atmosphere, and its resultant change in atmospheric density, lag about three hours behind the sun. Moreover, the heated bulge in the atmosphere is shaped somewhat like an elongated eye, with the broadest part at the equator and the tapered ends nearer the poles. Most recently, they found that the solar wind—high-energy particles ejected by the sun—also contributes to atmospheric heating.

SAO investigations of the solar system include theoretical, laboratory, and observational programs concerned with the moon and planets, the sun, meteors and comets, and meteorites and cosmic dust.

On 9 January 1970, near the hamlet of Lost City, Oklahoma, the field manager of the Smithsonian Astrophysical Observatory's Prairie Network recovered a 22-pound fragment of a meteorite that had been photographed by the Network as the meteor fell to earth just six nights earlier. Within the next four months, three more fragments were discovered in the same area. This was only the second time in history—and the first time, intentionally—that meteoritical material photographed entering the earth's atmosphere had been recovered from the ground.

The rapid recovery of the Lost City meteorite allowed immediate analysis of its very short-lived radioisotopes created by cosmic-ray bombardment. Moreover, the photographic record of the meteor fall provides information on the meteorite's origin (from the asteroid belt beyond the orbit of Mars) and its loss of mass in flight. This informa-

tion is particularly valuable because the meteorite proved to be a bronzite chondrite, a type that probably accounts for some 35 percent of all falls. Thus, Lost City can provide a standard reference for meteoriticists around the world. Moreover, the photographic data can be used to calibrate information gathered on thousands of bright meteors photographed by both the Prairie Network and other organizations.

Because of the Observatory's experience in the analysis of recovered meteoritical material, three separate research groups were selected as principal investigators of lunar material returned by the Apollo astronauts.

One research group has been engaged in the mineralogical and petrological studies of lunar sample particles through X-ray diffraction and electron-microprobe techniques. These researchers have found an unexpected amount of gabbroic anorthosite in Apollo 11 samples. These anorthosite materials match the chemical composition of materials from the lunar highlands, thus suggesting that the anorthosites may be mountain fragments tossed onto Mare Tranquillitatis (the Apollo 11 landing site) by cratering impacts.

Another group has been conducting analyses of Apollo 11 and 12 samples to measure precisely the amounts of argon 37 and tritium, radioactive isotopes created by cosmic-ray bombardment. This research not only reveals information concerning radiation levels on the moon but also provides indications of the exposure age of the samples themselves. In a parallel effort, a third group is conducting isotopic analyses of lunar samples with a laser to free the radioactive gases for mass-spectrometer study.

Studies of energetic phenomena are concerned with the nature of newly discovered and largely unexplained sources of radiation far outside the solar system, as well as with the physical processes in stellar objects that hold clues to the creation and evolution of the universe.

Proceedings of the April 1969 meeting on stellar atmospheres held jointly by SAO and the Harvard College Observatory have now been published as *Theory and Observation of Normal Stellar Atmospheres* (MIT Press: 1970). This standard reference work will provide a baseline for much stellar-physics research for the next five years. Specifically, the book gives spectral and other data for a reference set of 68 stellar atmospheres in an effective temperature range from 4000° to 50,000°. This grid of model atmospheres was computed entirely at the Observatory.

A companion volume to the comprehensive *SAO Star Catalog* issued in 1966 has now been published by MIT Press. *The Smithsonian*

Star Atlas, a boxed collection of 152 individual sky charts, is a boon to professional and amateur astronomers alike. The same quarter of a million stars listed in the catalog are graphically depicted, with special designations of double stars and variable stars, as well as nonstellar objects such as galaxies, globular clusters, and planetary nebulas.

Observing the universe at radio wavelengths with an 85-foot antenna, SAO astronomers are searching for signals from chemical compounds not heretofore known to exist in space. Radiation of this type is thought to come from the extended cloud of rarefied gases between the stars. Concurrent laboratory studies are identifying other compounds possibly present in space and measuring their characteristic wavelengths, thus providing a basis for intensive searches with radio telescopes.

A laboratory experiment performed jointly by personnel of the National Bureau of Standards and of the Smithsonian Astrophysical Observatory now indicates that laser emission by water vapor may be involved in the process that converts the energy of infrared stars into the microwave line radiation observed from water and hydroxyl molecules in space. The experiment shows that a far-infrared spectral line emitted by a water-vapor laser has nearly the same frequency as an infrared absorption line of the hydroxyl molecule. By tuning the hydroxyl absorption line with a variable magnetic field, the experimenters determined the exact frequency difference and deduced that an optical pumping of the hydroxyl vapor could occur, at low pressures, when the two lines were brought into coincidence. In space, this fine tuning might be achieved by Doppler shifts.

Smithsonian scientists are now analyzing the data produced by the Celescope experiment onboard NASA's second Orbiting Astronomical Observatory. More than 8500 photographs of over 2800 areas of the sky were made during the experiment's lifetime. The photographs provide brightness data for more than 25,000 stars in each of three ultraviolet regions and for a limited number of stars in a fainter region, as well as new information about the moon and comets and about hydrogen near the earth.

The search for sources of ultra-high-energy gamma rays by the Observatory is being conducted with a 34-foot optical reflector at Mt. Hopkins and with balloon-borne detectors launched from Texas and India. The observations at Mt. Hopkins represent the most sensitive searches ever conducted. While no discrete sources have yet been conclusively identified, the Mt. Hopkins project has established new standards for determining "background noise," disproved several spurious sources, helped revise several theories, and produced valuable new information on the magnetic field of the Crab Nebula and that of the

radio galaxy Virgo A. Ultimately, gamma-ray astronomy may provide the key to our understanding of many phenomena, including magnetic fields, the density of matter, and high-energy particles in intergalactic space and radio sources.

Astronomy seems poised ready to achieve a fuller understanding of the universe in the 1970s. The mysteries of pulsars, quasars, gamma rays, antimatter, and other possible keys to the evolution of the universe are now nearer than ever to being solved. Naturally, success depends significantly on new instrumentation. Therefore, the Observatory has embarked on a long-range program to develop the advanced tools needed for the future. This year, for example, the Observatory installed at Mt. Hopkins a new 60-inch reflecting telescope for studies of stellar and planetary atmospheres. Also, production began on a series of advanced laser-ranging systems for both geophysical and lunar sciences.

Looking to the future, the Observatory continued its design studies to determine the feasibility of constructing a very large, but inexpensive and lightweight, optical telescope using many small primary mirrors rather than a single large one. Also, development began on an improved hydrogen-maser system, the most precise timing device known, which could vastly improve the accuracy of many astronomical measurements. Finally, the Observatory continued to work on advanced design concepts that might greatly reduce the cost of constructing the world's largest, fully steerable radio telescope.

This foresighted approach to the development of new instrumentation should allow the Observatory to meet the critical research requirements of this next decade.

Smithsonian Tropical Research Institute

Competition for scarce resources and life space is an increasingly urgent problem of human society. It has always been a problem for the organisms of the tropics, where the greatest diversity of life-forms on earth produces intense competition among species. Understanding the outcome of this interaction—in effect, the reasons for evolutionary success or failure—is one of the principal objectives of the Smithsonian Tropical Research Institute (STRI).

In this connection, we are also seeking to determine how and why tropical floras and faunas differ from those of the rest of the world.

Diversities are greater in the tropics, ecological and behavioral relations among species are more complex than elsewhere, and new and major types of adaptation to new ways of life are more likely to be evolved by tropical species than those of other regions. The scientists of the STRI staff, research associates, fellows, visiting scientists, and advanced students from institutions all over the world, are attempting to describe these features in more precise, quantitative, mathematical, or physical terms, and to discover causal relationships among them.

Gaining such an understanding of the tropical environment is imperative. Human populations in the tropics are increasing very rapidly and are headed for ecological disaster in the absence of adequate information about their environment. In the north, we are concerned about air pollution, entrophication of lakes, and the deleterious effects of insecticides. In the tropics, the problems are more brutal. Areas such as the hill country of Colombia and Panama, and the whole island of Madagascar are fast becoming deserts. The basic features of tropical ecology must be understood as quickly as possible. Assembling new insight and understanding into a coherent picture of the tropics as a whole—where one half of mankind lives—is another continuing objective of the Smithsonian Tropical Research Institute. It offers a strong union of intellectual and environmental resources. Advances were made in both realms in 1970.

During the year the community of workers in biology at STRI grew to include 9 staff biologists, 4 predoctoral and 6 postdoctoral fellows, 556 professional visitors (including 155 scientists and advanced students working at STRI facilities for 4687 visitors days), from 62 universities in 31 states and 19 countries. Twenty-four seminars by staff and visiting scientists were conducted at STRI during this period.

The year saw continuation of an orderly progress of STRI research into the tropical environs.

Exploration of marine areas was extended to the full length of the Isthmus of Panama. With United States Navy cooperation, dives were conducted in previously unexplored waters of the Pacific in western Panama. Large constructional coral reefs, populations of the Crown-of-Thorns starfish, nine species of fishes new to science and eleven new to the fauna of Panama, in addition to two species of hydrocorals previously unreported in the eastern Pacific were the discovery highlights of the initial expeditions. In the San Blas Islands, off the eastern Panama Atlantic coast, a field team began exploration of complex reef communities.

With a base camp at Barro Colorado Island, hydrobiologists launched comparative studies on the dynamics of lakes, both natural

and man-made, in the lowlands and mountains of Panama, Colombia, and Costa Rica.

On Barro Colorado Island itself, on a base of four decades of studies, an accelerating effort—including sixteen studies of one year or longer—since 1965 is resulting in development of new methods for discerning environmental adaptive strategies. Under study are biological parameters such as reproductive strategies of forest trees, population dynamics, and social organizations of possibly key organisms, communication patterns and functions, and various questions of predatory adaptations, energetics, and phenological characteristics. Thus, correlative efforts may now proceed with greatly enhanced chances of success.

Comparative studies elsewhere in the New World, and in the Old World, are adding important new dimensions to the data on Panama and are clarifying the distinctive biological role of the tropics. During the year the staff and fellows of STRI extended comparative studies into the cold tropics of the Colombian Andes, into montane and lowland continental regions of West Africa and India which vary interestingly from Central America, and into the contrasting insular areas of Madagascar and New Guinea.

STRI continued to concentrate on aspects of evolution, ecology, and behavior, combining experimental analysis in the laboratory with observations in the field under natural conditions both in the Old and New World tropics.

Adaptive strategies employed by organisms in their relationship to their environment are particularly complex and varied in the tropics. The adaptive aspects of plants, which have not been thoroughly studied in the past, are the concern of several studies: the nature of the reproductive strategies employed by various tree species in the rich Barro Colorado Forest; in-depth studies to delineate the complex adaptations of orchids to their available insect resources; and comparative studies of the structure of tropical forests in both the New and Old World.

The largest migration in 26 years of the day-flying moth *Urania fulgens* was studied by Neal G. Smith. Billions of these conspicuous moths crossed the isthmus toward South America between August and October. Smith is trying to understand the adaptive significance of this almost yearly migration which has been mentioned repeatedly in newspaper and scientific literature as far back as the early 1800s.

Adaptive mechanisms of organisms in the marine environment were brought under new study. Feeding experiments with visual fish predators of the sand beach isopod *Ancinus* have shown a preference

for the most frequent pattern morph. This selective removal is considered important in affecting the polymorphic population structure. The sea snake, *Pelamis platurus,* a docile, conspicuous, and highly poisonous animal which at times is exceedingly abundant at the surface along drift lines in the Pacific, was studied for its population movements and basic biology by Chaim Kropach. Ira Rubinoff experimented with potential fish predators of the snake in order to develop a colonization model of theoretical as well as applied significance should the animal gain introduction into the Atlantic. Pacific fishes have adapted to avoid the snake, while Atlantic fishes of apparently the same species eat them with avidity and are often bitten and die in the process.

The partitioning of environmental resources among organisms is being studied from a variety of perspectives, and on a variety of species, with suprisingly different results in some cases. The relationships between food niche overlap and food availability in stream dwelling fishes was studied by Tom Zaret and A. Stanley Rand. They found evidence that the degree of overlap correlated well with prey abundance. On the other hand Henry Hespenheide has shown that over a broad range of species and feeding habits of birds, the width of niches as measured by prey size is a function only of the mean prey size, and thus is independent of such factors as prey abundance and foraging techniques of the birds. Related data gathered by Eugene Morton indicates that while adult vireos eat insects in the rainy season, they eat fruit in the dry season when they breed, but feed their young insects. This may be adaptation to reduce intraspecific competition when insects are relatively scarce.

Amazingly, it has taken fifty-four years after its creation for Gatun Lake to become a subject of intensive biological study. Z.M. Gliwicz of the University of Warsaw, Department of Hydrobiology, undertook a fifteen-month investigation of the primary and secondary productivity of Gatun and Madden lakes, and extended this comparative analysis to lakes in Costa Rica and Colombia. A key purpose is to compare the ecological efficiency of the primary production utilization by plankton consumers in temperate and tropical lakes similar in morphometry and trophic characteristics.

Intraspecific behavior is affected importantly by relations between species, and their adaptations, as reflected in their "communication systems." The ways in which "messages," whether simply or highly specialized signals, mediate among organisms, and with the environment, is one of the principal pursuits of research at STRI. A. Stanley Rand continued his studies of animal communication in amphibians

Acanthaster planci observed for first time in Central America along the Pacific shore of western Panama (Contreras Islands, 5 m depth, 30 April 1970). Feeding on *Pavona*.

Underwater view of coral reef, a recently discovered community off southwestern coast of Panama (Secas Islands, 3 m depth, 1 May 1970). Such reefs were previously thought not to exist along the Pacific shore of Panama.

and reptiles. In collaboration with George Drewry of the Puerto Rican Nuclear Center, he analyzed the chorus structure in Puerto Rican frogs. They found that species that chorus together vocalize at different frequencies, apparently to avoid interspecific jamming. Their vocalizations also differ in a number of other ways, presumably encoding other information.

Coral reefs in the eastern Pacific have been considered typically represented by those in the relatively well-studied area of Panama Bay. STRI conducted two highly productive expeditions to the Secas and Contreras islands which have made it clear that the interpretation of biotic composition and species numbers between Atlantic and Pacific coasts have been biased. Coral reefs and associated fauna of considerable richness were found. Revealed for the first time along the Pacific Ocean in Central America were the occurrence of large constructional coral reefs; populations of the Crown-of-Thorns starfish *(Acanthaster)*, an important predator and an associated shrimp *(Hymenocera)*; a coelenterate hydrocoral group represented by at least two species of the stinging form *Millepora;* and several fish species previously known only from the western Pacific biogeographic region.

In its educational emphasis STRI serves as an advanced studies center. Informal guidance and association mark the STRI professional contribution to independent studies by visiting scientists, research fellows, and advanced students. More than seventy projects by visitors were accommodated in 1970.

Seminar programs were offered and attended by staff and students from other research and educational institutions on the Isthmus of Panama.

STRI scientists also extended their educational contributions elsewhere. During the year they conducted seminars at the University of Panama, University of California, University of Chicago, Cornell University, Harvard University, Rockefeller University, Washington University, and elsewhere. Courses were conducted at the University of Mexico by Dr. Dressler, at the University of Pennsylvania by Drs. Rand and Robinson, and at Princeton University by Dr. Leigh.

The Organization of Tropical Studies conducted a major portion of its marine sciences summer course at STRI.

The Smithsonian Tropical Research Institute is indebted for the continuing excellent cooperation extended by the government and agencies of the Republic of Panama, by the Panama Canal Company and Canal Zone government, by the United States Southern Command, and by our fellow research and educational institutions throughout the Isthmus of Panama, and in Colombia.

Radiation Biology Laboratory

From a number of small buildings in the old Astrophysical Observatory Yard south of the Smithsonian Building and a few small rooms scattered throughout the Smithsonian Building, the Radiation Biology Laboratory has been relocated to new modern quarters in Rockville, Maryland. The new facility is a two-story structure designed to meet specialized requirements of the areas of biological and environmental research relating to the program of the laboratory. The areas of investigation are principally in the field of regulatory biology and include: (1) physiology, (2) biochemical processes of developmental responses to light, and (3) measurement of solar radiation. In addition, the laboratory maintains a carbon-dating facility for archeological and anthropological research and for research and development in carbon-dating techniques.

The new building provides about fifty thousand square feet of space and includes plant physiology, biochemistry, biophysics, genetics, and biology laboratories. There is a staff office, a general laboratory work area, small handling and preparation rooms, and special function rooms, such as controlled temperature units, drak-growth rooms, and light-treatment facilities. A Phillips, Model 300, electron microscope has been installed. Low-level counting systems for radiocarbon dating and a standards laboratory for photometric and radiometric calibrating standards are being installed. Several large areas are planned for environmental control rooms, a temperature-controlled greenhouse, and specialized irradiation systems, such as monochromators for action spectra determinations. Installation of equipment is in progress.

The support facilities for the laboratory include a small auditorium, a library, secretarial and administrative offices, and an instrument shop for servicing the laboratory research programs.

The monitoring and recording of radiation measurements was continued at the Mall location throughout the year. An additional facility at Rockville was installed and is functioning. The personnel complement at the station in Jerusalem, Israel, was completed, and data are being accumulated on a continuous basis. A new radiometric instrument has been developed through joint efforts of the Smithsonian Radiation Biology Laboratory and Eppley Laboratories for extending the monitoring of spectral quality of daylight to include pre-sunrise and post-sunset periods when biological clocks are presumed to be activated. This area of solar radiation measurement is a new phase of investigation in physical measurements for biological purposes.

In the research area of the electron microscopy study of the fine structure of algae, recent evidence obtained revealed that there are major structural differences in the location of the phycobiliproteins (photosynthetic accessory pigments). In red and blue-green algae they are aggregated on the stroma side of the photosynthetic lamellae, while in the photosynthetic cryptophyte algae, the phycobilins are located in the intrathylakoidal spaces. The known chemical and structural differences lead to the conclusion that these pigments appeared independently in evolutionary development.

There have been several recent additions to the staff. Dr. Roy Harding, geneticist, will assume the direction of work on chromosome aberrations induced by ultraviolet radiation and will also undertake work on the genetics of photoperiodism. Dr. Andrew Snope will assist with this work. Dr. Maurice Margulies has spent the past year on sabbatical leave at Harvard University.

Despite curtailment of research necessitated by the relocation, a number of research papers were completed and published by members of the staff. Staff members participated in scientific meetings and conferences, both national and international.

National Zoological Park

The National Zoological Park celebrates this year the 80th anniversary of its founding in 1890. From a small menagerie housed in the rolling woodland of Rock Creek Park, it has grown into one of the important zoos of the world.

One important action taken this year resulted in the Zoo being transferred from the budget of the District of Columbia to the appropriation of the Smithsonian Institution. This will lead to a change of emphasis regarding education, conservation, and advancement of science and should lead to the development of a truly National Zoo, so that it will no longer be mistakenly referred to as "the Washington Zoo."

The new hospital and research building was completed in December 1969 and is partially occupied. The Scientific Research Department has already moved into its offices and laboratories. The Animal Health Department and the Office of the Pathologist will transfer to the new building shortly. The spacious, thoroughly modern facility is located near the Director's office on Administration Hill.

Madame Suharto, wife of the President of Indonesia, presents Dr. Reed with a photograph of the Komodo dragon, gift of her government. Mrs. Soedjatmoko, wife of the Indonesian Ambassador, looks on.

Fieldwork in connection with the Ceylon elephant project, begun in 1967, has been completed. This was headed by resident scientist, John F. Eisenberg and was undertaken as a Smithsonian project in cooperation with the Ceylon government. The primate study in that country is continuing.

The status of the collection remains about the same. The aim of the National Zoological Park is to obtain collections of diversified animal groups, rather than solitary individuals, so that reproduction, especially of rare species, may be encouraged.[1]

[1] Certain tabulated, statistical, and other information formerly contained in the report of the National Zoological Park in the *Smithsonian Year* now appears as appendixes to the Separate of this Report (available on request from the Director of the National Zoological Park). This information contains: visitor statistics and other operational information; report of the Veterinarian, augmented by case histories and autopsy reports; report of the pathologist; and complete lists of (a) animals in the collection on 30 June 1970; (b) all births and hatchings during the year; (c) changes in the collection by gift, purchase, or exchange.

Many exciting and valuable gifts were received during the year. Through the good offices of Crawford H. Greenewalt, a Regent of the Smithsonian, a notable collection of New Guinea fauna was acquired. This consisted of four birds of paradise of two different species, a king parrot, an orange lory, three tree kangaroos, and six sugar gliders.

The government of Indonesia presented the National Zoo with a Komodo dragon as a mate for the lone female that the Zoo has had since 1967. When President Suharto and his wife paid a state visit to Washington, Mrs. Suharto came to the Zoo, bringing with her a photograph of the huge male, which arrived a few days later on 27 May.

Another gift from a foreign government was a pair of tuataras. The rare reptile is considered a bridge between the living reptiles of today and those of prehistoric times. These were formally presented by Ambassador Frank Corner of New Zealand at a ceremony in the reptile house on 4 June. Tuataras are often referred to as "living fossils" because they are the sole survivors of the age of reptiles and have scarcely changed since the Triassic Period of 200 million years

Moni, the newest of the white tigers, and friends on Lion House Hill. (Photo by Ellis.)

ago. They are being carefully protected in simulated native habitat. There are only two others in United States zoos.

The number of births continues to be gratifying. There was one tragedy, however; Mohini, the white tigress, gave birth to four cubs, two white and two normal color, on 8 March. Forty-eight hours later she gave birth to another cub, stillborn, and in the course of labor she fell on three of the first born, killing them. Moni, the lone survivor, a white male, was removed from her den and successfully reared in the Director's home. He is now on exhibition at the Zoo.

An orangutan and a black rhinoceros were born during the year, and antelopes acquired over the past few years, since the establishment of the new hoofed-stock area, are now reproducing satisfactorily. The number of hatchings at the bird house surpassed any former year and included some that had not previously occurred here.

Although hiring of personnel has been restricted, the Zoo was fortunate in getting an architect on the staff, Mr. Norman Melun, who reported for work on 4 May. This enables the Zoo to set up a planning division, which will oversee the development and modernization of the Park.

After many months of investigation and discussion, the Friends of the National Zoo were finally able to inaugurate the running of three trackless trains. There are three train stations and visitors may board at any one of them, ride to the next stop, view the animals and continue either on the same train or on the next one that comes along. These rides are proving very popular, and proceeds from the sale of tickets will go to the Friends' educational fund.

Office of Environmental Sciences

On 28 October 1970 the Secretary established the office of Environmental Sciences in order to "make more visible the Smithsonian Institution's broad spectrum of research projects in the environmental sciences and improve the opportunities for attracting financial support and scientific collaboration." Building on the accomplishments of the Ecology Program and the Oceanography and Limnology Program, the Office has continued a series of activities to bring the Smithsonian to the attention of national and international scientific groups including funding agencies.

Recognizing that the care and study of the research collections are a principal function of the largest Smithsonian bureau, the National Museum of Natural History (NMNH), the office places its greatest emphasis in collaboration with this program. Support is sought for and provided to scientists in NMNH in several ways. Collecting expeditions are supported by incorporating plans of Smithsonian scientists into international programs, such as the U.S. Antarctic Program and the Southeast Asia Ministers of Education BIOTROP project developed in Indonesia. The International Union for Conservation of Nature and Natural Resources developed field conferences and symposia with Smithsonian participation and the Cooperative Investigations of the Mediterranean will include Smithsonian collecting. Other cooperative bilateral collecting was arranged by the Office in Taiwan, Iran, Australia, Ceylon, Israel, Tunisia, Thailand, Laos, Cambodia, New Zealand, Chile, Brazil, British Honduras, United States and French Pacific Trust Territories, Japan, Korea, India, Pakistan, Kenya, Ethiopia, Indonesia, Malta, France, Italy, Jamaica, Panama, Argentina, Ecuador, and other countries.

The results of marine collecting are received and sorted by two processing centers, the Smithsonian Oceanographic Sorting Center and the Mediterranean Marine Sorting Center. The masses of material collected by nets, trawls, and dredges are such that there is a substantial backlog of work to be accomplished. In increasing the availability of sorting, distribution, and identification services the Office has proposed and is negotiating the establishment of sorting centers in South America (Chile) and in Asia (Indonesia or the Philippines.) These centers recognize the requirement for utilization of the research and identification of hundreds of scientists in work on marine collections and arrange the participation of competent marine scientists wherever they exist in the world. In addition to using all available NMNH scientists it has been possible to enroll about three hundred non-Smithsonian scientists in twenty-seven countries of the world, who work to gain information from the collections made available by the sorting centers.

Even with the above collections-related scientific effort, there are biological taxa which need attention because of special interest from an agency standpoint. Using money for Antarctic studies, the Office provides funds for specialists to carry on the necessary identifications and related research in certain taxa, which are potentially important as Antarctic resources. In a similar manner the Office stimulates the production of keys to freshwater organisms of importance to the Federal Water Quality Administration.

Within available resources the Office supports inadequately funded Smithsonian scientists by assisting with the purchase of collections, assisting with publication costs, and meeting otherwise unfunded requirements such as visiting other museums. Assistance is provided in recruitment of personnel to fill gaps in Smithsonian scientific capabilities. Consultants are provided to advise on scientific problems and in special cases a person may be employed temporarily to fill an NMNH need, pending the establishment of a NMNH position.

The possible role of the Smithsonian in national and international plans is considered within and outside the federal government. Interests of the Smithsonian are written into projects having appropriate objectives. Liaison is maintained for this purpose with the National Council for Marine Resources and Engineering Development, the Federal Council for Science and Technology, the Council on Environmental Quality, the National Water Commission, and broad projects of the Departments of State, Defense, Interior, Health, Education and Welfare, the National Science Foundation, and Atomic Energy Commission. Close association is also maintained with programs of the National Academy of Sciences.

In attracting financial support the Office develops concepts appropriate to funding by public and private agencies and individuals in as varied a nature as possible within the time available. Funding of such ideas was received from the National Science Foundation, Atomic Energy Commission, Coast Guard, Coast and Geodetic Survey, Naval Oceanographic Office, Office of Naval Research, Army Engineers, Bureau of Commercial Fisheries, National Institutes of Health, Department of State, Federal Water Quality Administration, Agency for International Development, National Academy of Sciences, American Association for the Advancement of Sciences, Woods Hole Oceanographic Institution, American Institute of Biological Sciences, Link Foundation, Vetlesen Foundation, Iran Foundation, Atlantic Foundation, TaiPing Foundation, Asia Foundation, Smithsonian Research Foundation, Smithsonian Foreign Currency Program, Edwin A. Link, J. Seward Johnson, Carl Dry, Alpine Geophysics, Incorporated, and Ocean Systems, Incorporated.

Current program development lies in such broad program areas as (1) environmental assessment and prediction as a result of man's activities, (2) provision and protection of natural areas, (3) expediting collections and related research, (4) developing Smithsonian participation in national and international environmental programs, (5) providing ship and underwater support of research, and (6) operating the Chesapeake Bay Center for Environmental Studies in such a way

as to insure its productivity and viability as a model watershed, a natural preserve, and a local asset.

Center for the Study of Man

In its second year of operation the Center for the Study of Man has continued to carry out a number of cooperative research and information programs in the human sciences. The most important single development of the year occurred at the second annual meeting of the full membership held at the Smithsonian during 16–19 May 1970. The members agreed that the Center should become in effect an international studies center devoted to adding anthropological perspective to understanding of such major world problems as war, colonialism, destructive nationalism, gross inequalities, racism, poverty, technological and urban overdevelopment, irreversible environmental destruction, population growth, alienation, anomie, and lack of generational continuity. The Center will establish annually a new international "task force" of research anthropologists and other scientists to deal for a limited time (perhaps five years) with a selected and closely defined facet of one of these major problems. The first problem to be investigated is human fertility. A working paper has been commissioned and the work of assembling resources is underway.

The American Indian program of the Center was very active throughout the past year. A major objective of this program is to assist Indians in achieving goals which they have set for themselves. This has been done in a modest way by sending them difficult-to-obtain materials free of charge, by referring them to anthropologists and other scholars who can help them in matters involving their rights, by referring them to other Indian groups with similar problems, and by advising them in matters where they have requested our knowledge.

The program to computerize a roster of 4700 anthropologists throughout the world has been completed. The results of this program, carried out in conjunction with the Smithsonian Information Systems Division and with the support of the Wenner-Gren Foundation for Anthropological Research will appear in a forthcoming issue of the world-wide anthropological journal *Current Anthropology.*

The Center has continued to coordinate the Urgent Anthropology Program. Six grants involving four different countries have been

made under the Small Grants Program for urgent research. Some results of this program are now beginning to be received and one such is the discovery of a new Java Man skull by Professor Sartono of the Bandung Institute in Indonesia.

The current bibliography of anthropological publications has continued to develop under the direction of Dr. Robert M. Laughlin. In the past year a total of 6800 titles has been classified and readied for publication. To date 2439 have been published and the remainder will continue to appear bimonthly.

A special committee on the proposed National Museum of Man, chaired by Dr. Irven DeVore, met in February 1970 to develop plans for relating the Center to the proposed Museum. The report of this meeting, presented to Secretary Ripley at the Center's meeting in May, precipitated the subsequent resolution on the part of the membership to move the Center in its new direction.

Center for Short-Lived Phenomena

The Center for Short-Lived Phenomena now has more than 2500 registered correspondents located in 124 countries of the world including 956 earth science correspondents, 379 biological science correspondents, 266 astrophysical science correspondents, 189 urgent anthropology/urgent archaeology correspondents, 191 Transient Lunar Phenomena correspondents, and 372 multidisciplinary correspondents.

During 1969 the Center reported to scientists around the world 145 short-lived events that occurred in 58 countries including 61 earth science events, 52 biological science events, 24 astrophysical science events, and 4 urgent archeological and 2 urgent anthropological events. Scientific teams investigated at least 102 of the 145 events reported by the Center in 1969.

The Center reported 18 volcanic eruptions in Alaska, Antarctica, Costa Rica, Hawaii, Indonesia, Japan, the Mariana Islands, New Zealand, Nicaragua, Peru, the Philippines, and the Soviet Union.

The Center reported 18 other earth science events during the year, including major landslides in Sweden, Hungary, Finland, Israel, and the Azores, two submarine volcanic eruptions in the Marianas and the Solomon Islands, a major tidal wave in China, a natural gas eruption in Yugoslavia, a major flood in China, a major mud flow in Hungary, a rockfall in the French Alps, a storm surge in the Hawaiian Islands,

and a floating island in the Caribbean. At least 42 of the 61 earth science events were investigated by one or more field research teams.

The Center reported 52 biological events, including 12 oil spills in the Netherlands, England, France, South Africa, Alaska, and the continental United States; 19 animal kills in Ireland, Spain, Peru, Canada, England, South Africa, and the United States; 11 animal irruptions, migrations, and colonizations occurring in Australia, Panama, Trinidad, Peru, Alaska and the United States; six pollution events occurring in the Philippine Islands, Peru, Germany and the United States; and two major flora kills occurring in Japan and the United States.

At least 46 of the 52 biological events reported by the Center in 1969 were investigated by one or more field research teams.

The Center reported 24 astrophysical events including 17 major fireball events in Japan, Greece, Mexico, Malawi, Brazil, Tunisia, Canada, Australia, New Zealand, and the United States; 4 meteorite falls in Mexico, Czechoslovakia, Australia, and Ireland; and several transient lunar events that occurred during Apollo manned lunar missions.

Specimens of all four meteorites were quickly recovered and sent to laboratories for radioisotope analysis. Delay between the time of the fall of the objects and the time they arrived in measuring laboratories ranged from four days for "Allende" to eighteen days for "Murchison" with the average being eleven days. In addition, fireball ablation products were successfully sampled in the atmosphere by high altitude air collection aircraft within 12–18 hours after the "Allende" event occurred.

During 1969 the Center reported two urgent anthropological events (the discovery of two new tribes in Surinam and Colombia) and four urgent archeological events.

The Center issued 143 event notification reports, 523 event information reports, 12 event publications, and handled a communications volume of 245,000 cable words and a mail volume of 390,000 pieces during 1969.

HISTORY AND ART

THE FISCAL YEAR 1970 was one of real accomplishments and of real promise in the areas of history and art at the Smithsonian. As the National Collection of Fine Arts and the National Portrait Gallery settled more comfortably into their quarters in the historic Patent Office Building, construction on the Joseph H. Hirshhorn Museum and Sculpture Garden began, the refurbishing of the Renwick Gallery continued, and the Cooper-Hewitt Museum prepared to move into the Andrew Carnegie Mansion of New York's Fifth Avenue.

In every case, our history and art bureaus, often with the valuable assistance of their advisory boards and commissions, emerged from a serious consideration of their purposes and plans with a strengthened sense of mission and identity. Although increased appropriations were not the order of the day this year, we are sure that this sharpened sense of purpose, this exercise in self-definition, will allow each of our bureaus to make the best possible use of the funds that are available to it.

This was also a year in which the Smithsonian welcomed a number of extraordinary new directors, whose several qualifications range from brilliant service in other museums, or in other parts of the Smithsonian, to academic distinction of the highest sort. Since it is our museum and bureau directors who must formulate and carry out the Institution's programs in history and art, this infusion of new talent and enthusiasm augurs well for the future.

In addition to the exhibitions and acquisitions mentioned below, a special word should be said about the coming to the Smithsonian of the Archives of American Art. This enormously important archival resource will strengthen the position of the Smithsonian as a leading national center for the study of American civilization; the presence of the Archives has already made itself felt in our successful efforts to recruit distinguished scholars to the staffs of our various museums.

In addition to the obvious and satisfying progress of each of our history and art bureaus, it is pleasant to report that relations among them seem more cordial than ever. The transfer of portraits from the National Collection of Fine Arts to the National Portrait Gallery, as urged by the Portrait Gallery Commission, as well as the transfer of three Augustus Saint-Gaudens reliefs to the National Collection of Fine Arts from the National Portrait Gallery was a case in point. The Cooper-Hewitt Museum's gracious loan of a number of Winslow Homer paintings to the National Collection of Fine Arts, where they

are now beautifully displayed, is another. As the Institution enters a period of intensive preparation for the celebration of the Bicentennial of the American Revolution, we are confident that the strengths of our individual bureaus, and their willingness to work together in a common cause, will prove worthy to this great occasion.

National Museum of History and Technology

The announcement made in January 1969 of the appointment of Dr. Daniel J. Boorstin as the Director of the National Museum of History and Technology signalized the search for a fresh approach to history in the museum world. Coming from the Department of History of the University of Chicago, Dr. Boorstin assumed his new responsibilities in October.

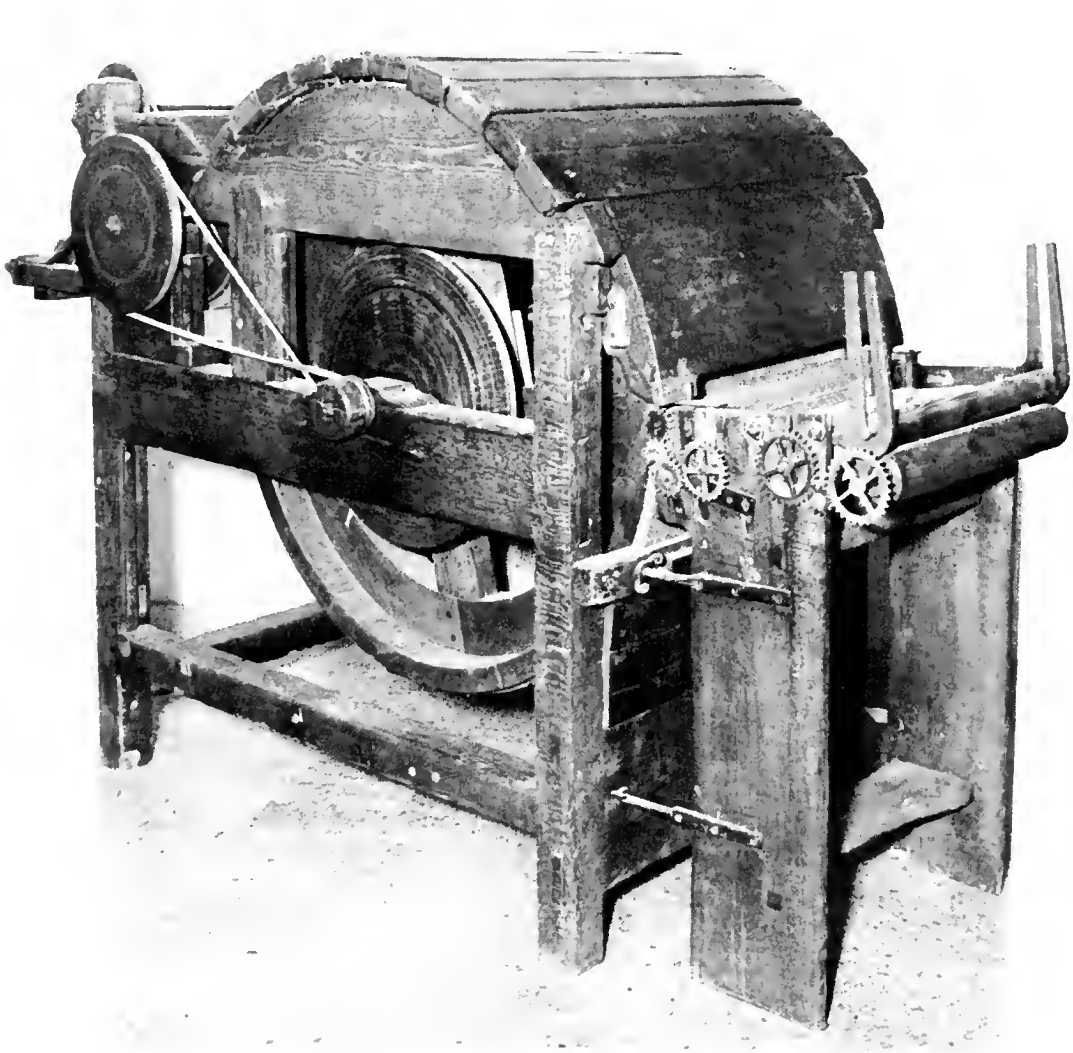
He immediately directed his efforts, with the cooperation of his scholarly staff, to the development of new programs designed to widen, deepen, and enlarge the visitors' museum involvement by recapturing man's experience in everyday life in the nation's past. By employing innovative techniques in exhibition and by reinterpretation of the unwritten documents of American civilization which form the national collections, new emphasis is being directed to several hitherto neglected aspects of the Museum's functions and capabilities.

A sweeping new program of visitor orientation was instituted to make the Museum's holdings and facilities more readily accessible and meaningful to the more than five million visitors who come to it each year. Several successful elements of this program, designed to provide useful guidance to the public at various levels, have already been initiated. A series of special tour brochures to provide self-guidance to the visitor was produced to highlight particular aspects of history presented in the Museum and specialized subject interests. A continuing series of changing special exhibits at the Mall entrance commemorate historical events of national importance and traditional American holidays. Through a display of selected materials (including national treasures from the collections and incorporating modern audio-visual techniques), the holiday exhibits orient the public to the other displays within the Museum on related subjects. More elaborate orientation techniques and programs to assist the public more effectively in the use of the Museum are being developed.

The emerging new role of the Museum as the national center for the study of American civilization was recognized in the annual banquet of the Society of American Historians, for which the Museum served as host, and at which presentations of the Francis Parkman Prize and the Allan Nevins Prize were made.

Considerable effort has been directed in the past year to develop plans for the Museum's role in the forthcoming celebration of the American Revolution Bicentennial. Planning for a comprehensive program combining exhibits, conferences, and publications is in progress.

The continuing exhibits program of the Museum has been redirected to feature selected materials from major collections which have



Samuel Slater carding machine, circa 1790, on display in the Hall of Textiles, National Museum of History and Technology.

not yet been exhibited, and material aspects of American life which have not been acknowledged elsewhere in the exhibition areas. Displayed for the first time in the Museum is a new exhibit incorporating significant historical machinery and products of the American textile industry. In a representative sampling of American textiles organized by the curator, Rita Adrosko, the historic carding machine of Samuel Slater and components of Slater's spinning machine are highlighted. These machines, which were made about 1790, brought textile production out of the home into a developing American textile industry. Featured also is the only Jacquard loom in operable condition in any American museum. The exhibit includes programmed spinning and weaving demonstrations by members of the staff.

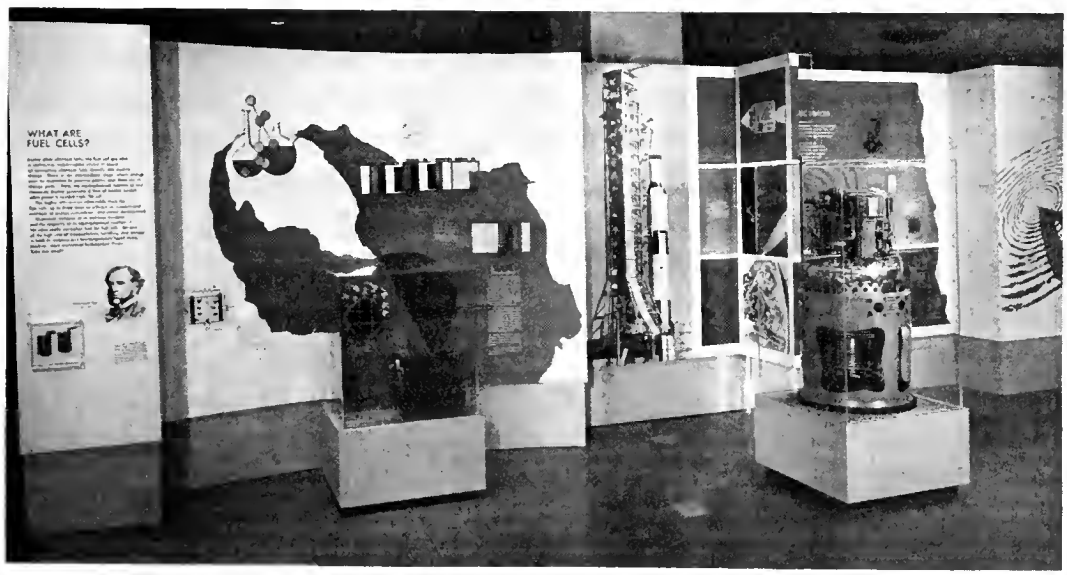
"Energy Conversion," a special exhibit prepared by Warren Danzenbaker under the direction of Bernard S. Finn, was opened in September and illustrated the methods of converting energy sources to electrical

School group watching Mrs. Lois Vann spinning wool on an 18th-century woolwheel from Virginia, in the National Museum of History and Technology.

power. Historic specimens in the national collections were displayed together with significant artifacts donated by related industries. Among these were the world's first fuel-cell tractor and an Apollo spacecraft fuel cell, as well as a thermoelectric generator and numerous other artifacts, which demonstrated the story of man's harnessing of heat, sunlight, and chemical energy.

Renewed efforts have been made by the Museum's scholarly staff as part of a long-range program to render the displayed collections more meaningful to the public, by attempting to recapture the environment of the past in which the materials exhibited play a role.

A conference and exhibit on "The Roots of California Culture," conceived and developed by C. Malcolm Watkins, were held at the Oakland Museum in April, and sponsored jointly by the Museum's Department of Cultural History, the University of California Extension, and the Oakland Museum. Six curators presented papers focused on the background environments of the major groups that settled California, cumulative material cultures that conditioned them, and the industrial technology that emerged in the nineteenth century to effect the cultural changes that made California a "nation within a nation." A special exhibition related to the original man-made environment and material culture that emerged after the settlement of the West was prepared in the National Museum of History and Technology, which drew from its reserve collections of objects of



A special exhibit on energy conversion showing the development of fuel-cell technology, in the Hall of Electricity, National Museum of History and Technology.

everyday life in pre-industrial and Victorian America and were combined with materials from the Oakland Museum. The exhibition will tour other museums and institutions in California on continuing display.

Special exhibits, produced during the year, have ranged from "Women in Politics," which was conceived by Keith E. Melder and opened in May to commemorate the founding of the League of Women Voters, to a temporary hall planned by Philip W. Bishop, featuring artifacts and models in a historical approach to remind the visitor of the size and importance of the American iron and steel industry.

The maintenance and development of the national collection continued to be a major concern of the curatorial staff, with a total of 104,731 additions made to the Museum's holdings in the past year. Although the major part of the Museum's acquisitions are accepted for display, there is nevertheless equal curatorial concern for developing the Museum's resources for study by the curatorial staff and visiting scholars and students. Among such significant new study accessions was a collection of approximately thirteen thousand glass and film negatives recording the production of the Pullman Car Works for a period of almost half a century from 1885 to 1932. This plant is of particular significance to railroad history because it built not only the elegant sleeping and parlor cars for the Pullman Company, but it also produced thousands of freight cars.

The Museum benefited by a generous gift of almost the entire collection of old type matrices owned by the American Type Founders, a unique collection consisting of thousands of sets of nineteenth-century matrices made by independent foundries. Arrangements have been completed by the curator, Elizabeth M. Harris, to have fonts of type from the more significant mats cast by private subscribers on the condition that a font of each be deposited in the collection. A checklist of the mats is in preparation and an illustrated catalog with the histories, specifications, illustrations, and identifications will be one of the valuable products of this project. This is merely one example of the many ways in which the Museum not only serves the public in its avowed functions as the keeper of the national collections with its exhibits and publications, but also preserves more pedestrian aspects of the American heritage.

Continuing his program of studies in industrial archeology, Robert M. Vogel documented by interview, by physical measurement, and with motion picture film, the process of manufacturing wooden wheels—a process virtually unchanged in the Hoopes Bro. & Darlington factory in Westchester, Pennsylvania, since the end of the nineteenth

century. Similarly in the field of medical science, Audrey Davis undertook a study of the development of the gastroscope, with interviews of individuals connected with its early history and filming of the manufacture of the instrument at the original United States plant, which was established in the 1940s.

In the Division of Postal History, Carl H. Scheele and Reidar Norby developed a series of exhibits of postal issues of groups of countries, which in addition to providing continuing displays resulted in the acquisition of important stamps and postal objects, and added depth and broadness to the study collections which are utilized by numerous visiting researchers.

A deliberate program has been initiated for the acquisition of new collections of historical materials not already represented in the national collections. This program will enlist the cooperation of the related industries. Plans are proceeding for development of collections and exhibits of the history of American advertising art, the history of early broadcasting and radio, and similar aspects of American life which previously have not been the subject matter of museums.

Archives of American Art

On 1 May 1970 the Archives of American Art formally joined the Smithsonian Instution as a bureau.

The Archives, which was founded in Detroit in 1954 as an independent research institution, is committed to encouraging and aiding scholarship in the visual arts in this country from the 18th century to the present time. It acts to achieve this goal by acquiring and preserving the primary documentation needed by historians—the correspondence, diaries, business papers, and photographs, of painters, sculptors, critics, dealers, and collectors, and the formal records of galleries, museums, and art organizations. These collections of papers are microfilmed and made available to scholars in a series of regional branch offices and through interlibrary loans.

The processing and chief reference center of the Archives is now located in space provided by the National Collection of Fine Arts/National Portrait Gallery Library. Regional branch offices operate in New York and Detroit and field offices were established in 1970 in Boston and Santa Fe.

During the past year the Archives has acquired over 100,000 items. Among the more important collections received were the papers of William Baziotes, Cecilia Beaux, Karl Bitter, Herbert Ferber, Palmer Hayden, Ibram Lassaw, Guy Pene du Bois, José de Rivera, and Ben Shahn. Of particular interest is a large collection of records accumulated by Charles Henry Hart, an authority on 18th and early 19th century portraiture.

The Archives' oral history program continued its activities with a series of tape-recorded interviews with administrators and other figures in the New York art world. This work was made possible by a grant from the New York State Council on the Arts. Among those people interviewed were Harvard Arnason, Ralph Colin, Lawrence Fleischman, Henry Geldzahler, Huntington Hartford, and Gordon Washburn.

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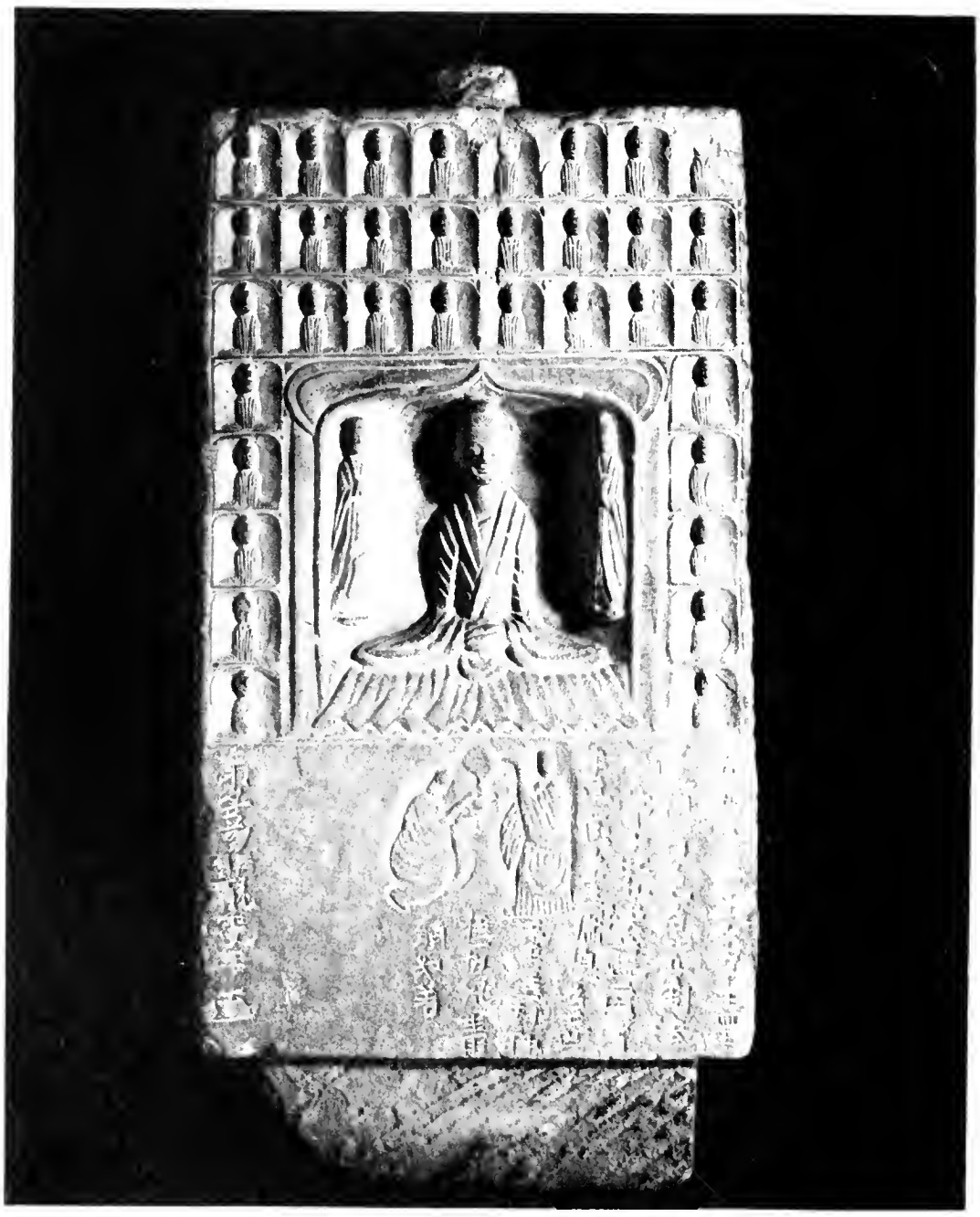
Freer Gallery of Art

Mr. Freer understood that the most effective way to study a civilization, to learn what motivated the thinking of men in other times and other parts of the world, was to study the finest things they made. The investigation of the reasons why men made these beautiful things, and the research into the nature of the materials of which they were made, and the methods used to fashion those materials cannot but yield basic information about the men themselves and the civilizations they created. Thus the twofold program envisaged by Mr. Freer involves the continuing search for works of oriental art of the highest quality that may be added to the Freer Gallery collections and the continuing study of these works of art as keys to understanding the civilizations that produced them. This research in all its manifold aspects is the basic task of the professional staff of the Freer Gallery; and all the supporting services of the Gallery (library, photographic laboratory, oriental picture-mounting studio, technical laboratory, etc.) operate to expedite and facilitate this research. Members of the curatorial staff travel frequently and widely in order to be familiar with the latest additions to other collections, to examine archeological sites and findings, and to meet and discuss problems of mutual interest with colleagues who are engaged in related research. At the same time, we receive and give every cooperation to all scholars, including many from Europe and Asia, who come to the Freer Gallery to make use of our unparalleled resources both in the collections themselves and in the study facilities. We also give guidance and encouragement to graduate students in the field who come to the Gallery either for short visits or for protracted periods under established fellowship programs.

Work of this kind does not lend itself to sensational discoveries. It proceeds slowly, and when something important is accomplished, it is published. Our public is to be found among the users of 500-odd libraries and universities all over the world that receive Freer publications free of charge. The books are also widely sold. Our most recent work, published this year, was the second volume of *The Freer Chinese Bronzes*, which deals with the technical aspects of the subject. This was a pioneering effort in that it is the first book ever devoted to the study of the materials and methods which produced the magnificent vessels that are the glory of the Bronze Age in China and one of the finest artistic achievements in the history of mankind.

To maintain the atmosphere that fosters productive research, to continue adding to the sum of knowledge of the civilizations of the East, to publish and make available this information to the interested world, these matters are the concen of those who are responsible for the operation of the Freer Gallery.



Chinese stone sculpture of Buddha, dated 29 April A.D. 521 during the Northern Wei Dynasty.

National Collection of Fine Arts

The year was marked by a series of major exhibitions organized and shown by the National Collection of Fine Arts and the first steps toward the reorganization of the permanent collection and establishment of new activities in the areas of education and research. The most notable of the temporary exhibitions, all with catalogs, were the large retrospective of the work of Milton Avery; the very popular exhibition "Explorations," organized by the International Art Program and produced by the Center for Advanced Visual Studies under Gyorgy Kepes at Massachusetts Institute of Technology; and a mid-career retrospective of the work of Leonard Baskin. In connection with "Explorations," several special events were scheduled—musical performances, a poetry reading, and an expanded program of experimental films. A handsomely installed exhibition of Tibetan Art prepared by Asia House was shown, although the policy will now be to exhibit only American art and related material in the Fine Arts Gallery.

Various areas of the building were redesigned and systematic storage areas reinstalled. A larger portion of the permanent collection was placed on exhibition and an easily accessible print and drawing study room was instituted. Two small exhibitions, one devoted to Winslow Homer (chiefly of works from the Cooper-Hewitt Museum) and one made up of painting and sculpture from the 1930s, inaugurated a new policy of informal exhibitions underscoring various aspects of the permanent collection.

Activity with local school children continued at the Children's Museum and an active docents program was climaxed by a lively children's spring festival.

Plans have continued for the further restoration of the Renwick Gallery, scheduled to open in 1971, which will be devoted to American design and crafts.

The International Art Program circulated a print workshop and various exhibitions abroad, among the most interesting being "Disappearance and Reappearance of the Image" shown in Romania, Czechoslovakia, and Belgium.

On the first of January, Assistant Director Robert Tyler Davis, who had been Acting Director since 30 May 1969, turned over the direction of the NCFA to Joshua C. Taylor.

National Portrait Gallery

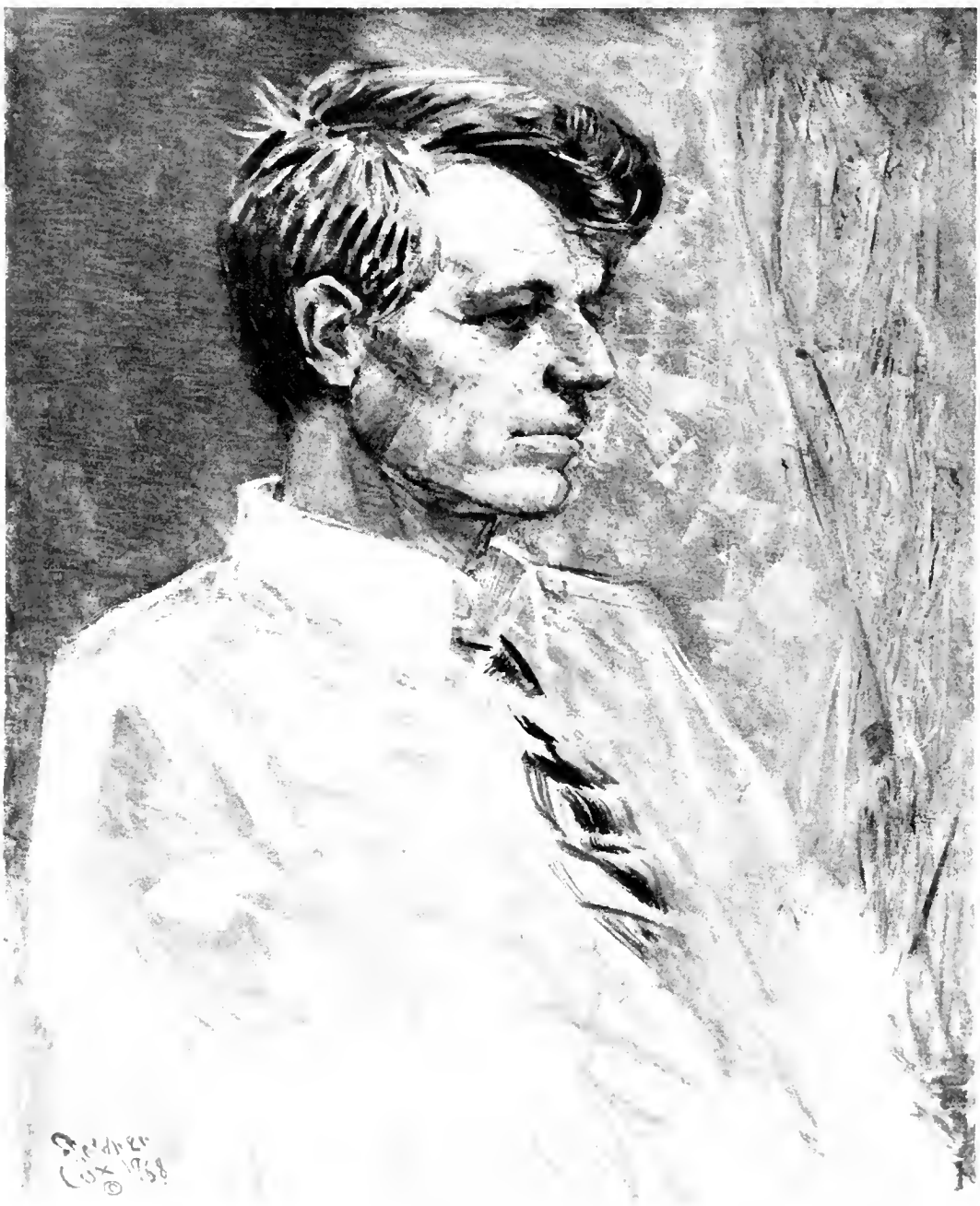
The year past was the first for the second Director at the National Portrait Gallery. While much of the time during this period was spent in the preparation of programs and the planning of events that will not materialize until 1971, one major exhibition occurred this year and 110 portraits were added to the permanent collection.

The exhibition was "Augustus Saint-Gaudens: The Portrait Reliefs." A full-scale catalog, designed by Leonard Baskin, reproducing all reliefs from photographs made especially for this purpose by David Batchelder and produced by the Meriden Gravure Company, was made possible by a generous gift from Mr. and Mrs. John E. Marqusee of New York. The catalog was subsequently issued in book form by Grossman Publishers. The exhibition was organized and the catalog written by John Dryfhout, curator of the Saint Gaudens National Historic Site in Cornish, New Hampshire.

Two other small exhibitions intended primarily for use in connection with the Gallery's secondary school educational program were held during the year. One was devoted to a portrait of the arctic explorer Elisha Kent Kane, and the other to Thomas Edison; each portrait was hung in a separate gallery surrounded by materials related to the subject's life and achievements.

Among the many important acquisitions of the year, several deserve special mention. A magnificent life portrait of John Randolph of Roanoke by John Wesley Jarvis was given by Mrs. G. B. Lambert, a descendant of the artist; and a fine oil of General Horatio Gates by James Peale (after Charles Willson Peale) was acquired by the Gallery partly with its own funds and partly through a generous gift from Mr. Lawrence Fleischman. Through the kind offices of a member of the NPG Commision, Wilmarth Sheldon Lewis, Gardner Cox presented the Gallery with his moving study of Robert F. Kennedy, as well as two original sketches for the work, which were done from life in February 1968. Other notable acquisitions included a portrait of Daniel of Saint Thomas Jenifer by John Hesselius, acquired from a descendant of the subject; a handsome version in marble of Giuseppi Cerrachi's portrait bust of George Washington in Roman garb; a Sharples pastel of Alexander Hamilton; an oil of Bret Harte by John Pettie, the best-known likeness of the author; a portrait of Mathew Brady by Thomas LeClear, one of only two known oils of the master American photographer; and Adolfo Muller-Ury's pastel of Lillian Russell, which was included in the Gallery's opening exhibition.

Twenty-four acquisitions were transfers from the National Collection of Fine Arts through the generous cooperation of the Commission and Director of that sister institution. These works included portraits of President John Tyler by George P. A. Healy and of George Catlin by William Fisk.



Life Study of Robert F. Kennedy, by Garner Cox, presented to the National Portrait Gallery.

Joseph H. Hirshhorn Museum and Sculpture Garden

By its Act of 7 November 1966, Congress accepted the Joseph H. Hirshhorn collection as a gift to the United States. Congress also approved a site on the Mall for the Hirshhorn Museum and Sculpture Garden and provided statutory authority for the appropriation of construction and operating funds.

In 1968 the 90th Congress provided contract authority and an initial $2,000,000 for construction; in 1969, an additional $3,300,000 was appropriated. The ground-breaking ceremony, led by former President Johnson was held on 8 January 1969. Construction commenced in 1970. The public opening of the Joseph H. Hirshhorn Museum and Sculpture Garden is scheduled for 1972–1973.

The world-renowned sculptures in the Hirshhorn collection range historically from antiquity to the present. The depth of representation of major sculptors of the nineteenth and twentieth centuries is unique. The paintings in the collection are primarily twentieth century. Beginning with such precursors as Thomas Eakins and Winslow Homer,

Three Piece Reclining Figure No. 2: Bridge Prop, by Henry Moore.

the course of American painting is extensively covered. Complementing the American section is a strong group of significant European paintings of the past three decades.

For museum officials, scholars, students, and publishers, the Hirshhorn collection continues to be a major source of documentation in the field of modern art. In 1970 the curatorial staff replied to 190 requests for research information and photographs. More than one hundred scholars, artists, and officials visited the Museum office and warehouse in New York. The loan program is severely curtailed during the present interim period; nonetheless, 65 paintings and sculptures were loaned to 30 museums, galleries, and institutions. Approximately 2000 persons attended 23 benefit tours for educational, cultural, and philanthropic organizations at the Hirshhorn Sculpture Garden in Connecticut.

In 1970, the Hirshhorn Museum staff formulated plans for the selection and preparation of the paintings and sculpture for the opening exhibition, as well as for the future programs of the Hirshhorn Museum.

Cooper-Hewitt Museum of Decorative Arts and Design

The Museum's long history in the Cooper Union Building will soon come to a close. A new home has been obtained for the Museum—the historic Andrew Carnegie Mansion on 90th Street and Fifth Avenue. The Mansion will provide five times more space than the present location and allow for a great expansion of collections, programs, and services. The staff has worked hard to make the Museum's last year at Cooper Union an interesting one, while at the same time planning for the move to "Museum Row" on upper Fifth Avenue.

When the Cooper-Hewitt relocates this summer it will take along 1315 new objects acquisitioned in the past year. The most significant of these are seventy-three drawings, watercolors, and oil sketches by William Stanley Haseltine; twenty-nine theatre designs by Oliver Smith; quilted bed cover of 18th-century Indian Chintz; 16th-century Persian double cloth; 14th-century Peruvian tied and dyed net; examples of ikat from various parts of the world; wall hangings by Arthur Crisp and Theo Moorman; six Lalique and two Daum vases; Bent-

wood console table by Michael Thonet; lacquered coffee table by Jean Durand; two Louis XV armchairs and an 18th-century French settee; collection of 18th- and 19th-century wallpapers, including one of the earliest known examples of a labeled 18th-century American wallpaper; and a Morris & Co. wallpaper sample book of 1890.

The Library acquired 418 new books, approximately half through gifts. The most notable of these are 95 books on architecture and the decorative arts presented by the Cooper Union Library and an important collection of books on wallpaper and textiles.

The special exhibitions presented in the past year include "Kabuki Prints"; "Contemporary Japanese Posters"; "A Stately Pleasure Dome: The Royal Pavilion at Brighton"; "Light and Line: Etchings by Rembrandt"; "Posters by E. McKnight Kauffer, 1890–1954"; "Contemporary Drawings by New York Artists" and the beautiful farewell exhibition, "India Chintz," made possible through a grant from The JDR 3rd Fund. Alice Baldwin Beer prepared *Trade Goods: A Study and Catalogue of Indian Chintz in the Cooper-Hewitt Museum of Decorative Arts and Design, Smithsonian Institution* to accompany the exhibition.

"E. McKnight Kauffer Posters" from the collection were shown at the IBM Gallery in New York and "Master Drawings: The Kingdom of the Two Sicilies" at the Finch College Museum. Objects from the Decorative Arts Department were displayed at five branches of the East River Savings Bank in New York City. "Please Be Seated," an exhibition of chairs throughout history is being circulated by the American Federation of Arts following its opening in New York. A total of 254 objects was loaned to institutions in this country and abroad. Long-term loans of 129 additional objects were arranged with the Fogg Art Museum at Harvard, the Brooklyn Museum, the Philadelphia Museum of Art, and museums of the Smithsonian Institution.

Mrs. Lisa Suter Taylor, former program director of the Smithsonian Associates, was appointed Director in October, replacing Dr. Richard Wunder, who is on sabbatical leave. Mr. Leo Arffman was engaged to administer the capital development program.

The Cooper-Hewitt was visited by over 10,000 persons, of whom 1372 consulted curatorial departments or the library about specific projects. Tours were given to twenty-two school groups and a twelve-week adult education course was offered in conjunction with New York University.

The architectural firm of Hardy, Holzman and Pfeiffer was commissioned to prepare a program plan for the relocation of the Muse-

um. During the renovation of the Mansion, major portions of the collection will be shown at other museums. The staff and study collections will be housed in Miller House, a townhouse adjoining the Carnegie Mansion. All available resources and energy will be directed to the planning of a vital and meaningful new institution—a national museum of design.

National Armed Forces Museum Advisory Board

At the Advisory Board's recommendation, a legislative proposal to establish a national historical museum park to be designated Bicentennial Park, has been forwarded to the Bureau of the Budget. Reflecting President Eisenhower's belief in the need for a national museum devoted to the historic commitment of the American people to the cause of freedom, the park will be a living outdoor museum, bringing to present-day Americans a sense of the spirit that drove our forebears to conceive a new nation within the majestic framework of the Declaration of Independence.

At rural Fort Foote, in Prince George's County, Maryland, Bicentennial Park will enable visitors to see, hear, handle, smell, and taste life as known by our 18th-century ancestors. With emphasis focused on the Revolutionary War citizen-soldier—his background, his motives, and the labor, sacrifice and self-reliance demanded in the struggle to bring forth the first modern republic—Bicentennial Park will be essentially an animated museum, portraying the daily camp duties while craftsmen demonstrate their trades in the tailor and shoemaker shops and at the smithy and armory. The rumble of wagons, the clank of forge, odors of woodsmoke and picket line, the heft of tools and weapons, muted shades of coarse homespun and flashing colors of silken standards, all will envelop the visitor in the long-vanished world of young America.

Colorful reviews to a Continental "band of musick" will be held on the parade ground, along with such other activities as folk dancing, pageants, and theatricals—all reflecting the customs and traditions of our Revolutionary forebears, black and white, townsmen, farmers, backwoodsmen, seafarers, artisans, merchants, and professional men.

Woodrow Wilson International Center for Scholars

During fiscal year 1970 the Woodrow Wilson International Center for Scholars, created by the Congress in October 1968 to be a living memorial "expressing the ideals and concerns of Woodrow Wilson . . . symbolizing and strengthening the fruitful relation between the world of learning and the world of public affairs" did work preparatory to opening its doors in October of 1970.

After some months of study, the presidential mixed private-public Board of Trustees headed by former Vice President Hubert H. Humphrey, approved at its fall meeting the opening of new fellowship and guest-scholar programs in prime space that has been offered to the Center in the newly renovated Smithsonian Institution Building. The theme of the fellowship program is designed to accentuate those aspects of Wilson's ideals and concerns for which he is perhaps best remembered a half century after his presidency: his search for international peace and the imaginative new governmental approaches he used to meet pressing issues of his day. In the opening period the Board plans to stimulate particularly substantial studies on (1) the development of international understanding, law, and cooperation in ocean space; and (2) man's relations with and his response to his deteriorating environment, with special attention to the new forms of international cooperation needed to address effectively those environmental problems that transcend boundaries.

When the program is fully operational, up to forty distinguished scholars—approximately half from the United States and half from other countries—will be selected to work and study for periods ranging from a few weeks to several years. They will be chosen—again in approximately equal geographic measure—from many traditional academic disciplines and from a variety of nonacademic occupations and professions such as government, law, business, labor, and journalism.

During the past fiscal year, Director Benjamin H. Read and a small staff prepared to launch the program, determining policies, publicizing and getting support for the program, recruiting and selecting the first fellowship recipients, initiating a private fund-raising campaign, and working in other ways to breathe life into this newest of presidential memorial institutions.

Office of American Studies

The Office of American Studies conducts a formal graduate program which is directed to the original Smithsonian purpose: "the increase and diffusion of knowledge among men." During the past year, thirty graduate students from five universities participated in the Program, gaining academic credit toward advanced degrees at those universities. Three courses were offered by the American Studies staff during the year. The introductory seminar, "Material Aspects of American Civilization," this year examined American culture as it has been self-consciously displayed at world's fairs and international expositions. A two-semester seminar, "The Physical City: Approaches to American Urban History," taught in conjunction with a visiting urban historian, Dana F. White, offered students an opportunity to study the American city as a physical artifact. During the spring semester, students enrolled in a seminar on "Material Aspects of Cultural History" undertook an archeological excavation on Theodore Roosevelt Island in

Graduate student Joanne Baker studying the gravestones of a church yard in New Hampshire under the sponsorship of the George Washington University-Smithsonian program in American Studies.

the Potomac in conjunction with members of the staff of the National Museum of History and Technology. In addition to the formal courses listed above, a number of students in the program carried on individual research and study under the direction of members of the Smithsonian's curatorial staff. Studies pursued included industrial and historical archeology, the history of photography, and the material culture of the period of the American Revolution.

While conducting a program of graduate education, staff members of the Office of American Studies continued research in several areas, such as 19th-century politics as revealed by an analysis of symbols and mottoes on hand-painted campaign banners; a biographical dictionary of American civil engineers; technology, architecture, and urbanization; early exploration; the history of cartography; and Indian-White relations. The political banners project was outlined in a paper by Wilcomb E. Washburn at the annual meeting of the Organization of American Historians in April 1970. In January 1970, Harold Skramstad presented a paper discussing "The Engineer as Architect" at the annual meeting of the Society of Architectural Historians. Several papers by the staff, based on earlier research, were published during the year.

The Joseph Henry Papers

In 1970 the Henry Papers received an enormous influx of microfilm and xerox copies of documents and was able to add more than 4000 of these to its computer-control system. Most of these documents were from Henry's Princeton years, 1833–1846, and the early days of the Smithsonian Institution, 1847–1852.

At the same time, the staff was engaged in the necessary preliminaries for preparing the first volume of a major documentary publication. By far the most laborious (and most elementary) activity was a careful review of documents from Henry's Albany period, 1792–1832, to winnow chaff. Documents surviving this review are being edited for textual accuracy and their contents researched to provide meaningful annotations for readers. The first volume will not only depict a young man developing into a significant scientist but will also provide a documentary précis of the social and intellectual setting for this development.

Albany in Henry's day was a lively provincial center, not too much different from similar localities in the United States. By focusing intensely on one man's rise, the Henry Papers will illuminate some of the factors in his immediate environment and the society at large affecting our nation's development.

SPECIAL MUSEUM PROGRAMS

THROUGH THE YEAR'S WORK there ran a strong current of service to the community of interests and objectives of the world's museums. The preservation of every nation's heritage and the desire to engage museums in action roles in education, cultural development, and the enhancement of the quality of life have become increasingly the common interests of museum professionals everywhere. The Smithsonian has directly and indirectly aided the Department of State, UNESCO, and the International Council of Museums to press on with efforts to rally museum action to suppress unethical practices in acquiring objects of art, antiquities, and cultural history. Wider circulation was given to codes of acceptable conduct of scientific and archeological expeditions respecting the natural and cultural resources of host countries and the encouragement of cooperation with counterpart scholars and institutions. The General Counsel continued to guide the legislation, now enacted, to authorize the adherence of the United States to the International Centre for the Preservation and the Restoration of Cultural Property (the Rome center).

Assistance was given to the efforts of the American Association of Museums and the United States National Committee of the International Council of Museums to coordinate their interests in the world community of museums and to improve communications between museum professionals everywhere. Advice and guidance have been provided to the director of the recently established World Museum Fund designed to encourage international support of museum purposes.

Foreign museum professionals and cultural and scientific personnel in large numbers continued to consult with colleagues at the Smithsonian. They came for advice in establishing national programs of museum-based sciences, as well as to consult with the personnel of conservation and exhibits laboratories, the Registrar, and many others on museum functions, techniques, and administration. Some of this appears in the reports that follow. The Conservation Analytical Laboratory, for example, provided consultation and demonstrations to more than thirty foreign colleagues who came from Italy, Pakistan, Jordan, Germany, Nigeria, Guinea, India, Mexico, Belgium, Jamaica, Venezuela, England, Iran, Taiwan, Canada, and elsewhere.

Office of the Director General of Museums

The past year has seen an intensifying of the need of museums and their professional organizations to improve and carry out programs which, in the words of the National Museum Act, are "necessary to insure that museum resources for preserving and interpreting the nation's heritage may be more fully utilized in the enrichment of public life in the individual community." Cooperation with museums in America and abroad, continued emphasis upon museum training and exhibit effectiveness, and an increased concern for the world community of museums have characterized the activities of the Office of the Director General.

The Director General, under the authority of the Museum Act, has responded to an ever-increasing number of requests for technical assistance and advice from museums in this country and overseas. Response under the act has varied from consultant activities to support of international symposiums, as well as to the direct assistance of museum programs with national implication such as the American Association of Museums' study of museum accreditation. Under the general provisions of the act, members of the Smithsonian's scientific and curatorial staff have aided the Oakland Museum, California; the Buffalo Museum of Science, New York; the New York State Museum at Albany, and such nascent institutions as the Virginia Museum of Science.

Essential to providing adequate information and advice has been the continuing accumulation of data pertinent to museums and their missions. The Director General has cooperated with the American Association of Museums and the United States Department of Education in gathering and refining statistical data relating to museums. Within the Smithsonian, interviewing of visitors to the National Museum of History and Technology and the National Museum of Natural History for the year-long Smithsonian visitor survey was completed in October. Volunteer interviewers have questioned more than 5000 visitors and the Smithsonian's Information Systems Division has completed card-punching of their responses. Programmed use of this data will permit an analysis of our visitors and their experiences at the Smithsonian.

Training has continued as an important adjunct of the National Museum Act. Over 1600 persons from both domestic and foreign institutions have received advice on exhibition techniques and in the general principles of museum management. Cooperation with the Art Department of Fisk University, Nashville, Tennessee, resulted in a

student planned and supervised exhibition on the black ghetto, first shown at the National Museum of History and Technology in August of 1969. At another level of involvement, the Office of the Director General, in concert with the Office of Academic Programs conducted a symposium: "Opportunities for Extending Museum Contributions to Pre-College Science Education." Supported by the National Science Foundation, forty-five invited participants met at the Belmont Conference Center 26–27 January 1970. The proceedings of the symposium will be published in book form.

Internally, the Director General has chaired an Institution-wide committee charged by the Secretary with the responsibility of review and study of the future of exhibits at the Smithsonian. The committee has completed its finding and has prepared its final report and recommendations.

In October, Mr. Taylor and Mr. Welsh attended a meeting of the ICOM International Committee for Museums of Science and Technology which was held in India, principally at Bangalore. The purpose of the meeting was to plan a laboratory with a capability to produce basic science exhibits designed to meet the specific needs of individual, developing countries. It is anticipated that a laboratory will be founded in India at Bangalore and that it will become a depository of experience, a center of training, and a useful example of international cooperation among museums. This meeting was the culmination of several years' effort and planning by the Director General of Museums based on the belief that science-teaching exhibits, carefully prepared and tested, can help bridge the science lag between developed and developing countries.

The Director General of Museums has furthered the concept and utilization of the Arts and Industries Building as an Exposition Hall. The Exposition Hall programs provided a setting for two exhibitions on urban themes, "Urban Transit: Problem and Promise" and "Urban Design: Manhattan," and an opportunity for the general public to hear Rai Y. Okamoto, city planner-architect, lecture on urban transit and its impact. Industrial design students from several major schools presented in the "New Concepts for Leisure" exhibition their solutions to diminishing leisure resources and increasing leisure time.

Support from industry made possible the expansion of the traveling "Plastic as Plastic" exhibition. It demonstrated the historical development of plastic in America and emphasized the future of plastics when shaped by the hands of innovative designers and technicians. An experimental space enclosure of urethane foam sprayed on stretched cotton jersey fabric, early plastic objects from the Smithsonian collections, the first all-plastic airplane, an experimental automobile with plastic

body, an operating injection-molding machine, and "instant vacation home" were high points of the exhibition.

Significant progress was made this year in coordinating and planning the Smithsonian's role in the celebration of the Bicentennial of the American Revolution. This was accomplished by Mr. John J. Slocum, special assistant for Bicentennial planning, whose completed study, with estimates of the various Smithsonian elements expected to participate in the Bicentennial, has been forwarded to the Secretary of the Institution. Mr. Slocum continued to serve as a liaison officer between the Smithsonian, the American Revolution Bicentennial Commission, other government agencies, and private organizations.

Office of Exhibits Programs

The Office of Exhibits Programs collaborates in the production of exhibits originating in the curatorial, scientific, academic, and public service programs of the Smithsonian. More than 225 individual projects were worked on during the year including sixty temporary exhibits and upgrading and maintenance in nearly every gallery of the National Museum of History and Technology, the National Museum of Natural History, and the National Air and Space Museum. The exhibitions produced are described in part in the reports of the divisions and museums in which they originated and are listed in Appendix 8.

The "Laser 10" exhibition was designed and produced by this Office with the essential assistance of a group of distinguished laser scientists from universities and industry. The scientists planned the exhibition and assisted in the acquisition of laser instruments and demonstrations. This exhibit, visited by about 750,000 people in the period January to June, will remain until the fall of 1970.

The instruction of museum personnel in museum exhibition practices and techniques continued. A total of twenty-nine persons from ten states and ten foreign countries received instruction during the year.

Conservation-Analytical Laboratory

Detailed advice on good environments for the preservation of museum objects and on acceptable methods of cleaning and preserving

them have been provided to many museums and to the public. Documents and objects made of such various materials as wood, leather, and metal—that have been damaged, were in need of cleaning, or subject to active corrosion or decay—have been repaired and stabilized for each of the various Smithsonian bureaus.

Two conservators were added to the staff. A visiting research associate spent an academic year studying methods and materials applicable to plain and painted African wooden cult objects for use in tropical areas.

One of the staff has worked briefly at Florence, Italy, on flood-damaged books and documents. Practical emergency assistance has been given to a museum damaged by hurricane Camille. Trainees from the Pacific area have been instructed at Honolulu in conservation methods. A second series of twenty weekly lectures for Smithsonian staff attracted up to fifty-six attendees at some sessions.

Innumerable facilities and services were provided to Smithsonian Museums. Analytical facilities were applied to more than sixty requests from six bureaus. Sensitive neutron-activation analysis is being applied to characterize American ceramics and also to medieval glass from the collections, and a method of precise analysis by X-ray fluorescence has been developed for museum objects that promises to be of universal application with a minimum of synthetic standards. A computer terminal was installed to facilitate calculations. Emission spectrography and X-ray diffraction also served to analyze such diverse objects as moon rock, earth minerals, Chinese bronzes, and religious medals.

Office of the Registrar

In addition to the important function of receiving and recording specimens and objects into the museums' collections, the Office of the Registrar provides services that support the Smithsonian's research, education, collection management, and exhibition programs. For all bureaus of the Smithsonian, these are the shipping operation, the customs work, central mail activity, travel documents for official foreign travel, as well as the receipt and control of public inquiries and official correspondence for the museums.

More than two million pieces of mail were handled, with the Smithsonian Associates and the *Smithsonian* (magazine) generating large

volumes. Among public inquiries, ecology and man's environment captured the interests ranging from that of the youngest school child to the older citizens as evidenced by letters received.

Shipping activities covered the usual wide diversity of objects, such as the 30,000-year-old man from Spain, 47,000 pounds of records from Detroit for the Archives of American Art, the Napoleon diamond necklace sent as a loan to the Palais du Louvre, and a man-eating crocodile from the Caroline Islands.

Official travel by staff members and foreign currency grantees extended to all parts of the world, including Vietnam, Cambodia, Australia, New Guinea, and Iceland. The Office of the Registrar obtained 204 passports and 275 visas for 250 travelers.

Smithsonian Institution Traveling Exhibition Service

During this past fiscal year exhibitions of the Smithsonian Institution Traveling Exhibition Service (SITES) were shown in all of the United States with the exceptions of Alaska and Hawaii. Seven hundred bookings were viewed by an estimated four to five million people. Institutions in several Canadian cities also exhibited SITES shows. Smithsonian museums showed eleven of them.

"Contemporary American Black Artists" organized by the National Association for the Advancement of Colored People and the Lee Nordess Galleries, and "The Art of Henry O. Tanner" jointly organized by the Museum of African Art and the National Collection of Fine Arts were added to the SITES program this year.

It is encouraging to report a substantial increase in the number of traveling exhibitions organized during the past year by Smithsonian units. Two versions of "The Douglass Years" are being circulated in cooperation with the Anacostia Neighborhood Museum. The following exhibits originated in the Smithsonian, contain material from Smithsonian collections, or were planned and produced by Smithsonian programs: "Jean Louis Berlandier," "Photography and The City," "John Wesley Powell: The Indomitable Major," "Werner Drewes Woodcuts," "The People's Choice," "The Malay Archipelago," and "A Heritage in Peril—Alaska's Vanishing Totems." Modest progress was made toward a broader program of traveling exhibitions and the extension of Smithsonian resources to other parts of the United States.

The Service continues to receive letters of thanks from staff and trustees of museums using the Service, frequently accompanied by press notices of the interest stimulated in their communities by traveling exhibits.

This year has been a critical one financially. SITES has been caught in the squeeze between higher operating costs and lower revenues. Salaries and other expenses are rising while museums generally are suffering from inadequate support. Many museums cannot now afford the larger shows and this has reduced the income of SITES disproportionately. SITES is supported by fees received for its services so it has had to reduce its operations somewhat to work within its income.

The number of exhibitions in the program has been reduced ten percent and the staff by about the same percentage. In making these cutbacks, 42 exhibitions have been dispersed, 32 new ones initiated, and 67 continued from prior years. Of the new shows initiated this year, twelve are from other countries. Eighteen of those continued from last year are also from abroad.

PUBLIC SERVICE AND INFORMATION ACTIVITIES

The worth and importance of the Institution are not to be estimated by what it accumulates within the walls of its buildings, but by what it sends forth to the world.

SECRETARY JOSEPH HENRY
Smithsonian Annual Report, 1852

The Institution's diverse public service activities all have the one common purpose so well expressed in Secretary Henry's vision. They range from the traditional one-page Monthly Calendar of Events to the newly established *Smithsonian* magazine, or from a small workshop class in enameling to an international conference on arid-land ecology.

In April of 1970 the Smithsonian took a significant step forward in sending forth its storehouse of knowledge to the world with the publication of the monthly *Smithsonian* magazine. Essentially popular in character, the magazine was originally conceived as a means of extending the Smithsonian Associates from a local or Washington-based membership group to a nationwide audience. With the publication of the first issue, therefore, the Smithsonian Associates established both resident and national membership categories. Resident members continued to receive a varied program of lecture courses, workshops, and guided tours, as well as an option to subscribe to the magazine at a reduced rate. National members received the *Smithsonian* and certain other benefits, such as a reception center, located in the Great Hall of the Smithsonian Building, to help plan their visits to Washington; the opportunity to participate in both domestic and international study tours; and discounts on Museum Shop articles and Smithsonian Institution Press publications.

The magazine, ably headed by Edward K. Thompson, former managing editor of *Life,* and a small editorial staff of seven, reached a circulation of 180,000 by its fourth issue. It was thus favored by what many professionals call the most successful start in the recent history of magazine publishing. *Smithsonian's* principal theme is "man: his environment, sciences, arts, adventures, follies, fortunes." Each issue, therefore, carries at least one major article on man's problems with his environment, in both humanistic and scientific terms. Within this environmental context, the magazine seeks to portray and interpret Smithsonian interests in science, art, and cultural history.

Other major efforts in carrying the Smithsonian Institution beyond

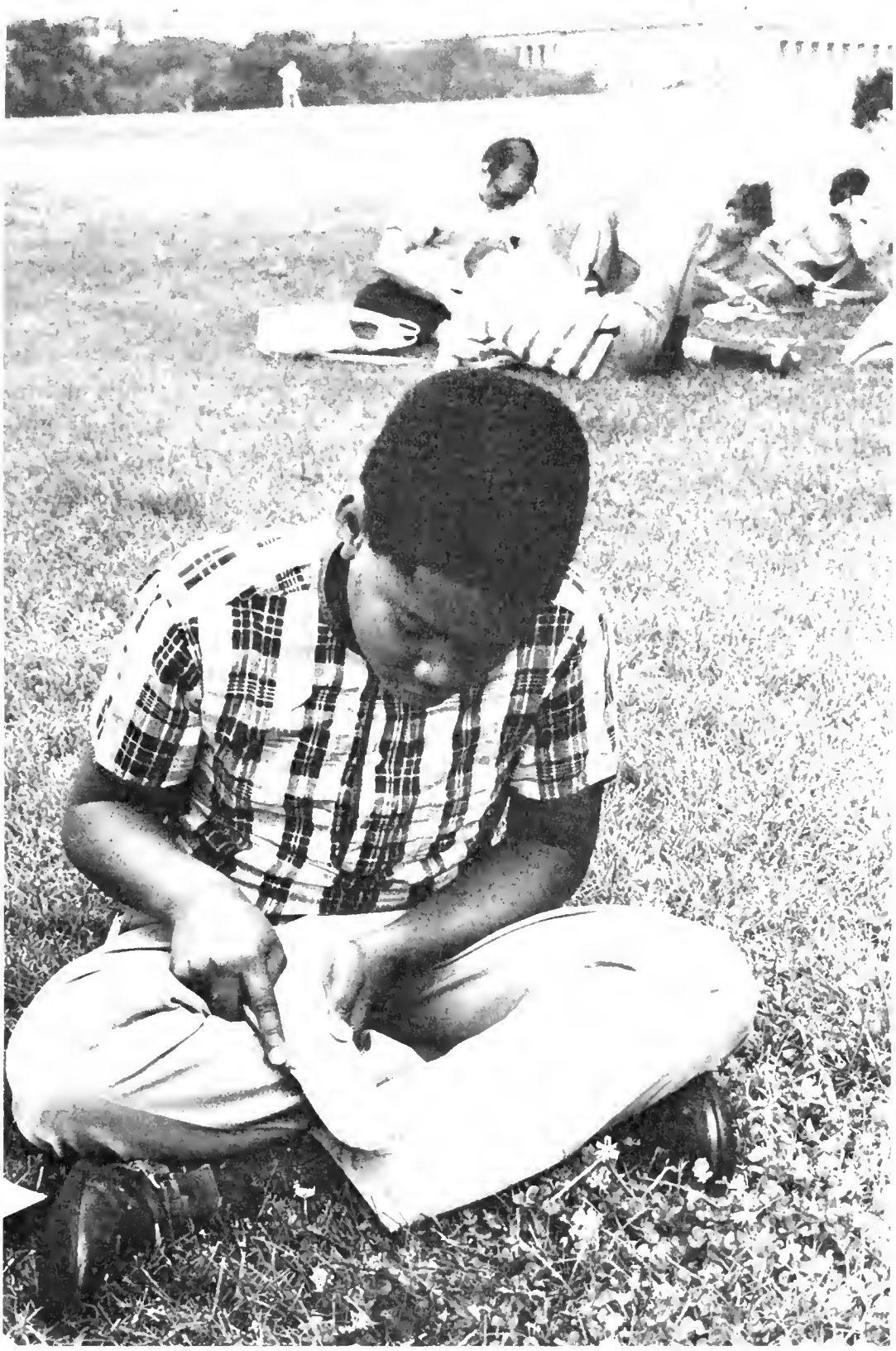
its own walls centered around the medium of television, both public and commercial. In April the Institution received a generous grant from the Corporation for Public Broadcasting to produce a general documentary on the Smithsonian's various museums and scientific bureaus for National Educational Television. The film will be adapted later for continual showings within the Smithsonian for visitor orientation. It thus will fill a long felt need for improved guidance of the Institution's visitors. In June the Institution entered into an agreement with the Columbia Broadcasting System for a series of documentaries, principally based on the Smithsonian's overseas scientific expeditions. It is expected that this agreement will provide for the first time the instrumentality for popular interpretation of the Institution's scientific missions to the significant number of listeners attracted by the evening or prime-time broadcasts of a major network.

Other signal achievements in the work of carrying the Smithsonian's interests beyond its own walls included a new program of urban problem identification at the Anacostia Neighborhood Museum, supported by a Carnegie Corporation grant; Office of International Activities participation in a Mekong Basin study team, designed to assess the ecological effects of present and proposed hydroelectrical projects on the Mekong River; and an Information Systems Division bulletin published especially for the museum community, showing how automatic data processing can best be applied to museum collections.

Smithsonian Associates

In its fourth year, the Smithsonian Associates continued to create numerous opportunities for both its members and the general public to participate in the life of the Smithsonian Institution. More than 40,000 adults and young people were involved in a broad variety of activities, ranging from special events such as the opening of the exhibition "Laser 10," Zoo night, and the Folk Festival Preview to in-depth classes taught primarily by Smithsonian scholars in fields of Smithsonian interest.

Programs for members only, more than half of which were without charge, totaled some 121 separate events, many of which were repeated by popular demand. Events also open to the public totaled another 111. These activities included lecture courses in history, science, and the humanities; films, field trips (both outdoors and behind-the-scenes



A young Associate works at shaping down his own boomerang in preparation for learning to throw it. Nearly 200 people attended the Boomerang Workshops under the direction of Benjamin Ruhe, Smithsonian Office of Public Affairs. (Photograph by Robert de Gast, *Smithsonian* Magazine.)

in the National Museums of History and Technology and Natural History), exhibit openings, an exploration into conservation of art objects at the National Collection of Fine Arts, the ever-popular annual Kite Carnival, a new and well-received workshop on boomerang making and throwing, and numerous concerts and theatrical productions, ranging from a play on drug addiction presented by student members of the Daytop rehabilitation program of New York to a concert by leading experimenters with the Moag synthesizer and other electronic instruments. In addition, young people and adults studied in some 93 classes and craft workshops.

Emphasis was on doing—on learning and growing and "becoming involved." Some discussed ecological problems at an Encounter series while others studied natural history on a schooner cruise off the coast of Maine, explored archeology at the luncheon series, dug fossils at Calvert Cliffs, hunted mushrooms in Maryland, and considered the past through art-history tours in nearby states. As varied and extensive as these activities have been, they mark only the beginning of the Associates' adventure in discovery.

A major event in the history of the Associates occurred in April with the publication of the first issue of the *Smithsonian* magazine. A list of the Smithsonian Associates membership gifts is in Appendix 3.

Office of Public Affairs

The Office of Public Affairs (OPA) in the past year broadened its programs of communication with visitors and the public at large. A full-time visitor-information desk service was inaugurated in cooperation with the Smithsonian Associates. The Smithsonian Motion Picture Group undertook three productions: a public television program about Institution activities under a grant from the Corporation for Public Broadcasting, a film about museums in modern life, and a contemporary study of libraries with the American Library Association. A half-hour television show, "Smithsonian," was produced with the American University Broadcast Center and WRC-TV. Broadcasters focused increased attention on the Smithsonian, and numerous projects from modern art to space flight were carried out with OPA aid. Radio Smithsonian, a program series of music and conversation, was carried regularly by stations in Washington, D.C., and New York City and distributed nationally and overseas. A publications branch was estab-

lished to initiate and distribute a wide range of printed materials—including information leaflets, building guides, and foreign-language material. The News Bureau, charged with communicating day-to-day developments to news media, prepared a series of "news-features" that were widely reprinted. The Smithsonian Film Theatre presented 37 weekly programs in art, science, and history attended by more than 25,000 persons. An educational radio internship program was established with American University, and the OPA also sponsored the third annual day of staff briefings for student science writers.

Office of International Activities

Office activities were concentrated on the environmental consequences of development, with the Director leading a team of scientists to the Mekong Basin to assess the ecological effects of present and proposed hydroelectrical projects there. He also served on the National Academy of Sciences committee to study the biological consequences of a sea-level canal in Panama.

The Office assisted Smithsonian scientists in planning research abroad and briefed American diplomats going overseas and foreign visitors to the Institution on its international programs. Museum training for three Africans was arranged, a symposium on Smithsonian projects in Ceylon was successfully carried out and two Smithsonian staff members were sent to Iran as consultants under the Iran-United States Science Agreement, the first such international agreement in which the Smithsonian has been designated as the program-directing agency. Staff members visited more than twelve nations to arrange new cooperative programs.

Closing its fifth year, the Foreign Currency Program had awarded more than $10,000,000 in "excess" foreign currency grants to over fifty American institutions of higher learning, of which $3,500,000 was awarded this year alone. Grants included more than the equivalent of five million dollars for work in archeology and related disciplines; over three and one half million in systematic and environmental biology; more than $400,000 in astrophysics and earth sciences; and nearly $150,000 in the newly authorized category of Museum programs.

Program accomplishments over the five-year period include some 50 research publications, 150 postdoctoral research opportunities for

Americans, 110 field-training opportunities for doctoral candidates, and research collections for the Smithsonian and many of the American grantee institutions. The bi-national collaborative research pattern fostered by the program contributed in a similar beneficial way to 200 foreign host institutions.

A list of the grants awarded in fiscal year 1970 is included in Appendix 1.

Division of Performing Arts

The Division of Performing Arts continued to enliven and enrich the experience of museum visitors with a variety of programs and projects. "Perceptions II," a series of contemporary forms in performing arts, now in its second year, highlighted the world premiers of two musical works. One of them, "Misfortunes of the Immortals" by Morton Subotnick, has been added to the permanent repertoire of the Dorian Woodwind Quintet. The series also included two powerful and timely dramatic works: "The Concept," dealing with the endeavors of former drug addicts to reenter society; and "Neighbors," a rock musical based on the *Spoon River Anthology*. "Perceptions" is presented in cooperation with the Smithsonian Associates.

The third annual Festival of American Folklife was again the most popular single event on the Mall. More than half a million visitors were once again reminded of their own cultural roots by the exhibits of crafts and cooking and performances of music and dance. A special section was devoted to the craft and music of the State of Pennsylvania.

The Touring Performances Service, in the second year, sponsored a wide range of American performing artists and lecturers at cultural and educational institutions across the country. The American Folklife Company, The Black Experience, the touring Smithsonian Puppet Theatre, The Jelly Roll Memorial Band, The Concept, and other programs disseminated the experience and success of the Smithsonian in the field of performing arts.

The Resident Puppet Theater, an exceedingly popular informative entertainment for children, continued during 1970 with three new shows in expanded facilities. One hundred and forty colleges and universities submitted their productions to the American College Theatre Festival, and the ten best were then restaged in Washington, D.C., to

general critical acclaim. The Division also presented programs in cooperation with other organizations: A series of concerts was offered monthly with the Left Bank Jazz Society, and chamber music concerts with the Washington Performing Arts Society, as well as an evening of Brazilian folk music with the the Brazilian Embassy, among others.

Smithsonian Museum Shops

The Smithsonian Museum Shops installations in all museums were completed during the last year. Special efforts were made to expand the role of the book stores of the Museum Shops.

Facilities for publications were increased in the Shops of the Arts and Industries Building (A&I) and the National Museum of History and Technology (NMHT). A special sales area for the "Contributions to the Museum of History and Technology" was installed at NMHT and all Shops offered specially selected publications focused on the special exhibits of each museum.

The Museum Shops once more participated in the Folklife Festival on the Mall in July of 1969 offering items of traditional American crafts. The Second Annual Aerospace Modeling Exhibit was held in the shop of the Arts and Industries Building sponsored by the National Air and Space Museum and the Museum Shops, which included a weekend launching competition on the Mall of model rocket and flight craft.

The sales exhibitions program of the Museum Shops was highlighted with the introduction of a new series of exhibitions honoring the crafts and craftsmen of the United States in February when the works of thirty-four distinguished craftsmen from Montana were shown in the Museum Shop in A&I. Other special sales exhibitions offered the public an opportunity to select crafts from Pakistan and Chile; flat-woven rugs from Greece, Iran, and Turkey; wooden circus toys made by William Accorsi; and animals in iron sculpture by Orvello Wood.

Belmont Conference Center

The Belmont Conference Center, now in its fourth year of full operation, continues to grow and to find itself scheduling conferences at an

ever-increasing rate. At the present time, groups are reserving the Center as far as a year in advance. During the past year, fifty-eight conferences met at Belmont, sponsored by thirty-three agencies (governmental as well as public and private organizations).

Smithsonian groups holding conferences at Belmont have included the Smithsonian Council, Interdisciplinary Communications Program, Office of Academic Programs, Program for Postdoctoral Fellows in Education Research, and the Office of International Activities. The Center has been host to groups as diversified as the National Urban Coalition and the Senate Public Works Committee, while guests have included Nobel Prize winner Dr. Murray Gell-Mann; Dr. John Clark, Director of Goddard Space Flight Center; Dr. Robert Marston, Director of National Institutes of Health; Mr. Robert Mayo, Counsellor to the President; Mr. Elmer Staats, Comptroller General; Dr. John Gardner, Chairman, National Urban Coalition; and Commissioner Nicholas Johnson of the Federal Communications Commission, to name a few of the more than 1,000 persons who have been welcomed to Belmont this past year.

The Center accommodates twenty-four resident guests with facilities for meetings and meals for thirty people. The completion of a new roof, as well as extensive repairs to the main house and other buildings, has made Belmont more comfortable and attractive.

Conference operations continue to be directed toward the needs of small groups which require the kind of attractive and secluded setting which Belmont provides, together with the advantages of easy access to Washington's National and Baltimore's Friendship airports.

Anacostia Neighborhood Museum

Highlights in the Anacostia Neighborhood Museum's 1970 programs included the exhibit "The Rat: Man's Invited Affliction," which focused on the environmental problem of rat infestation and how to deal with it. A simulated backyard was especially constructed so that the viewer could see how live rats live and breed. This exhibit received nationwide attention when it was filmed for the ABC television program "Discovery." A portion of the exhibit was shown at the Buffalo Museum of Science under the cosponsorship of that museum and the Buffalo County Health Department. The impact of "The Rat" reinforced the conviction that the Anacostia Neighborhood Museum

should be a mechanism for change in the inner city. A proposal was submitted, and in May of this year, the Carnegie Corporation granted the Museum $100,000 "to enable the staff to work with neighborhood groups in analyzing urban problems and their effect on the neighborhood and to make information and educational materials on these issues available to schools, museums, and other local and national groups."

In cooperation with the SITES, the Museum's exhibit on Frederick Douglass and his influence on Afro-American history, "The Douglass Years," has been shown at various museums throughout the country.

During the major part of the school year, over 23,000 children and teenagers visited the Museum on guided school tours. Films and various programs of educational and popular interest were presented with each new exhibit. The Mobile Division reached approximately 6600 students during visits to area schools with a condensed version of "The Douglass Years."

Special exhibit "The Rat: Man's Invited Affliction" at the Anacostia Neighborhood Museum, focused on the environmental problem of rat infestation and how to deal with it.

Smithsonian

The *Smithsonian* magazine, born of the Institution's desire to extend the Smithsonian Associates into a nationwide membership organization, published its first issue in April of 1970. It soon achieved a circulation of 180,000.

The editorial office, located in the Arts and Industries Building, is headed by Edward K. Thompson. Before coming to Washington, Mr. Thompson served for ten years as managing editor of *Life* magazine, after which he became editor of all *Life* publications. In this capacity he was largely responsible for launching a well-known *Life* books program.

With Mr. Thompson on the Board of Editors of *Smithsonian* are Ralph T. Backlund, formerly associate and managing editor of *Horizon* magazine; R. Hobart Ellis, who has served as editor of various scientific publications, including *Nucleonics, Nuclear Fusion,* and *Physics Today;* Edward Parks, formerly editor of several magazines in Australia and associate director of the National Geographic's book department; and Mrs. Grayce P. Northcross, who has done research and reporting for *Time, Life,* and the United States Information Agency's *America.*

The magazine's advertising, circulation, and promotion offices are in New York City. Heading the New York office is advertising director Thomas H. Black, formerly sales executive with J. Walter Thompson, ABC, *Life*, and *Time*; assisted by general manager Joseph J. Bonsignore, previously head of editorial production for *Life, Fortune, Time,* and *Sports Illustrated;* and circulation-promotion director Anne Keating, formerly advertising and promotion director of *Natural History.*

Early articles to attract national attention concerned the Crown-of-Thorns starfish infestation of Pacific coral reefs, the history of our volunteer armies, and a historical appraisal of women's rights movements. Smithsonian scientists and staff members contributing to *Smithsonian* included Dr. John Eisenberg of the National Zoological Park, James Weaver of the National Museum of History and Technology's Division of Musical Instruments, and photographer Francis Greenwell of the National Museum of Natural History. In addition, Regent Crawford H. Greenewalt contributed an article, with his own photographs, on Birds of Paradise.

An early letter to the editor perhaps best sums up the broad appeal and the unique character of *Smithsonian.* The writer, a high school graduate and heavy-equipment operator, asked:

I would like to see occasional articles on native and primitive art . . . plus at least one good article on heraldry . . . and definitions of the items involved in this form of art.

Edward Thompson has stated that *Smithsonian* will not disappoint him or its other readers.

Smithsonian Institution Archives

The Archive's major obligations are preservation of the materials in its custody and announcement of the availability of three resources to scholars. At present physical work predominates; records are separated into discrete units, cleaned, boxed, and shelved. During this arrangement process a limited amount of information is also collected about each record or manuscript unit, and in Jaunary 1971 this information will be issued as the first comprehensive finding aid to the Archives' holdings. Description of records in depth has begun and will proceed according to the research importance of the materials. A full guide to the Smithsonian Archives will appear in about four years.

The program for physical arrangement and production of good quality-finding aids will create information which can be computerized simply and effectively. When information of sufficient quality about the collections has been assembled, the Archives will be prepared for computerized finding aids to complement information systems within other divisions of the Smithsonian and national systems for manuscript collections.

In March 1970 the Archives occupied its newly remodeled space in the Smithsonian Institution Building. Reference service was provided to a wide range of users. Drs. Charles G. Abbot and Alexander Wetmore made arrangements for transfer of their personal Secretarial papers to the Smithsonian. This was the highlight of the year and undoubtedly ranks among the most important transactions in the history of the Smithsonian Archives.

Smithsonian Institution Libraries

The Smithsonian Institution and the National Agricultural Library conducted a facsimile transmission experiment to augment delivery

service between the two libraries. Permanent transmission services await staff augmentation. The Libraries produced an exhibit, to be available through the Traveling Exhibition Service (SITES) commemorating the 100th anniversary of the publication of Alfred Wallace's *The Malay Archipelago*. The first American Library Association tutorial program on basic library automation was conducted by the Smithsonian Libraries, with the District of Columbia Library Association as a cosponsor. The Institution was elected to its third consecutive two-year term on the Federal Library Committee.

Reduced buying power of funds for the purchase of library materials heightened the importance of the Libraries' gift and exchange program. A new review process was organized and subject experts on the Libraries' staff selected over 5,000 items for retention from among the many items received this year. This effort was capped by a valuable gift of historical items in botany by Mr. Harry Lubrecht of New York City. Processing was begun of the rare books in the Dwight-Tucker ornithological collection and the task of recataloging the Department of Anthropology Library reached the halfway mark in 1970.

A long-range solution to space problems for the curation of the Libraries' collections was reached through the creation of the Smithsonian Institution Library Center away from the Mall in the Institution's Lamont Street building. The Center will hold the growing number of large and special collections, particularly for historical research. Library space in Mall buildings will be devoted to reference and concentrated research collections. The large collection transferred to the Smithsonian from the Patent Office last year was moved immediately to the Center.

International Exchange Service

Publications weighing more than 700,000 pounds were received from over 370 organizations in the United States for exchange with libraries in other countries. Exchange publications weighing approximately 500,000 pounds were forwarded by ocean freight to 39 exchange bureaus in 32 countries, and approximately 200,000 pounds were mailed to addressees in countries that do not have exchange bureaus. More than 120,000 pounds were received in exchange from the foreign exchange bureaus for addressees in the United States.

Some 350,000 pounds of official United States publications were exchanged for the official documents of other countries. Recipients in 45 countries received the full sets of official publications, and partial sets

were sent to recipients in 34 countries. The official journals, the *Congressional Record,* and the *Federal Register* were sent on exchange to 65 countries. United States patent specifications were exchanged with patent libraries in 24 countries.

Medical and dental publications were received from more than 180 libraries in the United States for exchange with medical and dental libraries in other countries.

During the year the United States Department of Agriculture and the Geological Survey discontinued using the Service for the mailing list portions of their exchange programs.

Information Systems Division

The Information Systems Division, staffed with specialists in retrieval and indexing techniques, mathematical computation, and management information services, continues to provide Smithsonian museologists and management with technical assistance in all areas of automation. In addition to the continuing research and development of new applications and the maintenance of existing systems, several computer systems were implemented during the year to handle the diverse information needs of the Institution.

A generalized software package was developed to establish a museum data file within the Smithsonian, based on a standard means of recording and updating information. Additional calculation capabilities have been offered to Smithsonian scientists with the development of a library of advanced mathematical software packages. The Division also sponsored seminars in statistical applications to enhance the value of these computer programs. A system was designed and implemented to combine all personnel and payroll data into one readily accessible file. Other systems began operating this year to provide record-management procedures for library serials, oceanographic rock samples, and fine-arts inventory, and another to report accumulating cost and workload data for labor and materials at all management levels.

As a service to the museum community at large, the Division began publishing a technical bulletin dedicated to acquainting the reader with automated systems specifically designed to solve the collection problems of museums and herbaria. In addition, many members of the

community from both home and abroad attended demonstrations of the now operating Smithsonian Institution information retrieval system for handling biological and petrological data in all their complexities.

Smithsonian Institution Press

The publication programs of the Smithsonian Institution Press were reviewed in March by a visiting committee of four prominent publishers. The committee concluded that the Smithsonian is meeting adequately its mandate for diffusion of knowledge to scholars through publication of research reports and catalogs, but that communication to a broader audience is not as well organized or as effective. The committee proposed an organic program of publication on three levels: (1) leaflets, available at the exhibits of public museums, for the purpose of exhibit interpretation; (2) booklets and other educational materials, to be produced and distributed by cooperation with other publishers, for the purpose of extension to schools and communities; and (3) adult books, related to Smithsonian programs and interests, for the purpose of reviewing and integrating significant information in science, history, and art. This plan was reviewed by the Press staff, the standing Editorial Policy Committee, the Secretary, and the bureau directors, all of whom gave it their strong endorsements and approvals for implementation commencing in fiscal 1971.

Arrangements with Random House, Inc. for sales and distribution of privately funded books in the United States and Canada were terminated at the end of the year. A new contract for these services was executed with George Braziller, Inc.

Production costs of 111 publications were funded by federal appropriation in the amount of $374,497; 11 were supported by Smithsonian private funds in the amount of $89,996; and 12 were subsidized by grants of gifts in the amount of $43,157. The total output of 134 titles is listed in Appendix 5. The Press warehouse and Random House shipped, on order and subscription, a total of 256,000 publications during the year.

Science Information Exchange

Beginning its second decade, the Science Information Exchange (SIE) has continued to expand its services to the national scientific community. About 100,000 records of currently active research are received annually and from this automated data bank, thousands of inquiries are being answered to assist research investigators and administrators in the planning and management of the projects and programs. During 1970 there has been a significant increase in demands for complex multi-disciplinary, multi-agency compilations that describe the details of broad programs of national importance, such as water resources, marine sciences, environmental pollution, and outdoor recreation. These compilations, including thousands of related projects, are being furnished as computer listings, printed catalogs, and tables of data or matrices showing the distribution of research effort over the appropriate subspecialties of complex programs.

Interest in the international exchange of information of this kind appears to be increasing, although most announced systems still seem to be in planning stages. A registry of Scientific and Technical Services among nine Asiatic nations, however, is currently operational in Australia, and a one-year experimental exchange arrangement has been initiated between SIE and the International Atomic Energy commission in Vienna.

The Exchange has progressed substantially toward a systems-network capability. About half of the total project input is now being received on compatible machine-readable tape capable of two way exchange. Eight keyboard visual screen terminals are now connected directly to the automated data bank and could be connected through leased lines whenever remote real time access is deemed desirable and economically feasible. Within a few months, the full text of all SIE records will be available in the computer store.

Reading Is Fundamental

The National Reading Is Fundamental program (RIF) has operated since 1968 as an independent unit under Smithsonian sponsorship and is supported by the Ford Foundation. RIF's purpose is to motivate disadvantaged youngsters and adults to want to read, by making available a wide variety of interesting and relevant inexpensive paperbacks.

"Reading Is Fundamental" in Cleveland—Elementary school children participate in RIF book distribution, visited by their Mayor, the Honorable Carl Stokes (member of RIF National Advisory Board), far right; Joseph D. Burrucker, Director, Cleveland-RIF, standing next to the Mayor; and Jerrold Sandler, Executive Director, National RIF Program, far left. Spring, 1970.

The program stresses self-selection and ownership of books in the belief that the right to read should be the birthright of all America's children. Under the Ford grant, RIF provides technical assistance and information to those interested in beginning a local project—school systems, libraries, and community agencies.

During 1969–1970 eleven model projects were developed, covering both urban and rural areas throughout the country, and including various ethnic groups—American Indians, Blacks, and Mexican-Americans. All funds for books, as well as the selection of titles, were the responsibility of the local sponsoring groups. Areas covered included Cleveland; Pittsburgh; Appalachia, Mississippi; New York City; East Los Angeles; St. Louis; Eastern Shore, Maryland; Columbus, Ohio; and Washington, D. C. In addition to these model projects, the Reading Is Fundamental central staff acts as liaison with the publishing industry, government, schools, and libraries regarding book programs and provides general information to all who seek it.

Two major publications were completed during the year for wide distribution: *Action for Change*, a pictorial booklet describing the

national program, and RIF's *Guide to Book Selection,* including more than 1700 titles and 1100 authors, with special sections dealing with materials of relevance to the ethnic groups served. Future plans call for the development of guidelines for setting up a RIF program and development of a new film for distribution via television and community organizations showing the program in action.

The Ford Foundation will continue to support RIF as a Smithsonian activity through a renewal grant of $400,000 for the three-year period, 1970–1973. Policy guidance for RIF is provided by a National Advisory Board composed of more than thirty distinguished Americans from many walks of life. The founder and chairman of RIF is Mrs. Robert S. McNamara; Secretary Ripley serves ex officio as a member of the RIF board.

OFFICE OF ACADEMIC PROGRAMS

SIXTY ACADEMIC APPOINTMENTS of six months or longer and seventy of shorter duration were conferred upon students and trainees in the Institution's programs of higher education in academic year 1969–1970 (Appendix 6). All such appointments now depend upon prior acceptance by members of the professional staff. This was the first year that the recipients of stipend awards had been chosen by committees of professional staff members, thus assuring that those selected would fit in well with our efforts in research. These guarantees have in turn increased staff members' willingness to supervise student projects. In a recent survey of more than 300 staff scientists and scholars only 53 indicated that they would not be available to supervise students (mostly because of administrative duties or plans to spend most of their time in the field), while 36 indicated that they would prefer only students who would assist them directly; 82 indicated a desire to supervise one student working on doctoral dissertation research and 78 expressed interest in having more than one. In addition, over 100 indicated a willingness to assist younger graduate students who had not yet completed their coursework and 83 indicated a willingness to offer seminars dealing with their research. This represents a very considerable capacity to conduct higher-education programs. While 29 PhDs were earned within the Smithsonian in 1969–1970, the total could readily be several times that amount. The Institution's major objective in higher education is to employ its capacity to the maximum practical extent.

In school services a 50 percent increase was achieved in escorted visits for local schoolchildren this year, through the expanded efforts of our groups of devoted volunteer docents (see Appendix 6). The total of 68,000 pupils is encouraging, but it is far more important to report that more and more of their experiences are self-directed explorations of museum exhibits as resources for individual learning. Rather than attempt to reproduce the classroom experience of listening to a lecture, we endeavor to help children learn how to learn on their own, enlisting visual curiosity and the important sense of touch (8 of the 16 tours offered each day include objects to be passed around). Let our concern about the limitations of conventional schooling lead us to significant experiments in the development of learning environments in the congenial and fascinating open settings of museums. In January we drew together a group of educators and museum staff members from around the country to help identify the most promising contributions of mu-

seums to science education. Its recommendations are being transmitted to the National Science Foundation, which supported the conference. With the aid of grants from the Charles F. Kettering Foundation and The New World Foundation, Professor John Appel of Michigan State University has conducted a pilot project in the preparation of learning resource materials from the Smithsonian collections to show the history of prejudice in America through the portrayal of ethnic and racial stereotypes in cartooning and the popular arts. The Institution also agreed to cooperate with the Encyclopaedia Britannica Educational Corporation in preparing sound filmstrips, an experiment aimed at extending the museum into the nation's classrooms.

Perhaps the greatest need in education is to introduce the comprehensive insights of modern science and scholarship into the process of education at all levels. The Smithsonian is endeavoring to conduct cycles of activities, each to last for a year or so, such as a series of commissioned essays to be presented in a major international symposium and an interdisciplinary exhibit to illuminate and reappraise an area of knowledge. The fourth cycle will explore cultural factors which may account for more rapid social change in the modern world. The program began with a year-long research seminar on popular culture conducted for faculty members and staff members of organizations in the Washington area, which was a fascinating exploration of the subject matter while serving as a welcome opportunity for interchange among scholars in the metropolitan area.

ADMINISTRATIVE MANAGEMENT

THE RELATIONSHIP of the Smithsonian Institution's executive management staff with its bureau directors and managers of other organization units may be described as one of partnership directed toward national goals in the fields of research, education, exhibition, culture, and public enlightenment. Day-to-day activities in furthering these objectives result in this partnership interacting in numerous ways, large and small, with every branch of government; schools and universities, museums and art galleries; citizens of all ages; professional societies and organizations; scientists and scholars, artists and authors the world over; foreign governments and institutions, and the international public. The program support groups also form a vital segment of this very diverse, yet closely related, internal and external network. Significant steps, such as the forming of an internal audits activity in the Office of the Under Secretary, have been taken during the year to strengthen and simplify the administrative framework within which all of these relationships function and thrive.

To enhance the efforts of the support units, some growth has been realized this year in two areas—the Office of Personnel and Management Resources benefitted by the addition of several positions and the Travel Services Office added one employee. Despite these modest increases, the support group as a whole has not yet realized position and funding increases commensurate with the growth of the Smithsonian program units. These handicaps did not lessen the lively interest, continuing cooperation, and dedicated efforts of these groups. A review of their individual and collective accomplishments during the year reveals that a noteworthy volume of high-standard work has been performed. The following statement highlights some of their achievements.

PROGRAM SUPPORT ACTIVITIES

The Office of Personnel and Management Resources has continued to advise and assist all Smithsonian staff in encouraging the development of an atmosphere of individual achievement within a framework of sound management of human resources. During this year an embryonic manpower program was developed, which established manpower

"ceilings" for the organizations within the Institution, and managers were asked to develop their programs within these ceilings. In this program top management is involved increasingly in decisions affecting human resources management. Manpower adjustments and key employee selections are reviewed by the appropriate Assistant Secretary and recommendations presented to the Secretary for decision. This procedure has the effect of translating top management interest throughout the Institution and contributes immeasurably to high-quality staffing and efficient manpower utilization.

An exciting program called "Vision '70" was launched this year in an effort to broaden the horizons of administrators, managers, and employees. This program began with a series of film presentations encompassing vital challenges of life in the 70s. One series of four films about Black America drew an attendance of 600. Other series were presented on environmental pollution and on drugs in American life. The goal calls for a monthly series on interrelated presentations, lectures, discussions, and symposia.

The awards program through which excellence can be rewarded has been simplified and authority to grant awards was delegated to bureau directors, eliminating unnecessary committees and additional paperwork. The career-development and job-enrichment training authority also has been delegated to bureau directors giving them the ability to plan their staff's training consistent with program requirements. A pilot program started in one major bureau in which the authority to classify jobs was delegated may develop into a prototype leading to increased flexibility for managers.

The training and development program provided for the attendance of two major program managers at the Federal Executive Institute, a voluntary executive management-development film program, a forty-hour first-level supervisory development program, and a secretarial training course tailor-made for the Smithsonian. These were in addition to continuing skills development in on-and-off the job training provided to employees from the trades and crafts through the professional ranks.

The varied activities of the Office as evidenced by the following statistical table of personnel actions, reflects the dynamics of organizational life of the Smithsonian Institution:

	Federal	*Private*	*Total*
New hires	744	499	1243
Employees leaving	604	391	995
Grade promotions	542	145	687
Other actions (reassignments, job changes, etc.)	621	269	890
Meritorious pay increases	178	24	202
Regular pay increases	784	184	968
Total actions	3473	1512	4985

A special survey showed that this year the office received 4524 visitors, responded to 52,392 telephone calls, and replied to 3240 letters. This total of over 60,000 responses to individuals seeking information is in addition to some 5000 internal requests from managers, supervisors, and employees.

Under the personal leadership of the Secretary, the Smithsonian's Office of Equal Employment Opportunity has continued a realistic program designed to assure genuine equality of opportunity in all official actions of the Smithsonian Institution.

During the year approximately 110 consultations were conducted with individual supervisory staff members on matters relating to their selections of candidates for promotion under the merit promotion program. A number of informal complaints were reviewed, factual information developed, and necessary adjustments made to the satisfaction of the complainants. Upon request, special counseling services are provided regularly to employees aspiring to positions of greater responsibility. This service provides staff members with information about educational opportunities available in the metropolitan D.C. area and the methods for acquiring specific educational and experience requirements for career advancement.

Two special training sessions were conducted for employees assigned recently to supervisory positions. The discussions stressed the necessity for eliminating personal prejudices, indifference to the needs of employees, and favoritism in supervisory practices.

In cooperation with the Office of Personnel and Management Resources a program is being developed to offer additional career opportunities for employees in lower-level positions.

The past year was one of progressive change and improvement for the Buildings Management Department. With the assistance of a private management consulting firm, an analysis was made of the Department's program and functional areas and plans were developed to provide a more manageable and effective operation. Service units were consolidated into three major groupings: Building Services Division, Engineering and Construction Division, and Protection Divison. The

new EDP (electronic data processing)-oriented system was implemented to provide regular, detailed financial and work-progress data covering virtually all services performed by the Department.

The largest of all Smithsonian units, the Department is responsible for the operation and maintenance of the physical plant, which comprises nearly 3.5 million square feet of floor space; safeguarding the priceless national collections, and guiding, assisting, and protecting the millions of people who visit the Smithsonian each year. The very spirit of these responsibilities results in the Department giving daily support to the Institution's diversified research, cultural, educational, and public enlightenment programs.

The 2560 special events and ceremonies which occurred during the year, required major participation by the Department. These included the Folklife Festival and the Tent Theatre productions which were presented on the Mall. In addition, special efforts were required to cope with problems associated with various demonstrations held in the vicinity of Smithsonian Institution buildings.

Major construction and renovation projects, which will total an expenditure of $16.6 million when completed, required the Department's continuing attention. This included design work, design-review planning conferences, contract development and review, as well as contract supervision. Major projects in this category were: the Hirshhorn Museum and Sculpture Garden, renovation of the original Smithsonian Institution Building, restoration of the exterior of the Arts and Industries Building, and remodeling of the snack bar in the History and Technology Building. Innumerable smaller projects were undertaken throughout the Smithsonian properties, including renovation and construction of office spaces, modifications to air-handling equipment, installation of a new freight elevator in the Freer, and extensive design work for other proposed projects.

The Administrative Ssytems Division issued in April the Smithsonian Staff Handbook 510—*Requisitioning—Purchase of Supplies and Services*. Work started on another handbook in this series, which will furnish policy and procedural guidelines covering internal services available to managers and supervisors in support of their programs. Some 250 administrative issuances were distributed to the staff, ranging from matters of permanent major policy and procedural guidelines to special interim instructions and matter-of-fact information of a temporary nature. Material about the staffing and functions of the organizations in the Smithsonian was provided to 30 external publications. A program was developed, in cooperation with the Information Systems Division, to provide computer support for the preparation and mainte-

Smithsonian Visitors During Fiscal Year 1970—1 July 1969–30 June 1970

Fiscal Year	*Smithsonian* [1] *Building*	*Arts & Industries*	*Natural History Building*	*Air & Space Building*	*Freer Gallery of Art*	*History & Technology Building*	*Fine Arts and Portrait Galleries*	*Totals*
1969								
July	Closed	318,388	388,929	278,917	27,299	718,742	14,019	1,746,294
August	Closed	337,167	448,380	355,291	35,639	775,077	21,126	1,972,680
September	Closed	188,537	165,638	107,002	16,533	245,391	11,277	734,378
October	Closed	234,355	198,472	145,849	15,120	307,635	22,975	924,406
November	Closed	249,216	247,623	108,624	12,778	409,362	21,169	1,048,772
December	Closed	107,452	124,883	52,651	7,045	186,504	10,598	489,133
1970								
January	Closed	109,194	147,644	46,003	11,956	197,487	14,294	526,578
February	Closed	102,479	154,990	67,050	10,300	215,659	9,656	560,134
March	Closed	194,639	285,615	138,057	17,683	429,919	10,599	1,076,512
April	Closed	257,630	383,303	185,987	20,223	635,103	36,677	1,518,923
May	Closed	215,038	371,617	164,182	16,591	686,707	25,865	1,480,000
June	Closed	243,060	352,697	189,760	26,138	675,969	18,268	1,505,892
Totals	–	2,557,155 [2]	3,269,791	1,839,373 [3]	217,305	5,483,555 [4]	216,523	13,583,702 [5]

[1] Closed for renovation.
[2] The popularity of the moon-rock exhibit is reflected in the one million increase.
[3] Worldwide interest in the exhibits recently acquired from space flights is reflected in the three-fourth-million increase.
[4] Moratorium demonstrations and the popularity of the Laser exhibits account for the one-and-one-half-million increase.
[5] Of the 3.2 million increase over FY 1969, normal growth accounts for approximately one-fourth million: the remainder is identified at footnotes 2, 3, and 4.

nance of data required for the *Smithsonian Institution Directory*. The Forms Management Unit processed, through in-house reproduction, 604 requests from 112 organizations for a variety of forms and form letters to support management, research, education, exhibition, and public service activities. In addition, 149 orders were placed with the Government Printing Office and other external sources.

The Photographic Services Division continued its active participation in programs concerned with research, documentation and conservation of collections, exhibitions, education, training, publications, and public service; and provided essential technical assistance and guidance as well as training for staff members in other Smithsonian organizations. Outstanding special exhibits, benefiting from professional photographic talent, where the "Laser 10," "Neutra," "Computer," and "Frederick Douglass" shows.

The 5870 work requests received by the Division provided 23,734 negatives, 13,734 transparencies, 33,699 microfilm frames, and 103,094 prints.

The Travel Services Office continues to experience growth in some major services, i.e., air and rail reservations booked were up 6 percent; travel itineraries issued 16 percent, and transportation requests prepared 10 percent, and the dollar value of all transportation purchased was some $53,000 higher than last year. Formerly cumbersome procedures involved in obtaining travel with excess foreign currencies for affiliates of the American Institute of Indian Studies have been streamlined. Travel management advice, program planning assistance, and a wide variety of travel services and technical guidance were provided to support major national and international symposia, meetings, expeditions, and special programs.

Purchases by the Supply Division this year have exceeded 12,000 units, an estimated increase of 1000 over the previous year. Under the government property distribution and utilization programs, items from airplanes to missiles—including a seagoing vessel from the Coast Guard—with an original acquisition value exceeding $8,000,000, have been obtained for exhibition and research purposes.

CONSTRUCTION PROGRESS

National Museum of History and Technology

Calder Stabile. A contract to install a filtration system for the pool was let 24 February 1970 to the John J. Kirlin Co. Completion of this work is expected by 24 August 1970.

Snack Bar. This facility was completely remodeled by the Joseph McCann Company. Construction commenced on 4 February 1970 and was completed on 1 June 1970.

Joseph H. Hirshhorn Museum and Sculpture Garden

Contract was awarded to the Piracci Construction Company and actual work was started on 23 March 1970. The projected completion date of this project is September 1972.

National Zoological Park

Hospital-Research Building. The Lomack Corporation contractors completed their work in December. The building, now partially occupied, will be completely used when required furnishings are delivered and installed.

Multiclimate House. Severe modifications in the final design resulted in the indefinite deferment of this project.

Heating Study. Final design was accepted and bids will be let and construction started early in fiscal year 1971.

Pollution Abatement Study. Recommended modifications of the sewerage system were accomplished and some erosion control measures were implemented at the same time.

Restoration and Renovation of Buildings

Renovation of Smithsonian Institution Building. The Grunley-Walsh Construction Company continued work throughout the year. The project was accepted as being substantially completed on 29 June 1970.

Freight Elevator in Freer Gallery. Contracts were let for this project on 3 March 1970. It is expected that the project will be completed by the fall of 1970.

Renwick Gallery. A contract for furthering restoration work was awarded to Associated Builders, Inc., on 15 June 1970. It is anticipated that this work will be completed about 15 October 1970.

Arts and Industries Building. A contract was awarded on 4 August 1969 to Mr. William Watts for the cleaning and restoration of the exterior of the building. Work was completed during November 1969.

Feasibility Studies

National Museum of History and Technology. A feasibility study was made to result in the preparation of a design for facilities necessary for the celebration of the Bicentennial of the American Revolution.

Woodrow Wilson International Center for Scholars. The Urban Design and Development Corporation completed a study for the Center to be located on a proposed Pennsylvania Avenue-Market Square complex. The conclusions were that the location was not feasible and that, if the entire complex could not be constructed under a central agency, the Center should be located elsewhere.

Parking. A draft of the study made by Wilbur Smith and Associates for Mall garages and Zoo parking is being reviewed.

Storage. The study completed by the George M. Ewing Company for redevelopment of the Smithsonian's Silver Hill facility is being reviewed.

NATIONAL GALLERY OF ART

National Gallery of Art

J. Carter Brown, *Director*

The National Gallery of Art, although technically established as a bureau of the Smithsonian Institution, is an autonomous and separately administered organization. It is governed by its own Board of Trustees, the statutory members of which are, ex officio, the Chief Justice of the United States (Chairman), the Secretary of State, the Secretary of the Treasury, and the Secretary of the Smithsonian Institution. There are also five General Trustees, from whom, in fiscal year 1970, Paul Mellon was reelected President of the Gallery, and John Hay Whitney, Vice President. The other General Trustees continuing to serve were Dr. Franklin D. Murphy, Lessing J. Rosenwald, and Stoddard M. Stevens.

During the fiscal year 1970 the Gallery had 1,935,533 visitors, an increase of more than 50 percent over the previous year. Its collections were augmented by an unusually large number of important accessions. Most notable among these is the Ailsa Mellon Bruce bequest, a collection which includes *Bazille and Camille* and *The Artist's Garden at Vétheuil,* both by Monet; and, among twenty two Renoirs, *Le Pont Neuf* and *Madame Monet and her Son in their Garden at Argenteuil.* Also in the collection is *Riverbank* by Cézanne, nine paintings by Bonnard, five by Pissarro, ten by Vuillard, and the *Condesa de Chinchón* by Goya.

The major single acquisition was *The Artist's Father* by Cézanne, a gift of Mr. Paul Mellon. Other important acquisitions include two Cubist paintings, *Football Players* by Albert Gleizes and *Rush Hour, New York* by Max Weber; *The City from Greenwich Village* by John Sloan; and drawings by Andrew Wyeth and van Dyck. *Portrait of Mme. Caillebotte,* by Renoir, was bequeathed by Angelika Wertheim Frink. The Gallery also received two American naive paintings from Colonel and Mrs. Edgar William Garbisch. Loans were made to 61 institutions in this country and abroad.

Especially notable among the years's exhibitions at the Gallery were "German Expressionist Watercolors," "Old Master Drawings from Chatsworth," "Joseph Wright of Derby," "The Artist and Space,"

"Masterpieces of African Sculpture" (attended by 118,801 persons in five weeks), and "The Reality of Appearance: The Trompe l'Oeil Tradition in American Painting."

In February, the Gallery announced a multimedia education program for junior and senior high schools throughout the nation, which will use a new means of reaching students. The program is based on a low-priced periodical called "Art and Man," published by Scholastic Magazines. This is packaged with filmstrips, slides, posters, color reproductions, and teaching guides. These are drawn from the resources not only of the National Gallery, but of other museums and private collections throughout the world.

The Gallery's extension services have also developed a comprehensive audio-visual program for use in classrooms. Slide lectures covering the history of art from the Byzantine period to the 20th century, traveling exhibits of framed reproductions, and 16-mm motion pictures dealing with art, humanities, history, social studies, and literature are loaned to schools at no cost. Last year extension services materials were used in over 3,000 communities in the nation and reached more than 3,100,000 people.

Total attendance at talks given by the Gallery's educational staff and for the programs presented in the auditorium, exclusive of "Civilisation" films, was 89,951 for 2610 separate tours and events. This represents an increase in attendance of 2993 over last year, when 2518 programs were scheduled. Some of the events regularly presented at the Gallery are its Tours of the Week, Paintings of the Week, and the Sunday Auditorium Lectures and Films.

Late last October the American premiere of the thirteen-part series "Civilisation," narrated by Britian's distinguished art historian Kenneth Clark, was presented at the Gallery. Audience response to this extraordinary series was immediate and enthusiastic. Through generous public cooperation, funds were raised to purchase prints of the entire series, making it possible for the series to be shown on a continual basis. Attendance in the Gallery at the films was over 247,000. In addition, the Gallery loaned its print, by request, to the White House, the Department of State, and the Central Intelligence Agency.

That same month saw the broadcast over the National Educational Television (NET) network of "In Search of Rembrandt," which was made possible by a grant to the National Gallery by Mrs. Cordelia Scaife May. The hour-long program, produced by the Gallery, was narrated by James Mason. NET cameras recorded more than 600 Rembrandt paintings and drawings from some 100 museums throughout the world, some of which are part of the Gallery's collection. The

film is now available through the Gallery to schools, libraries, and other educational institutions.

There were thirty-two guest lecturers who spoke at the Gallery during the last fiscal year. They included the A. W. Mellon Lecturer in the Fine Arts, Sir Nikolaus Pevsner, who gave eight talks on the subject of "Some Aspects of Nineteenth-Century Architecture."

Through the new self-service sales facility the Gallery's publications fund made available fourteen new publications, as well as eight catalogs of those exhibitions shown at the Gallery. During the year over 370,000 customers were served.

Under the supervision of Richard Bales, forty concerts were given on Sundays in the East Garden Court, twelve of them by the National Gallery Orchestra. Attendance continued high throughout the season, usually at capacity for the orchestral programs. All concerts were broadcast in their entirety by station WGMS, AM-FM.

Scientific research on the causes of deterioration of museum objects, sponsored in large part by the National Gallery, continues at Carnegie-Mellon University's Mellon Institute, Pittsburgh, Pennsylvania. The fading of pigments and dyes has received major consideration, as well as the processes of oxidation and ways in which they may be inhibited. This research project is exploring the application of durable modern materials to problems in conservation and is concentrated principally on polymer emulsions, ultraviolet absorbers, and solvents for the removal of synthetic polymers.

I. M. Pei & Partners moved ahead on the design of the East Building and connecting link addition to the Gallery. Plans call for over half a million gross square feet of space devoted to exhibition galleries and related supporting facilities, such as a Center for Advanced Study in the Visual Arts, a library, print and drawing facilities, photo archives, and offices for the Gallery's administrative and curatorial staff.

JOHN F. KENNEDY CENTER FOR
THE PERFORMING ARTS

John F. Kennedy Center for the Performing Arts

WILLIAM MCC. BLAIR, JR., *General Director*

PRESIDENT NIXON BECAME THE FOURTH AMERICAN PRESIDENT to give tangible support to the John F. Kennedy Center for the Performing Arts when on 17 October 1969 he signed a bill authorizing additional federal funds for the Center. The authorization increased the Center's matching federal grant from $15.5 million to $23 million and the United States Treasury loan from $15.4 million to $20.4 million. Without these additional funds, which were subsequently appropriated, construction of the Center could not have been completed on schedule (P.L. 91–90).

The Center was initiated by President Eisenhower on 2 September 1958 as the National Cultural Center (P.L. 85–874). It received the strong support of President Kennedy who signed legislation extending the fund-raising deadline on 19 August 1963 (P.L. 88–100). The Center was named as the sole official memorial in the nation's capital to President Kennedy on 23 January 1964 when President Johnson signed the John F. Kennedy Center Act (P.L. 88–206). This legislation also provided the first federal funds for the project.

The Kennedy Center is administered separately by a 45-member Board of Trustees appointed by the President to ten-year terms, together with members ex-officio from pertinent public agencies and from the United States Senate and House of Representatives. Members of the Board at the end of fiscal 1970 are as follows:

Richard Adler
Floyd D. Akers
Robert O. Anderson
Ralph E. Becker
K. LeMoyne Billings
Edgar M. Bronfman
Mrs. George R. Brown
Robert W. Dowling
Ralph W. Ellison
Abe Fortas
Representative Peter H. B. Frelinghuysen
Senator J. William Fulbright
Mrs. George A. Garrett
Leonard H. Goldenson
Mrs. Rebekah Harkness
George B. Hartzog, Jr.
Senator Edward M. Kennedy
Thomas H. Kuchel
Mrs. Albert D. Lasker

Erich Leinsdorf
Sol Myron Linowitz
Mrs. Michael J. Mansfield
Harry C. McPherson, Jr.
George Meany
Robert I. Millonzi
L. Quincy Mumford
Senator Charles Percy
Elliot Richardson
John Richardson, Jr.
S. Dillon Ripley II
Richard Rodgers
Arthur M. Schlesinger, Jr.
Mrs. Jouett Shouse
Mrs. Stephen E. Smith
Roger L. Stevens
William H. Thomas
Representative Frank H. Thompson, Jr.
Jack J. Valenti
William Walton
Walter E. Washington
Lew R. Wasserman
Edwin L. Weisl, Sr.
Representative James C. Wright, Jr.
Senator Ralph W. Yarborough

On 27 March 1970 President Nixon appointed a 57-member Advisory Committee on the Arts for the Center under the chairmanship of Mrs. J. Willard Marriott of Washington, D.C. On 26 May the President appointed an additional 49 members to the Advisory Committee, which is provided for in the John F. Kennedy Center Act.

Members of the Advisory Committee were sworn into office by Robert H. Finch, Secretary of Health, Education, and Welfare and a Trustee of the Center, on 8 June 1970 preceding their first business meeting. This committee, which represents 48 states and serves at the pleasure of the President, will make recommendations to the Board

John F. Kennedy Center for the Performing Arts nearing completion.

of Trustees regarding programs presented by the Center and also will assist the Board in its fund-raising program.

Construction of the Kennedy Center stands 75 percent complete at the end of fiscal year 1970, compared with 50 percent a year ago. An average of 600 men are working daily on the structure to assure that the official opening can take place during the second week of September 1971. Early in March 1970, Ambassador Egidio Ortona of Italy witnessed the placing of the final piece of Carrara marble in the Center's exterior wall which closed in the building. The Center's entire requirement for marble, about 3500 tons, is an official gift of the people of Italy.

Progress payments for construction in place and materials furnished reached $50.1 million of which $41.8 million were federal funds including $20.4 million of repayable bonds. Six additional subcontracts totaling $1.6 million were awarded during the year bringing to thirty-eight the number of separate competitive awards made since construction began in 1965. The awards total nearly $36 million.

The subcontracts awarded during the year are as follows:

Auditorium seating: American Seating Company of Palisades Park, New Jersey; $434,885.

Ceramic tile and terrazzo: Peter Bratti Associates, Inc. of New York, New York; $395,300.

Plumbing enclosures and partitions: Global Steel Products Corporation of Deer Park, Long Island, New York; $57,000.

Painting and finishing and wall coating: Clifton D. Mayhew, Inc. of Arlington, Virginia; $516,000.

Wood flooring: Couglin-Berk, Inc. of New York, New York; $162,380.

Drapery, curtain, and heavy-duty track: Washington Shade and Awning Co. of Washington, D.C.; $11,980.

The Secretary of State of Canada, the Honorable Gerard Pelletier, announced his government's gift to the Kennedy Center on 16 April 1970 during a brief ceremony at the Center's construction site. The gift, the ninth from a foreign nation, is a woolen stage curtain for the Eisenhower Theater designed by Madame Mariette Rosseau-Vermette, designer of the curtain for the Opera of the National Arts Centre in Ottawa. In addition to the nine nations which have already presented gifts to the Kennedy Center, there are more than twenty countries that have offered gifts, and discussions with them are continuing.

Looking forward to one kind of education program that will be presented by the Kennedy Center after its opening, the Center presented both the second American College Theater Festival and the National College Jazz Festival in the spring of 1970. The theater festival, presented with the Smithsonian and sponsored by American

Presentation of a color sketch of the black-and-red woolen stage curtain for the Kennedy Center's Eisenhower Theater, a gift of the people of Canada. Left to right, Susan Eisenhower, granddaughter of Mrs. Dwight D. Eisenhower; Madame Mariette Rousseau-Vermette, designer of the stage curtain; Roger L. Stevens, Chairman of the Board of Trustees of the Kennedy Center; the Honorable Gerard Pelletier, Secretary of State of Canada; Mrs. Edward M. Kennedy, representing the Kennedy family.

Airlines, brought ten of the nation's best college theater companies to perform at Ford's Theatre and the new George Washington University Center Theater between 27 April and 12 May. The jazz festival presented finalists from six regional college jazz festivals at the Krannert Center for the Performing Arts at the University of Illinois in Champaign-Urbana on 16 and 17 May.

John LaMontaine, the American composer, was commissioned to write a work for orchestra and organ for the opening season of the Center and first performance on the organ in the Concert Hall, it was announced on 28 January 1970. The work was commissioned by Mrs. Jouett Shouse, a Trustee of the Center and the donor of the Concert Hall's Aeolian Skinner organ. The theme for Mr. LaMontaine's composition will be taken from the books of Henry Thoreau, *Winter, Spring, Summer,* and *Autumn.*

On 18 June 1970 the Center sponsored "An Evening with Edward Villella" at Lisner Auditorium which presented Edward Villella, Patricia McBride, Violette Verdy, and ten other dancers from the New York City Ballet. About 150 tickets were made available to students at one dollar through the sale of benefit tickets.

With the substantial progress of interior construction work during fiscal year 1970, tours of the building were arranged on a limited basis. In September 1969 all major contributors to the Center in the Washington area were invited to see the building. Subsequently during the year many foreign ambassadors to the United States, the cultural attaches of all foreign embassies, members of the press, the D.C. Arts Council, representatives of the National Endowment on the Arts and the United States Information Agency, and other groups with a special interest in the building were invited for a tour.

The Friends of the Kennedy Center, established as an auxiliary organization by the Trustees in 1966, have about 3000 members in 48 states and 29 regional and state chairmen. The Friends are seeking to expand membership both in the Washington area and across the country and welcome all new members.

On 2 June the National Council of the Friends met to elect the following officers:

Mrs. Polk Guest, chairman

Mrs. Norris Dodson, Jr., vice chairman

Mrs. Eugene Carusi, secretary

Mr. Henry Strong, treasurer

During July and August 1969, the Friends sponsored a city-wide arts project under the title, "Music, Music, Music" for which 1000 children produced works of art in conjunction with music experiences. All participants were invited to the construction site on 9 August for a picnic and to view an exhibit of their works using the River Terrace covered parkway to form a giant exhibition center.

On 18 December 1969 the Friends produced a unique evening entitled "The Kennedy Center is for everyone." The occasion was the premiere of the film "Hello, Dolly!," sponsored by the Kennedy Center, and included a box supper at the National Museum of Natural History. Tickets sold at prices from $1 (limited to students contacted through city programs) to $50, and by selling a large number of tickets at the higher prices the Friends were able to make available over 350 tickets to young people.

The Friends continued to sponsor a weekly radio program on the performing arts on station WGMS, manned the Information Center at the construction site, and maintained a Speakers Bureau whose members gave talks both in Washington and throughout the country. The Fourth Annual Meeting of the Friends, held 12 and 13 May, featured Senator Claiborne Pell of Rhode Island as key speaker.

APPENDIXES

Appendix 1

SMITHSONIAN FOREIGN CURRENCY PROGRAM GRANTS AWARDED IN FISCAL YEAR 1970

Archeology and Related Disciplines

OFFICE OF ANTHROPOLOGY, SMITHSONIAN MUSEUM OF NATURAL HISTORY, WASHINGTON, D.C. Survey of disappearing traditional crafts, industries, and Technologies in Ceylon.

UNIVERSITY OF HAWAII, HONOLULU, HAWAII. Ceylon archeological survey.

UNIVERSITY OF WASHINGTON, SEATTLE, WASHINGTON. A study of the relations between kinship structure and economic organizations among the Veddas of Ceylon.

AMERICAN INSTITUTE OF INDIAN STUDIES, PHILADELPHIA, PENNSYLVANIA. Support for American Institute of Indian Studies research fellowships.

UNIVERSITY OF MISSOURI, COLUMBIA, MISSOURI. To complete investigations of ancient glass manufacturing sites.

AMERICAN SCHOOLS OF ORIENTAL RESEARCH, CAMBRIDGE, MASSACHUSETTS. Archeological activity of the American Schools of Oriental Research.

CARNEGIE MUSEUM, PITTSBURGH, PENNSYLVANIA. Excavations of a Philistine city at Ashdod.

JERUSALEM SCHOOL OF ARCHEOLOGY OF THE HEBREW UNION COLLEGE, CINCINNATI, OHIO. Excavations of an archeologocial site at Gezer, Israel.

OFFICE OF ANTHROPOLOGY, SMITHSONIAN MUSEUM OF NATURAL HISTORY, WASHINGTON, D.C. Archeological investigations of southern Palestinian culture at Tel Jemmah.

UNIVERSITY OF ARIZONA, TUCSON, ARIZONA. A program for research and training in prehistoric archeology in Israel: Excavations at the site of Tabun.

AMERICAN SCHOOLS OF ORIENTAL RESEARCH, CAMBRIDGE, MASSACHUSETTS. Expeditions to Tel El Hesi and Khirget Shema.

UNIVERSITY OF MISSOURI, COLUMBIA, MISSOURI. Excavations at Tel Anafa (Shamli), Israel.

UNIVERSITY OF ILLINOIS, URBANA, ILLINOIS. The Maqam tradition in theory and practice.

OFFICE OF ANTHROPOLOGY, SMITHSONIAN MUSEUM OF NATURAL HISTORY, WASHINGTON, D.C. Survey of disappearing traditional crafts, industries, and technologies in Pakistan.

DUMBARTON OAKS CENTER FOR BYZANTINE STUDIES, WASHINGTON, D.C. A corpus of ancient mosaics of Tunisia.

AMERICAN RESEARCH CENTER IN EGYPT, INC., PRINCETON, NEW JERSEY. Support for the activities of the American Research Center in Egypt (ARCE).

University of Pennsylvania, Philadelphia, Pennsylvania. The Akhnaten temple project.

Brooklyn College of the City University of New York, Brooklyn, New York. Excavations at Starcevo, Yugoslavia.

University of California at Los Angeles, Los Angeles, California. Excavations of a Neolithic stratified settlement at Anzibegovo in Eastern Macedonia, Yugoslavia.

Denison University, Granville, Ohio. Archeological excavations at Sirmium.

University of Texas at Austin, Texas. Archeological excavations at Stobi.

Douglass College, Rutgers University, New Brunswick, New Jersey. Excavations at Salona.

University of California at Los Angeles, Los Angeles, California. The Early Bronze Age cemetery at Mokrin. (Publication costs only.)

University of Minnesota, Minneapolis, Minnesota. Excavations of Diocletians palace, Split, Yugoslavia.

Indiana University, Bloomington, Indiana. Excavations at Nin, Dalmatia, Yugoslavia.

Dumbarton Oaks Center for Byzantine Studies, Washington, D.C. Medieval Bargala.

University of Pittsburgh, Pittsburgh, Pennsylvania. Early food-producing cultures in Yugoslavia.

University of California at Los Angeles, Los Angeles, California. Excavations at Senta (Velebit).

University of California at Los Angeles, Los Angeles, California. Archeological investigations at the Iron Age sites in Batina and Dalj.

Systematic and Environmental Biology (Including Paleobiology)

Smithsonian National Zoo, Washington, D.C. Studies on the behavior and ecology of the Ceylonese elephant.

Smithsonian Museum of Natural History, Washington, D.C. A revision of Trimen's *Handbook to the Flora of Ceylon.*

Department of Entomology, Smithsonian Museum of Natural History, Washington, D.C. Biosystematic studies of the insects of Ceylon.

Smithsonian Institution, Washington, D.C. Administration of Smithsonian sponsored projects in Ceylon.

Smithsonian National Zoo, Washington, D.C. The comparative ecology and behavior of Ceylonese Cercopithecidae.

Smithsonian Institution, Washington, D.C. Binational symposium to assess impact of Smithsonian-supported research on Ceylonese national science objectives.

University of Michigan, Ann Arbor, Michigan. Cytological studies of Indian mollusks.

Smithsonian Ecology Program, Washington, D.C. Conference for the International Union for the Conservation of Nature (IUCN).

Smithsonian Ecology Program, Washington, D.C. Conference for the International Council for Bird Preservation (ICBP).

SMITHSONIAN ECOLOGY PROGRAM, WASHINGTON, D.C. Ecological research in the Gir Forest.

YALE UNIVERSITY, NEW HAVEN, CONNECTICUT. Habitat relationships, numbers, and distribution of wild ungulates in the Gir Forest, India.

DEPARTMENT OF VERTEBRATE ZOOLOGY, SMITHSONIAN MUSEUM OF NATURAL HISTORY, WASHINGTON, D.C. Migratory bird survey.

DEPARTMENT OF BOTANY, SMITHSONIAN MUSEUM OF NATURAL HISTORY, WASHINGTON, D.C. A flora of the Hassan District, Mysore State, India.

SMITHSONIAN OCEANOGRAPHY PROGRAM, WASHINGTON, D.C. Biota of the Red Sea and Eastern Mediterranean.

SMITHSONIAN ECOLOGY PROGRAM, WASHINGTON, D.C. Bird Banding and Avifaunal Survey.

UNIVERSITY OF THE STATE OF NEW YORK, STONY BROOK, LONG ISLAND, NEW YORK. A Study of the Eilat Coral Reef.

UNIVERSITY OF MISSOURI, COLUMBIA, MISSOURI. Ecology and behavior of gazelles in Israel.

DEPARTMENT OF VERTEBRATE ZOOLOGY, SMITHSONIAN MUSEUM OF NATURAL HISTORY, WASHINGTON, D.C. A geographical and ecological study of the mammals of Morocco.

SMITHSONIAN INSTITUTION AND NATIONAL ACADEMY OF SCIENCES, WASHINGTON, D.C. International Biological Program (IBP) research, planning, and training in the "excess" currency countries.

FOREIGN SCIENCE INFORMATION PROGRAM, WASHINGTON, D.C. Scientific translation services.

SMITHSONIAN OCEANOGRRAPHY PROGRAM, WASHINGTON, D.C. Support for the Mediterranean Marine Sorting Center.

DEPARTMENT OF INVERTEBRATE ZOOLOGY, SMITHSONIAN MUSEUM OF NATURAL HISTORY, WASHINGTON, D.C. Studies on the systematics and physiological ecology of Tunisian sponge communities.

UNIVERSITY OF COLORADO, BOULDER, COLORADO. Paleontological investigations in Tunisia.

SMITHSONIAN OCEANOGRAPHIC PROGRAM, WASHINGTON, D.C. International Conference on Meiofauna. (Unanticipated extra costs.)

DEPARTMENT OF VERTEBRATE ZOOLOGY, SMITHSONIAN MUSEUM OF NATURAL HISTORY, WASHINGTON, D.C. A serological and ectoparasite survey of the migratory birds of East Africa.

SMITHSONIAN OCEANOGRAPHY PROGRAM, WASHINGTON, D.C. Preparation of plans and projects for refitting the research vessel *Phykos*.

DEPARTMENT OF INVERTEBRATE ZOOLOGY, SMITHSONIAN MUSEUM OF NATURAL HISTORY, WASHINGTON, D.C. International Conference on the Biology of Sipunculids.

Astrophysics and Earth Sciences

SMITHSONIAN ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASSACHUSETTS. Continuation of a study of cosmic gamma rays.

SMITHSONIAN ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASSACHUSETTS. Multicolor photoelectric observations of flare stars at the Uttar Pradesh State Observatory and analysis of flare-star observations.

SMITHSONIAN ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASSACHUSETTS. A study of the collective behavior of self-gravitating systems.

SMITHSONIAN ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASSACHUSETTS. The construction of stellar models of evolving stars.

SMITHSONIAN ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASSACHUSETTS. An astronomical observing program in Israel.

FOREIGN SCIENCE INFORMATION PROGRAM, NATIONAL SCIENCE FOUNDATION, WASHINGTON, D.C. (on behalf of Smithsonian Astrophysical Observatory). Translation of the Polish Copernican studies of L. A. Birkenmajer.

Museum Programs

DEPARTMENT OF ANTHROPOLOGY, SMITHSONIAN MUSEUM OF NATURAL HISTORY, WASHINGTON, D.C. Exhibit of Bhutanese Art.

DIRECTOR GENERAL OF MUSEUMS, SMITHSONIAN INSTITUTION, WASHINGTON, D.C. Support for Science Museum Conference at Bangalore.

BOSTON MUSEUM OF FINE ARTS, BOSTON, MASSACHUSETTS. Exhibition of Egyptian royal sculpture.

Appendix 2

MEMBERS OF THE SMITHSONIAN COUNCIL 30 JUNE 1970

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PROFESSOR JOHN D. SPIKES. Professor of Biology, College of Letters and Science, University of Utah, Salt Lake City.

PROFESSOR STEPHEN E. TOULMIN. Department of Philosophy, Michigan State University, East Lansing.

DR. RAINER ZANGERL. Field Museum of Natural History, Roosevelt Road and Lakeshore Drive, Chicago, Illinois.

PROFESSOR WARREN H. WAGNER, JR. Department of Botany and Matthaei Botanical Gardens, The University of Michigan, Ann Arbor.

Appendix 3

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Appendix 4

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Under Secretary	James Bradley[1]
Special Assistant	Robert Engle
Administrative Officer	Dorothy Rosenberg
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Assistant Secretary (Science)	Sidney R. Galler
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Assistant Treasurer	Betty J. Morgan
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Director, Office of Academic Programs	Philip C. Ritterbush
General Counsel	Peter G. Powers
Assistant General Counsel	Alan Ullberg[2]
Director, Office of Personnel and Management Resources	Leonard B. Pouliot
Special Projects, Office of the Secretary	
Special Assistant to the Secretary	Richard H. Howland
Director, Office of Development	Lynford E. Kautz[3]
Equal Employment Opportunity Officer	Joseph A. Kennedy
Editor, Joseph Henry Papers	Nathan Reingold
Chief, Administrative Systems Division	Ann S. Campbell
Director, Buildings Management Department	Andrew F. Michaels

[1] Effective 21 May 1970.

[2] Effective 18 January 1970.

[3] Effective 2 September 1969.

Chief, Supply Division	Fred G. Barwick
Chief, Photographic Services Division	O. H. Greeson
Chief, Travel Services Office	Betty V. Strickler
Honorary Research Associates	Charles G. Abbot, Secretary Emeritus
	Leonard Carmichael, Secretary Emeritus
	Paul H. Oehser
	Alexander Wetmore, Secretary Emeritus
Honorary Fellow	John A. Graf

SCIENCE

Assistant Secretary	Sidney R. Galler
Special Assistants	Helen H. Hayes
	Harold J. Michaelson

National Museum of Natural History

Director	Richard S. Cowan
Assistant Director	Paul K. Knierim
Assistant to Director (ADP)	James F. Mello[4]
Special Assistant, Tropical Biology	F. Raymond Fosberg
Botanist	Marie-Helene Sachet
Administrative Officers	Mabel A. Byrd
	John J. Prenzel[5]
	John C. Townsend[6]
Special Assistant to the Director	Joseph C. Britton[7]
Anthropology	
Chairman	Clifford Evans[8]
Senior Physical Anthropologist	T. Dale Stewart
Senior Archeologist	Waldo R. Wedel
Senior Ethnologist	John C. Ewers
Archivist	Margaret C. Blaker
Latin American Anthropology	
Supervisor and Associate Curator	Robert M. Laughlin
Curator	Clifford Evans
Associate Curator	William H. Crocker
Old World Anthropology	
Supervisor and Curator	Gordon D. Gibson
Curator	Saul H. Riesenberg

[4] Appointed 11 January 1970.
[5] Transferred to Department of Defense September 1969.
[6] Appointed 28 June 1970.
[7] Resigned 26 June 1970.
[8] Effective 25 January 1970.

Associate Curators	Eugene I. Knez
	Gus W. Van Beek
	William B. Trousdale
North American Anthropology	
Supervisor and Curator	Richard B. Woodbury[9]
Curator	William C. Sturtevant
Associate Curator	Paul H. Voorhis
Physical Anthropology	
Supervisor and Curator	J. Lawrence Angel
Assistant Curator	Donald J. Ortner[10]
Associate Curator	Lucile E. St. Hoyme
Honorary	Hans-George Bandi (Archeology)
	W. Montague Cobb (Physical Anthropology)
	Henry B. Collins (Archeology)
	Wilson Duff (Ethnology)
	Roger I. Eddy (Ethnology)
	Marcus S. Goldstein (Physical Anthropology)
	Sister Inez Hilger (Ethnology)
	C. G. Holland (Archeology)
	Neil M. Judd (Archeology)
	Richard T. Koritzer (Physical Anthropology)
	Ralph K. Lewis (Archeology)
	Olga Linares de Sapir (Archeology)
	Betty J. Meggers (Archeology)
	Philleo Nash (Ethnology)
	Victor A. Nunez Regueiro (Archeology)
	Mary Slusser (Archeology)
	Wilhelm G. Solheim (Archeology)
	Matthew W. Stirling (Archeology)
	Douglas Taylor (Ethnology)
	William J. Tobin (Physical Anthropology)
	Theodore A. Wertime (Archeology)
	William S. Willis, Jr. (Ethnology)
	Edwin F. Wilmsen (Archeology)
Botany	
Chairman	Edward S. Ayensu[11]
Senior Botanist	Lyman B. Smith
Phanerogams	
Supervisor and Associate Curator	Dan H. Nicolson
Curators	John J. Wurdack
	Velva E. Rudd

[9] Resigned 31 July 1969.
[10] Appointed 21 September 1969.
[11] Effective 2 April 1970.

Associate Curator	Wallace R. Ernst
Assistant Curator	Stanwyn G. Shetler
	Dieter C. Wasshausen
Ferns	
Supervisor and Associate Curator	David B. Lellinger
Curator	Conrad V. Morton
Grasses	
Supervisor and Associate Curator	Thomas R. Soderstrom
Cryptogams	
Supervisor and Associate Curator	Harold E. Robinson
Curator	Mason E. Hale, Jr.
Plant Anatomy	
Supervisor and Associate Curator	Richard H. Eyde
Associate Curator	Edward S. Ayensu
Fungi[12]	
Research Associates	Chester R. Benjamin
	John A. Stevenson
	Francis A. Uecker
	John L. Cunningham
	Paul Lewis Lentz
	Marie L. Farr
	Kent H. McKnight
	L. R. Batra
Honorary	Andrew W. Archer (Flowering Plants)
	Paul S. Conger (Diatomaceae)
	José Cuatrecasas (Flora of Tropical South America)
	James A. Duke (Flora of Panama)
	Emily W. Emmart (Plants of Mexico)
	F. Raymond Fosberg (Tropical Biology)
	Howard S. Gentry (Economic Plants of Northwestern Mexico)
	William H. Hathaway (Flora of Central America)
	Frederick J. Hermann (North American Flora)
	Elbert L. Little, Jr. (Dendrology)
	Alicia Lourteig (Neotropical Botany)
	Floyd A. McClure (Bamboos)[13]
	Kittle F. Parker (Compositae)
	Julian C. Patiño (Flora of Colombia)
	Clyde F. Reed (Ferns)
	James L. Reveal (Ferns)

[12] National fungus collections are curated by Department of Agriculture staff.
[13] Died 15 April 1970.

Honorary—Continued	Marie L. Solt (Melastomataceae)
	William L. Stern (Plant Anatomy)
	Edward E. Terrell (Phanerogams)
	Egbert H. Walker (Myrsinaceae, East Asian Flora)
Entomology	
Chairman	Karl V. Krombein
Senior Entomologist	J. F. Gates Clarke
Neuropteroids	
Supervisor and Curator	Oliver S. Flint, Jr.
Lepidoptera and Diptera	
Supervisor and Associate Curator	Donald R. Davis
Associate Curator	W. Donald Duckworth
Assistant Curator	William D. Field
Coleoptera	
Supervisor and Associate Curator	Paul J. Spangler
Curator	Oscar L. Cartwright[14]
Hemiptera and Hymenoptera	
Supervisor and Assistant Curator	Gerald I. Stage[15]
Associate Curator	Richard C. Froeschner
Myriapoda and Arachnida	
Supervisor and Curator	Ralph E. Crabill, Jr.
Honorary	William H. Anderson (Coleoptera)
	Doris H. Blake (Coleoptera)
	Franklin S. Blanton (Diptera)
	Frank L. Campbell (Insect Physiology)
	Oscar L. Cartwright (Coleoptera)
	K. C. Emerson (Mallophaga)
	Frank M. Hull (Diptera)
	William L. Jellison (Siphonaptera, Anoplura)
	Harold F. Loomis (Myriapoda)
	Carl F. W. Muesebeck (Hymenoptera)
	Thomas E. Snyder (Isoptera)
	Robert Traub (Siphonaptera)
Invertebrate Zoology	
Chairman	Raymond B. Manning
Senior Zoologists	Fenner A. Chase, Jr.
	Horton H. Hobbs, Jr.
	Harald A. Rehder
Crustacea	
Supervisor and Curator	Thomas E. Bowman
Curators	J. Laurens Barnard
	Louis S. Kornicker
Associate Curator	Roger F. Cressey

[14] Retired 30 April 1970.

[15] Appointment terminated 30 March 1970. Replaced by Richard C. Froeschner 1 July 1970.

Echinoderms	
Supervisor and Curator	David L. Pawson
Associate Curator	Klaus Ruetzler
Worms	
Supervisor and Associate Curator	W. Duane Hope
Curators	Meredith L. Jones
	Marian H. Pettibone
Associate Curator	Mary E. Rice
Mollusks	
Supervisor and Associate Curator	Clyde F. E. Roper
Curator	Joseph Rosewater
Associate Curator	Joseph P. E. Morrison
Honorary	Frederick M. Bayer (Lower Invertebrates)
	Willard W. Becklund (Helminthology)
	S. Stillman Berry (Mollusks)
	J. Bruce Bredin (Biology)
	Isabel C. Canet (Crustacea)
	Maybelle H. Chitwood (Worms)
	Ailsa M. Clark (Marine Invertebrates)
	Elisabeth Deichmann (Echinoderms)
	Mary Gardiner (Echinoderms)
	Roman Kenk (Worms)
	Anthony J. Provenzano, Jr. (Crustacea)
	Waldo L. Schmitt (Marine Invertebrates)
	Frank R. Schwengel (Mollusks)
	I. G. Sohn (Crustacea)
	Donald F. Squires (Echinoderms)
	Gilbert L. Voss (Mollusks)
	Mrs. Mildred S. Wilson (Copepod Crustacea)
Mineral Sciences	
Chairman	Brian H. Mason
Curator	George S. Switzer
Meteorites	
Supervisor and Associate Curator	Roy S. Clarke, Jr.
Chemist	Joseph A. Nelson
Curator	Kurt Fredriksson
Geochemist	Robert F. Fudali
Chemist	Eugene Jarosewich
Mineralogy	
Supervisor and Associate Curator	Paul E. Desautels
Petrology	
Supervisor and Associate Curator	William G. Melson
Honorary	Howard J. Axon (Meteorites)
	Edward P. Henderson (Meteorites)

Honorary—Continued	John B. Jago (Mineralogy)
	Peter Leavens (Mineralogy)
	Rosser Reeves (Mineralogy)
	Thomas E. Simkin (Petrology)
	Geoffrey Thompson (Petrology)
	Harry Winston (Mineralogy)
Paleobiology	
Chairman	Porter M. Kier
Senior Paleobiologists	G. Arthur Cooper
	C. Lewis Gazin
Invertebrate Paleontology	
Supervisor and Curator	Martin A. Buzas
Curators	Richard S. Boardman
	Alan H. Cheetham
	Erle G. Kauffman
	Richard Cifelli
	Richard M. Benson
Associate Curator	Thomas R. Waller
Staff Specialist (Electron-microscopy)	Kenneth M. Towe
Vertebrate Paleontology	
Supervisor and Curator	Clayton E. Ray
Curator	Nicholas Hotton III
Paleobotany	
Supervisor and Associate Curator	Walter H. Adey[16]
Associate Curators	Leo J. Hickey
	Francis M. Hueber
Sedimentology	
Supervisor and Curator	Daniel J. Stanley
Associate Curator	Jack W. Pierce
Honorary	
Invertebrate Paleontology	Arthur J. Boucot
	Anthony C. Coates
	C. Wythe Cooke
	J. Thomas Dutro
	Robert M. Finks
	Mackenzie Gordon, Jr.
	Richard E. Grant
	John W. Huddle
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	N. Gary Lane
	Kenneth E. Lohman
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	William A. Oliver, Jr.
	Axel A. Olsson
	John Pojeta, Jr.
	Norman F. Sohl
	Margaret Ruth Todd
	Wendell P. Woodring

[16] Effective 1 October 1969.

Honorary—Continued	Ellis L. Yochelson
Vertebrate Paleontology	Douglas Emlong
	Frank C. Whitmore, Jr.
Sedimentology	Gilbert Kelling
	Frederic R. Siegel
Vertebrate Zoology	
Chairman	George W. Watson
Fishes	
Supervisor and Curator	Robert H. Gibbs, Jr.[17]
Curators	Ernest A. Lachner
	Victor G. Springer
	Stanley H. Weitzman
Associate Curator	William R. Taylor
Reptiles and Amphibians	
Supervisor and Curator	James A. Peters
Associate Curator	George R. Zug
Birds	
Supervisor and Curator	Richard L. Zusi
Associate Curator	Paul Slud
Mammals	
Supervisor and Curator	Charles O. Handley
Curator	Henry W. Setzer
Associate Curator	Richard W. Thorington[18]
Honorary	John W. Aldrich (Birds)
	Richard C. Banks (Birds)
	William Belton (Birds)
	James E. Böhlke (Fishes)
	Leonard Carmichael (Psychology, Animal Behavior)
	Daniel M. Cohen (Fishes)
	Bruce B. Collette (Fishes)
	John F. Eisenberg (Mammals)
	Herbert Friedmann (Birds)
	Crawford H. Greenewalt (Birds)
	Arthur M. Greenhall (Mammals)
	Philip S. Humphrey (Birds)
	David H. Johnson (Mammals)
	Clyde J. Jones (Mammals)
	Gwilm S. Jones (Mammals)
	E. V. Komarek (Mammals)
	Roxie C. Laybourne (Birds)
	Richard H. Manville (Mammals)
	J. A. J. Meester (Mammals)
	Edgardo Mondolfi (Mammals)
	Russell E. Mumford (Mammals)
	Dioscoro S. Rabor (Birds)
	S. Dillon Ripley (Birds)
	Leonard P. Schultz (Fishes)

[17] Effective 1 July 1969.

[18] Effective 2 November 1969.

Honorary—Continued	Frank J. Schwartz (Fishes)
	Alexander Wetmore (Birds)
	David B. Wingate (Birds)

National Air and Space Museum

Acting Director	Frank A. Taylor[19]
Acting Assistant Director (Aeronautics)	Louis S. Casey
Curator (Aircraft Propulsion)	Robert B. Meyer
Assistant Director (Astronautics)	Frederick C. Durant III
Assistant Director (Information)	Ernest W. Robischon
Advisory Board	S. Dillon Ripley, Chairman (ex officio)
	Major General Nils O. Ohman, USAF
	Vice Admiral Thomas F. Connolly, USN
	Brigadier General James L. Collins, USA
	Brigadier General H. S. Hill, USMC
	Rear Admiral Roderick Y. Edwards, USCG
	Julian Scheer, NASA
	General Gustav Lundquist, FAA
	(Three civilian vacancies)
Honorary	Olive Ann Beech
	William E. Hall
	Elwood R. Quesada

Astrophysical Observatory

Director	Fred L. Whipple
Assistant Director (Science)	Charles A. Lundquist
Assistant Director (Management)	Robert V. Bartnik[20]
Scientific Staff	Arthur C. Allison
	Eugene H. Avrett
	Eric Becklin
	Prabhu Bhatnagar
	Nathaniel P. Carleton
	Frederic Chaffee
	Jerome R. Cherniack
	Giuseppe Colombo
	Matthias F. Comerford
	Allan F. Cook

[19] Effective 10 September 1969.

[20] Appointed 12 January 1970.

Scientific Staff—Continued

Alex Dalgarno
Robert J. Davis
James C. DeFelice
William A. Deutschman
John S. Dickey, Jr.
Dale F. Dickinson
Giovanni G. Fazio
Edward L. Fireman
M. Raymond Flannery
Giuseppe Forti
Fred A. Franklin
Edward M. Gaposchkin
Owen Gingerich
Antanas Girnius
Mario D. Grossi
Henry F. Helmken
Paul W. Hodge
Luigi G. Jacchia
Wolfgang Kalkofen
Yoshihide Kozai
David Latham
Myron Lecar
Carlton G. Lehr
Martin Levine
Hiram Levy II
A. Edward Lilley
Richard E. McCrosky
Brian G. Marsden
Ursula B. Marvin
Naresh C. Mathur
George H. Megrue
Donald H. Menzel
Lawrence W. Mertz
Henri E. Mitler
Paul A. Mohr
Carl S. Nilsson
Yasushi Nozawa
Robert W. Noyes
Costas Papaliolios
Cecilia H. Payne-Gaposhkin
Michael R. Pearlman
Douglas T. Pitman
Annette Posen
Harrison E. Radford
George Rieke
George B. Rybicki
Winfield W. Salisbury
Rudolph E. Schild
Mario R. Schaffner
Ladislav Sehnal

Scientific Staff—Continued	Zdenek Sekanina
	Chen-Yuan Shao
	I. Shapiro
	Jack W. Slowey
	Richard B. Southworth
	Gert Spannagel
	Stephen E. Strom
	Wesley A. Traub
	Robert Vessot
	Richard B. Wattson
	George Weiffenbach
	Trevor C. Weekes
	Charles A. Whitney
	John A. Wood
	Frances W. Wright
Consultants	John Danziger
	Salah E. Hamid
	Kurt Lambeck
	Nirumpama Raghaven
	Stanley Ross
	Robert Stein
	Karen Strom
	George Veis
	Natarajan Visvanathan
Fellows	David R. Hearn
	Noam Sack
Executive Director, Central Bureau for Satellite Geodesy	Jan Rolff
Director, Central Bureau for Astronomical Telegrams	Brian G. Marsden

Smithsonian Tropical Research Institute

Director	Martin H. Moynihan
Deputy Director	Edward H. Kohn
Assistant Director, Marine Biology	Ira Rubinoff
Administrative Officer	Adela Gomez
Biologists	Robert L. Dressler
	Peter W. Glynn
	Egbert Leigh
	A. Stanley Rand
	Michael H. Robinson
	Roberta W. Rubinoff
	Neal G. Smith
Honorary	Charles F. Bennett, Jr.
	John F. Eisenberg
	Carmen Glynn
	Carlos Lehmann
	Robert H. MacArthur

Honorary—Continued	Giles W. Mead
	Ernst Mayr
	Barbara Robinson
	Patricio Sánchez
	W. John Smith
	C. C. Soper
	Paulo Vanzolini
	Martin Young

Radiation Biology Laboratory

Director	William H. Klein
Assistant Director	Walter A. Shropshire, Jr.
Biochemists	David L. Correll
	Maurice M. Margulies
	Robert L. Weintraub
	Homer T. Hopkins
Biologist	Elisabeth Gantt
Geneticist	Andrew W. Snope
Anthropologist	Robert Stuckenrath
Geochemist	James Mielke
Physicist	Bernard Goldberg
Plant Physiologists	John Edwards
	Victor B. Elstad
	Rebecca Gettens
	Leonard Price

National Zoological Park

Director	T. H. Reed
Assistant Director	John Perry
Office of the Director	
Pathologist	Robert M. Sauer
Engineer	Frank A. Maloney
Architect	Norman Melun
Acting Head, Information and Education	Sybil E. Hamlet
Administrative Officer	Joseph J. McGarry
Special Assistant to the Director	Warren J. Iliff
Personnel Management Specialist	Robert H. Artis
Department of Living Vertebrates	
Manager, Bird Division	Kerry A. Muller
Manager, Reptile Division	Jaren G. Horsley
Scientific Research Department	
Resident Scientist	John F. Eisenberg
Zoologist	Larry R. Collins
Veterinarian, Animal Health Department	Clinton W. Gray

Chief, Operations and Maintenance Department	James H. McAllister
Associates in Ecology	Helmut K. Buechner
	S. Dillon Ripley
	Lee M. Talbot
Research Associates	Jean Delacour
	Suzanne Ripley
Collaborators	Richard Fiennes
	F. M. Garner
	Leonard Goss
	J. Lear Grimmer
	Carlton Herman
	Werner P. Heuschle
	Paul Leyhausen
	Charles R. Schroeder
	Constance P. Warner

Office of Environmental Sciences[21]

Director	I. Eugene Wallen[22]
Ecology Program	
Director	Dale W. Jenkins[23]
Senior Scientist	Helmut K. Buechner
Resident Ecologist	Lee M. Talbot
Oceanography and Limnology Program	
Director	William I. Aron[24]
Director, Mediterranean Marine Sorting Center	Robert P. Higgins
Director, Smithsonian Oceanographic Sorting Center	H. Adair Fehlmann
Oceanographer	Dail W. Brown
Chesapeake Bay Center for Environmental Studies	
Director	Frank S. L. Williamson

Center for the Study of Man

Acting Director	Sol Tax
Program Coordinator	Sam Stanley

Center for Short-Lived Phenomena

Director	Robert Citron

[21] Established 28 October 1969.
[22] Appointed 28 October 1969.
[23] Appointed 8 March 1970.
[24] Appointed 22 March 1970.

Operations Manager	David R. Squires[25]
Assistant Operations Specialist	Richard P. DiBenedetto
Event Research Specialist	
Biology/Ecology	Sarah P. Meselson
Environmental Information Specialist	Wendy Quinones

History and Art

Assistant Secretary	Charles Blitzer
Director, Special Projects	Ervin S. Duggan

National Museum of History and Technology

Director	Daniel J. Boorstin
Assistant Director	Silvio A. Bedini
Assistant Director for Administration	Robert G. Tillotson[26]
Special Assistant to the Director	Ladd E. Hamilton[27]
Administrative Officer	Virginia Beets
Senior Scientific Scholar	Robert P. Multhauf
Research Assistants	Peter C. Marzio
	Robert H. McNulty
	James W. Seymore
Applied Arts	
Chairman	Carl H. Scheele
Graphic Arts and Photography	
Supervisor and Curator	Eugene Ostroff
Assistant Curators	Elizabeth M. Harris
	David E. Haberstich
Numismatics	
Supervisor and Curator	Vladimir Clain-Stefanelli
Curator	Elvira Clain-Stefanelli
Postal History	
Supervisor and Curator	Carl H. Scheele
Associate Curator	Reidar Norby
Textiles	
Supervisor and Curator	Grace R. Cooper
Associate Curator	Rita J. Adrosko
Honorary	Emery May Norweb (Numismatics)
	R. Henry Norweb (Numismatics)
Cultural History	
Chairman	C. Malcolm Watkins
Costume and Furnishings	
Supervisor and Associate Curator	Rodris C. Roth
Assistant Curator	Claudia B. Kidwell

[25] Effective 1 December 1969.
[26] Effective 10 December 1969.
[27] Effective 5 April 1970.

Ethnic and Western Cultural History	
Supervisor and Curator	Richard E. Ahlborn
Curator	C. Malcolm Watkins
Musical Instruments	
Supervisor and Associate Curator	John T. Fesperman
Associate Curator	Cynthia A. Hoover
Preindustrial History	
Supervisor and Curator	C. Malcolm Watkins
Associate Curator	Anne C. Golovin
Honorary	Mrs. Arthur M. Greenwood
	Ivor Noël Hume
	Anne W. Murray (Curator Emeritus, Costume)
	Joan Pearson Watkins
	Edward B. Jelks
Industries	
Chairman	John H. White, Jr.
Senior Historian	Howard I. Chapelle
Agriculture and Mining	
Supervisor and Curator	John T. Schlebecker
Associate Curator	John N. Hoffman
Ceramics and Glass	
Supervisor and Curator	Paul V. Gardner
Curator	J. Jefferson Miller II
Manufacturing	
Supervisor and Curator	Philip W. Bishop
Transportation	
Supervisor and Curator	John H. White, Jr.
Curator	Melvin H. Jackson
Honorary	Hans Syz (Ceramics)
National and Military History	
Chairman	Edgar M. Howell
Historic Archeology	
Supervisor and Curator	Mendel L. Peterson
Military History	
Supervisor and Curator	Edgar M. Howell
Associate Curator	Craddock R. Goins, Jr.
Naval History	
Supervisor and Curator	Philip K. Lundeberg
Curator	Harold D. Langley
Political History	
Supervisor and Associate Curator	Keith E. Melder
Curator	Margaret B. Klapthor
Associate Curator	Herbert R. Collins
Honorary	William Rea Furlong (Flag History)
Science and Technology	
Chairman	Bernard S. Finn
Electricity and Nuclear Energy	
Supervisor and Curator	Bernard S. Finn
Associate Curator	Uta C. Merzbach

Mechanical and Civil Engineering	
Supervisor and Curator	Robert M. Vogel
Curators	Edwin A. Battison
	Otto Mayr
Medical Sciences	
Supervisor and Curator	Sami K. Hamarneh
Associate Curator	Audrey B. Davis
Physical Sciences	
Supervisor and Associate Curator	Deborah J. Warner[28]
Curator	Walter F. Cannon
Associate Curator	Jon B. Eklund
Honorary	Anthony R. Michaelis (Scientific Instruments)
	Derek J. De Solla Price (Scientific Instruments)

Archives of American Art[29]

Director	William E. Woolfenden
Deputy Director	Garnett McCoy
Curator	Arthur Breton
Area Directors	Butler Coleman (New York)
	Robert Brown (Northeast)

Freer Gallery of Art

Director	John A. Pope
Assistant Director	Harold P. Stern
Curator, Chinese Art	Thomas Lawton
Assistant Curator, Chinese Art	Hin-cheung Lovell
Head Conservator, Technical Laboratory	W. Thomas Chase
Research Consultant, Technical Laboratory	Rutherford J. Gettens
Research Assistant, Far Eastern Ceramics	Josephine H. Knapp
Research Assistant, Herzfeld Archives	Joseph M. Upton
Honorary Associates	Richard Edwards
	Calvin French

National Collection of Fine Arts

Director	Joshua C. Taylor[30]
Assistant Director	Robert Tyler Davis[31]

[28] Effective 23 June 1970.

[29] Brought into Smithsonian 1 May 1970.

[30] Appointed 5 January 1970.

[31] Appointed 5 January 1970.

Administrative Officer	Harry W. Zichterman
Registrar	Elisabeth Strassmann
Editor, Publication	Georgia M. Rhoades
Curator, Exhibition and Design	Harry Lowe
Associate Curator, 18th- and 19th-Century Painting and Sculpture	William H. Truettner
Curator, Contemporary Painting and Sculpture	Adelyn D. Breeskin
Acting Curator, Prints and Drawings	Janet L. Flint
Chief, International Art Program	Lois A. Bingham
Coordinator of Special Projects, Renwick Gallery	Donald R. McClelland
Chief, Museum Programs	Susan C. Sollins
Photographer (NCFA-NPG)	Lowell Kenyon
Conservator (NCFA-NPG)	Charles H. Olin
Librarian (NCFA-NPG)	William B. Walker
National Collection of Fine Arts Commission	Charles H. Sawyer, Chairman
	Walker Hancock, Vice Chairman
	S. Dillon Ripley, Secretary
	Leonard Baskin
	William A. M. Burden
	H. Page Cross
	David E. Finley
	Martin Friedman
	Lloyd Goodrich
	Walker Hancock
	Bartlett H. Hayes, Jr.
	August Heckscher
	Thomas C. Howe
	Mrs. J. Lee Johnson III
	Samuel C. Johnson
	Wilmarth S. Lewis
	Henry P. McIlhenny
	Ogden M. Pleissner
	Edgar P. Richardson
	Charles H. Sawyer
	Mrs. Otto L. Spaeth
Honorary Members	Alexander Wetmore
	Leonard Carmichael
	Gilmore D. Clarke
	Paul Mellon
	Stow Wengenroth
	Andrew Wyeth

National Portrait Gallery

Director	Marvin S. Sadik
Assistant to the Director	Douglas E. Evelyn[32]

[32] Appointed 14 December 1969.

Historian	Beverly J. Cox
Curator	Robert G. Stewart
Assistant Curator	Monroe Fabian
Keeper of the Catalogue	Wilford P. Cole
Museum Specialist (Art)	Genevieve Stephenson
Senior Research Assistant (Art)	Mona Dearborn
Research Assistant (History)	Dorothy Brewer
Research Assistant (History)	Ann M. Schofield
Librarian (NPG-NCFA)	William B. Walker
Conservator (NPG-NCFA)	Charles H. Olin
Registrar	Jon D. Freshour
NPG Commission	John Nicholas Brown, Chairman
	Whitfield J. Bell, Jr.
	Catherine Drinker Bowen
	Lewis Deschler
	David E. Finley
	Wilmarth S. Lewis
	Edgar P. Richardson
	Andrew Oliver
	Jules D. Prown
Ex officio	Chief Justice of the United States
	Secretary, Smithsonian Institution
	Director, National Gallery of Art

Joseph H. Hirshhorn Museum and Sculpture Garden

Director	Abram Lerner
Administrative Officer	Joseph Sefekar[33]
Associate Curator	Cynthia Jaffee McCabe
Historian	Frances R. Shapiro
Associate Registrars	James J. Elias
	Frank B. Gettings

Cooper-Hewitt Museum of Decorative Arts and Design

Director	Lisa Suter Taylor[34]
Administrator	Christian Rohlfing
Curator of Textiles	Alice Baldwin Beer
Curator of Drawings and Prints	Elaine Evans Dee
Associate Curator of Decorative Arts	Janet Thorpe
Librarian	Edith Adams
Registrar	Mary F. Blackwelder

[33] Appointed 14 June 1970.
[34] Effective 1 October 1969.

National Armed Forces Museum Advisory Board

Director	John H. Magruder III
Assistant Director	James S. Hutchins
Administrative Officer	Miriam H. Uretz
Tecumseh Project	Robert M. Calland
Collections	John M. Elliott
Historian	James J. Stokesberry
Registrar	Lorene B. Mayo
Advisory Board	John Nicholas Brown, Chairman
	The Honorable Earl Warren
	Secretary of Army
	Secretary of Navy
	Secretary of Air Force
	Robert C. Baker
	James H. Cassell, Jr.[35]
	David Lloyd Kreeger[36]
	William H. Perkins, Jr.[37]
Ex officio	Secretary of Defense
	Secretary, Smithsonian Institution

Woodrow Wilson International Center for Scholars

Director	Benjamin H. Read[38]
Deputy Director	Albert Meisel

Office of American Studies

Director	Wilcomb E. Washburn
Specialist in American Studies	Harold K. Skramstad

Joseph Henry Papers

Editor	Nathan Reingold
Assistant Editor	Stuart Pierson
Staff Historian	James M. Hobbins

[35] Term expired 9 April 1970.

[36] Term expired 9 April 1970.

[37] Term expired 9 April 1970.

[38] Appointed 30 March 1969.

Special Museum Programs

Director General of Museums	Frank A. Taylor
Office of Director General	
Assistant to Director General	Peter C. Welsh
Program Manager	Lloyd E. Herman
Office of Exhibits Program	
Chief	John E. Anglim
Assistant Chief	James A. Mahoney
Special Projects	Eugene F. Behlen
Exhibits Labels Editor	Constance Minkin
Administrative Officer	James H. Jones
Chief, Natural History Laboratory	James A. Mahoney
Assistant Chief	Harry Hart
Chief of Design	William F. Haase
Senior Museologist	A. Gilbert Wright
Production Supervisor	Frank Nelms
Chief, History and Technology Laboratory	Benjamin W. Lawless
Chief of Design	Richard S. Virgo
Production Supervisor	William W. Clark, Jr.
Conservation-Analytical Laboratory	
Chief	Robert M. Organ
Research Chemist	Jacqueline S. Olin
Office of the Registrar	Helena M. Weiss
Assistant Registrar	William P. Haynes
Smithsonian Institution Traveling Exhibition Service	
Chief	Dorothy Van Arsdale
Administrative Assistant	Eileen Rose
Program Assistant	Frances P. Smyth
Registrar	Terence Forbes
Exhibits Coordinators	Anne R. Gossett
	Jane Kinzler

Public Service and Information Activities

Assistant Secretary	William W. Warner
Deputy Assistant Secretary	Robert W. Mason

Smithsonian Associates

Program Director	Susan Hamilton[39]
Business Manager	Marlin C. Johnson[40]
Special Events Assistant	Carolyn Amundson
Subscription Assistant	Carolyn A. Hecker

[39] Effective 1 July 1969.

[40] Appointed 1 June 1969.

Office of Public Affairs

Director	Frederic M. Philips
Special Assistant to the Director	William C. Grayson
Administrative Officer	Jewell S. Dulaney
News	George J. Berklacy
Audio-Visual Services	Albert J. Robinson
Radio Production	Vacant
Motion Picture Unit	John O'Toole
Publications	William C. Craig
Manager, Community Directory of Interests	Alicia R. Fisher

Office of International Activities

Director	David Challinor
Assistant Director	Michael R. Huxley[41]
Foreign Currency Program	
Director	Kennedy B. Schmertz
Deputy Director	Kenneth D. Whitehead
Program Officer	Richard C. Conroy
Grants Technical Assistants	Betty J. Wingfield
	Judy E. Rodgers
Administrative Assistant	Paula E. Ullmann

Division of Performing Arts

Director	James R. Morris
Deputy Director	Richard P. Lusher
Director, Festival of American Folklife	Ralph C. Rinzler
Budget and Development Officer	John A. McQuiggan
Operations Officer	Ruri Kesa Sakai
Planning Officer	Marian A. Hope
Indian Programs	Clydia D. Nahwooksy
Acting Director, Touring Performances	Mary E. Carrington
Manager, Puppet Theatre	Mel Mackler

Smithsonian Museum Shops

Acting Director	John E. Skuce[42]
Administrative Officer	Martha L. Wilson
Design Chief	J. Michael Carigan
Book Shops Manager	Florence R. Lloyd

[41] Appointed 3 May 1970.

[42] Effective 16 April 1970.

Belmont Conference Center

Director	Joanne S. Baker[43]

Anacostia Neighborhood Museum

Director	John R. Kinard
Assistant Director	Zora B. Martin
Research and Design Coordinator	Larry Erskine Thomas
Exhibit Specialist	James E. Mayo
Artist in Residence	Georgia Mills Jessup

Smithsonian (magazine)

Editor	Edward K. Thompson
Members, Board of Editors	Ralph Backlund
	R. Hobart Ellis
	Edwards Park
Associate Editor	Grayce P. Northcross
Advertising Director	Thomas H. Black
Circulation-Promotion Director	Anne Keating
General Manager	Joseph Bonsignore

Smithsonian Institution Archives

Archivist	Richard H. Lytle[44]
Assistant Archivist	Donald Danuloff[45]
Historian	James Steed[46]

Smithsonian Institution Libraries

Director of Libraries	Russell Shank
Assistant Director of Libraries	Mary A. Huffer
Special Assistant to the Director of Libraries for Biological Science Programs	Jean C. Smith
Library of Congress Liaison Librarian	Ruth E. Blanchard
Public Service Advisor	Frank A. Pietropaoli
Administrative Librarian	Thomas L. Wilding

[43] Effective 1 January 1970.
[44] Appointed 5 January 1970.
[45] Appointed 22 June 1970.
[46] Appointed 2 March 1970.

Acquisitions Division	
Chief	L. Frances Jones
Assistant Chief	Mildred D. Raitt
Serials Librarian	Edna S. Suber
Catalog Division	
Chief	Vija L. Karklins
Catalogers	Bertha S. Sohn
	Angeline D. Ashford
	Ruth E. Carlson[47]
	Charles H. King
	Martha L. Lang[48]
	Cynthia P. Rupp
	Margaret A. Sealor
Reference and Circulation Division	
Assistant Chief	Jack F. Marquardt
Reference Librarians	Sue Y. Chen
	A. James Spohn
Branch Librarians	
Freer Gallery of Art	Priscilla P. Smith
National Collection of Fine Arts and National Portrait Gallery	William B. Walker
National Museum of History and Technology	Jack S. Goodwin
Smithsonian Astrophysical Observatory	Elizabeth H. Weeks[49]
	Joyce M. Rey
Smithsonian Tropical Research Institute	Alcira Mejia
Department of Anthropology	Mary L. Horgan
Department of Botany	Ruth F. Schallert
Branch Library Reference Staff	
Reference Librarians	Charles G. Berger (NMHT)
	Aleita A. Hogenson (NCFA-NPG)
Technical Information Specialist	Shirley S. Harren (NCFA-NPG)[50]

International Exchange Service

Director	Jeremiah A. Collins
Assistant Director	John E. Estes[51]

[47] Retired 31 October 1969.
[48] Transferred 30 May 1970.
[49] Resigned 7 November 1969.
[50] Transferred 4 April 1970.
[51] Appointed 20 April 1969.

Information Systems Division

Director	Nicholas J. Suszynski[52]
Acting Director	Stanley A. Kovy[53]
Manager, Management Systems Section	Stanley A. Kovy
Manager, Computer Operations	Roy G. Perry
Manager, Information Storage and Retrieval Section	Reginald A. Creighton
Manager, Library Systems and Programs Maintenance Section	James J. Crockett
Manager, Scientific Applications Section	Dante Piacesi
Senior Programming Analysts	George Davis
	William Lawson
	Edwin A. Robinson
	Raymond D. Shreve

Smithsonian Institution Press

Director	Anders Richter
Managing Editor	Roger Pineau
Managing Designer	Stephen Kraft
Promotion Manager	Maureen R. Jacoby
Business Manager	Eileen M. McCarthy
Editors	Mary Frances Bell
	Ernest E. Biebighauser
	Louise J. Heskett
	Joan B. Horn
	Mary M. Ingraham
	John S. Lea
	Nancy L. Powars
	Albert L. Ruffin, Jr.
	Jane W. Sieverts
Designers	Crimilda Pontes
	Elizabeth Sur
Series Production Manager	Charles L. Shaffer

Science Information Exchange

Director	Monroe E. Freeman
Deputy Director	David F. Hersey
Associate Directors	
Life Sciences	Willis R. Foster
Physical Sciences	Frank J. Kreysa

[52] Resigned 20 December 1969.

[53] Appointed 20 December 1969.

Data Processing	Martin Snyderman
Special Assistant	Richard C. Reeser
Executive Officer	V. P. Verfuerth
Administrative Officer	Evelyn M. Roll
Life Sciences Division	
Chief	Willis R. Foster
Deputy Chief	Charlotte M. Damron
Chief, Medical Sciences Branch	Faith F. Stephan
Chief, Biological Sciences Branch	James R. Wheatley, Jr.
Chief, Agricultural Sciences Branch	William T. Carlson
Chief, Behavioral Sciences Branch	Rhoda Stolper
Chief, Social Sciences and Community Programs Branch	Barbara F. Lundquist
Physical Sciences Division	
Chief	Frank J. Kreysa
Chief, Chemistry Branch	Samuel Liebman
Chief, Earth Sciences Branch	Joseph P. Riva, Jr.
Chief, Electronics Branch	John J. Park
Chief, Engineering Branch	Inder Jit Bhambri
Chief, Materials Branch	William H. Payne
Chief, Physics and Mathematics Branch	Robert Summers
Data Processing Division	
Chief	Martin Snyderman
Deputy Chief	Bernard L. Hunt
Chief, Registry Branch	Angelo Piccillo
Chief, Data Edit Branch	Mary Rumreich
Chief, Report Services Branch	Olympia Merritt
Chief, Systems and Programming Branch	Robert A. Kline
Chief, Computer Operations Branch	Paul Gallucci

Reading Is Fundamental

Executive Director	Jerrold Sandler
Assistant Director	Barbara B. Atkinson

National Gallery of Art

President	Paul Mellon
Vice President	John Hay Whitney
Director	J. Carter Brown
Assistants to the Director	Richard Bales (Music)
	Katherine Warwick (Public Information)
Administrator	E. James Adams
Assistants to the Administrator	Charles B. Walstrom (Personnel and Administration)

Assistants to the Administrator—Continued	Sterling P. Eagleton (Scientific and Technical Information)
Treasurer	Lloyd D. Hayes
Secretary	Kennedy C. Watkins
Acting Chief Curator	William P. Campbell
Deputy Administrator	Joseph G. English
Deputy Administrator, Extension Services and Publications	W. Howard Adams
Curator of Painting	H. Lester Cooke
Curator in charge of Education	Margaret Bouton
Curator of Sculpture	C. Douglas Lewis, Jr.
Curator, Index of American Design and Decorative Arts (Exhibitions and Loans Officer)	Grose Evans
Editor	Theodore S. Amussen
Personnel Officer	Jeremiah J. Barrett
Assistant Treasurer	James W. Woodard

John F. Kennedy Center for the Performing Arts

Chairman	Roger L. Stevens
Vice Chairman	Robert O. Anderson
Vice Chairman	Sol M. Linowitz
General Counsel	Ralph E. Becker
Secretary	K. LeMoyne Billings
Treasurer	Robert G. Baker
General Director	William McC. Blair, Jr.
Deputy General Director and Assistant Secretary	Philip J. Mullin
Music Adviser	Julius Rudel
Artistic Administrator	George London
Assistant Treasurers	John L. Bryant
	Kenneth Birgfeld
	Paul J. Bisset
	L. Parker Harrell, Jr.
Executive Director for Engineering	William A. Schmidt
Project Manager	Robert L. Prichard
Honorary Treasurer Emeritus	Daniel W. Bell

Appendix 5

PUBLICATIONS OF THE SMITHSONIAN INSTITUTION PRESS IN FISCAL YEAR 1970

Books

American Printmaking: The First 150 Years. Preface by A. Hyatt Mayor, foreword by Donald H. Karshan, introduction by J. William Middendorf II, text by Wendy J. Shadwell. 180 pages, 115 plates. 1 August 1969. Cloth, $12.50.

Archipenko. Edited by Donald H. Karshan, preface by S. Dillon Ripley, foreword by David W. Scott, with essays by Guillaume Appollinaire and Guy Habasque. 116 pages, 178 illustrations. 1 May 1970. Cloth, $10.00.

Devereux, George. *Mohave Ethnopsychiatry: The Psychic Disturbances of an Indian Tribe.* xvi + 597 pages. Bureau of American Ethnology Bulletin 175, originally published 1961. Revised edition, 17 November 1969. Cloth, $16.50.

Ewers, John C. *The Horse in Blackfoot Indian Culture.* xv + 374 pages, 33 figures, 17 plates, 7 tables. Bureau of American Ethnology Bulletin 159, originally published 1955, reissued 17 November 1969. Cloth, $12.50.

Isleta Paintings. With introduction and commentary by Elsie Clews Parsons; edited, and with a new foreword, by Esther S. Goldfrank; and with annotated glossary of Isleta terms by George L. Trager. xxii + 170 pages, 140 paintings plus frontispiece. Bureau of American Ethnology Bulletin 181, originally published 1962. Revised edition 10 June 1970. Cloth, $13.95.

Lewis, Emanuel Raymond. *Seacoast Fortifications of the United States: An Introductory History.* xiv + 145 pages, 66 figures. 30 June 1970. Cloth, $8.95.

Pursell, Carroll W., Jr. *Early Stationary Steam Engines in America: A Study in the Migration of a Technology.* viii + 152 pages, 19 illustrations. 17 November 1969. Cloth, $6.75.

Scheele, Carl H. *A Short History of the Mail Service.* 250 pages, 14 figures, 13 tables. 15 March 1970. Cloth, $6.95.

Spencer, Robert F. *The North Alaskan Eskimo: A Study in Ecology and Society.* viii + 490 pages, 2 figures, 9 plates, 4 maps. Bureau of American Ethnology Bulletin 171, originally published 1959. Reissued 17 November 1969. Cloth, $15.00.

Takhtajan, Armen. *Flowering Plants: Origin and Dispersal.* Translated by C. Jeffrey. x + 310 pages, 32 figures, 13 plates. 10 November 1969. Cloth, $6.95.

Booklets

Dubos, Rene. *A Theology of the Earth.* 19 pages. 30 December 1969.

Hoover, Cynthia A. *Harpischords and Clavichords.* 43 pages, 36 figures. 31 December 1969.

MacInnis, Joseph B., M.D., and Jon M. Lindbergh. *Underwater Man: His Evolution and Explorations.* iii + 20 pages, 8 figures. Publication 4763. 8 December 1969. $.75.

Purdy, Virginia C., and Daniel J. Reed. *Presidential Portraits.* Edited by J. Benjamin Townsend. iv + 76 pages, 39 illustrations. Publication 4748. Originally published 1968. Revised edition, 20 October 1969. $1.25.

Shortridge, John D. *Italian Harpischord-Building in the 16th and 17th Centuries.* 15 pages, 12 figures. Contributions from the Museum of History and Technology, United States National Museum Bulletin 225 (Paper 15), originally published 1963. Reprinted with changes, 11 June 1970.

Smithsonian Institution Explorer's Booklet. Numbers 1–6. Illustrated. 26 August 1969.

Serial Publications

United States National Museum Bulletins

277. L. P. Kelsey. *A Revision of the Scenopinidae (Diptera) of the World.* v + 336 pages, 208 figures. 31 December 1969.

282. William Ralph Taylor. *A Revision of the Catfish Genus* Noturus *Rafinesque with an Analysis of Higher Groups in the Ictaluridae.* vi + 315 pages, 5 figures, 21 plates, 14 maps, 28 tables. 31 December 1969.

291. Clyde F. E. Roper. *Systematics and Zoogeography of the Worldwide Bathypelagic Squid Bathyteuthis (Cephalopoda: Oegopsida).* v + 210 pages, 74 figures, 12 plates, 20 tables. 1 August 1969.

293. Maureen E. Downey. *Catalog of Recent Ophiuroid Type Specimens in Major Collections in the United States.* vi + 239 pages. 6 November 1969.

295. Rosalie F. Maddocks. *Revision of Recent Bairdiidae (Ostracoda).* iv + 126 pages, 63 figures, 1 plate, 2 tables. 18 August 1969.

296. Jack T. Tomlinson. *The Burrowing Barnacles (Cirripedia: Order Acrothoracica).* v + 162 pages, 45 figures, 3 tables. 25 November 1969.

297. James A. Peters and Roberto Donoso-Barros. *Catalogue of the Neotropical Squamata: Part II. Lizards and Amphaisbaenians.* viii + 293 pages, 104 figures. 24 February 1970.

Contributions from the Museum of History and Technology

BULLETIN 250
(Whole volume)

Papers 59–64 on History. vii + 203 pages, illustrated. 31 December 1969.

Smithsonian Contributions to Anthropology

VOLUME 2

5. William K. Jones. "Notes on the History and Material Culture of the Tonkawa Indians." Pages 65–81, 19 figures, 3 maps, 31 December 1969.
6. Jack Frederick Kilpatrick and Anna Gritts Kilpatrick. "Notebook of a Cherokee Shaman." Pages 83–125. 6 May 1970.

VOLUME 9
(Whole volume)

Aubrey W. Williams, Jr. "Navajo Political Process." ix + 71 pages, 1 figure, 10 plates, 6 maps, 6 tables. 25 June 1970.

VOLUME 11
(Whole volume)

James A. Ford. "A Comparison of Formative Cultures in the Americas: Diffusion or the Psychic Unity of Man." xviii + 211 pages, 32 figures, 22 charts, 13 tables. 10 December 1969.

(Seriation by volume/number is replaced hereon by number only.)

12. C. G. Holland. "An Archeological Survey of Southwest Virginia." xvi + 194 pages, 43 figures, 28 plates, 9 tables. 27 May 1970.
13. Leland C. Wyman. "Sandpaintings of the Navaho Shootingway and The Walcott Collection." xii + 102 pages, 44 plates, colored frontispiece, 5 tables. 11 June 1970.

Smithsonian Contributions to Botany

1. Dan Henry Nicolson. "A Revision of the Genus *Aglaonema* (Araceae)." 69 pages, 23 figures, 1 table. 14 August 1969.
2. Harold Robinson. "A Monograph on Foliar Anatomy of the Genera *Connellia, Cottendorfia,* and *Navia* (Bromeliaceae)." 41 pages, 277 figures. 10 October 1969.
3. Wm. Randolph Taylor and Charles F. Rhyne. "Marine Algae of Dominica." 16 pages, 2 figures. 5 March 1970.

Smithsonian Contributions to Paleobiology

1. G. Arthur Cooper and Richard E. Grant. "New Permian Brachiopods from West Texas." 20 pages, 5 plates. 14 July 1969.
2. G. Lewis Gazin. "A New Occurrence of Paleocene Mammals in the Evanston Formation, Southwestern Wyoming." 17 pages, 1 figure, 3 plates. 31 December 1969.
4. Richard Cifelli and Roberta K. Smith. "Distribution of Planktonic Foraminifera in the Vicinity of the North Atlantic Current." 52 pages, 22 figures, 6 plates, 8 tables. 13 April 1970.

Smithsonian Contributions to Zoology

4. W. Donald Duckworth. "Bredin-Archbold-Smithsonian Biological Survey of Dominica: West Indian Stenomidae (Lepidoptera: Gelechioidea)." 21 pages, 30 figures. 13 August 1969.
7. Rosalie F. Maddocks. "Recent Ostracodes of the Family Pontocyprididae Chiefly from the Indian Ocean." 56 pages, 35 figures, 5 tables. 17 September 1969.
8. Louis S. Kornicker. "Morphology, Ontogeny, and Intraspecific Variation of *Spinacopia*, a New Genus of Myodocopid Ostracod (Sarsiellidae)." 50 pages, 26 figures, 6 plates, 7 tables. 22 August 1969.
9. Robert E. Ricklefs. "An Analysis of Nesting Mortality in Birds." 48 pages, 11 figures, 26 tables. 12 December 1969.
10. Charles W. Myers and A. Stanley Rand. "Checklist of Amphibians and Reptiles of Barro Colorado Island, Panama, with Comments on Faunal Change and Sampling." 11 pages, 2 figures, 1 table. 13 August 1969.
11. Dale J. Osborn and Karl V. Krombein. "Habitats, Flora, Mammals, and Wasps of Gebel 'Uweinat, Libyan Desert." 18 pages, 13 figures, 1 table. 27 August 1969.
12. R. E. Crabill, Jr. "Tracheotaxy as a Generic Criterion in Himantariidae, with Proposal of Two New Bothriogastrine Genera (Chilopoda: Geophilomorpha)." 9 pages, 23 figures. 13 August 1969.
13. Clyde F. E. Roper, Richard E. Young, and Gilbert L. Voss. "An Illustrated Key to the Families of the Order Teuthoidea (Cephalopoda)." 32 pages, 2 figures, 16 plates, 1 table. 18 August 1969.
14. Robert P. Higgins. "Indian Ocean Kinorhyncha: 1, Condyloderes and Sphenoderes, New Cyclorhagid Genera." 13 pages, 23 figures, 3 tables. 13 August 1969.
15. Richard E. Young and Clyde F. E. Roper. "A Monograph of the Cephalopoda of the North Atlantic: The Family Joubiniteuthidae." 10 pages, 6 figures, 1 table. 13 August 1969.
16. Alan Stone. "Bredin-Archbold-Smithsonian Biological Survey of Dominica: The Mosquitoes of Dominica (Diptera: Culicidae)." 8 pages, 9 July 1969.
17. Leonard P. Schultz. "The Taxonomic Status of the Controversial Genera and Species of Parrotfishes with a Descriptive List (Family Scaridae)." 49 pages, 2 figures, 8 plates, 13 tables. 10 December 1969.
18. Ronald W. Hodges. "Nearctic Walshiidae Notes and New Taxa (Lepidoptera: Gelechioidea)." 30 pages, 46 figures, 6 August 1969.
19. Karl V. Krombein. "Life History Notes on Some Egyptian Solitary Wasps and Bees and Their Associates (Hymenoptera: Aculeata)." 18 pages, 26 figures. 13 August 1969.
20. Gayle A. Heron and David M. Damkaer. "Five Species of Deep-Water Cyclopoid Copepods from the Plankton of the Gulf of Alaska." 24 pages, 28 figures, 1 table. 23 September 1969.
21. Oscar L. Cartwright and Robert E. Woodruff. "Ten Rhyparus from the Western Hemisphere (Coleoptera: Scarabaeidae: Aphodiinae)." 20 pages, 15 figures. 6 November 1969.
22. Karl V. Krombein. "A Revision of the Melanesian Wasps of the Genus *Cerceris* Latreille (Hymenoptera: Sphecidae)." 36 pages, 23 figures. 19 December 1969.

23. Thomas Borgmeier. "Bredin-Archbold-Smithsonian Biological Survey of Dominica: The Phoridae of Dominica (Diptera)." 69 pages, 152 figures. 18 November 1969.
24. Charles E. King and Louis S. Kornicker. "Ostracoda in Texas Bays and Lagoons: An Ecologic Study." 92 pages, 15 figures, 21 plates, 19 tables. 25 March 1970.
25. Harold Robinson. "A Monographic Study of the Mexican Species of *Enlinia* (Diptera: Dolichopodidae)." 62 pages, 221 figures. 6 November 1969.
26. Helmut K. Buechner and Jimmie H. Buechner, editors. "The Avifauna of Northern Latin America: A Symposium Held at the Smithsonian Institution 13–15 April 1966." 119 pages, 4 figures. 3 April 1970.
27. J. F. Eisenberg and Edwin Gould. "The Tenrecs: A Study in Mammalian Behavior and Evolution." 137 pages, 77 figures, 13 tables. 9 March 1970.
28. M. Moynihan. "Some Behavior Patterns of Platyrrhine Monkeys II. *Saguinus geoffroyi* and Some Other Tamarins." 77 pages, 25 figures, 1 table. 15 April 1970.
29. F. D. Por. "Deep-Sea Cerviniidae (Copepoda: Harpacticoida) from the Western Indian Ocean, Collected with R/V *Anton Brunn* in 1964." 60 pages, 182 figures, 1 table. 6 November 1969.
30. Carl F. W. Muesebeck. "The Nearctic Species of *Orgilus* Haliday (Hymenoptera: Braconidae)." 104 pages, 57 figures. 20 February 1970.
31. Robert H. Gibbs, Jr. "Taxonomy, Sexual Dimorphism, Vertical Distribution, and Evolutionary Zoogeography of the Bathypelagic Fish Genus *Stomias* (Stomiatidae)." 25 pages, 6 figures, 15 tables. 2 December 1969.
32. Louis S. Kornicker. "Ostracoda (Myodocopina) from the Peru-Chile Trench and the Antarctic Ocean." 42 pages, 25 figures, 1 table. 11 February 1970.
33. Frank N. Young. "A Checklist of the American Bidessini (Coleoptera: Dytiscidae-Hydroporinae)." 5 pages. 25 November 1969.
34. J. Laurens Barnard. "Sublittoral Gammaridea (Amphipoda) of the Hawaiian Islands." 286 pages, 180 figures, 6 tables. 15 April 1970.
35. Robert E. Martin. "Cranial and Bacular Variation in the Populations of Spiny Rats of the Genus *Proechimys* (Rodentia: Echimyidae) from South America." 19 pages, 12 figures, 4 tables. 30 January 1970.
36. Raymond B. Manning. "A Review of the Genus *Harpiosquilla* (Crustacea, Stomatopoda), with Descriptions of Three New Species." 41 pages, 43 figures, 1 table. 31 December 1969.
37. Thomas W. Donnelly. "The Odonata of Dominica British West Indies." 20 pages, 27 figures. 11 February 1970.
39. Louis S. Kornicker. "Myodocopid Ostracoda (Cypridinacea) from the Philippine Islands." 32 pages, 18 figures, 5 tables. 11 February 1970.
40. Thomas Phelan. "A Field Guide to the Cidaroid Echinoids of the Northwestern Atlantic Ocean, Gulf of Mexico, and the Caribbean Sea." 67 pages, 7 figures, 22 plates. 10 March 1970.
41. Marian H. Pettibone. "Revision of the Aphroditoid Polychaetes of the Family Eulepthidae Chamberlin (= Eulepidinae Darboux; = Pareulepidae Hartman)." 44 pages, 31 figures. 6 November 1969.

42. Helmut E. Zibrowius. "Review of Some Little Known Genera of Serpulidae (Annelida: Polychaeta)." 22 pages, 7 figures. 31 December 1969.
44. J. Laurens Barnard. "Benthic Ecology of Bahia de San Quintin, Baja California." 60 pages, 18 figures, 12 tables. 10 March 1970.
46. Karl V. Krombein. "Behavioral and Life-History Notes on Three Floridian Solitary Wasps (Hymenoptera: Sphecidae)." 26 pages, 78 figures, 3 tables. 25 May 1970.
47. Horton H. Hobbs, Jr., and H. H. Hobbs III. "New Entocytherid Ostracods with a Key to the Genera of the Subfamily Entocytherinae." 19 pages, 9 figures. 26 May 1970.
48. W. Donald Duckworth. "Neotropical Microlepidoptera XVIII: Revision of the Genus Peleopoda (Lepidoptera: Oecophoridae). 30 pages, 55 figures, 3 plates, 8 maps. 19 June 1970.

Smithsonian Studies in History and Technology

1. Melvin H. Jackson. "Privateers in Charleston, 1793–1796: An Account of a French Palatinate in South Carolina." x+159 pages, 24 figures. 31 December 1969.
2. W. E. Knowles Middleton. "Catalog of Meteorological Instruments in the Museum of History and Technology." v+128 pages, 124 figures. 4 August 1969.
3. Betty Lawson Walters. "The King of Desks: Wooton's Patent Secretary." iv+32 pages, 28 figures, frontispiece. 31 December 1969.

Atoll Research Bulletins

128. A. D. Forbes-Watson. *Notes on Birds Observed in the Comoros on Behalf of the Smithsonian Institution.* 23 pages. 15 August 1969.
129. John D. Milliman. *Four Southwestern Caribbean Atolls: Courtown Cays, Albuquerque Cays, Roncador Bank and Serrana Bank.* 22 pages, 10 figures, 13 plates, 4 tables. Appendix: Reef Productivity Measurement, by John D. Milliman and Conrad V. W. Mahnken. 4 pages, 7 figures, 2 tables. 15 August 1969.
130. C. D. Adams. *A Botanical Description of Big Pelican Cay, A Little Known Island off the South Coast of Jamaica.* 10 pages, 1 figure, 4 plates. 15 August 1969.
131. D. R. Stoddart. *Post-Hurricane Changes on the British Honduras Reefs and Cays: Re-survey of 1965.* 25 pages, 15 figures. 15 August 1969.
132. F. R. Fosberg. *Plants of Satawal Island, Caroline Islands.* 13 pages. 15 August 1969.
133. F. R. Fosberg and Michael Evans. *A Collection of Plants From Fais, Caroline Islands.* 15 pages. 15 August 1969.
134. M. D. Gwynne and D. Wood. *Plants Collected on Islands in the Western Indian Ocean During a Cruise of the M.F.R.V. "Manihine," Sept.–Oct. 1967.* 15 pages. 15 August 1969.
135. *Island News and Comment.* 17 pages.

Manuals

Campden-Main, Simon M. *A Field Guide to the Snakes of South Vietnam.* v + 114 pages, 77 figures. 27 January 1970.

Van Peenen, P. F. D. *Preliminary Identification Manual for Mammals of South Vietnam,* vi + 310 pages, 181 figures. 1 December 1969.

Wildlife Southeast Asia. Study card set. 27 February 1970.

Catalogs

The Art of Henry O. Tanner. 60 pages, 27 illustrations. 6 August 1969.

Beer, Alice Baldwin. *Trade Goods: A Study of Indian Chintz in the Collection of the Cooper-Hewitt Museum of Decorative Arts and Design, Smithsonian Institution.* 135 pages, 4 color plates, 30 black and white plates. 26 June 1970.

D. C. Art Association 2nd Annual Art Exhibition. 60 pages, illustrated. 13 April 1970. Exhibit announcement. 10 April 1970.

Explorations. With statements by Gyorgy Kepes, Joshua C. Taylor, and Howard W. Johnson. 4 booklets. 3 April 1970.

The Frederick Douglass Years: A Cultural History Exhibit. 12 pages, illustrated. 10 April 1970. Pamphlet, 8 pages, January 1970. Folder, February 1970.

G. Méliès. 12 pages, illustrated. November 1969. Foldout: *Méliès Film Festival: Films of Fantasy and Illusion From the 1890's.* December 1969.

Indian Images: Photographs of North American Indians 1847–1928. Introduction and catalog by Joanna Cohan Scherer. 31 pages, illustrated. 30 June 1970. Paper.

Laser 10. Exhibit folder. January 1970. Hologram. January 1970.

Leonard Baskin. Essay by Alan Fern, annotated by Leonard Baskin, foreword by Joshua C. Taylor. 76 pages, 62 illustrations. 12 June 1970.

The Rat: Man's Invited Affliction. 8 pages. 17 November 1969.

Werner Drewes Woodcuts. Introduction by David W. Scott, statement by Werner Drewes, text by Jacob Kainen, catalogue by Caril Dreyfuss. 32 pages, 36 illustrations. 20 August 1969. $.50.

Leaflets

The American Folklife Company. Foldout. November 1969.

American Studies Program. Foldout. February 1970.

The Anacostia Neighborhood Museum, Smithsonian Institution Presents The Columbians. 20 pages, illustrated. 7 November 1969.

The Black Experience. Announcement. November 1969.

Color Me Mankind. Announcement. August 1969.

Electricity and Matter. 4 pages. 8 July 1969.

Electricity and Physiology, Chemistry, Magnetism, Heat. Folder. October 1969.

Explorer–I and Jupiter–C. 4 pages, illustrated. December 1969.

A Guide to the Arts & Industries Building, Smithsonian Institution. Guide map. 13 June 1970.

History of Science and Technology at the Smithsonian Institution. Foldout. 24 December 1969.

Learning Opportunities for Schools. Foldout. 21 November 1969.

National Museum of History and Technology. Foldout. Revised 10 September 1969.

National Portrait Gallery Sculpture Court. Folder. May 1970.

Organs in Early America. Folder. October 1969.

Smithsonian Film Theatre. Schedules. December 1969–January 1970. November 1969. February–March 1970. January 1970. April–May–June 1970. March 1970.

The Smithsonian Institution Invites Volunteers in Education. 4 pages. April 1970.

The Smithsonian Institution Offers Academie Research Opportunities. Foldout. 22 September 1969.

Smithsonian Institution, Washington, D. C. Guide map. Revised 16 December 1969. Revised 11 June 1970.

The Speakers Bureau. 12 pages. 10 April 1970.

The Theory of Electricity. Foldout. November 1969.

Wiley Post's "Winnie Mae": Lockheed Model 5–C "Vega" (Modified). Folder. December 1969.

Wind Instruments. Folder. November 1969.

Woodrow Wilson International Center For Scholars. Foldout. March 1970.

Women, Cameras, and Images II: Betty Hahn and Gayle Smalley. Exhibit announcement. July 1969.

Women, Cameras, and Images III: Berenice Abbott. Exhibit announcement. July 1969.

Women, Cameras, and Images IV: Barbara Morgan. Exhibit announcement. October 1969.

Official Publications

Annual Report of the American Historical Association for the Year 1968. Volume 1: "Proceedings." xvii+172 pages. 8 December 1969.

Annual Report of the American Historical Association for the Year 1961. Volume II: "Writings on American History, 1959." Edited by James R. Masterson. xv+737 pages. 2 October 1969.

Increase and Diffusion: A Brief Introduction to the Smithsonian Institution, Washington, D.C. Foreword by Frederic M. Philips. 87 pages. 30 April 1970.

Smithsonian Institution Directory. 151 pages. Publication 4638. January 1970.

Smithsonian Institution Opportunities for Research and Advanced Study, 1970–1971. xvi+230 pages, 8 illustrations. 22 September 1969.

Smithsonian Year 1969: Annual Report of the Smithsonian Institution for the Year Ended 30 June 1969. viii+705 pages, illustrated. Publication 4765. 20 May 1970.

Woodrow Wilson International Center for Scholars, 1970–1971. 20 pages, illustrated. 15 November 1969.

Appendix 6

ACADEMIC APPOINTMENTS 1969-1970

Postdoctoral Visiting Research Associates

Program in American History

WALTER L. CREESE. The American imagery resulting from political action and how it influenced the formulation of the visual and esthetic environment over the last two hundred years, "History of the Effect of American Government on the American Arts from Washington's Time," with Dr. Wilcomb E. Washburn, American Studies Program, from 1 July 1969 to 30 June 1970.

E. RAYMOND LEWIS. A history of American seacoast fortification, with John H. Magruder III, National Armed Forces Museum Advisory Board, from 1 October 1969 to 1 October 1970.

JOHN J. MCCUSKER. Philadelphia shipping, 1722–1776; a statistical study, with Dr. Melvin H. Jackson, National Museum of History and Technology, from 1 September 1969 to 31 August 1970.

LINDA M. MCKEE. A biographical study of Commodore Isaac Hull, with Howard I. Chapelle, National Museum of History and Technology, from 1 September 1969 to 1 September 1970.

SPENCER C. TUCKER. A history of American muzzle-loading naval ordnance, with Dr. Melvin H. Jackson, National Museum of History and Technology, from 23 July 1969 to 23 July 1970.

DANA F. WHITE. A systems study of the development of the city of Washington, D.C., with Dr. Wilcomb E. Washburn, American Studies Program, from 1 July 1969 to 1 July 1970.

Program in Anthropology

R. H. IVES GODDARD III. Linguistics, ethnography, and ethnohistory of the Algonquin Indians, with Dr. William C. Sturtevant, National Museum of Natural History, from 1 August 1969 to 1 August 1970.

IRVING I. ZARETSKY. A social history of spiritualism in the San Francisco Bay Region, with Dr. William C. Sturtevant, National Museum of Natural History, from 1 September 1969 to 1 September 1970.

Program in Environmental Sciences

PENELOPE WILLIAMSON. Behavioral studies of foraging in starling flocks, with Dr. George Watson, National Museum of Natural History, from 15 September 1969 to 15 September 1970.

Program in Evolutionary and Behavioral Biology, Tropical Zones

ZBIGNIEW M. GLIWICZ. Freshwater phytoplankton productivity; differential availability of different kinds of algae to various consuming organisms, with Dr. Martin H. Moynihan, Smithsonian Tropical Research Institute, from 16 October 1969 to 16 October 1970.

HENRY A. HESPENHEIDE III. Ecology of tropical insectivorous birds and their prey, with Dr. Martin Moynihan, Smithsonian Tropical Research Institute, from 1 July 1969 to 1 July 1970.

BRUCE A. MILLER. Ecology and systematics of Pacific and Western Atlantic Terebridae, with Dr. Peter Glynn, Smithsonian Tropical Research Institute, from 12 May 1970 to 11 March 1971.

EUGENE S. MORTON. Communication in birds, with Dr. Neal Smith, Smithsonian Tropical Research Institute, from 1 January 1970 to 1 January 1971.

JOHN CONRAD OGDEN. Ecology of inshore fishes, with Dr. Ira Rubinoff, Smithsonian Tropical Research Institute, from 1 September 1969 to 1 November 1970.

UZI RITTE. Ecological and genetic adaptations of populations of the spiny rat, *Proechimys semispinosus*, to different climatic regimes, and Dr. Martin H. Moynihan, Smithsonian Tropical Research Institute, from 1 September 1969 to 1 September 1970.

ERIC S. TODD. Ecophysiology of some air-breathing gobiid and gobiesocid fishes, with Dr. Martin H. Moynihan, Smithsonian Tropical Research Institute, from 1 September 1969 to 1 September 1970.

Program in Evolutionary and Systematic Biology

WILLIAM C. BANTA. Evolution of bryozoa as illustrated by the structure and development of the body wall, with Dr. Alan Cheetham, National Museum of Natural History, from 1 September 1969 to 1 September 1970.

DANIEL B. BLAKE. Evolutionary and morphological relationships of paleozoic bryozoa, with Dr. Richard Boardman, National Museum of Natural History, from 1 September 1969 to 1 September 1970.

J. STANLEY COBB. Brain morphology and behavior of deep-sea fishes, with Dr. Robert Gibbs and Dr. Stanley Weitzman, National Museum of Natural History, from 1 October 1969 to 1 October 1970.

ARTHUR L. DAHL. Ecological investigations of marine algae with computerized analysis of their habitats, with Dr. Mason Hale, National Museum of Natural History, from 15 September 1969 to 14 September 1970.

DESMOND J. G. GRIFFIN. Evolutionary relationships of decapod crustacea, with Dr. Raymond Manning, National Museum of Natural History, from 19 January 1970 to 19 October 1970.

STUART LANDRY, JR. Evolution and relationships of rabbits and rodents, with Dr. Charles O. Handley, Jr., National Museum of Natural History, from 1 September 1969 to 1 September 1970.

JAMES E. MORROW. Systematics of Alaskan White fishes and Charrs, with Dr. Robert Gibbs, National Museum of Natural History, from 18 September 1969 to 31 May 1970.

SHIH-CHIEH SHEN. Systematic and morphologic studies of fishes, with Dr. Robert Gibbs, National Museum of Natural History, from 3 November 1969 to 31 October 1970.

Program in History of Science and Technology

STANLEY GURALNICK. Science education in nineteenth-century American colleges, with Dr. Nathan Reingold, Joseph Henry Papers, from 1 August 1969 to 1 August 1970.

DAVID J. JEREMY. The textile industry in England and the United States; a case study in transmission of a technology, with Dr. Philip Bishop, National Museum of History and Technology, from 18 August 1969 to 18 August 1970.

CARROLL PURSELL, JR. Mobilization of American science and technology for World War I, with Dr. Nathan Reingold, Joseph Henry Papers, from 15 December 1969 to 15 June 1970.

PETER STECHL. Biological and standardization of drugs, 1928-1940, with Dr. Sami Hamarneh, National Museum of History and Technology, from 23 June 1969 to 23 June 1970.

Program in Physical Sciences

TOMAS FEININGER. Petrology of some Colombian and Ecuadorian Andean metamorphic rocks, with Dr. George Switzer, National Museum of Natural History, from 1 September 1969 to 31 August 1970.

TER-CHIEN HUANG. Origin and nature of deep-sea sediments and sediment transport processes, with Dr. Daniel J. Stanley, National Museum of Natural History, from 1 January 1970 to 1 January 1971.

ANIL LYALL. Studies of outer continental margin sediments near the Wilmington Canyon, with Dr. Daniel J. Stanley, National Museum of Natural History, from 1 November 1969 to 1 July 1970.

FORESE C. WEZEL. Sediments on the continental rise in the vicinity of the Wilmington Submarine Canyon, eastern United States, with Dr. Daniel J. Stanley, National Museum of Natural History, from 1 November 1969 to 31 October 1970.

Predoctoral Visiting Research Associates

Program in American History

FAYE JOANNE BAKER. A study of tombstones as a reflection of American culture, with Dr. Wilcomb E. Washburn, American Studies Program, from 1 September 1969 to 1 September 1970, leading to the award of PhD from the George Washington University.

DAVID K. SULLIVAN. Studies in the documentation of American political history in the United States, with Dr. Wilcomb E. Washburn, American Studies Program, from 1 September 1969 to 1 June 1970, leading to the award of PhD from Georgetown University.

JOANNA S. ZANGRANDO. The Memorial Bridge; monumental bridge design and the City Beautiful movement, with Robert M. Vogel, National Museum of History and Technology, from 1 September 1969 to 1 March 1970, leading to the award of PhD from the George Washington University.

Program in Anthropology

RICHARD LUNT. Folkloric study of traditional American boatbuilding techniques,

with Howard I. Chapelle, National Museum of History and Technology, and Ralph Rinzler, Division of Performing Arts, from 1 September 1969 to 1 September 1970, leading to the award of the PhD from Indiana University.

Program in Environmental Sciences

DOROTHY J. MORTON. Developmental physiology of grass seedlings with special reference to effects of light on corn, with Dr. Robert Weintraub, Radiation Biology Laboratory, from 1 July 1969 to 31 December 1969, leading to the award of PhD from the George Washington University.

Program in Evolutionary and Behavioral Biology, Tropical Zones

MARK H. BERNSTEIN. The significance of "quirks" in captive primates, with Dr. Martin H. Moynihan, Smithsonian Tropical Research Institute, from 1 September 1969 to 1 September 1970.

ROBIN B. FOSTER. Fruiting sequences in the tropical rainforest (schedules of food availability), with Dr. A. Stanley Rand, Smithsonian Tropical Research Institute, from 1 September 1969 to 1 September 1970.

CHAIM N. KROPACH. Ecology and population structure of the eastern Pacific sea snake, with Dr. Ira Rubinoff, Smithsonian Tropical Research Institute, from 1 August 1969 to 1 August 1970.

THOMAS M. ZARET. Seasonal variation in a tropical freshwater predator-prey relationship (Thyrionopsis: Ceriodaphnia), with Dr. Martin H. Moynihan, Smithsonian Tropical Research Institute, from 1 July 1969 to 1 July 1970.

Program in Evolutionary and Systematic Biology

JEAN T. DEBELL. Electron microscopy of body wall structure of certain marine worms, with Dr. W. D. Hope, National Museum of Natural History, from 9 October 1969 to 9 October 1970, leading to the award of PhD from the George Washington University.

T. GARY GAUTIER. Morphological, stratigraphic and paleoecological relationship of the bryozoa of the West Texas Permian, with Dr. Richard S. Boardman, from 1 August 1969 to 31 July 1970, leading to the award of PhD from the University of Kansas.

RICHARD H. GOODYEAR. Systematic studies of deep-sea fishes (Malacosteidae), with Dr. Robert H. Gibbs, National Museum of Natural History, from 25 August 1969 to 25 August 1970, leading to the award of PhD from the George Washington University.

WALTER S. GRAY, JR. Systematic and morphologic studies of Antarctic amphipod crustacea, with Dr. J. L. Barnard, National Museum of Natural History, from 15 February 1970 to 15 February 1971, leading to the award of PhD from the George Washington University.

LYNDON HAWKINS. Systematic and morphologic studies of the American braconid wasps, with Dr. Richard Froeschner, National Museum of Natural History, from 1 November 1969 to 30 April 1970, leading to the award of PhD from the University of Idaho.

ROBERT W. HINDS. Evolutionary and morphological studies of fossil bryozoa of the Gulf Coast, with Dr. Richard S. Boardman, National Museum of Natural History, from 1 July 1969 to 1 September 1970, leading to the award of PhD from Columbia University.

CATHERINE J. KERBY. Ecology, histology, embryology, and systematics of marine worms, with Dr. Meredith Jones, National Museum of Natural History, from 1 August 1969 to 1 August 1970, leading to the award of PhD from the George Washington University.

JACKSON E. LEWIS. Evolutionary and morphologic studies of fossil and Recent decapod crustacea, with Fenner A. Chace, Jr., National Museum of Natural History, from 1 July 1969 to 1 July 1970, leading to the award of PhD from Tulane University.

GERALD R. NOONAN. Systematics and zoogeographical relationships of coleopteran beetles, with Dr. Paul J. Spangler, National Museum of Natural History, from 1 October 1969 to 30 September 1970, leading to the award of PhD from the University of California, Riverside.

JOHN S. PEEL. Comparative studies of British and American fossil gastropods, with Dr. Ellis Yochelson, National Museum of Natural History, from 8 October 1969 to 8 October 1970, leading to the award of PhD from University of Leicester, England.

Program in History of Art and Music

ROBERT ROREX. Lady Wun-Chi, a historical study, with Dr. Thomas Lawton, Freer Gallery of Art, from 1 September 1969 to 1 September 1970, leading to the award of PhD from Princeton University.

Program in Museum Studies

MIRIAM DAVIDSON PLOTNICOV. Studies in the display and restoration of museum collections, with John Anglim, Office of Exhibits Programs, from 1 September 1969 to 31 May 1970.

JON SEGER. Research and production of visual displays and film strip recording packages, with Nathanial Dixon, Office of Academic Programs, from 22 September 1969 to 21 September 1970.

DONNA STONE. Research in ethnomusicology techniques of collection maintenance of musical instruments, with John Fesperman, National Museum of History and Technology, from 1 September 1969 to 1 June 1970.

KITTI THONGLONGYA. Taxonomic revision of the bats of Thailand, with Dr. George Watson, National Museum of Natural History, from 8 September 1969 to 7 September 1970.

ROBERT WORKS. Studies in museum administration and the history of American art, with Marvin Sadik, National Portrait Gallery, from 1 January 1970 to 31 August 1970.

Program in Physical Sciences

LESLIE RAY BRADY. Studies of atomic nuclear processes associated with production of sunshine and starlight, with Dr. Henri Mitler, Smithsonian Astrophysical Observatory, from 1 July 1969 to 1 July 1970, leading to the award of PhD from Brandeis University.

DUANE CARBON. Theoretical calculations of how stars produce light, with Owen J. Gingerich, Smithsonian Astrophysical Observatory, from 1 July 1969 to 30 June 1970, leading to the award of PhD from Harvard University.

CHUNG-CHIEH CHENG. Theoretical studies of the flux and energy spectrum of gamma radiation from the sun, with Dr. G. G. Fazio, Smithsonian Astrophys-

ical Observatory, from 1 June 1968 to 31 August 1969, leading to the award of PhD from Harvard University.

ERIC G. CHIPMAN. Studies of outer layers of the sun, with Dr. E. H. Avrett, Smithsonian Astrophysical Observatory, from 1 July 1969 to 30 June 1970, leading to the award of PhD from Harvard University.

J. STEPHEN DUERR. Studies of the physical effects of outer space on meteorites, with Dr. Charles A. Lundquist, Smithsonian Astrophysical Observatory, from 1 July 1969 to 1 July 1970, leading to the award of PhD from the Massachusetts Institute of Technology.

JONATHAN E. GRINDLAY. Theoretical studies of cosmic ray origin, with Dr. G. G. Fazio, Smithsonian Astrophysical Observatory, from 1 July 1969 to 1 July 1970, leading to the award of PhD from Harvard University.

ROBERT L. KURUCZ. Theoretical studies of particularly hot stars, with Dr. Wolfgang Kalkofen, Smithsonian Astrophysical Observatory, from 1 July 1969 to 30 June 1970, leading to the award of PhD from Harvard University.

ELIA M. LEIBOWITZ. Studies of dynamics and evolution of planetary nebulae, with Dr. Charles A. Lundquist, Smithsonian Astrophysical Observatory, from 1 July 1969 to 30 June 1970, leading to the award of PhD from Harvard University.

TIMOTHY L. STEPHENS. Studies of effects of light radiation on hydrogen gas, with Professor A. Dalgarno, Smithsonian Astrophysical Observatory, from 1 September 1969 to 30 June 1970, leading to the award of PhD from Harvard University.

JOSEPH VEVERKA. Photopolarimetry of satellites and minor planets, with Dr. Fred Whipple, Smithsonian Astrophysical Observatory, from 1 July 1969 to 1 February 1970, leading to the award of PhD from Harvard University.

Summer 1969 Undergraduate Research Participation Appointments

Names marked with an asterisk indicate students whose research was supported through grants from the National Science Foundation's Undergraduate Research Participation Program (grants GY4240: Social Sciences, and GY 4549: Biological Sciences).

Program in American History

BARBARA BLANCHARD BOWIE, Skidmore College. Interpretation through computer applications of nineteenth-century political symbols, with Harold Skramstad, American Studies.

ELIZABETH REA DULCAN, New Mexico Highlands University. The original prints of Theodor de Bry and copies by Bernard Picart, with Karil Dreyfuss, National Museum of History and Technology.

EDWARD S. HAYNES, Duke University. Development of naval uniforms, with Craddock R. Goins, Jr., National Museum of History and Technology.

CHERRY DEBORAH MAURER, Wells College. Urban design and transportation systems, with Dr. Wilcomb E. Washburn, American Studies.

PETER N. MUNSING, University of Michigan. A study of Revolutionary War military leaders, with Robert Stewart, National Portrait Gallery.

THOMAS RAYSOR, JR., University of Virginia. Research in authentication of military uniforms in the national collections, with Craddock R. Goins, Jr., National Museum of History and Technology.

BRYANT YOUNG, Yale University. Urban design and transportation systems, with Dr. Wilcomb E. Washburn, American Studies.

Program in Anthropology

*JAMES BARE, Johns Hopkins University. Data Processing in linguistics; the tonal system of the Amoy dialect of China, with Dr. Paul Voorhis, National Museum of Natural History.

*CHRISTINE DIANE COOPER, Wellesley College. Analysis of an archeological collection from Central Kansas, with Dr. Waldo R. Wedel, National Museum of Natural History.

*MARY FRANCES GUPTILL, University of Arizona. Research in dream texts from Zinacantan, Mexico, contributing to the first Tzotzil dictionary, with Dr. Robert M. Laughlin, National Museum of Natural History.

*LAURA MAY KAPLAN, Rice University. Sex prediction determined by comparison of bone length and joint size in long bones, with Dr. Lucile E. St. Hoyme, National Museum of Natural History.

*THOMAS WHITNEY KAVANAGH, University of New Mexico. Classification of Plains Indian legging traits, with Dr. William C. Sturtevant, National Museum of Natural History.

KAREN ANN LARSON, Raymond College. Research in Micronesian ethnohistory, with Dr. Saul H. Riesenberg, National Museum of Natural History.

*PETER WARREN OCHS, Yale University. Analysis of the various areas of native geographical and navigational knowledge from the Island of Puluwat, with Dr. Saul H. Riesenberg, National Museum of Natural History.

*CATHERINE SEASE, Bryn Mawr College. Sindhi textiles, costume, and costume accessories of West Pakistan, with Dr. Eugene I. Knez, National Museum of Natural History.

*SAMUEL MARTIN SEIFFER, City College of New York. A survey of the anthropological profession and social dissent, with Dr. Sam Stanley, National Museum of Natural History.

*JUDITH ANN SHULIMSON, University of Wisconsin Early collectors of African materials: a biographical survey, with Dr. Gordon D. Gibson, National Museum of Natural History.

*JOHN ANDERSON VAN NESS, New College. Linguistic notes of John Harrington, linguist of the Bureau of Ethnology, with Margaret Blaker, National Museum of Natural History.

Program in Environmental Sciences

*HARVEY J. ALEXANDER, University of Miami. Development of avian capture techniques, with Dr. Francis S. L. Williamson, Chesapeake Bay Center for Environmental Studies.

*ROSEMARIE C. ALISIO, St. Joseph College. Sexual patterns of *Solenodon paradoxus* and *Dinomys branickii*, with Larry R. Collins, National Zoological Park.

*PEGGY JEAN ARPS, Cornell University. Problems in germination of *Arabidopsis thaliana*, with Dr. William H. Klein, Radiation Biology Laboratory.

*ROBERT A. ASKINS, University of Michigan. Comparative ecology of the Hooded Warbler *(Wilsonian citrina)* and Kentucky Warbler *(Oporarnis for-*

mosus), with Dr. Francis S. L. Williamson, Chesapeake Bay Center for Environmental Studies.

*Nelson Jay Bassin, Oberlin College. Distribution of ice-rafted rocks in the South Pacific determined from sea-floor photographs, with Dr. Thomas E. Simkin, Oceanographic Sorting Center.

*Suzanne Marie Bogdanski, Trinity College. Histochemical applications in diagnosis of tumors of lower animals, with Dr. John C. Harshbarger, National Museum of Natural History.

*Douglas H. Boucher, Yale College. Measuring human impact on ecological systems, with Dr. Richard S. Cowan, National Museum of Natural History.

*David A. Couzin, University of Aberdeen. The effects of shading on plant growth, with Dr. William H. Klein, Radiation Biology Laboratory.

*Betty Jean Gray, Mt. Holyoke College. Population density study of foraging behavior in the cardinal, with Dr. Francis S. L. Williamson, Chesapeake Bay Center for Environmental Studies.

*James S. Harper III, University of Pennsylvania. Survey of enteric pathogens in collection animals at the National Zoological Park, with Dr. Robert M. Sauer, National Zoological Park.

*Howard M. Laten, Baldwin-Wallace College. Study of the intestinal flora of the Boidae, with Dr. Clinton W. Gray, National Zoological Park.

*Mark A. Mostow, Harvard College. Survey of small mammals at the Bay Center and their relationships to vegetation types, with Dr. Helmut K. Buechner, Chesapeake Bay Center for Environmental Studies.

*John M. Peach, St. Lawrence University. Concepts of marine ecology as applied in oceanographic engineering, with Dr. Francis S. L. Williamson, Chesapeake Bay Center for Environmental Studies.

*Steven E. Reynolds, University of California at Davis. Research in the practice of veterinary medicine in the exotic animals, with Dr. Clinton W. Gray, National Zoological Park.

*Joel F. Zipp, University of Wisconsin. Determination of paleoenvironments of the Outer Banks, North Carolina, with Dr. Jack W. Pierce, National Museum of Natural History.

Program in Evolutionary and Behavioral Biology, Tropical Zones

*William F. Graney, University of Delaware. Analysis of the criteria for web location of the spider, *Arogiope argentata,* with Dr. Michael H. Robinson, Smithsonian Tropical Research Institute.

*Robert Klein, Cornell University. Habit discrimination of *Agglychnis,* with Dr. A. Stanley Rand, Smithsonian Tropical Research Institute.

Deborah Lee, Wells College. Physiology of tropical marine fishes, with Dr. Ira Rubinoff, Smithsonian Tropical Research Institute.

*Wayne L. Smith, University of California at Santa Barbara. Comparison of germinated species pairs of invertebrates found in the Atlantic and Pacific Oceans of the Isthmus of Panama, with Roberta W. Rubinoff, Smithsonian Tropical Research Institute.

Program in Evolutionary and Systematic Biology

*Mary R. Ditman, George Washington University. Study of micromorphological character of *Hymenoxys* and related genera, with Dr. Kittie F. Parker, National Museum of Natural History.

*Paul E. Drez, Old Dominion College. Field study of Pleistocene paleoecology in southeastern Virginia, with Dr. Clayton E. Ray, National Museum of Natural History.

*Susan Hershey, Charles County Community College. Feeding behavior and morphology of larval and adult sipunculid worms, with Dr. Mary E. Rice, National Museum of Natural History.

*Katherine H. Lewis, University of Miami. Viability of ostracods eggs following consumption and defecation by fish, with Dr. Louis S. Kornicker, National Museum of Natural History.

*Susan Platkin, University of Maryland. Compilation of data for the moth genus *Urodus* and completion of a catalogue for one species of the genus, with Dr. W. Donald Duckworth, National Museum of Natural History.

*Clara P. Sperapani, University of Maryland. Primitive and advanced characters of the leaves of the Fagaceae, with Dr. Leo J. Hickey, National Museum of Natural History.

*Mary Ann Turner, Indiana University. Morphologic characters of specific importance in the South African *Dicynodontis,* with Dr. Nicholas Hotton III, National Museum of Natural History.

*Edward J. Wall, Muhlenberg College. Study of Pleistocene bivalve mollusk fauna of a Mississippi mudlump island, with Dr. Thomas R. Waller, National Museum of Natural History.

*Steven J. Zehren, University of Wisconsin. A comparative study of the osteology and anatomy of teleost fishes, with Dr. Stanley H. Weitzman, National Museum of Natural History.

Program in History of Art and Music

Ronald Brucato, Pratt Institute. Magic realism in painting: 1930–1950, with Robert T. Davis, National Collection of Fine Arts.

Roger W. Evans, Stetson University. Eighteenth-century keyboard instruments, with John T. Fesperman, National Museum of History and Technology.

James E. Furman, Claremont College. The art of Maurice Prendergast, with Robert T. Davis, National Collection of Fine Arts.

Janice H. Hertenstein, Michigan State University. History and techniques of printmaking in America, with Donald R. McClelland, National Collection of Fine Arts.

Program in History of Science and Technology

*Bernard C. Dale, Kenyon College. Historical and social interrelationships of the mints of Asia Minor, with Vladimir Clain-Stefanelli, National Museum of History and Technology.

*Ming M. Ivory, Tufts University. Problems of access and interpretation for the Joseph Henry Papers, with Dr. Nathan Reingold, Joseph Henry Papers.

*Robert O. Lapidus, Ohio University. The Sputnik and its repercussions: an historical analysis, with Frederick C. Durant III, National Air and Space Museum.

*Howard Jay Millard, Michigan State University. An historical survey of photographic processes and techniques, with Eugene Ostroff, National Museum of History and Technology.

*David Alan Rosenberg, The American University. The sloop of war *Saratoga:* verification of data in the national collection, with Philip K. Lundeberg, National Museum of History and Technology.

*John F. K. Tyner, Trinity College. Development of the P. K. Tomajan Collection catalogue, with Dr. Elizabeth Harris, National Museum of History and Technology.

*William A. Watson, George Washington University. Development of electron injection techniques in the McMillan synchrotron, with Dr. Philip W. Bishop, National Museum of History and Technology.

Program in Museum Studies

Laurel L. Arnold, Mount Holyoke College. Research in conservation techniques, with Charles H. Olin, National Collection of Fine Arts and National Portrait Gallery.

James P. Batchelor, Williams College. Research in conservation techniques, with Charles H. Olin, National Collection of Fine Arts and National Portrait Gallery.

Susan B. Keily, Mount Holyoke College. History and techniques of printmaking in America, with Robert G. Stewart, National Portrait Gallery.

Program In Physical Sciences

Thomas L. Marzetta, Massachusetts Institute of Technology. Research in electron microprobe laboratory instrumentation refinement activities, with Dr. William G. Melson, National Museum of Natural History.

Summer 1969 Graduate Research Participation Appointments

Program in American History

George L. Mitchell, University of Chicago. The image of the city in American silent film, with Dr. Wilcomb E. Washburn, American Studies Program.

Program in Anthropology

Raymond P. DeMallie, University of Chicago. Studies in American Indian linguistics—Siouan groups, with Dr. Paul Voorhis and Margaret C. Blaker, National Museum of Natural History.

Jane I. Lumpkin, University of Alabama. Identification of artifacts from Thailand and Pakistan, with Dr. Eugene I. Knez, National Museum of Natural History.

Jill Ellen Marshall, American University. Study of culture and population in Africa, with Dr. Gordon D. Gibson, National Museum of Natural History.

Program in Evolutionary and Behavioral Biology, Tropical Zones

Yael Devora Dubin, University of Florida. Ecology and behavior of spiders, with Dr. Martin H. Moynihan, Smithsonian Tropical Research Institute.

Program in Evolutionary and Systematic Biology

SANA ISA ATALLAH, University of Connecticut. Mammals of the eastern Mediterranean region: their ecology, systematics, and zoogeographical relationships, with Dr. Henry W. Setzer, National Museum of Natural History.

Program in Physical Sciences

DOUGLAS NELSON, University of South Carolina. Clay mineralogy of Atlantic project, with Dr. Jack W. Pierce, National Museum of Natural History.

Visiting Scholars

ALFRED R. HENDERSON. A biographical study of Dr. Charles Land and his role in the development of dentistry and medicine, with Dr. Robert P. Multhauf, National Museum of History and Technology, from 15 June 1969 to 15 June 1970.

DALE W. RICHEY. Conservation problems of Chinese minor bronzes of the Chou and Han periods, with W. Thomas Chase, Freer Gallery of Art, from 1 September 1969 to 1 September 1970.

WILLIAM WING. A comprehensive study of drug use, with Philip C. Ritterbush, Office of Academic Programs, from 16 February 1970 to 15 May 1971.

Appendix 7

PUBLIC AFFAIRS

News Releases Issued

Texas Folklorist Helps Plan Take-Over of D.C.	2–7–69
CBS Labs Give Smithsonian Original Field-Sequential Color Equipment	2–7–69
FBI Building Site Fertile Spot for Smithsonian Archeologist	3–7–69
Henry O. Tanner Exhibition To Open at National Collection of Fine Arts	8–7–69
Henry O. Tanner Biography	8–7–69
Smithsonian and Yugoslavs Sign Research Agreement	10–7–69
National Collection of Fine Arts Will Present Four Summer Lectures	15–7–69
Smithsonian Exhibit Chronicles Powell's Colorado River Trek	15–7–69
Works of Three Women Featured in Photo Shows Opening 17 July	15–7–69
Zoo Police Get Pay Raise	17–7–69
Smithsonian To Exhibit Works of Richard Neutra	18–7–69
Smithsonian To Stage Satirical Musical *Of Thee I Sing* in Theatre-On-The-Mall	23–7–69
Smithsonian To Exhibit Work of Ten Afro-American Artists	29–7–69
Works of Pacesetting Italian Architects Going on Display at Smithsonian	30–7–69
Dr. Wunder Taking Leave of Absence from Cooper-Hewitt Museum of Design	31–7–69
Dr. Robert P. Higgins New Director of Mediterranean Marine Sorting Center	31–7–69
Tent Show Cancellation	5–8–69
The Concerned Photographer Exhibition To End Three-Month Run	8–8–69
Smithsonian To Present Exhibit of Top British Craft Designs	12–8–69
Smithsonian Children's Theater Will Present 18th-Century Fable	14–8–69
United States To Show Four Team Exhibits at Youth Art Biennial in Paris	14–8–69
Smithsonian To Display Student Design Exhibit *Color Me Mankind*	15–8–69
Cooper-Hewitt Museum To Trace History of the Chair	15–8–69
Time Magazine Cover Show Is Extended at Smithsonian	20–8–69
Carolina Pottery Shop Salvaged by Smithsonian	22–8–69
Smithsonian Appoints Development Director	26–8–69
R.A.F. To Present a Hawker Hurricane to Smithsonian Air and space Museum	26–8–69
"Pharmacy in Prints" Shows Artist's View of Medicine	27–8–69
Professor Joshua C. Taylor To Head Smithsonian Museum	3–9–69
Museums at Smithsonian Institution Holding 57 Art Exhibitions	4–9–69

Smithsonian Museum Schedules Sky Spectacle on 9 May	5–5–70
Smithsonian Museum Schedules National Glassware Exhibition	6–5–70
The Nevins and Parkman Prizes of the Society of American Historians	7–5–70
Air Force Art Show at Smithsonian	7–5–70
Exhibit Shows Influences of Spanish on American Culture	8–5–70
Lloyd McNeil, Capitol Ballet Company to Premiere "Washington Suite"	13–5–70
Mall Sky Spectacle Is Planned by Smithsonian on Saturday, 16 May	13–5–70
Composition Premiered at Smithsonian Is Given First Foreign Performance	18–5–70
Smithsonian Honors Mrs. Eugene Meyer for Devoted Service to Freer Gallery	19–5–70
Multimedia Soft Rock Musical To Be Presented	19–5–70
National Collection of Fine Arts Continues Public Tours This Summer	19–5–70
Recommendations Made To Save Hawaiian Endangered Species	22–5–70
African Costume Paintings Shown	22–5–70
Smithsonian Exhibit Honors Gutenberg	25–5–70
Smithsonian Regents' Spring Meeting	26–5–70
Teaching Exhibition Scheduled by National Portrait Gallery	27–5–70
Smithsonian Museum To Unveil Portrait of Robert F. Kennedy	27–5–70
Winslow Homer Exhibition Focuses on Artist's Popular Early Works	27–5–70
Naval Research Lab Gives First Radar Equipment to Smithsonian	1–6–70
Special Exhibition Traces Manhattan's Historic Trip	1–6–70
Artist Leonard Baskin Being Accorded Mid-Career Exhibition at Smithsonian	3–6–70
Puppet Theatre Opens Summer Variety Show	3–6–70
High School Students Needed as Smithsonian Tour Guides	8–6–70
Early Bird Twin To Be Presented to Smithsonian	10–6–70

Newsfeatures Issued

Wheels of Progress Haven't Caught 102-Year-Old Pennsylvania Factory	26–11–69
American Artist Rediscovered in Washington Exhibition	15–12–69
Amateurs Can Help Scientist Search for Dinosaur Fossils	1–1–70
A Change of Clothes for Each First Lady Is Curator's Goal	14–1–70
Where Have All the Wild Flowers Gone?	9–2–70
Flowering Death Strikes Japanese Bamboo Plants	2–3–70
Ecologist Warns of Effects of Environmental Ruin on Young	17–3–70
Topping 100th Birthday Celebration Will Challenge Bicentennial Planners	20–4–70
Man Probably Villain in Ice Age Mammal Extinction	15–6–70

"Radio Smithsonian" Programs

1. The Infestation of Starfish in the Pacific. Paul Morris, Violinist. Tibetan Art.
2. "Jumbo Mumbo"—Conservation and Ecology in Ceylon. Color Me Mankind.

3. The Festival of American Folklife.
4. Music—*Concerto for Two Organs in F. Theme and Variations.*
5. Frederic Tanner's Role in Art. Hurricane Fighter Plane. Ladies' Bathing Garments.
6. Archeology in South America. National Portrait Gallery.
7. Atomic Art. The British Crafts Show.
8. The Concerned Photographer. *The Sacred Grove.* The Doll House.
9. Meteorites and Moon Rocks. Stitchery.
10. Encounter. The Deep Discoverers.
11. Smithsonian School Aids. The Bahar River Tiger. Grasses as Food and Medicine.
12. Music at the Smithsonian. The Exhibits Story. In the Architect's World.
13. A Christmas Program.
14. A Concert Program.
15. The Art of Whistler. The Anacostia Neighborhood Museum.
16. The Frozen Wing. Primate Biology and Evolution.
17. Public Broadcasting. Civilization.
18. On the Trail of the Dinosaur. *Syntagma Musicum.*
19. The Continental Motion. Mineralogy.
20. A Gift to the Nation. Objects: USA. A House of Foam.
21. An Oral History of Aviation. NASA Space Art.
22. Frankincense and Myrrh. *Pièces de Clavecin en Concerts.*
23. The First Ladies' Gowns. Music of the Political Campaigns.
24. Perceptions II.
25. Freeze-Drying. Flora North America.
26. *Ensembles Musical de Buenos Aires.*
27. China and the Porcelain Trade. Reading Is Fun-damental.
28. The National Zoological Park.
29. Laser 10.
30. Smithsonian. The Collection of Meteorites.
31. *Orchestra Sinfonia di Como.* The Hammer Collection.
32. The Chesapeake Bay Center for Environmental Studies. The Flowering Death.
33. The Art of Barbara Holmquest. Privateers: Opportunists or Pirates?
34. The Machine Left Behind. Archeology Beneath the Sea.
35. Music at the Smithsonian.
36. The Concept of Honor. American Seacoast Fortifications.
37. Paleolithic-Era Burial Remains: The First Clues. The Kalihar Bushmen.
38. The Smithsonian Puppet Theater.
39. Women's Liberation—From Suffrage to Careers. Tektite II: An Undersea Experiment.
40. The History and Folk Music of Peggy Seeger and Ewan McColl.
41. Pollution in Perspective. Butterfly Collecting.
42. Greek Archeology. Foraminifera: Indicator Organisms.
43. Russian Porcelain. Pleasure of Minerals as *Objects d'art.*

Public Inquiries

Dial-a-Museum calls	27,000
Dial-a-Satellite calls	150,000
Calls for information	27,500
Letter requests for information	9,150

Appendix 8

SMITHSONIAN EXHIBITS

Special Exhibits

History and Technology Building

American Holidays—Appomatox
American Holidays—Washington/Lincoln
American Holidays—Winter
Archeological Finds
Atomic Art
Bethlehem Steel
Captain Buck's Paintings
Color Me Mankind
Demand for Water
Energy Conversion
Gurnsey-Jersey Stamps
Historic Site Archeology
Laser 10
Méliès Film Festival
Model T Ford
Napoleonic Coins and Medals
People Figures
Pharmacy in Prints
Photography—Elliot Erwitt
Photography—Hosee/Johnson
Roots of California Culture
Scandinavian Stamps
Ship Models
Ten Modern Italian Architects
The Camera and the Human Facade
The Works of Richard Neutra
Weather (Philately)
Westward to Promontory
Women, Cameras, and Images, Parts II-IV
Women and Politics

Natural History Building

A Heritage in Peril—Alaska's Vanishing Totems
African Art
Armand Hammer
Daco Roman Traces in Romania
Dead Sea Scrolls, Parts I and II
Library Show (Malay Archipelago)
The Indomitable Major
The World Beneath the Sea
Volcanos and Volcanism

Arts and Industries Building

British Designer Craftsmen
Contemporary Black American Artists
Contemporary Tapestries and Graphics—Yugoslavia
Johannes Gutenberg
Lovis Corinth
Moon Rock
New Concepts in Leisure
Plastic as Plastic
Polish Folk Art
Scientific Illustrators
Toledo Glass
Urban Transit

National Air and Space Museum

Apollo Art
USAF Show

Anacostia Neighborhood Museum

Rats—Man's Invited Affliction
The Douglass Years

Permanent Exhibitions

History and Technology Building

Agriculture
Armed Forces Chronology—Navy
Autos and Coaches
Everyday Life in the American Past
Flag Hall
Graphic Arts
Hall of Photography
Iron and Steel
Philately
Political History

Natural History Building

Fossil Fishes
Ice Age Mammals
Physical Geology
Prehistoric Peoples of North America
Whale (Life in the Sea)

Appendix 9

FINANCIAL STATEMENT

30 JUNE 1970

SMITHSONIAN INSTITUTION

Summary of Grants and Contracts

Year Ended 30 June 1970

	Total	*Grants*	*Contracts*
Department of Health, Education, and Welfare	$ 325,832	$ 311,119	$ 14,713
Department of Defense	1,085,685	46,343	1,039,342
National Aeronautics and Space Administration	6,560,854	3,780,531	2,780,323
National Science Foundation	2,246,241	283,884	1,962,357
Other	606,554	107,742	498,812
Total grants and contracts	$10,825,166	$ 4,529,619	$ 6,295,547

Summary of Endowment and Similar Funds Investments

Book Values at 30 June 1970

	Total	*Freer Fund*	*Other*
Short-term bonds	$ 1,909,345	$ 1,121,352	$ 787,993
Medium-term bonds	1,494,486	877,426	617,060
Long-term bonds	9,349,386	5,228,216	4,121,170
Preferred stocks	281,484	205,796	75,688
Common stocks	17,178,444	5,749,008	11,429,436
Total	$30,213,145	$13,181,798	$17,031,347

PEAT, MARWICK, MITCHELL & CO.

CERTIFIED PUBLIC ACCOUNTANTS
1025 CONNECTICUT AVENUE, NW
WASHINGTON, D.C. 20036

The Board of Regents
Smithsonian Institution:

We have examined the balance sheet of private funds of Smithsonian Institution as of 30 June 1970 and the related statement of changes in fund balances for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying statement of changes in fund balances presents fairly the operations of the unrestricted private funds of Smithsonian Institution for the year ended 30 June 1970, in conformity with generally accepted accounting principles; and with respect to all other funds, subject to the matters referred to in note 1, the accompanying balance sheet of private funds and the related statement of changes in fund balances present fairly the assets and fund balances of Smithsonian Institution at 30 June 1970 and changes in fund balances resulting from cash transactions of the private funds for the year then ended, all on a basis consistent with that of the preceding year.

PEAT, MARWICK, MITCHELL & CO.

22 October 1970

SMITHSONIAN INSTITUTION
BALANCE SHEET OF PRIVATE FUNDS 30 JUNE 1970

Assets

Current funds:		
Cash:		
In U. S. Treasury		$ 49,599
In banks and on hand		168,225
Total cash		217,824
Receivables:		
Accounts	$ 349,484	
Advances—travel and other	146,269	
Reimbursements—grants and contracts	1,536,516	2,032,269
Inventories at net realizable value		544,413
Investments—stocks and bonds at cost (market value $2,900,264)		3,409,426
Prepaid expense		39,541
Deferred magazine subscription expenses (note 2)		267,300
Equipment—museum shops (less accumulated depreciation of $49,932)		64,115
Total current funds		$ 6,574,888
Endowment and similar funds:		
Cash		77,533
Note receivable		96,934
Investments—stocks and bonds at cost (market value $29,456,568)		30,213,145
Loan to U.S. Treasury in perpetuity		1,000,000
Real estate (at cost or appraised value at date of gift) (note 3)		1,760,448
Total endowment and similar funds		$33,148,060

See accompanying notes to financial statements.

SMITHSONIAN INSTITUTION
BALANCE SHEET OF PRIVATE FUNDS 30 JUNE 1970

Liabilities and Fund Balances

Current funds:		
Accounts payable		$ 968,933
Accrued liabilities		63,986
Deferred magazine subscription income		1,030,115
Unrestricted fund balance		1,869,941
Restricted fund balances:		
Gifts	$ 1,566,028	
Grants	108,330	
Contracts	177,814	1,852,172
Unexpended income:		
Freer	434,873	
Other	354,868	789,741
Total current funds		$ 6,574,888
Endowment and similar funds:		
Mortgage note payable (note 3)		310,697
Fund balances:		
Endowment funds—income restricted:		
Freer	13,188,994	
Other	13,214,651	26,403,645
Current funds reserved as an endowment—income unrestricted		6,433,718
Commitment (note 4)		
Total endowment and similar funds		$33,148,060

SMITHSONIAN INSTITUTION
PRIVATE FUNDS

Statement of Changes in Fund Balances
Year Ended 30 June 1970

	Current funds	
	Total current funds	*Unrestricted funds*
Balance at beginning of year	$ 6,024,712	$ 2,851,411
Adjustment—accrued interest	26,670	26,670
Adjustment balance at beginning of year	6,051,382	2,878,081
Additions:		
Grants and contracts, net of refunds	9,517,884	.....
Investment income	1,322,315	323,206
Gifts and bequests	2,307,097	17,550
Gross profit on sales	744,950	744,950
Rental	1,583,657	1,583,657
Dues and fees	531,184	531,184
Reimbursement from grantors or contractors	384,629	109,989
Other	451,960	283,372
Net gains (loss) on sales and exchanges of investments	(41,899)	(41,899)
Total additions	16,801,777	3,552,009
Deductions (additions):		
Expenditures:		
Salaries and benefits:		
Administrative	4,093,708	4,093,708
Research	6,225,853	.....
Purchases for collection	429,526	.....
Travel and transportation	610,162	158,358
Equipment and facilities	922,188	80,370
Supplies and materials	1,375,145	225,910
Rents and utilities	964,606	366,224
Communication	247,680	77,227
Contractual services	2,162,920	1,211,299
Computer rental	1,027,765	176,023
Promotion and advertising	133,717	133,717
Depreciation	31,296	22,825
Administrative expenditures applicable to other funds	.....	(2,056,728)
Reduction of inventory to net realizable value	42,724	42,724
Total deductions	18,267,263	4,531,657
Transfers in (out):		
Income added to principal	(52,989)	.....
Transfers for designated purposes	.....	(7,439)
Transfers to endowment funds	(21,053)	(21,053)
Transfer in support of activities	.....	.....
Total transfers to (from)	(74,042)	(28,492)
Balance at end of year	$ 4,511,854	$ 1,869,941

See accompanying notes to financial statements.

Current funds—Continued

Restricted funds		*Endowment and similar funds*		
Gifts, grants, and contracts	*Unexpended income*	*Total endowment and similar funds*	*Endowment funds*	*Current funds reserved as an endowment*
$ 2,379,937	$ 793,364	$26,489,937	$20,075,884	$ 6,414,053
.....	.....	.....	.....	.....
2,379,937	793,364	26,489,937	20,075,884	6,414,053
9,517,884	.....	.....	.....	.....
.....	999,109	.....	.....	.....
2,289,547	.....	6,384,289	6,384,289	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
274,640	.....	.....	.....	.....
74,541	94,057	113,577	.....	113,577
.....	.....	(224,482)	(130,570)	(93,912)
12,156,612	1,093,156	6,273,384	6,253,719	19,665
.....	.....	.....	.....	.....
5,791,461	434,392	.....	.....	.....
175,801	253,725	.....	.....	.....
412,521	39,283	.....	.....	.....
821,478	20,340	.....	.....	.....
1,085,831	63,404	.....	.....	.....
595,159	3,223	.....	.....	.....
156,133	14,320	.....	.....	.....
887,779	63,842	.....	.....	.....
812,744	38,998	.....	.....	.....
.....	.....	.....	.....	.....
.....	8,444	.....	.....	.....
1,981,771	74,957	.....	.....	.....
.....	.....	.....	.....	.....
12,720,678	1,014,928	.....	.....	.....
.....	(52,989)	52,989	52,989	.....
36,301	(28,862)	.....	.....	.....
.....	.....	21,053	21,053	.....
.....	.....	.....	.....	.....
36,301	(81,851)	74,042	74,042	.....
$ 1,852,172	$ 789,741	$32,837,363	$26,403,645	$ 6,433,716

NOTES TO FINANCIAL STATEMENT
30 June 1970

1. *Basis of Accounting.*—The accounts for unrestricted funds are maintained on the accrual basis of accounting. Accounts for other funds are maintained on the basis of cash receipts and disbursements, except that reimbursements for work performed pursuant to a grant or contract are accrued and certain real estate is carried at cost or appraised value as explained below.

Except for certain real estate acquired by gift or purchased from proceeds of gifts which are valued at cost or appraised value at date of gift, land, buildings, furniture, equipment, works of art, living and other specimens, and certain other similar property, are not included in the accounts of the Institution; the amounts of investments in such properties are not readily determinable. Current expenditures for such properties are included among expenses. The accompanying statements do not include the National Gallery of Art, the John F. Kennedy Center for the Performing Arts, nor other departments, bureaus, and operations administered by the Institution under Federal appropriations.

2. *Deferred Magazine Subscription Expenses.*—This amount represents promotional and other expenses incurred in connection with the introduction of the *Smithsonian* magazine. Amortization is over a period of twelve months which commenced in March 1970, the month of the first issue.

3. *Mortgage Notes Payable.*—The mortgage notes payable are secured by first deeds of trust on property acquired in connection with the Chesapeake Bay Center. Funds for the curtailment of these notes will be transferred from Restricted Funds—Gifts, designated for the development of the Chesapeake Bay Center. The details of the mortgage notes payable are as follows:

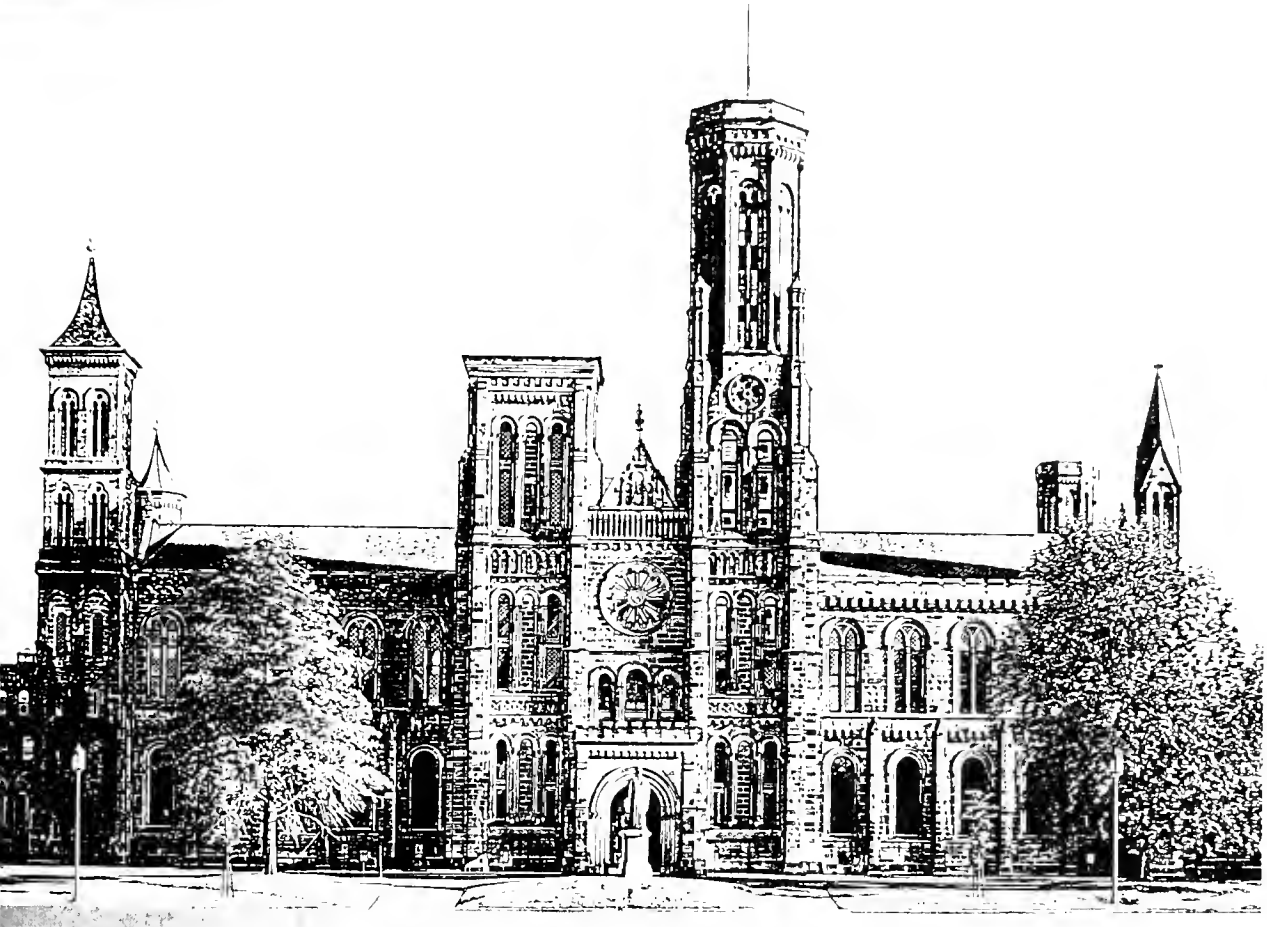
a. A $266,000 note on property acquired for $376,000. The note is payable in twenty consecutive semi-annual installments of $13,300, plus interest at the prevailing prime rate on the due date of payment but not less than 8 percent.

b. A $44,697 note on property acquired for $118,533. The note is payable in monthly installments of $451.02, including interest at the rate of 6 percent, with the final payment due on 1 November 1989.

4. *Commitment.*—Pursuant to an agreement, dated 9 October 1967, between the Institution and The Cooper Union for the Advancement of Science and Art, the Institution acquired, on 1 July 1968, all funds belonging to The Cooper Union for use exclusively for museum purposes, and certain articles of tangible personal property as defined in the agreement.

The agreement provides, among other covenants, that the Institution will maintain a museum in New York City and has pledges in excess of $800,000 for the support of such a museum. Pledges in the amount of $500,000 have been collected to date.

☆U.S. GOVERNMENT PRINTING OFFICE: 1970 O—401–511



Smithsonian Year

1971

ANNUAL REPORT OF
THE SMITHSONIAN INSTITUTION
FOR THE YEAR ENDED 30 JUNE 1971

SMITHSONIAN INSTITUTION PRESS
City of Washington
1971

SMITHSONIAN PUBLICATION 4767

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The Smithsonian Institution

The Smithsonian Institution was created by act of Congress in 1846 in accordance with the terms of the will of James Smithson of England, who in 1826 bequeathed his property to the United States of America "to found at Washington, under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge among men." In receiving the property and accepting the trust, Congress determined that the federal government was without authority to administer the trust directly, and therefore, constituted an "establishment," whose statutory members are "the President, the Vice President, the Chief Justice, and the heads of the executive departments."

The Establishment

RICHARD M. NIXON, President of the United States
SPIRO T. AGNEW, Vice President of the United States
WARREN E. BURGER, Chief Justice of the United States
WILLIAM P. ROGERS, Secretary of State
JOHN B. CONNALLY, Secretary of the Treasury *
MELVIN R. LAIRD, Secretary of Defense
JOHN N. MITCHELL, Attorney General
WINTON M. BLOUNT, Postmaster General
ROGERS C. B. MORTON, Secretary of Interior †
CLIFFORD M. HARDIN, Secretary of Agriculture
MAURICE H. STANS, Secretary of Commerce
JAMES D. HODGSON, Secretary of Labor
ELLIOT L. RICHARDSON, Secretary of Health, Education, and Welfare
GEORGE W. ROMNEY, Secretary of Housing and Urban Development
JOHN A. VOLPE, Secretary of Transportation

* Replaced David M. Kennedy on 11 February 1971.
† Replaced Walter J. Hickel on 29 January 1971.

Board of Regents and Secretary

30 June 1971

Presiding Officer ex officio	RICHARD M. NIXON, President of the United States, Chancellor
Regents of the Institution	WARREN E. BURGER, Chief Justice of the United States, Chancellor
	SPIRO T. AGNEW, Vice President of the United States
	CLINTON P. ANDERSON, Member of the Senate
	J. WILLIAM FULBRIGHT, Member of the Senate
	HUGH SCOTT, Member of the Senate
	FRANK T. BOW, Member of the House of Representatives
	JOHN J. ROONEY, Member of the House of Representatives
	GEORGE H. MAHON, Member of the House of Representatives
	JOHN NICHOLAS BROWN, citizen of Rhode Island
	WILLIAM A. M. BURDEN, citizen of New York
	CRAWFORD H. GREENEWALT, citizen of Delaware
	CARYL P. HASKINS, citizen of Washington, D.C.
	THOMAS J. WATSON, JR., citizen of Connecticut
	JAMES E. WEBB, citizen of Washington, D.C.
Executive Committee (Permanent Committee)	WARREN E. BURGER, Chancellor (Board of Regents)
	CLINTON P. ANDERSON
	CARYL P. HASKINS (Chairman ad interim)
	JAMES E. WEBB
The Secretary	S. DILLON RIPLEY
Under Secretary	JAMES BRADLEY
Assistant Secretaries	DAVID CHALLINOR, Acting Assistant Secretary (Science) *
	CHARLES BLITZER, Assistant Secretary (History and Art)
	WILLIAM W. WARNER, Assistant Secretary (Public Service)
Treasurer	T. AMES WHEELER

A listing of the professional staff of the Smithsonian Institution, its bureaus, and its offices appears in Appendix 4.

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* Replaced Sidney R. Galler on 11 January 1971.

Contents

Statement by the Secretary

S. Dillon Ripley

This annual report of the Institution covers a twelve-month period from 1 July 1970 to 1 July 1971. This year seems to have been the time for a distinct pause in American affairs, economically, politically, and to some extent in the realm of ideas as well, for in such times moods are contagious. This has been the year of the decrescendo, the de-escalation, the lowering of rhetoric.

The pause, while unfamiliar to some, has not been unwelcome. It has been a sober experience, and sober times are always useful in these days of mental assault by the mixed media among which we live and the false euphoria engendered by our innate hucksterism. But if the pause has succeeded in being somewhat anti-inflationary, it is too bad that it has not been more productive of contemplation.

The basic problems of the present stage of American cultural and economic history remain: anomie in the young, the pandemic use of drugs, alienation among the poor and the ethnic minorities that remain disadvantaged, and the curious loss of interest in hand labor, skills and crafts—those talents that once helped set American energy and creativeness in a class by itself.

Annually the Institution attempts to remind Americans of this traditional approach towards life and personal fulfillment in our Folk Festival. The 1970 Folk Festival, our fourth on the Mall, was even more successful than its predecessors.

A main feature was provided by the State of Arkansas, a national center for crafts and folk music traditions. One hundred and seventy five Arkansans led by State officials, participated in the five day festival, demonstrating everything from the carving of dulcimers to the making of sorghum, corncob jelly, barrels, saddles, fiddles, split oak cotton baskets, knives, quilts, and wood carvings. They also demonstrated wine-making and milking, churning, cheese-making, and baking. A huge turn-out of Washington citizens and tourists watched with fascination and awe as all sorts of things were made by hand.

Among the foods sold at the festival were barbecued buffalo meat, Indian fried bread, Arkansas barbecued chicken, and blackberry cobbler, Ozark style.

In addition we played host to our first big assemblage of American Indians organized by Mrs. Clydia Nahwooksy and George Kishketon, Cherokee and Kickapoo, respectively. Tribes represented included Comanches, Kiowas, Ponca, Ponca-Sioux, Kickapoo, Osage, Cheyenne, Kiowa-Choctaw and Arapaho. Crafts, music, and dance were all demonstrated.

As one tourist wrote, "I wish Washington was like this all year round. You have brought life to the center of the Mall. It's a living greensward, not a dead one."

During the period 16-31 July 1970, the Institution had its first general Congressional hearings since 1855. The purpose of the hearings, called by our committee in the House, the Subcommittee on Library and Memorials, was, in the words of the Honorable Frank Thompson of New Jersey, our Chairman, "a comprehensive look at the Smithsonian, which, established by Act of Congress in 1846, is essentially a federal responsibility," even though "relatively independent compared to other federal organizations. . . . We hope to obtain a better understanding of how the Smithsonian operates, of its structure, of how it develops and carries out its policies, of how its activity benefits the public and, of course, we want to find out what its goals are for the future."

"Only when we have this knowledge can the subcommittee and the Congress pass confidently on legislation requested by the Smithsonian."

In my own statement I responded in kind, "We feel we have far too few opportunities . . . to be in close touch with your committee . . . and it is a very hopeful and helpful sign of the continuing interest of the Congress of the United States" in our affairs. For indeed we welcome scrutiny as I had stated in our annual report of 1969, and we feel that we thrive on self-examination.

The two volumes of the hearings,* running to over 1,000 pages, were comprehensive indeed and no doubt will prove a valuable source book for the future. No stone seemed to be left unturned in our accounting of the multifarious activities of the Institution, although for those of us who constantly live the affairs of the Smithsonian, the time at hand seemed all too short in which to set the stage as it were, to provide the setting, both historical

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* *General Hearings before the Subcommittee on Library and Memorials of the Committee on House Administration.* House of Representatives, Ninety-first Congress, Second Session (Smithsonian Institution), U.S. Government Printing Office, Washington, 1970.

and contemporary, for what it is that we do, why we do it, and how it came about in the first place.

The demonstrated interest of Mr. Thompson, well known in the country for his sponsorship of cultural and arts legislation, of Mr. Brademas, whose concern for education is equally well known, and of the other members of the subcommittee, Mr. Schwengel, Mr. Bingham, Mr. Harvey, and Mr. Crane, in our hearings, was a most welcome one, and we are indeed grateful for this opportunity to be responsive to the Congress.

One of the particular recommendations of the Committee as a result of the hearings was that the Smithsonian should restudy the cross-Mall design for the sculpture garden of the Hirshhorn Museum. As a result a new solution was found; the plans were revised and are currently under way, thus not traversing the open space of the Mall's center panel. Finally the committee gave circulation to its far-reaching conclusion that, "the Smithsonian's value to the people of the United States is impossible to estimate. It can be safely stated that its role is basic and should be continued. Its work and research in science, education, history, the arts, and, of course, in its many museums far overshadow whatever criticisms of the Smithsonian have been made."

In all of the work of assembling material for the hearings, I should like to pay particular tribute to the Smithsonian staff, from my own assistants to the heads of bureaus and departments and to our Archivist, fiscal officers and secretarial aides, many of whom worked overtime and under great pressure performing research and providing data for presentation. The energy and initiative displayed were a testament to the fact that there exists a great loyalty and a sense of common enterprise among those who work for this much-cherished Institution. We are all very proud of the Smithsonian, and our pride is shown in the dedication and sense of fulfillment which is demonstrated in our work at such times.

During all this period of the summer of 1970, our budget unit had been preparing materials for submission to the President's Office of Management and Budget, for the fiscal year 1972 budget. Both at our hearings and also in the subsequent autumn discussions with the Budget authorities of the President, the Institution was honored to have a new champion for our air and space concerns in the person of Senator Barry Goldwater, one of the premier aeronauts in government, who took revived interest on our behalf for the long postponed National Air and Space Museum. This project,

passed by the Congress in 1966, with a site on the Mall and building plans approved, had been deferred for construction until such time as a significant decline in the American involvement in Vietnam had occurred. Meanwhile inflation had taken its toll of the original plans for the museum, which we estimated would cost nearly twice as much to build by 1976, as we had assumed in 1966. Consequently, the Board of Regents approved a scaling down of the original plans to produce a building more in keeping with the original estimated costs.

New scaled-down plans with their redesign will take nearly a year to achieve, and in order to accomplish this, an allowance in our budget of $1.9 million would be required. With the help of Senator Goldwater, as well as the authoritative and enthusiastic support of the Regents, this item was approved and incorporated in our budget for 1972. If the schedule presently outlined can be achieved without let or hindrance from acts of God, strikes, fires or flood, we are in a fair way to have a National Air and Space Museum within five years, namely by 1976.

The new Museum should incorporate many new devices and points of view on account of the very delay in its construction. There is a beneficial aspect in such delays. The triumphs of the astronauts on the Moon for example, give our designers scope for newly thought-out exhibits. The whole understanding of space which has evolved in the last five years since 1966 gives us new opportunities. A "Spacearium" should be incorporated in the new museum, an evolved planetarium concept orienting the participant to life in space. New advances in chemistry and geology have created new cosmogonies. New theories of the origin of the solar system and the galaxies of outer space can be demonstrated and exhibited in a manner which we would have been hard put to incorporate in an existing designed series of exhibits. So there is new scope for enthusiasm, and the new techniques will benefit the history of man's conquest of the air, as well as the story of the unfolding of the universe.

A most welcome addition to our staff this year has come in the person of Michael Collins, one of the Apollo 11 astronauts, who has taken up the post of Director of the National Air and Space Museum with captivating enthusiasm.

This has also been the year in which we have completed the budgeting, under contract authority, for the construction of the Joseph H. Hirshhorn Museum and Sculpture Garden. The final sum needed to complete this contemporary structure designed by

Gordon Bunshaft of the firm of Skidmore, Owings and Merrill is $3,697,000 and this has been voted by the Congress in the 1972 budget.

The Museum and Garden, situated between Seventh and Ninth Streets and Independence Avenue and Adams Drive, will play neighbor to the Arts and Industries Building erected in 1878. The four buildings taken in a row, the Freer Gallery, the Smithsonian "Castle," the Arts and Industries Building, and the Hirshhorn, provide a fascinating exercise in American architectural tradition and style over one hundred and twenty years.

All the buildings are or will be small, and each in its way symbolizes a period, and each has its own color values. Contrasted to the monolithic procession of buildings which ring the Mall, I sometimes think of these varied creations as colorful figures on a Bayeux tapestry, or in a Mayan pictograph.

The Hirshhorn will certainly add a vivid new dimension to touristing in Washington, with its extraordinary collections spanning the rise of contemporary art and its roots, the past one hundred years of sculpture and painting, particularly in America, as well as examples of many of the source materials from far-away places and eras like the Kingdom of Benin, the prehistoric cultures of the Middle East and central Asia, and examples of so-called "primitive" art.

The new design for the sculpture garden, drawn into the tree panel on the south side of the Mall is a positive improvement for the viewer, for shade is of the essence in tourist Washington during the long summer months. We are grateful to the Congressional hearings for spurring us into a reconsideration of that design.

Construction contracts on a tight budget are always fearful and risky things to tamper with. Inflationary cost-increases in construction threatened at one point to endanger the whole project, and we are additionally grateful to Mr. Hirshhorn for his generosity in adding a million dollars to our construction budget. With luck our schedule now assumes an opening of the Museum and Sculpture Garden in mid-1973. Meanwhile President Nixon has named the eight public Trustees of the Gallery, together with two *ex-officio* Trustees.

During autumn of 1970, the fourth Smithsonian symposium "Cultural Styles and Social Identities: Interpretations of Protest and Change" met to air issues of great concern to all of us. The colloquium, which was held through the generous interest and support of the Charles F. Kettering Foundation and the Rocke-

feller Brothers Fund, demonstrated our own interest in cultural change as reflected in the work of anthropologists and historians alike. We are most grateful to these foundations, and with the stimulus of the Kettering staff we hope to explore further aspects of the Smithsonian in the fields of education and public service that could help us grasp the "open university" concept.

If our setting as a *museum* seems to imply to many that we are merely guardians of old dead "things," then we should remind others as well as ourselves that we are keeping these objects for a purpose: to accompany the inevitable stream of change with the constant reminder of the thread of continuity. Past *is* prologue and young people today, who grow older each moment, will recall this in time.

If the new media are making us once again remember our preliterate gifts of ear and hand and nose and the nonreading eye, as I believe they are, then surely museums are the most valuable ally that formal education could find, ready-made, ready to hand. But if the juggernaut of education is capable of critical self-examination leading to change, can the museum be said to be so as well? Museums sometimes tend to be somnolent, backward-looking as the very materials they keep. Unless museums can be critical of their own role, they will be found wanting when the forces of education call for their support.

The symposium called forth its own protest from groups who felt unrepresented, Chicanos and women. This was welcome, and a great compliment to the Institution. Perhaps we really are a "sacred cow" as we were termed. I would like to think so, for if we can bend our attention to changes in the eddys and currents running through our culture then so much the better.

The Institution needs to strengthen its competence in certain behavioral and social fields in order to develop better interactive, teaching exhibits that are more useful and more germane to present styles of learning. The two great areas for this effort seem to me to lie in the fields of understanding our environment and of understanding our history and, perhaps, where both may lead us.

The American experience is brief but incalculably rich. Nothing so far has occurred that leads us to believe we cannot profit from past achievements as well as errors, and in so doing secure our future.

During the winter season an active program of new exhibits and openings delighted our Associates and the general public alike. Notable among these were the Rube Goldberg exhibit initiated

by Professor Boorstin, Director of the National Museum of History and Technology. We were fortunate to have Mr. Goldberg at the opening and to celebrate his many fruitful years as cartoonist, artist, sculptor, and philosopher of the American scene.

Dr. Sadik organized two especially interesting exhibits at the National Portrait Gallery in what is fast becoming a remarkable tradition of style and scholarship. The first, organized by Andrew Oliver, displayed the portraits of John Quincy Adams (to whom the Smithsonian owes so much for his interest during his latter years as Congressman). The second, the research on which was performed by Robert Stewart, exhibited the obscure 18th-century American portraitist, Henry Benbridge. Both were artistic triumphs.

The arrival at the National Portrait Gallery of Professor Lillian Miller from the University of Wisconsin will add a highly significant element to the Gallery's continual evolution as a center for historical scholarship.

Similarly the National Collection of Fine Arts created a rich and illustrative series of exhibits of American artists ranging from Jasper Cropsey to the virtually unknown (in this country) Lyman Saÿen, and Romaine Brooks. These exhibits, under the directorship of Professor Taylor, were notable for the exemplary taste in display of Harry Lowe.

This has been the first full year in operation of the Archives of American Art, and auguries for research and scholarship in American art history in Washington are just beginning to be appreciated. I feel sure that the Washington in years to come will be as well known as a metropolis of art and studies in art, as it is thought of today as the center for U.S. Government administration. That this will be so is assured by plans announced or in process of our two Smithsonian affiliates, the National Gallery of Art, and the John F. Kennedy Center for the Performing Arts. During the year, the National Gallery has broken ground for its formidably beautiful addition designed by I.M. Pei. In years to come this building and its space should set the capstone on the National Gallery's ambitions to be a world center for exhibition and study of centuries of art. The Kennedy Center, now virtually completed, will launch its performances shortly in halls that already have been shown to be acoustically as fine as any in the nation.

This year budgeting for the Institution at last reached an area of appropriate recognition. The demonstrated needs in science, in the administration of buildings, and in the initiation or completion of construction were largely met by an understanding and generous

Congress. We welcome this recognition of needs long overdue and are most grateful to our appropriations committees as well as to our Congressional Regents for their inestimable support.

In areas to do with the arts, with the coming of the Nation's Bicentennial, and with the environmental sciences, the Institution has still to achieve the recognition that its tasks are vital to progress in American culture and civilization. That this day will come I feel sure, and already we can look back at the years in which we have been stressing the needs of museums in general and the part which the Institution could perform nationally to aid museums as by no means wasted.

Museums are slowly but surely being recognized for their potential, and it is our hope that our own small nascent program of help to museums and kindred institutions under the National Museum Act will help to speed this progress.

To this end we are not only planning to launch expanded programs of museum-technician training and aid in exhibits, but also conferences, seminars, and other discussions on kindred subjects such as the future of systematic collections, data centers for descriptive sciences, and the linking of science museum exhibits to a teaching curricula.

This past year marked the fifteenth of our collaboration with Harvard University in astrophysics. In recognition of this fact President Pusey proposed that we hold a joint *ad hoc* discussion of past results and future hopes for this collaboration. The Smithsonian was delighted to do so, and a joint report to President Pusey and myself, organized by Dean Dunlop of Harvard and Under Secretary Bradley, has provided a foundation for new discussions of future cooperation.

In these fifteen years, the Smithsonian Astrophysical Observatory has become an integrated arm of teaching at Harvard, while the Harvard faculty have joined with us in an exciting series of research efforts at our tracking stations around the globe as well as new installations in Nebraska, and latterly, in Arizona at Mount Hopkins in conjunction with the University of Arizona.

Grateful thanks are indeed due for the prescience of my predecessor, Secretary Leonard Carmichael, and Professor Donald Menzel, then the Director of the Harvard College Obseratory, in initiating this collaboration which has resulted in the training of 76 graduate students, and the setting up of 4 joint laboratory facilities shared by the two institutions.

The year 1970 marks the completion of the fifth year of public

service inaugurated by the Associates' programs. The membership in the greater Washington area totals some 8,300 members that include family units and totals approximately 17,000 persons. The variety of activities available to these members and family members is astounding, and the participation by young and old continues to be increasingly rewarding to those of us who believe that this is one of the things that the Smithsonian must carry on and encourage—participation by Washingtonians in day-to-day Institution activities. The participation response as always continues to be heartwarming to ourselves.

The patience of our volunteers and members when, on occasion, classes are held in too-crowded quarters or when the unbelievable Washington traffic congestion on the Mall makes accessibility to our halls almost impossible, is a source of continuing gratitude.

This summer again we will be resuming our open-Museums policy with funds newly granted us by the Congress. Keeping the buildings open after business hours has been one of the most popular moves that has been made on the Mall. Many Washingtonians pass their whole lives without having time to visit the Smithsonian.

Traffic problems have become increasingly depressing. We continue to hope, along with the National Park Service, whose efficiency and organization deserve unbounded admiraton, that our joint concern and ambition in securing off-Mall or underground parking may somehow be achieved. Otherwise the dead hand of constant traffic jams may eventually strangle all movement on the Mall, and produce that mortuary effect that I sometimes think is the ultimate dream of the surburban developers and the final quietus of the city planners.

If it can be said that in this year the Smithsonian has done anything useful for the people of this country, then I think it is simply that we exist. In times of turmoil, even though lessened, in times of peculiar uncertainty of what role if any America can play in world affairs, it is rewarding to look back on the kinds of service to people which this Institution affords—an open sort of education, a reaffirmation of what we have accomplished in the past two centuries, a series of examples and precepts, not didactic, not shrill or hortatory, but simply there, showing something positive.

No matter how bitterly we may regret the past for lost opportunities or missed directions, our country shows an extraordinary ability to solve pragmatic problems which should encourage us

greatly in these days of awareness of environmental damage all around.

In addition, in spite of all the evidence of human frailty on every hand, Americans continue to show an essential friendliness, tolerance, and concern for their fellow men. We sense it in our day-to-day comings and goings on the Mall, and it is this which continues to give us all a sense of pride and accomplishment in our work in the Institution.

Financial Report

The total operating support for the Institution is composed of federally appropriated funds (including special foreign currency monies), research grant and contract awards, and private funds in the form of gifts and endowment fund income for both restricted and unrestricted purposes. With the exception of private unrestricted funds, the uses of these monies are limited to the specific purposes designated by the appropriation, grant, or gift, with the funds recorded separately in over 1,500 individual accounts.

Total funds for operations and for construction in fiscal years 1968–1971 are shown below (in thousands):

	FY 1968	*FY 1969*	*FY 1970*	*FY 1971*
OPERATING FUNDS				
Federal appropriations				
Salaries and expenses	$26,784	$29,150	$32,679	$36,895
Special foreign currency program	2,316	2,316	2,316	2,500
Subtotal	29,100	31,466	34,995	39,395
Research grants and contracts	11,584	11,624	10,825	9,312
Nonfederal funds:				
Gifts (excluding gifts to endowments)				
Restricted purpose	442	1,806	2,290	1,905
Unrestricted purpose	27	181	17	356
Income from endowment and current funds investment				
Restricted purpose	870	924	999	1,115
Unrestricted purpose	368	441	281	330
Miscellaneous	190	476	503	406
Total Operating Support	$42,581	$46,918	$49,910	$52,819
CONSTRUCTION FUNDS (Federal)				
National Zoological Park	$ 400	$ 300	$ 600	$ 200
National Air and Space Museum	–	–	–	–
Joseph H. Hirshhorn Museum	803	2,000	3,500	5,200
Restoration and renovation of buildings	1,125	400	525	1,725
Total	$ 2,328	$ 2,700	$ 4,625	$ 7,125

Federal Appropriated Funds

OPERATIONS (SALARIES AND EXPENSES).—As shown above, Congress has provided increases in appropriations to the Smithsonian in

recent years. The substantial inflation in this period, however, absorbed a large part of these increases. Throughout this period, also, there existed the need to provide for the natural growth of museum and scientific research collections, to meet established commitments toward improvement of the Institution's museums, and to participate more fully in growing research fields such as ecology and oceanography. Together these forces placed a severe strain upon operating budgets and accentuated existing shortages of support for our research scientists and museum directors. Fortunately, this situation has now been recognized and the increase in our appropriation for operations (salaries and expenses) for FY 1972 will make a good start toward alleviating these shortages in many areas.

The division of the Institution's federal appropriations (excluding special foreign currency program) for operating purposes in recent years among its broad areas of service has been as follows (in thousands):

	FY 1968	*FY 1969*	*FY 1970*	*FY 1971*
Science	$ 9,566	$10,467	$11,761	$13,495
History and Art	4,045	4,287	5,081	5,878
Public Service	973	1,159	1,445	1,442
Museum Programs	3,128	3,260	3,592	3,744
Administration	2,155	2,526	2,733	3,051
Building Maintenance	6,917	7,451	8,067	9,285
Total	$26,784	$29,150	$32,679	$36,895

Additional detail for FY 1971 is shown in Table 1 on page 22.

SPECIAL FOREIGN CURRENCY PROGRAM.—These funds, representing a portion of the U.S. Government's holdings of blocked currencies in nine foreign nations, have been awarded to the Smithsonian annually since 1964 to administer a program of grants to more than fifty museums and universities in the United States for the purpose of carrying on research in the related foreign currency countries. The uses of these currencies during FY 1971 were as follows (in thousands):

	Archeology	*Systematic and Environmental Biology*	*Astrophysics and Earth Sciences*	*Museum Programs*	*Grant Administration*	*Total*
Ceylon	$ 18.0	$ 431.7	$ –	$ –	$ –	$ 449.7
India	492.4	287.9	11.5	8.7	1.7	802.2
Israel	521.1	281.4	–	–	1.2	803.7
Morocco	3.9	41.6	–	–	2.9	48.4

Pakistan	47.1	42.4	–	–	–	89.5
Poland	39.8	–	3.0	1.1	–	43.9
Tunisia	61.7	15.2	–	–	–	76.9
Egypt	266.6	43.5	23.7	–	–	333.8
Yugoslavia	315.8	73.4	–	3.1	–	392.3
Total	$1766.4	$1217.1	$38.2	$12.9	$5.8	$3040.4*

* Includes unobligated balance from previous fiscal year.

These grants are audited by the Smithsonian internal auditing staff aided by foreign independent accountants in some cases, and also more recently with the assistance in foreign countries of the audit staff of the U.S. Department of Agriculture.

CONSTRUCTION.—An additional $5,200,000 was appropriated in the fiscal year 1971 budget for the construction of the Joseph H. Hirshhorn Museum and Sculpture Garden. This made a total of $11,303,000 appropriated for this project since the initial planning appropriation was received in fiscal year 1968. This left a final appropriation of $3,697,000, the balance of the $15,000,000 authorized by Congress for the project, to be obtained in the fiscal year 1972 appropriation. Construction is scheduled to be completed in the fall of 1972.

Of the $1,725,000 of appropriations for restoration and renovation of buildings appropriated to the Institution in fiscal year 1971, $774,000 was for the repair of fire damage suffered in the third floor of the National Museum of History and Technology in September 1970. An additional $500,000 was for the necessary redecking of space in the Arts and Industries Building to provide additional office areas.

Research Grants, and Contracts

Total grants and contracts carried on by the Institution in each of the past years, by awarding agency, were as follows (in thousands):

	FY 1968	*FY 1969*	*FY 1970*	*FY 1971*
Department of Health Education and Welfare	$ –	$ 272	$ 326	$ 297
Department of Defense	1,334	1,667	1,086	843
National Air and Space Agency	7,294	7,265	6,561	4,930
National Science Foundation	2,355	2,099	2,246	2,028
Other	601	321	606	1,214
Total	$11,584	$11,624	$10,825	$ 9,312

As indicated in last year's annual report, cutbacks by NASA, especially for the satellite tracking program at our Smithsonian Astrophysical Observatory, caused a further reduction in grants and contracts awarded to the Institution in fiscal year 1971. Adjustments in expenditures and personnel at the Observatory have been carried out as a result.

Table I, shows the usage of grant and contract monies by various bureaus of the Institution. Over 95 percent goes for scientific research—notably to our Astrophysical Observatory, to anthropologists and other scientists in the National Museum of Natural History and for studies in the environmental sciences. Grants from the National Science Foundation were largely for the funding of the Science Information Exchange which has been operated by the Smithsonian since 1953. For the fiscal year 1972, funding responsibility has also been transferred to the Institution, to become a part of its federal appropriation request with a corresponding reduction in future NSF funding.

Private Funds

In addition to federal appropriations and awards of research grants and contracts the Institution benefits from private funds received in the form of gifts and as income from its endowment and other investment funds. Not including contributions to endowment funds (discussed below), a total of $2,261,000 of gifts was received during fiscal year 1971, about the same level as in the previous year. Income from investments amounted to $1,444,000. An additional $406,000 was obtained from memberships, special fund-raising drives, and fees.

Following traditional practice, private fund accounts of the Institution are audited annually in their entirety by independent public accountants. Their report for fiscal year 1971, including comparative balance sheets and a statement of changes in balances in all the various funds, appears on pages 25-31. (Grant and contract monies received from federal agencies are audited annually by the Defense Contracts Audit Agency; audits of federally appropriated funds are conducted by the Institution's internal audit staff and from time to time by the General Accounting Office.)

UNRESTRICTED PRIVATE FUNDS.—Private funds are vital to the maintenance of the Institution, permitting it flexibility of operations, nonpolitical objectivity, and greater attraction for valuable national collections to benefit its millions of visitors. Unfortunately,

its total sources of private funds in fiscal year 1971 provided only 8 percent of overall operating revenues, with federal appropriations accounting for a growing portion of total support.

It is important to note, furthermore, that these private funds are dedicated largely to restricted purposes. This was the case for 77 percent of our fiscal year 1971 investment income and, in recent years, nearly all of the gift monies. In fiscal year 1971, however, the latter included $365,500 for unrestricted operating purposes; this was of immense value in aiding the Institution to approach a balance in its current unrestricted private funds operating budget despite the continued rise in costs of salaries, services, and supplies. The gap between income and expenditure was reduced to $138,690, a notable improvement over previous years. Nevertheless, the loss of these unrestricted private funds during the year was disappointing. The balance of these funds was $1,719,657 at 30 June 1971. This is below the desired level of working capital for the Institution; it must be rebuilt in future years by surpluses to be obtained by careful control of expenditures and by enlargement of our sources of income.

An examination of the present application of our private unrestricted funds is useful in understanding how this desired result may be achieved. Table 1 sets forth total Smithsonian income and disbursements—federal, nonfederal, and grant and contract monies —by bureaus, offices, and activities. In this table the revenues and expenses of our computer centers (which are run on a break-even basis) and of our revenue-producing "activities" have been netted out; only the net excess of disbursements is included in order to clarify their effect. From this table it may be seen that unrestricted funds are used in part to support new programs (Anacostia Museum, Chesapeake Bay Center), provide additional resources for certain established programs and supporting services (libraries, academic programs, Smithsonian Institution Press, performing arts), and to finance our revenue-producing "activities" until they can become fully self-supporting. Additionally, private unrestricted funds pay for administrative costs associated with these nonfederal expenditures, including the large amount of grants and contracts and the "activities" themselves—all of which are charged for a share of these administrative expenses in an effort to recover such expenses as fully as possible.

Results of the revenue-producing activities themselves in fiscal year 1971 were as follows (in thousands):

	Total	*Museum Shops*	*Press**	*Maga-zine*	*Asso-ciates*	*Per-forming Arts*	*Other***
Sales and Revenues	$4,654	$1,020	$ 148	$2,412	$ 597	$ 142	$ 335
Less Cost of Sales	2,188	686	134	1,134	193	–	41
Gross Income	2,466	334	14	1,278	404	142	294
Gifts	52	–	–	6	46	–	–
Total Income	2,518	334	14	1,284	450	142	294
Expenses	2,763	327	150	1,393	410	200	283
Income (loss) before charge for administrative costs	(245)	7	(136)	(109)	40	(58)	11
Less Administrative Costs	289	87	23	100	31	20	28
Net Income (loss)	$ (534)	$ (80)	$(159)	$ (209)	$ 9	$ (78)	$ (17)

* The privately funded activities of the Press as opposed to the federally supported publication of research papers.

** Includes Traveling Exhibitions, Belmont Conference Center, photo sales, and the "Commons" restaurant.

The *Smithsonian* magazine continued to gain acceptance and show excellent progress during this first full year of operation. Its loss, due in part to nonrecurring costs, was greatly reduced, and circulation at the fiscal year-end exceeded 250,000. Break-even results are expected in fiscal year 1972.

On the other hand, the continued loss ($80,000) in our Museum Shops, although caused in large part by liquidation of large unsalable inventories acquired in previous years, was most disappointing. The need for great business attention to the Shops and other similar activities has become abundantly clear. Effective in July 1971, Mr. Harry R. Albers has been given this responsibility by his appointment as Business Manager, Office of the Treasurer.

Another major factor causing the imbalance in private unrestricted fund accounts was the substantial underrecovery of private fund administrative expenses. An intensive study of this problem has been completed and with the adoption of certain policy changes the loss from this source should be reduced. If this can be accomplished and if expected improvements in financial results of the magazine and shops are also achieved, the Institution should make a start in fiscal year 1972 toward the desired rebuilding of its current operating funds.

From a different angle, our year-old Development Office is

actively at work in conjunction with the newly organized National Associations program at building an active national group of Smithsonian friends who will assist in the raising of additional sorely needed unrestricted private funds. At the same time the Office is soliciting contributions for a number of specific funding requirements of the Institution and is launching a program to make clear the need for future individual gifts and bequests. Additional unrestricted funds thus obtained could be constructively used to restore needed working capital, to provide equipment to outfit properly the Institution's photographic services division and Museum Shops (enabling the Institution to help itself by increasing revenues in these areas), to develop more rapidly its public education programs in new fields of audiovisual techniques, and to finance a great variety of research projects or collection acquisitions now stifled for lack of funds—to name but a few pressing requirements.

RESTRICTED PRIVATE FUNDS.—As indicated earlier, a total of $1,905,000 of gifts for restricted operating purposes was received during fiscal year 1971. Major donations included $276,000 for the Cooper-Hewitt Museum of Decorative Arts and Design in New York City, representing principally the payment of previous outstanding commitments toward reestablishment of this Museum. The Carnegie Corporation has agreed, subject to court review and certain terms and conditions, to donate the Carnegie Mansion as a site for this Museum. Strong measures are now needed to obtain the very substantial funds for rehabilitating the building for museum use and to provide future operating funds.

Continued progress was made in acquiring additional land at the Chesapeake Bay Center for Environmental Sciences and a new $25,000 gift was received for that purpose during the year. To exercise a favorable option to acquire one of the properties, it was necessary, however, to obtain a bank loan of $175,000 which it is hoped can be repaid within the near future from additional donations. Other acquisitions and proposals for additional grants are in process.

In another field, gifts totaling $243,000 were contributed toward the important underwater research efforts centered at the Institution's new oceanographic center in Fort Pierce, Florida, at which will be based the *Johnson-Sea-Link* submarine and the *J. Seward Johnson* oceangoing submarine tender, contributed to the Institution by Mr. Edwin A. Link and Mr. J. Seward Johnson. These were in addition to the substantial income for this purpose

received from a large special endowment fund. In part these funds financed the purchase of 172 acres of land at this center in June 1971, but it is expected that an interested foundation will repurchase this land within the near future while continuing to dedicate it to the same purposes. A final three-year grant of $259,000 to the Smithsonian-associated program of "Reading is FUNdamental" assured successful continuation of this valuable venture. Numerous other contributions for important research, educational and museum projects included those for Anacostia Museum, the Fourth International Symposium, and the acquisition of additional collection items. A listing of individual donors is shown on pages 19-21.

In addition to gifts, endowment funds established for specific purposes provided $1,114,000 of investment income and miscellaneous sources added another $195,000 of restricted purpose income in fiscal year 1971. Of the investment income $674,000 was for operation of the Freer Gallery, $116,000 was dedicated to the Marine Center oceanography program referred to above, and the remaining $324,000 was provided for a great variety of purposes designated by the donors.

Utilization of these gifts and restricted purpose investment income may not, of course, occur in the same year as the one in which they are received, with the result that year-end balances show considerable variations from year to year. In fiscal year 1971 land acquisition at the Chesapeake Bay Center required expenditure of $288,000 of money received for this purpose in previous years and unusually large collection purchases by the Freer Gallery drew down its previously accrued investment income balance by $180,000. These two items largely account for the decline in total restricted fund balances from $2,241,000 as of 30 June 1970 to $1,762,000 on 30 June 1971.

ENDOWMENT FUNDS.—The value of the Institution's endowment funds increased during the year, reflecting both additional gifts of $1,677,000 and also general increases in values of securities to reach a total market value on 30 June 1971 of $45,905,000 ($42,632,000 of stocks and bonds, $1,000,000 permanent loan to U.S. Treasury, $2,176,000 real estate, and a $97,000 note receivable). In addition, current fund investments on that date had a market value of $2,727,000. The endowment fund gifts included a $1,310,000 addition to the Oceanography Research Fund and a $79,000 bequest for unrestricted uses.

Most of the Institution's endowment funds are handled in three separate investment accounts consisting of the Freer Fund

($18,805,000 market valuation of 30 June 1971), dedicated to providing operating income for the Freer Gallery of Art; Endowment Fund No. 3 ($12,331,000), dedicated entirely to oceanographic research; and the Consolidated Fund ($11,470,000), in which all other restricted and unrestricted endowment funds have for many years been pooled for investment purposes. These funds, as well as current account investment funds, are summarized in Table 2. A listing of the individual investments held in the various endowment funds may be obtained upon request to the Treasurer of the Institution.

Increasing attention has been given to the monitoring of these funds in the past two years with the result that the Board of Regents appointed in September 1970 a new Investment Policy Committee consisting of the Secretary (ex-officio), three Regents (Mr. William A. M. Burden, Chairman; Dr. Crawford H. Greenewalt; and Mr. James E. Webb) and four experienced investment executives (Messrs. Harold F. Linder, Donald Moriarty, Charles H. Mott, and William R. Salomon). After reviewing the investment problems of the Institution, the Board of Regents, on the recommendation of this Committee, has adopted a number of changes affecting our endowment funds. Effective 1 July 1971, three new investment management firms have been given the responsibility for investing different portions of the funds. Discretion has been granted to the managers to carry out this responsibility, subject to general policy guidance and prompt reporting requirements imposed by the Board.

A listing of individual funds included in our Consolidated Investment Fund and their related investment income in fiscal year 1971 is set forth in Table 3.

Donors to the Smithsonian

The Smithsonian Institution gratefully acknowledges gifts and bequests received during fiscal year 1971 from the following:

$100,000 or more:

Ford Foundation
J. Seward Johnson
Mrs. Marjorie Merriweather Post

$10,000 or more:

Mrs. Hugo Astor
Mrs. W. Vincent Astor
Atlantic Foundation
Battelie-Memorial Institute
Mrs. Mary Graham Bruce
Carnegie Foundation
Joseph P. Crane Foundation
William H. Crocker
William L. Elkins
Daniel and Florence Guggenheim Foundation

$10,000 or more—Continued

Susan Morse Hilles Agency
Interdisciplinary Communications Association
International Business Machines Corporation
Iran Foundation
Junior League of Washington, D. C.
J. D. R. 3rd Fund, Inc.
J. M. Kaplan Fund, Inc.
Charles F. Kettering Foundation
Hoffman La Roche Foundation
Miami Beach Tourist Authority
Ambrose Monell Foundation
National Foundation for the Arts and Humanities
National Geographic Society
State of New York
Edward J. Noble Foundation
Prospect Hill Foundation
Rockefeller Brothers Fund
Rockefeller Foundation
Laurence S. Rockefeller
Clara Louise Safford Estate
San Diego Zoo
The Scaife Family of Pittsburgh
Hattie M. Strong Foundation
Bertrand L. Taylor
Wenner-Gren Foundation
Xerox Corporation

$1,000 or more:

Amalgamated Meat Cutters and Butchers Workmen of North America
American Conservation Association, Inc.
American Council of Learned Societies
American Federation of Information Processing Society
American Philosophical Society
Anonymous
W. Andrew Archer
Avco Corporation
Bakery and Confectionery Union
Barra Foundation
Henry W. Bass
Beal Foundation
Clay Bedford
Louis D. Beaumont Foundation
David P. Becker
Bernard P. Bishop Museum
Jacob Blaustein
Elizabeth Booker
Brunschwig & Fils, Inc.
Morris and Gwendolyn Cafritz Foundation
Charron Foundation
Cleveland Foundation
Continental Oil Company
Cook Industries, Inc.
Pamela C. Copeland
Cornell University
Dairy Industry Committee of Metro Washington
Elsie DeWolfe Foundation
Dillon Fund
Government of District of Columbia
Alfred U. Elser, Jr.
FAUNALABS, Inc.
Joseph Fenykovi
Harvey Firestone
Friendship Fund
General Electric Company
General Telephone and Electronic Corp.
George Washington University
Gordon D. Gibson
Bruce Gilchrist
Glass Bottle Blowers Association of the United States and Canada
William P. Graham
Crawford H. Greenewalt
Norris Harkness
Harvard University Press
Hill and Knowlton, Inc.
Charles Horsky
International Association of Bridge, Structural, and Ornamental Iron Workers of America
International Telephone and Telegraph Co.
John B. Jago
Johns Hopkins University
Marguerite Kellogg
Ellsworth P. Kelly
Mannheimer Kunstverein
Phyllis Lambert
Jack L. Leon
Charles A. Lindbergh

$1,000 or more—Continued

Link Foundation
Howard Lipman
Sally P. Livingstone
Lockheed Aircraft Corp.
Marcus Ward Lyon, Jr. Estate
Mr. and Mrs. Robert S. McNamara
Merck & Co., Inc.
City of Monroe, Louisiana
Museum d'Art et d'Historie, Geneve
National Audubon Society
Mr. and Mrs. Hugo V. Neuhaus
New York Foundation
New York Times Foundation
Dan H. Nicholson
Northern Trust Company
Occidental Petroleum Corporation
The Poynter Fund
H. Vnon Petrikovits
Preservation Society of Newport County
Mrs. Augustus Riggs IV
Ralph Rinzler
Mrs. Clifford Robertson
Rubin Foundation, Inc.
Sidney Printing and Publishing Co.
Symonds Foundation
E. W. Thaw and Co.
John B. Trevor, Jr.
Marcie Brady Tucker Foundation
W. M. Underwood Co.
UNESCO
Union Trust Co.
United States Steel Corp.
Mrs. H. G. Van Roijen
Dorothy Wallenstein
Ellen Bayard Weedon Foundation
Howard Weingrow
William Woodward, Jr.
Zoological Board of Victoria, Australia

$500 or more:

Madame Leon Barzin
Harry H. Bassett
William Beinecke
Bell and Howell Foundation
Carroll Cartwright
Caterpillar Tractor Co.
Lois Clark
Alice De Leman
Michael Desfayes
Early Birds
Electronic Corporation of America
Clifford Evans, Jr.
Peter A. Frank and Co.
Grossman Publications
Mason E. Hale, Jr.
Samuel J. Holladay
Institution of International Education
Johnson City Foundation
Abraham Melamed
Elinor Merrell
Dorothy S. Payer
Phillips Petroleum Company
Revlon Foundation
Scovill Manufacturing Company
E. R. Squibb and Sons
Strahein and Somann
The Upjohn Company
William C. Whitney Foundation
Marie and Joseph Wilson

We also gratefully acknowledge other contributions in the amount of $34,289.86 received from 484 persons during fiscal year 1971.

TABLE 1.—*Source and applications of funds (in thousands)*
Year ended 30 June 1971

Funds	*Federal Funds*	*Non-Federal Funds*			
		Total	*Unrestricted*	*Restricted*	*Grants and Contracts*
FUND BALANCES–1 July 1970	$ –	$ 4,512	$ 1,870	$ 2,356	$ 286
FUNDS PROVIDED					
Federal Appropriations	$36,895				
Investment Income		$ 1,444	$ 330	$ 1,114	$ –
Grants and Contracts		9,317			9,317
Gifts		2,261	356	1,905	
Other		406	211	195	
Total Provided	$36,895	$13,428	$ 897	$ 3,214	$ 9,317
TOTAL FUNDS AVAILABLE	$36,895	$17,940	$ 2,767	$ 5,570	$ 9,603
FUNDS APPLIED					
Science:					
Environmental Science	$ 724	$ 1,317	$ 42	$ 762	$ 513
Nat'l Museum of Nat. Hist.	4,339	849	–	236	613
National Zoological Park	3,163	60	–	34	613
Science Info. Exchange	–	1,675	–	–	1,675
S.A.O.	2,107	3,745	–	58	3,687
Other Science	3,162	900	–	115	785
Total	13,495	8,546	42	1,205	7,299
History and Art:					
Nat'l Portrait Gallery	784	1	–	1	–
Nat'l Collec. of Fine Arts	1,040	123	–	121	2
Freer Gallery	57	927	–	927	–
Nat'l Museum of Hist. and Tech.	2,243	103	40	62	1
Other History and Art	1,754	974	98	876	–
Total	5,878	2,128	138	1,987	3
Public Service:					
Revenue Producing Activities					
Smithsonian Press	691	136	136*	–	–
Performing Arts	215	245	58*	44	143
Other	–	103	103*	–	–
Anacostia Museum	151	97	39	58	–
Other	385	389	–	290	99
Total	1,442	970	336	392	242
Museum Programs:					
Libraries	744	60	53	7	–
Exhibits	2,409	14	–	14	–
Other Programs	591	15	8	–	7
Total	3,744	89	61	21	7
Buildings Management Dept	9,285	0	0	0	0
Administration:					
Direct	3,051	2,434	2,434	–	–
Overhead Applied	–	–	(1,964)	203	1,761
Net Administration	3,051	2,434	470	203	1,761
TOTAL FUNDS APPLIED	$36,895	$14,167	$ 1,047	$ 3,308	$ 9,312
FUND BALANCES–30 June 1971	$ 0	$ 3,773	$ 1,720	$ 1,762	$ 291

* Net loss before administrative charges; "Other" excludes $52,000 gifts reported in gift income above.

TABLE 2.—*Summary of investments in stocks and bonds of private funds, 30 June 1971*

Funds	*Book Value*	*Market Value*
INVESTMENT ACCOUNTS FOR ENDOWMENT FUNDS		
Freer Fund:		
Cash	$ 13,746	$ 13,746
Bonds	6,742,844	5,711,771
Convertible bonds	491,500	443,500
Convertible preferred stock	210,566	192,506
Common stocks	5,869,837	12,443,830
Total	$13,328,493	$18,805,353
Consolidated Funds:		
Cash	149,913	149,913
Bonds	4,188,588	3,607,052
Convertible bonds	471,842	376,900
Convertible preferred stock	252,799	147,492
Common stocks	5,917,075	7,188,655
Total	$10,980,217	$11,470,012
Endowment Fund #3:		
Cash	1,375	1,375
Bonds	777,625	798,875
Common stocks	6,352,570	11,530,750
Total	$ 7,131,570	$12,331,000
Miscellaneous:		
Cash	–	–
Bonds	10,065	9,500
Common stocks	3,322	16,608
Total	13,387	26,108
Total Endowment and Similar Funds investments	$31,453,667	$42,632,473
CURRENT FUNDS		
Special Endowment Fund:		
Cash	$ 304	$ 304
Bonds	558,728	457,962
Convertible bonds	243,050	205,950
Convertible preferred stock	106,584	101,400
Common stocks	769,051	792,747
Total	1,677,717	1,558,363
General Fund:		
Cash	70,000	70,000
Short-term notes	929,001	924,989
Total	999,001	994,989
Miscellaneous:		
Common stocks	182,345	173,675
Total Current Fund investments	$ 2,859,063	$ 2,727,027

TABLE 3.—*Consolidated investment fund*

Funds Participating in Pool	*Investment (Book Value) 1971*	*Income 1971*	*Unexpended Income 30 Jun 71*
UNRESTRICTED FUNDS	$ 4,164,751	$175,204	$ –
RESTRICTED FUNDS:			
Abbott, William L.	$ 180,649	$ 8,876	$ 2,621
Archives of American Art	23,649	214	186
Armstrong, Edwin James	3,188	129	–
Arthur, James	69,309	3,413	3,838
Bacon, Virginia Purdy	160,442	6,928	12,904
Baird, Spencer Fullerton	63,452	3,051	126
Barney, Alice Pike	49,702	2,446	300
Barstow, Frederic D.	1,732	85	1,515
Batchelor, Emma E.	58,715	2,738	2,555
Becker, George F.	275,364	11,990	32,646
Brown, Roland W.	55,958	2,333	2,798
Canfield, Frederick A.	66,828	3,760	–
Casey, Thomas Lincoln	21,721	1,070	2,385
Chamberlain, Frances Lea	48,800	2,402	8,091
Cooper, G. Arthur, Curator's Fund	1,502	50	–
Cooper-Hewitt Museum	158,645	5,828	40,597
Division of Mammals Curator Fund	3,439	131	924
Division of Reptiles Curator Fund	591	22	47
Drake, Carl J.	270,121	9,936	24,368
Dykes, Charles	74,607	3,671	–
Eickemeyer, Florence Brevoort	18,836	927	9,051
Guggenheim, David and Florence	176,211	4,604	4,888
Hanson, Martin Gustav and Caroline Runice	15,407	758	10,274
Hillyer, Virgil	11,389	561	5,891
Hitchcock, Albert S.	2,737	136	1,056
Hrdlicka, Ales and Marie	104,260	4,249	3,219
Hughes, Bruce	33,172	1,635	19,359
Johnson, E. R. Fenimore	14,383	561	3,067
Kellogg, Remington, Memorial	9,580	87	75
Lindsey, Jessie H.	634	24	171
Loeb, Morris	151,131	7,518	1,393
Long, Annette E. and Edith C.	943	48	968
Lyons, Marcus Ward	7,710	70	–
Maxwell, Mary E.	33,992	1,674	28,846
Myer, Catherine Walden	35,013	1,723	3,490
Nelson, Edward William	41,099	1,896	427
Noyes, Frank B.	1,670	87	940
Pell, Cornelius Livingston	12,850	636	8,527
Petrocelli, Joseph Memorial	12,850	635	6,638
Ramsey, Admiral and Mrs. DeWitt Clinton	480,156	18,962	54,052
Rathbun, Richard Memorial	18,436	911	9,987
Reid, Addison T.	30,823	1,517	460
Roebling Collection	209,097	10,243	–
Roebling Solar Research	43,259	1,959	–
Rollins, Miriam and William	301,552	13,147	10,221
Smithsonian Agency Account	104,055	2,277	–
Sprague, Joseph White	2,196,963	79,103	–
Springer, Frank	31,075	1,528	17,860
Stevenson, John A.	10,355	415	349
Strong, Julia D.	17,330	857	1,624
T. F. H. Publications, Inc.	7,848	275	4,369
Walcott, Charles D.	193,095	8,226	–
Walcott, Charles D. and Mary Vaux	797,383	39,228	3,251
Walcott Botanical Publications	100,112	4,757	–
Zerbee, Francis Brinckle	1,646	81	1,436
Total Restricted Funds	$ 6,815,466	$280,388	$347,790
Total Consolidated Fund	$10,980,217	$455,592	$347,790

PEAT, MARWICK, MITCHELL & CO.

CERTIFIED PUBLIC ACCOUNTANTS

1025 CONNECTICUT AVENUE, N. W.

WASHINGTON, D. C. 20036

The Board of Regents
Smithsonian Institution:

We have examined the balance sheet of private funds of Smithsonian Institution as of 30 June 1971 and the related statement of changes in fund balances for the year then ended. Such statements do not include the account of the National Gallery of Art, the John F. Kennedy Center for the Performing Arts, or other departments, bureaus and operations administered by the Institution under federal appropriations. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, except for the method of accounting for fixed assets and related depreciation described in note 1, the accompanying balance sheet and statement of changes in fund balance of private funds present fairly the financial position of Smithsonian Institution at 30 June 1971, and the results of its operations for the year then ended, in conformity with generally accepted accounting principles which, except for the adoption of the accrual basis of accounting for all funds described in note 2 in which we concur, were applied on a basis consistent with that of the preceding year.

PEAT, MARWICK, MITCHELL & CO.

27 August 1971

SMITHSONIAN INSTITUTION
BALANCE SHEET OF PRIVATE FUNDS 30 JUNE 1971
(With comparative figures for 1970) (note 2)

Assets

	1971	*1970*
CURRENT FUNDS:		
Cash:		
In U.S. Treasury	$ 413,857	$ 49,599
In banks and on hand (including $79,273 in savings; $17,214 in 1970)	235,270	168,225
Total cash	649,127	217,824
Receivables:		
Accounts	774,772	352,814
Advances—travel and other	194,835	146,269
Reimbursements—grants and contracts	1,369,306	1,835,671
	2,338,863	2,334,754
Inventories at net realizable value	522,908	544,413
Investments—stocks and bonds at cost (market value $2,656,723; $2,900,264 in 1970)	2,788,759	3,409,426
Prepaid expense	116,988	39,541
Deferred magazine subscription expenses (note 3)	404,472	267,300
Equipment (less accumulated depreciation of $71,636; $49,932 in 1970) (note 4)	521,325	64,115
Total current funds	$ 7,342,442	$ 6,877,373
ENDOWMENT AND SIMILAR FUNDS:		
Cash	165,033	77,533
Note receivable	96,663	96,934
Investments—stocks and bonds at cost (market value $42,467,439; $29,456,568 in 1970)	31,288,633	30,213,145
Loan to U.S. Treasury in perpetuity	1,000,000	1,000,000
Real estate (at cost or appraised value at date of gift) (note 5)	2,176,219	1,760,448
Total endowment and similar funds	$34,726,548	$33,148,060

See accompanying notes to financial statements.

SMITHSONIAN INSTITUTION
BALANCE SHEET OF PRIVATE FUNDS 30 JUNE 1971
(With comparative figures for 1970) (note 2)

Liabilities and Fund Balances

	1971	*1970*
CURRENT FUNDS:		
Notes payable (note 4)	$ 654,613	$ –
Accounts payable	814,581	1,381,000
Accrued liabilities	570,068	63,986
Unrestricted fund balance	1,719,657	1,858,347
Deferred income:		
Magazines subscriptions	1,400,926	1,030,115
Other	130,249	16,627
	1,531,175	1,046,742
Restricted fund balances:		
Gifts	1,109,718	1,493,041
Grants and contracts	290,741	286,144
	1,400,459	1,779,185
Unexpended income:		
Freer	210,562	389,906
Other	441,327	358,198
	651,889	748,104
Total current funds	$ 7,342,442	$ 6,877,373
ENDOWMENT AND SIMILAR FUNDS:		
Mortgage note payable (note 5)	293,641	310,697
Fund balances:		
Endowment funds—income restricted:		
Freer	13,328,493	13,188,994
Other	14,166,763	13,099,645
Current funds reserved as an endowment—income unrestricted	5,055,073	5,098,973
Real estate acquisition fund	1,882,578	1,449,751
Total fund balance	34,432,907	32,837,363
Commitments (note 6)		
Total endowment and similar funds	$34,726,548	$33,148,060

SMITHSONIAN INSTITUTION
PRIVATE FUNDS

Statement of Changes in Fund Balances
Year ended 30 June 1971

Current Funds

		Unrestricted funds		*Restricted funds*			
						Unexpended income	
	Total	*General*	*Activities*	*Gifts*	*Grants and contract*	*Freer*	*Other*
Balance at 30 June 1970	$4,511,854	1,869,941	–	1,566,028	286,144	434,873	354,868
Adjustments from cash to accrual basis	(126,218)	(11,594)	–	(72,987)	–	(44,967)	3,330
Adjusted balance at 30 June 1970	4,385,636	1,858,347	–	1,493,041	286,144	389,906	358,198
Additions:							
Grants and contracts net of refunds	9,316,961	–	–	–	9,316,961	–	–
Investment income	1,448,758	334,452	–	34,200	–	673,625	406,481
Gifts and bequests	2,261,285	304,292	52,218	1,895,589	–	1,705	7,481
Gross profit on sales	2,465,922	–	2,465,922	–	–	–	–
Rental	1,166,723	1,166,723	–	–	–	–	–
Other	251,629	56,926	–	127,042	–	67,259	402
Net gain (loss) on sale or exchange of investments	(4,541)	(4,541)	–	–	–	–	–
Total additions	16,906,737	1,857,852	2,518,140	2,056,831	9,316,961	742,589	414,364
Deductions (additions):							
Expenditures:							
Salary and benefits:							
Administrative	3,972,791	2,678,092	1,294,699	–	–	–	–
Research	5,720,632	–	–	712,667	4,537,637	386,771	83,557
Purchases for collection	599,043	–	–	317,518	–	249,891	31,634
Travel and transportation	644,201	65,751	58,272	152,537	323,104	31,223	13,314
Equipment and facilities	1,319,378	116,450	23,979	349,249	808,459	12,865	8,376
Supplies and material	800,841	161,974	171,309	125,358	264,351	74,237	3,612
Rent and utilities	567,656	263,907	18,915	15,832	269,002	–	–
Communications	147,641	69,150	17,116	11,872	49,445	–	5
Contractual service	2,377,568	318,773	493,967	759,459	639,968	126,529	38,87
Computer rental	653,121	–	–	1,182	651,939	–	–
Promotion and advertising	662,026	–	662,026	–	–	–	–
Depreciation	22,404	–	22,404	–	–	–	–
Administrative expenditures applicable to other funds	–	(2,254,104)	289,700	116,364	1,761,099	40,417	46,52
Total deductions carried forward	17,487,302	1,419,993	3,052,387	2,562,038	9,305,004	921,933	225,94
Adjusted balance at 30 June 1970 brought forward	$4,385,636	1,858,347	–	1,493,041	286,144	389,906	358,19
Total additions, brought forward	16,906,737	1,857,852	2,518,140	2,056,831	9,316,961	742,589	414,36
Total deductions, brought forward	17,487,302	1,419,993	3,052,387	2,562,038	9,305,004	921,933	225,94
Transfers in (out):							
Income added to principal	(63,322)	–	–	–	–	–	(63,32
Transfer to unexpended income	257,320	–	–	–	–	–	257,32
Transfer to endowment funds	(227,064)	(21,053)	–	(206,011)	–	–	–
Transfer to restricted funds—gifts	–	–	–	300,945	–	–	(300,94
Transfer for designated purposes	–	(13,037)	–	26,950	(15,572)	–	1,65
(Transfer to grants) computer services to commercial users	–	(8,212)	–	–	8,212	–	–
Transfer in support of activities	–	(534,247)	534,247	–	–	–	–
Total transfers	(33,066)	(576,549)	534,247	121,884	(7,360)	–	(105,28
Net income (loss) after transfers	(613,631)	(138,690)	–	(383,323)	4,597	(179,344)	83,12
Balance at 30 June 1971	$3,772,005	1,719,657	–	1,109,718	290,741	210,562	441,32

See accompanying notes to financial statements.

SMITHSONIAN INSTITUTION
PRIVATE FUNDS

Statement of Changes in Fund Balances
Year ended 30 June 1971

Endowment and Similar Funds

	Total	*Endowment*		*Current funds reserved as an endowment*	*Real estate acquisition fund*
		Freer	*Other*		
Balance at 30 June 1970	$32,837,363	13,188,994	13,099,645	5,098,973	1,449,751
Adjustments from cash to accrual basis	–	–	–	–	–
Adjusted balance at 30 June 1970	32,837,363	13,188,994	13,099,645	5,098,973	1,449,751
Additions:					
Grants and contracts net of refunds	–	–	–	–	–
Investment income	–	–	–	–	–
Gifts and bequests	1,676,848	–	1,345,256	79,776	251,816
Gross profit on sales	–	–	–	–	–
Rental	–	–	–	–	–
Other	–	–	–	–	–
Net gain (loss) on sale or exchange of investments	(114,370)	139,499	(130,193)	(123,676)	–
Total additions	1,562,478	139,499	1,215,063	(43,900)	251,816
Deductions (additions):					
Expenditures:					
Salary and benefits:					
Administrative	–	–	–	–	–
Research	–	–	–	–	–
Purchases for collection	–	–	–	–	–
Travel and transportation	–	–	–	–	–
Equipment and facilities	–	–	–	–	–
Supplies and material	–	–	–	–	–
Rent and utilities	–	–	–	–	–
Communications	–	–	–		–
Contractual service	–	–	–	–	–
Computer rental	–	–	–	–	–
Promotion and advertising	–	–	–	–	–
Depreciation	–	–	–	–	–
Administrative expenditures applicable to other funds	–	–	–	–	–
Total deductions carried forward	–	–	–	–	–
Adjusted balance at 30 June 1970, brought forward	$32,837,363	13,188,994	13,099,645	5,098,973	1,449,751
Total additions, brought forward	1,562,478	139,499	1,215,063	(43,900)	251,816
Total deductions, brought forward	–	–	–	–	–
Transfers in (out):					
Income added to principal	63,322	–	63,322	–	–
Transfer to unexpended income	(257,320)	–	(257,320)	–	–
Transfer to endowment funds	227,064	–	46,053	–	181,011
Transfer to restricted funds—gifts	–	–	–	–	–
Transfer for designated purposes	–	–	–	–	–
(Transfer to grants) computer services to commercial users	–	–	–	–	–
Transfer in support of activities	–	–	–	–	–
Total transfers	33,066	–	(147,945)	–	181,011
Net income (loss) after transfers	1,595,544	139,499	1,067,118	(43,900)	432,827
Balance at 30 June 1971	$34,432,907	13,328,493	14,166,763	5,055,073	1,882,578

See accompanying notes to financial statements.

SMITHSONIAN INSTITUTION
PRIVATE FUNDS

Notes to Financial Statements

30 June 1971

1. Accounting for Fixed Assets.—The Institution records additions to fixed assets as follows: museum shops and computer equipment purchased with now appropriated funds are capitalized in the current fund; land and buildings acquired by gift are recorded in the endowment and similar fund at the appraised value at date of gift except for gifts of certain islands in the Chesapeake Bay and the Carnegie Mansion which have been recorded at nominal values; land buildings, furniture, equipment, works of art, living and other specimens, and certain other similar property purchased from federal appropriations, nonappropriated funds, except as indicated above or proceeds of gifts are not included in the accounts of the Institution; depreciation is recorded only for the computer and business-type activities.

2. Basis of Accounting.—On 1 July 1970 the Institution changed its method of accounting for restricted funds and endowment and similar funds from the cash receipts and disbursements to the accrual basis. The comparative balance sheet has been restated to reflect this change—with this change, all private funds of the Institution are accounted for on the accrual basis.

3. Deferred Magazine Subscripion Expenses.—This amount represents promotional expenses incurred in connection with the Smithsonian magazine. These expenses are to be amortized over a period of twelve months.

4. Notes Payable.—The notes payable of 30 June 1971 are summarized as follows:

6% unsecured note payable to a bank due 25 June 1972	$175,000
Installment note payable secured by computer equipment due 30 June 1976 in monthly payments of $7,993.64	479,614
	$654,614

5. Mortgage Notes Payable.—The mortgage notes payable are secured by first deeds of trust on property acquired in connection with the Chesapeake Bay Center. Funds for the curtailment of these notes will be transferred from Restricted Funds—Gifts, designated for the development of the Chesapeake Bay Center. The details of the mortgage notes payable are as follows:

a. A $252,700 note on property acquired for $376,000. The note is payable in nineteen consecutive semi-annual installments of $13,300, plus interest at the prevailing prime rate on the due date of payment but not less than 8%.

b. A $40,941 note on property acquired for $118,533. The note is payable in monthly installments of $451.02, including interest at the rate of 6%, with the final payment due on 1 November 1989.

6. Commitments.—Pursuant to an agreement, dated 9 October 1967, between the Institution and the Cooper Union for the Advancement of Science and Art,

the Institution acquired, on 1 July 1968, all funds belonging to the Cooper Union for use exclusively for museum purposes, and certain articles of tangible personal property as defined in the agreement.

The agreement provided, among other covenants, that the Institution would maintain a museum in New York City and has pledges in excess of $800,000 for the support of such a museum. Pledges in the amount of $660,000 have been collected to date.

SCIENCE

THE INAUGURATION of the Environmental Science Program this year was a major step in coordinating the relatively disparate activities of the Institution's scientific bureaus. The funding of this program as a line item in our budget has given clear recognition to the special capabilities of the Smithsonian to conduct multidisciplinary research on two major ecosystems.

Under the direction of the Assistant Secretary (Science) a coordinated research plan has begun on a shallow water marine and a decidious forest ecosystem. Comparative studies of temperate and tropical aspects of these two ecosystems will be primarily done at the Smithsonian's research facilities on the Chesapeake Bay and in Panama. Emphasis will be on determining primary and secondary productivity of the ecosystems and developing techniques for monitoring their normally occurring changes.

This coordinated study will allow the Smithsonian to use the computer programming talents of the Smithsonian Astrophysical Observatory, the long experience of the Radiation Biology Laboratory in measuring solar radiation, the great taxonomic ability of the National Museum of Natural History, and the knowledge of animal behavior gained from the research of scientists at the Zoo. By bringing all of these hitherto independent research operations into focus under a common program, the Institution can finally take full advantage of its many scientific resources to help understand the complex nature of our environment.

The reports of the separate bureaus which follow give good evidence of the vigor of science at the Smithsonian. Important questions of policy, however, continue to arise. Space on the Mall for our collections is about exhausted and an off-Mall study and storage center seems inevitable. Scientific collections are only valuable if they can be used; thus it is essential to furnish laboratory space adjacent to the collections. Which collections can be moved and where they should be located are questions now being considered.

The exhibitions of the National Air and Space Museum, now under the directorship of astronaut Michael Collins, continues to occupy a World War I metal shed and various halls in the Arts and

Industries Building. The thousands of visitors certainly deserve better and we hope that construction of the long-delayed, new museum to house all these exhibitions under one roof will be finished in time for the Bicentennial in 1976.

Midway through the fiscal year the Assistant Secretary (Science) Sidney R. Galler left the Smithsonian to become the Deputy Assistant Secretary for Environmental Affairs in the Department of Commerce. His five years service with the Institution was marked by a rapid rise in new science programs and he will be sorely missed. Dr. David Challinor, formerly Director of the Office of International Activities, has been serving as Acting Assistant Secretary (Science).

National Museum of Natural History

As in all research/education centers over the country, the year was one of retrenchment, deferred needs, and constantly revised priorities. Rather than lose any of its excellent staff, this Museum chose to keep the people even though that decision meant drastically reduced funding for items other than salaries. By a combination of constant attention to fiscal details, priority reevaluations, and not a few sacrifices, this was a highly rewarding year. Examples of the achievements and developments that support this point of view are presented in the following pages.

RESEARCH

Although there were fewer trips for field and museum research and less participation in scientific meetings by the staff, there was a continuing flow of high quality research products. With a small portion of the funds available to the Institution for environmental sciences, research programs were initiated in soil biology, on coral reef ecology, and on the Panamanian biota of the shallow inshore waters. These complement and augment the more than a century of natural history research that continues to supply the fundamental data upon which other ecological projects have to be founded.

The impact of environmental conditions on early man influenced both his cultural and physical evolution. For example, data from large numbers of prehistoric eastern Mediterranean human skeletons show increasing longevity and improved health effects with the development of farming and stable village life, in contrast to the earlier mesolithic hunting and gathering life-support techniques.

Postdoctoral Research Associate Arnfried Antonius surveys a coral reef at a depth of 20 meters off Northeast Key, Glover's Reef, British Honduras, in a survey to select reefs suitable for a long term ecological study.

A natural consequence of longer life and better health was the beginning of the population increase so alarming in some parts of the modern world.

Dating of skeletal remains is critical to these studies and a method based on the rate of decay of protein in bone has been further perfected in the physical anthropology laboratories. From simulated aging experiments under carefully controlled conditions, it appears that amino-acid residues in teeth may serve as a useful index of archeological or geological age. Also, residues of certain amino-acids in bone appear from other studies to decrease with advancing age of the individual.

Such data are also important to archeological investigations of the cultural developments of ancient man, whether in our own Midwest, the deserts of Afghanistan, or an ancient town in Israel. The latter is the site of a multiyear excavation and study which began during the fiscal year at Tell Jemmeh in the western Negev. The site includes 15 meters of cultural debris, representing occupation from the second century B.C. back to the beginning of the Late Bronze Age in mid-15th century B.C. The excavations of this prehistoric site, at the crossing of two great trade routes, are utilizing techniques that

Workers, most of whom are volunteers from the United States, searching for artifacts on the Tell Jemmeh project, directed by Dr. Gus W. Van Beek. From materials found thus far, the site is presumed to be an ancient palace.

will help reconstruct the features of the total economy and the relationships of the people to their surroundings.

Characterization of plants and animals, their distribution geographically and stratigraphically, and their relationships with each other and the total environment continue to be major components of the Museum's research programs. Numerous contributions to our understandings of neotropical plants were completed, including the second volume of *Flora Neotropica* and several manuscripts for the *Flora Ilustrada Catarinense* (Brazil). Planning for the Flora North America Program was also greatly advanced, which will lead to the initiation of the implementation stage in January 1972. Independently and in cooperation with the taxonomists, the staff-anatomists carried out studies of internal structure and its evolutionary significance in several monocotyledonous families and in the Ginseng family.

The earliest occurring, and the first described, fossil plants of the Lower Devonian from the Canadian Arctic were described by one paleobotanist who then turned his attention to plants of the same time period in Australia, eastern Canada, and the southeastern

United States. A colleague, working at a much more recent time-level, conducted some very promising investigations of leaf architecture with important phylogenetic implications among both fossil and Recent taxa.

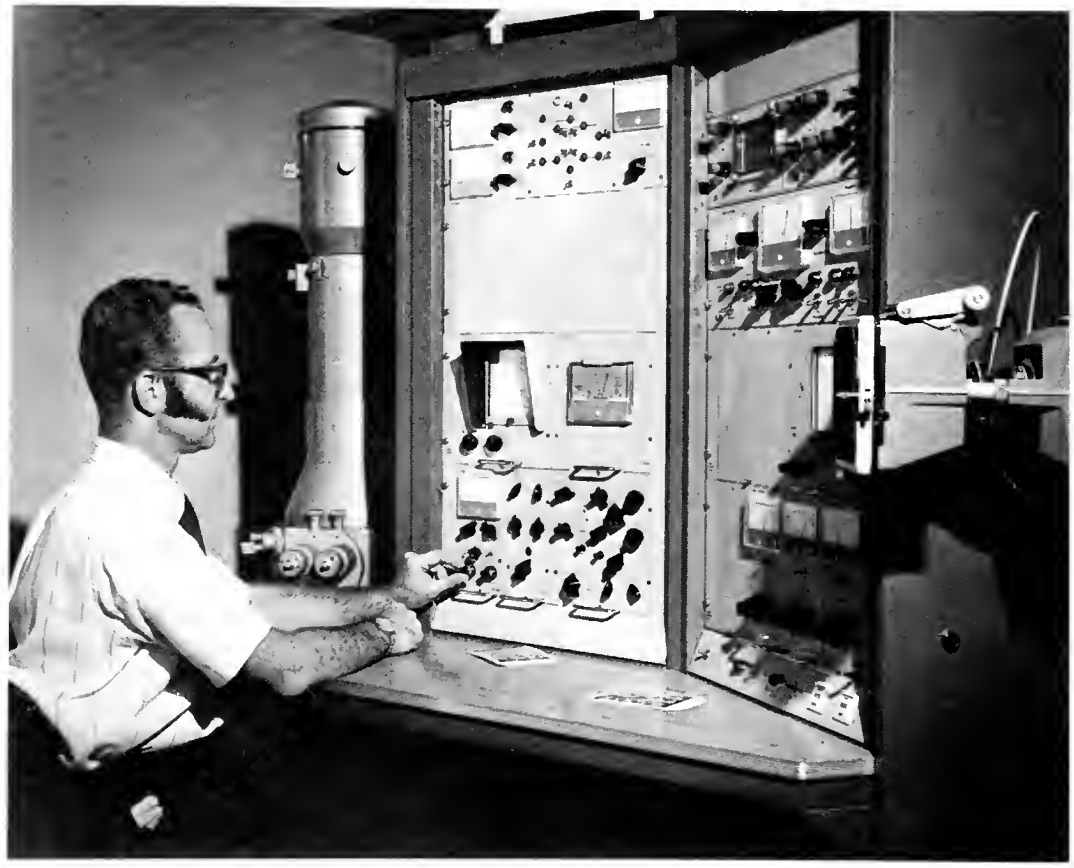
Extensive regional studies on the composition, relationships, and distribution of marine invertebrate faunas, including West Indian shrimps, Australian amphipods, and Indopacific littorinid snails, have been completed. Continuing faunal studies have led to the investigation of complex ecological problems, such as host-parasite relationships between fishes and copepod crustaceans and competition for space among sponges.

Studies of fossil organisms are the key to paleoecological conclusions but constituents of the sediments are important for these and modern ecological studies as well. For example, two minerals (pyrophyllite and talc) have been demonstrated, by a study by our sedimentologists, to be widely distributed over the continental shelf along the southeastern coast, but absent among the riverborne particulates discharged into the Atlantic. It is concluded that these mineral particles are introduced into the system as wastes from industrial processes, and may be useful in detecting and monitoring pollution in coastal waters.

Although uses of the scanning electron microscope (SEM) have been diverse, depending partly on availability of funds for materials, it has had its greatest impact in research on fossil invertebrates. For example, underwater investigations of a family of translucent, thin-shelled scallops demonstrated that they have a shell microstructure, as revealed by the SEM, quite unlike that of the common scallops. This, with other data, suggests close relationship of this family to a group thought to have become extinct 225 million years ago. Studies of deep-sea drilling cores are also greatly facilitated by the use of the SEM.

The enormous task of studying and classifying insects and their allies progressed with the publication of an outstanding volume concerned with the microlepidoptera of the remote tropical Pacific island of Rapa; a study of the behavior, life histories, and classification of a genus of small moths; a paper on the caddis flies of the Amazon Basin, based on research undertaken in cooperation with fishery officials in Brazil; and a very significant paper on the co-evolution of squashes/gourds and their bee associates, which are species-specific and entirely dependent on the plants for food in both larval and adult stages.

The interrelationships of animals are sometimes extremely close



The Scanning Electron Microscope, recently acquired by the National Museum of Natural History, is used by many of the Museum curators for the examination and illustration of tiny specimens too small or too delicate to be seen by conventional microscopes. The instrument has the capacity to provide images from 20 to 20,000 magnifications and can form these into three dimensional stereographic pictures, which reveal many features never previously observed.

and the phenomenon of mimicry is one of the most interesting. Field and laboratory studies of coral reef blenny fishes in Israel demonstrated that several kinds of mimicry had resulted in close resemblance of three species that are not phylogenetically close. In another group, a computer program has been developed to simulate the effects of predation on Batesian mimetic populations, providing predictions of the population structure of succeeding generations.

The more than 300 species of fishes of the Appalachian Mountains were treated in terms of their ecological preferences, drainage system occupied, as well as their distinguishing characteristics. The geological history of the river drainage system was also reviewed and correlated with the early dispersal and current distribution of the species. Such studies have obvious usefulness to environmentalists concerned with appraisals of fresh waters threatened with pollution

and the setting of rational standards for improvement based on ecological information.

In addition to the continuing research on lunar materials, which has involved most of the mineral sciences staff, a highly significant monograph on the Allende (Mexico) meteorite was completed and distributed. Parts of this, the largest stony meteorite fall on record (February 1969), have been shared for study with 99 other scientists in 79 organizations around the world. The national collections now include 2100 fragments of this meteorite with a total weight in excess of 400 kilograms. Studies of petrology, volcanology, and mineralogy have progressed and a long-awaited new program in crystallography has been initiated.

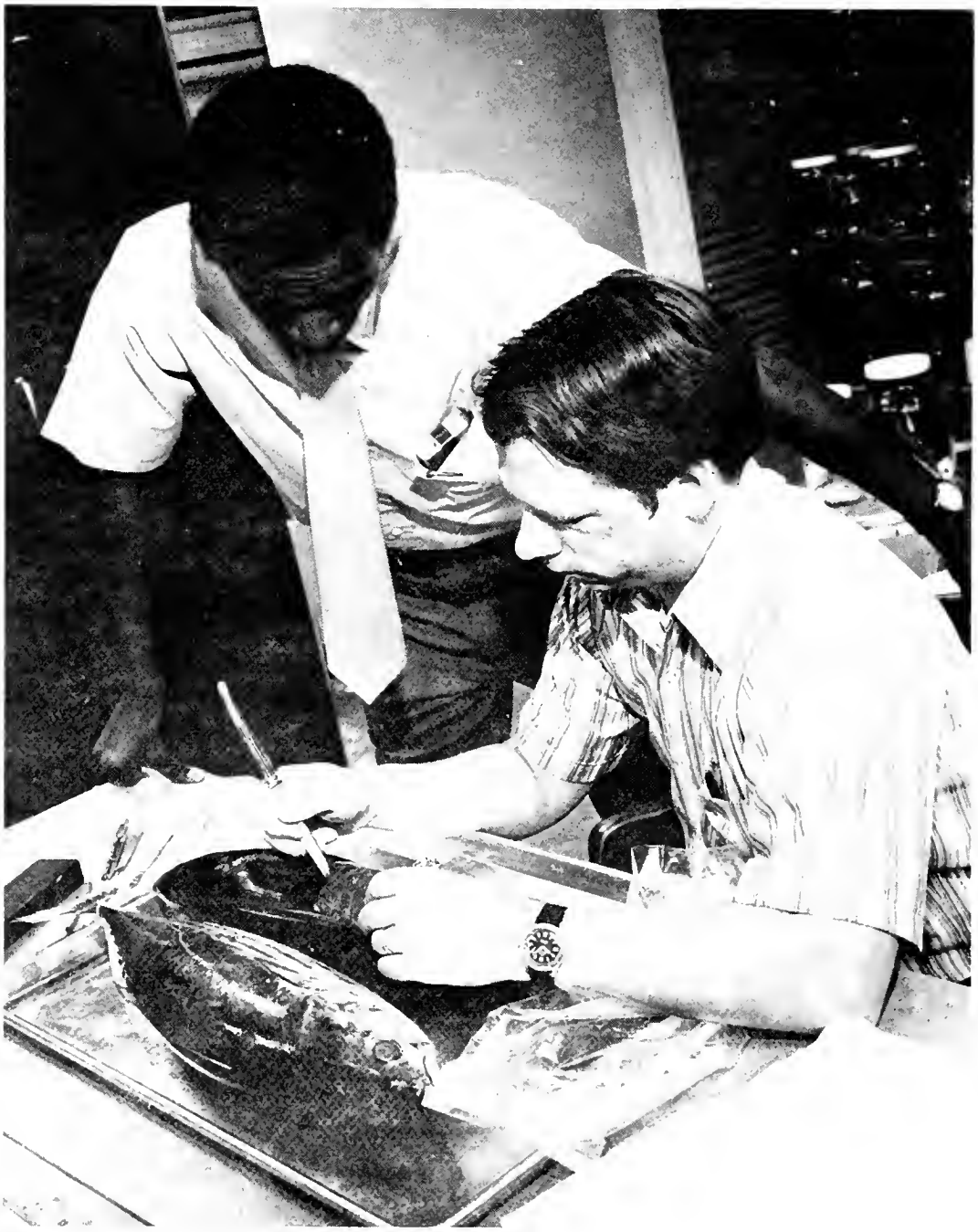
COLLECTIONS

The usefulness of natural history materials for documenting the composition of ecological systems, extant and in the past, is well recognized. The unique capability they provide to sample organisms gathered in pre-industrial, pre-pollution times was underscored by an experiment concerned with mercury as a pollutant. Tuna specimens collected in 1878 were found to contain amounts of mercury considerably in excess of that currently permitted by law to be present in foods. A National Science Foundation grant was obtained for the evaluation of the feasibility of using existing oceanographic specimens to determine pollutant levels in the oceans. At year's end work was underway to answer this very important question.

The evolution of central, departmental, specimen-processing units has continued and this year some of the largest, outstanding backlogs of specimens—plants and insects—have been greatly reduced. For example, nearly 135,000 specimens of insects and their relatives were accessioned and distributed for study to the appropriate specialists by the Entomological Preparation Laboratory.

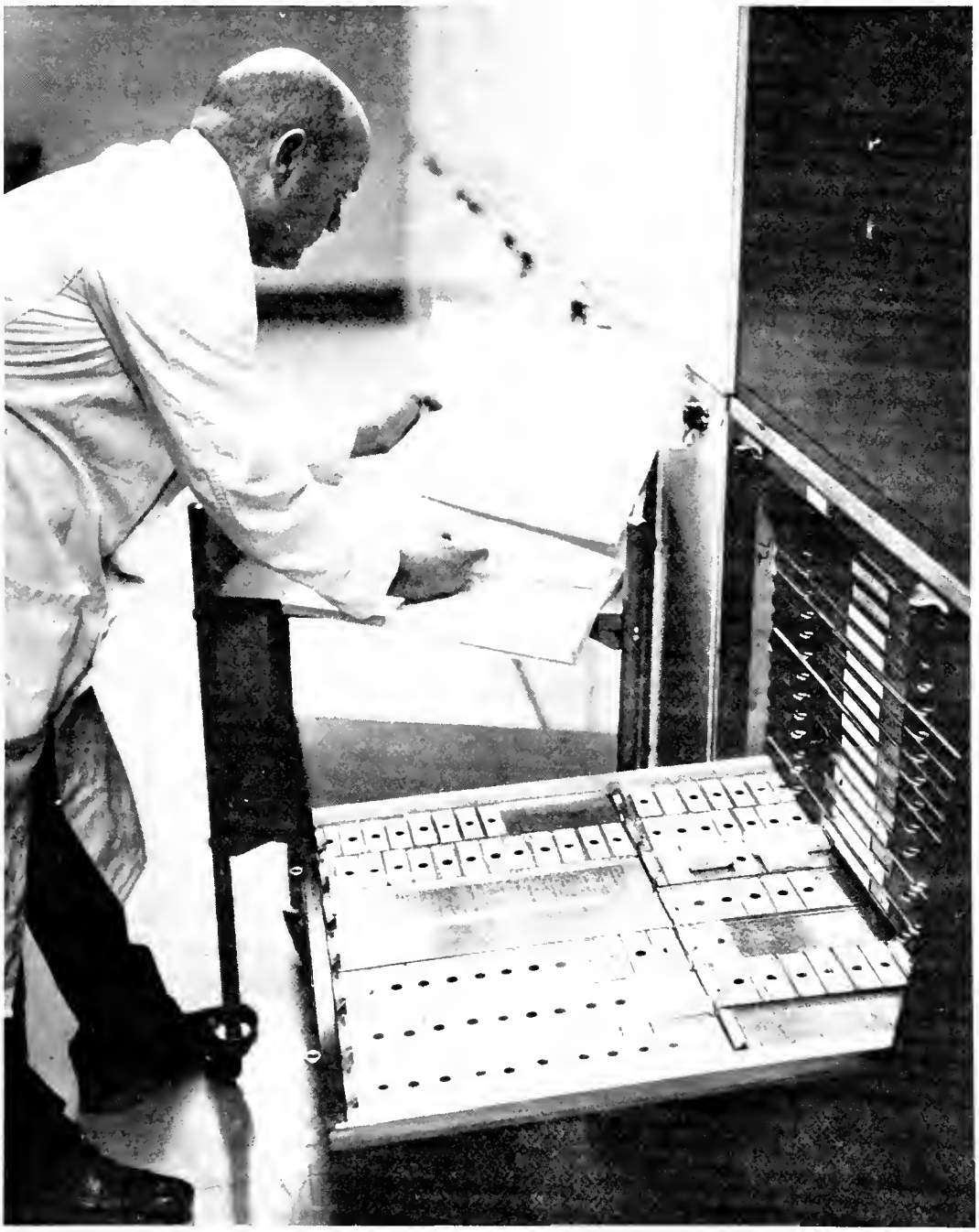
The collections of the National Anthropological Archives are of a different sort but as they become better organized and more available, an increasing number of visiting scholars are using them. These manuscripts, field notes, correspondence, photographs, and drawings are a rich source of research data formerly unavailable. Descriptive inventories of manuscripts relating to specific subjects, or the works of a single author, are now available to respond to specific inquiries of researchers.

One of the most important improvements with respect to the collections generally is the continuing application of data-processing



Dr. Bruce B. Collette (seated) of NOAA's National Marine Fisheries Service demonstrates to Mr. Edgar N. Gramblin, National Museum of Natural History, the removal of a flesh sample from a 30-year old skipjack tuna *(Katsuwonus pelamis)* from Peru for determination of levels to total mercury and methyl mercury. Specimens of tuna examined include some collected almost 100 years ago.

techniques referred to in earlier annual reports. Significant progress was made in the use of automated methods for capture, storage, and manipulation of data related to museum specimens. Modest funding allowed the Museum to initiate a long-range program for the con-



Mr. Frederick J. Collier, Collection Manager, consulting a computer listing of specimen data. These lists are used by Smithsonian scientists to locate quickly and easily specimens in the Museum's vast collections. The lists also are distributed to interested scientists and serve to circulate widely information on the Museum's collections.

version of ledger- and label-preparation from hand to machine methods. Procedures begun in four departments also include computer accumulation and rearrangement of the data followed by production of composite catalogs and cross-listings for local use and for

publication. Information on over 30,000 specimens was processed and plans for the future call for substantial broadening of the scope of the program. The ultimate aim is to capture data on virtually all incoming specimens while gradually converting collections-data already on hand in response to internal or external requests.

A most promising development with respect to management of information resources was the endorsement by the Conference of Directors of Systematic Collections of a cooperative intermuseum approach to the problem. The conference voted at its May meeting to accept and implement a blueprint for such cooperation, which calls for the National Museum of Natural History to serve as the interim clearinghouse for data collected in the program. Fossil and modern mammal specimens and botanical type-specimens will be the first groups to be treated by an initial informal consortium of six or seven museums and herbaria. Support will be sought to broaden the program to cover more groups of organisms and to include many more institutions curating and researching systematic collections.

EXHIBITS

Although the results are just beginning to show, this has been a period of considerable change. Planning has been advanced for several halls and parts of a hall on physical geology and another on ice-age vertebrates were opened to the public during the year, although construction continues in both. At the same time, much has been accomplished on the maintenance and updating of many of the exhibits already on view.

A new approach to exhibits planning and preparation has been initiated this year. While the staff scientists must always be the ultimate source for evaluation of the accuracy of the science to be presented, they are not required to spend literally years conceiving and writing exhibits. A small team of scientifically trained conceptualizers/writers (an exhibits planning group) works with the curators, and interacts with the other half of the team, the exhibits designers and producers. The planning group is also the focus for exhibits experimentation with techniques and subjects, among which one of the more interesting is the use of live insects to demonstrate biological principles in an Insect Zoo, manned by volunteers.

Formal preliminary planning has also begun for the Museum's part in the American Bicentennial Celebration of 1976. The themes are being defined and refined by the staff in cooperation with a contractual consultant in preparation for detailed development in the year ahead.

National Air and Space Museum

During fiscal year 1971, the Institution appointed Mr. Michael Collins Director of the National Air and Space Museum and Mr. Melvin B. Zisfein Deputy Director.

Mr. Collins came to the Institution from the Department of State where he had served as Assistant Secretary for Public Affairs and before that as an Air Force Colonel assigned to the space program where he participated as an astronaut in the Gemini 10 and Apollo 11 flights.

Mr. Zisfein comes from a career in air and space research having served as Associate Director of the Franklin Institute Research Laboratories, General Manager of the Astromechanics Research Division of the Conroe Corporation, and Chief of the Dynamics Department of Bell Aircraft Corporation.

An important addition this year to the Museum's collections which are maintained by the Department of Astronautics was the complete reference file of the late Willy Ley, representing forty years of historical research and study. Many historical photographs have been received and cataloged along with the acquisition of sound and video tape collections.

The most significant artifact received and placed on exhibit this fiscal year was the Apollo Lunar Module 2. Since lunar modules never return to earth from their space voyages (being unable to withstand the temperature and pressure of reentry into the earth's atmosphere), we are especially fortunate to have this rare flight artifact, which, though never flown, is identical to those now resting on the surface of the moon.

The collection of space art was increased by some twelve works of art.

The Department of Astronautics answered hundreds of letters requesting information concerning its specimens. Courses on the history of astronautics and the national space program were taught by the staff to youngsters of Smithsonian associates members.

The consultation activities of the Aeronautics Department staff continue at a high level providing advice and coordination to numerous museums and interested individuals, both here and abroad.

The professional staff also assisted the Civil Service Commission in establishing standards for personnel desiring air and space museum employment.

To revitalize the Flight Materiel Division of the Aeronautics Department, the curatorial function pertaining to aviation clothing,

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medals, insignia and personal equipment was reorganized. The preservation of related artifacts will be improved by the acquisition of special storage equipment and new larger storage space. With the completion of these steps, the thousands of artifacts in the flight materiel study collection will be available for the first time for examination and study by researchers and scholars.

The first priority of the Information and Education Department is the collection of documentation and the determination of the location of other specialized documentation holdings. In the vicinity of Washington, D. C. there exists the largest holdings of air and space documentation in the world. To supplement the NASM Historical Research Center's extensive holdings, major documentation collections in the field of air and space technology exist in many other government and educational agencies.

During the past year the collections of two early American pilots, Blance Stuart Scott and Beckwith Havens, have been added to the holdings of the Historical Research Center, as well as a collection from an early Norwegian pilot, Mr. Sem-Jacobsen.

Under a grant initiated in 1964 by the Daniel and Florence Guggenheim Foundation, the first reports of a survey to determine the impact on aerospace development resulting from two of the seven schools of aeronautical engineering established by the Daniel Guggenheim Fund for the Promotion of Aeronautics were completed and submitted to the foundation. The two schools were Leland Stanford University and the California Institute of Technology.

An already established oral history program of voice tape recording was expanded to include video recording. The department has now on hand a complete spectrum of voice recording equipment to meet all needs.

The following figures show a comparison of this year's activities with last year's:

	FY 1971	*FY 1970*
Requests answered	4987	4000
Visitors	1440	1300
Donations	85	62
Photo orders processed	744	637
New library titles received	177	132
Total library volumes received	269	194
Total mail received	11,885	10,000+

The urgencies of preservation have demanded that the major effort of the Preservation and Restoration Division be devoted to the maintenance of the collections.

Approximately 1800 specimens from the existing collections (700

astronautical and 1100 aeronautical) were verified by identification and category number against the accession records and properly warehoused and inventoried on our locator system.

Forty-five (45) shipments, totaling 107,949 pounds of astronautical material and 18 shipments totaling 25,548 pounds of aeronautical material were received to be added to the collections.

A total of 675 (465 astronautical and 210 aeronautical) new specimens were processed through identification, cataloging, inventory, and warehousing.

A considerable increase in astronautic artifacts restoration has been required because of the preparation requirements to support the world-wide loan program. Restoration was continued on the Douglas World Cruiser, the Nieuport Type 83, and on the Congrieve Rocket. The Fokker D–VII restoration was completed and put on exhibit. During this fiscal year the department also exhibited the Sirius, "Polar Star," and the FC–2, as well as preparing for traveling exhibitions the Gemini 6, 10, 11, and 12; the Mercury 7, 9, and 12; the Apollo 8; and the Goddard (1940–341) rocket.

The year ended with the augmented National Air and Space Museum staff developing an expanded program of study, publication, exhibit development, public service and new facility development for the coming years.

Smithsonian Astrophysical Observatory

This year, research at the Observatory (SAO) exemplified the complex relationship between science and technology—the symbiosis between the two illustrating the development of both.

The 60-inch reflector atop Mt. Hopkins in Arizona incorporates several unusual features that facilitate its use for study of the energy distribution in the light from planets and stars. At the lowest spectral resolution, the telescope has been used with an infrared photometer to measure the total amount of energy radiated by dust shells surrounding hot stars. These measurements are being interpreted to infer the amount of mass contracting in the youngest stars and to reveal the amount of dust condensing above or ejected from some of the most rapidly rotating stars. Together with low-resolution spectrographic observations of absorption and emission lines originating in the outer atmospheres of the rapidly rotating stars, these measurements offer new insight into the differential rotation of the hot stars.

Observations of the far-ultraviolet energy distribution of stars

already observed by Project Celescope are being reduced to permit a detailed comparison with data predicted by the stellar-atmospheres group using computer synthesis.

A new interferometer at Mt. Hopkins is making observations of cool pulsating variable stars; the resultant data will enable SAO scientists to map the velocity variations throughout the stellar atmosphere. An other interferometer is being used to map the atmospheres of Jupiter and Venus. These observations have already revealed strong variable winds in the atmosphere of Venus.

The easy access to accurate national time standards through the LORAN-C system has allowed SAO scientists to use Harvard's 61-inch telescope at Agassiz Station to make time-of-arrival measurements of the optical pulses from the Crab Nebula pulsar to a typical precision of 5 μsec. These measurements enable them: (1) to trace the evolution of a rapidly rotating (30 revolutions per second), highly magnetized neutron star, which this pulsar appears to be; (2) to check with precision and perhaps improve some of the orbital parameters of our solar system, particularly the orbit of the earth; and (3) to test some of the predictions of general relativity such as the "gravitational red shift," which indicates that the rate of a clock depends on the local gravitational potential.

It has already been learned that the dominant slowdown mechanism of the Crab pulsar is through electromagnetic radiation caused by the rotating dipolar magnetic field. The systematic deviations from the exact predictions are, however, still unexplained. One of these jumps in a period of 3 parts in 10^9, which occurred last September, could be interpreted as a change of only a thousandth of an inch in the typically 12-mile diameter of a neutron star.

A new interdisciplinary study—astrochemistry—has emerged through the alliance of radio astronomy and laboratory research. Recently detected distant gas clouds by a joint Smithsonian/Harvard observing team is the characteristic radiation of methyl alcohol. The astronomical discovery of this organic molecule may give part of the eventual answer to the question of how life evolves from primordial matter.

The Microwave Spectroscopy Laboratory supports the radio astronomy program of the Smithsonian Institution by measuring the characteristic wavelengths of selected molecules, thus providing the information needed for tuning radio telescope receivers and for analyzing Doppler shifts in the astronomical line spectra. Over the first year, measurements have been made on several organic and inorganic molecules that have current importance to astronomy, such

as formic acid, methyl amine, and hydroxyl. For his research of this type, H. E. Radford of SAO has been given the University of New Hampshire Distinguished Alumni Award.

Radio telescopes, thousands of miles—even continents—apart, can be used in conjunction. They are synchronized with precise atomic clocks whose errors are only one second per million years. Some of the most astounding recent discoveries in astronomy have been made possible with the perfection of these techniques called very long-baseline interferometry (VLBI). In April 1971, the American Academy of Arts and Sciences honored the individuals who pioneered the development of VLBI astronomy, by presentation of the Rumford Premium. One of the co-winners of the Rumford Medal, the oldest scientific prize in the United States, was James Moran of the Smithsonian Astrophysical Observatory.

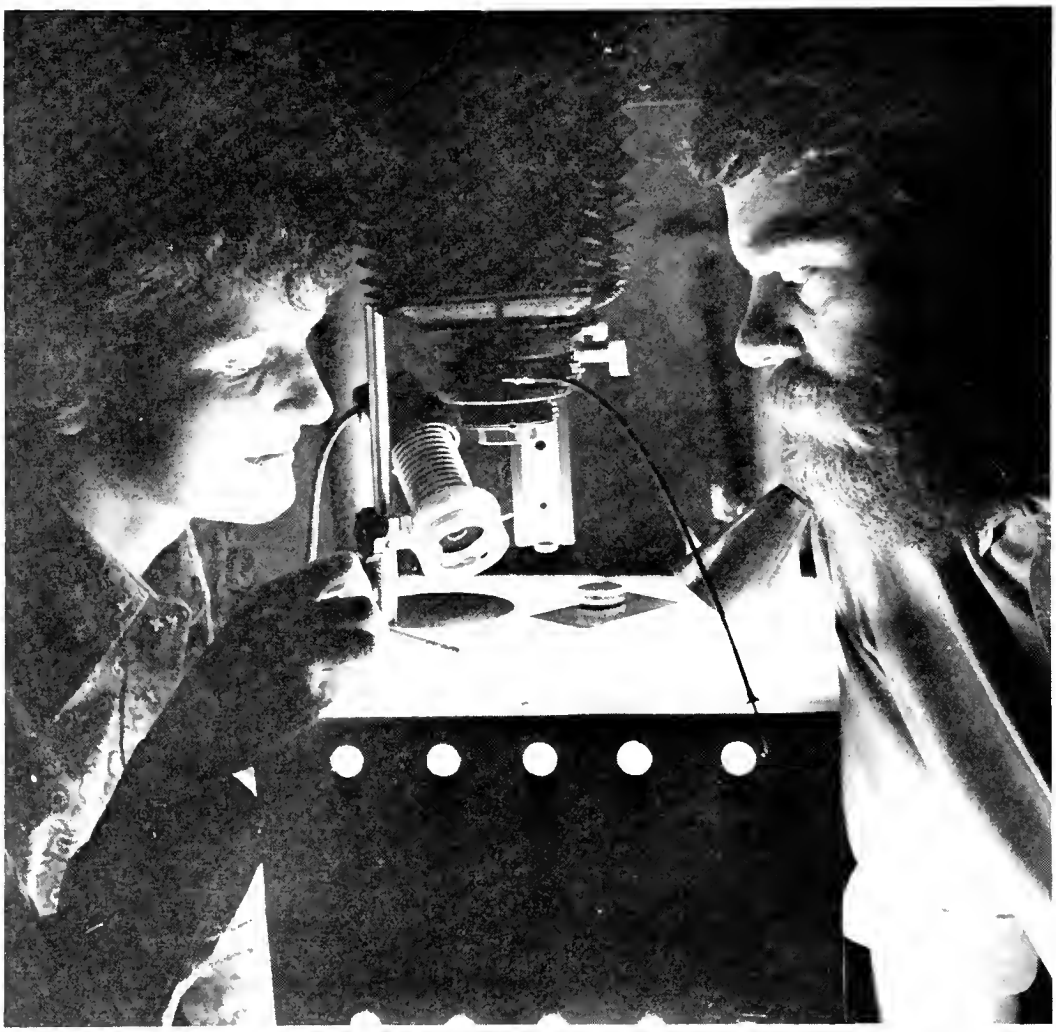
Another common means of communication—television—is now being used for astronomical purposes in the study of meteors. Meteors can be observed in our atmosphere in several ways, by the human eye, by camera, or by radar. The radar technique, however, does not work well on meteors bright enough to be photographed.

Thus a new and most recent technique employed is television of low light level. Its accuracy is comparable to that of radar, and it does reach meteors faint enough to be observed effectively by radar, thus providing a calibration of the radar method. Observations of the same meteors by both radar and television can relate light to ionization. Reduction of the radar and television observations and the combination of them by means of computer programs are well advanced. The results should give the relation between a meteor's brightness and velocity and the number of electrons per unit of path length it leaves behind.

Until recently, those meteors surviving fiery passage through the atmosphere to become meteorites have been the only extraterrestrial material available for study. But the most spectacular technological development of the 1960s, the Apollo Program, has now made lunar samples available.

Four SAO scientists have devoted essentially full time, for the past year, to a study of the mineralogic and petrologic characteristics of small rock fragments from samples of the lunar soil. A tablespoon of "coarse fines" (the sieve fraction between 1 and 10 mm in diameter) contains about 2000 particles, each with its own story to tell. The particles are examined under the microscope, and the microscopic crystals are analyzed with an electron microprobe.

The approach has been very rewarding because it has been pos-



Two SAO scientists examine samples of lunar soil returned by Apollo 14 astronauts.

sible to observe and study lunar rock types not represented among the larger rock specimens. It appears now that the near-surface regions of the moon (the "crust," to use a terrestrial term) are composed of three principal types of rock: dark basalt, a volcanic rock that filled the mare basins some 3.5 billion years ago; a lighter colored rock, termed norite, that is grossly basaltic in composition, but differs from the mare basalt in details of its chemical composition; and anorthosite, a light-colored rock of peculiar composition, in that it consists largely of a single mineral, plagioclase feldspar. The two latter light-colored rocks are believed to be samples of the lunar terra regions and the floors of the mare basins (beneath the dark basalt floods that fill them now).

There are discrepancies between the topographic irregularities of the lunar surface and the local value of lunar gravity (as revealed by

tracking of lunar satellites), such that the lunar highlands, although they represent a local excess in the amount of lunar material, do not exert a proportionately higher gravitational attraction than the lowlands. This can only mean that the lunar surface is underlain by rock of variable mass density. In particular, a lunar model that reconciles the lunar gravity field with its topography would involve a thickness of about 25 kilometers of anorthosite (low density) beneath the lunar highlands; a similar thickness of norite (medium density) beneath most of the mare basins; and the absence of these rocks, in favor of high-density mare basalt, in the other maria, those that display "mascons."

The satellite data from lasers are the natural technological advance beyond optical camera data. Whereas the camera data have an accuracy of 20 meters, those from laser tracking currently have an accuracy of 50 centimeters, roughly an improvement of two orders of magnitude.

The SAO geodesy and geophysics program is participating in the International Satellite Geodesy Experiment (ISAGEX) organized by the Centre National d'Etude Spatials (CNES), France. Fifteen laser-tracking systems are taking part. This observing program provides the basis for analysis that will result in a revised SAO Standard Earth.

The laser data will open a new chapter in the study of the solid earth. They may help answer questions that have intrigued scientists for centuries. For analyses at 5 meters, the earth can be assumed rigid. At 20 centimeters, it is very active. Crustal motions are 5 centimeters per year and earthquake displacements can be meters and are of unknown scale. The solid-earth tide varies with geographical region. These changes of mass distribution result in a complex rotational motion of the earth. This rotation, termed polar motion, will be measured with greater accuracy and possible precursors of earthquakes can then be determined. For the first time, these can be measured.

Meanwhile, current optical data have been used to relate the detailed mass distribution determined in 1969 to tectonic activity and to measure the solid earth tide, the annual variation in the mass distribution, and the motion of the earth's rotation axis with respect to the solid earth.

A new combination of data has enabled SAO scientists to complete the construction of new atmospheric models, now published as SAO Special Report No. 332 and soon to be incorporated into the forthcoming edition of the COSPAR International Reference (CIRA). These models try to represent all the observed variations of density and

composition at heights between 100 and 1500 km. The many different types of variation (the 11-year solar cycle, day-to-day solar activity, geomagnetic activity, the diurnal and semiannual variations, seasonal-latitudinal variations, the pole-to-pole migration of helium, and the escape of hydrogen) are all represented by means of empirical equations. The success of the models in representing the observed densities can be seen from the fact that the departures from the models average about 10 to 15 percent even in the height region between 400 and 500 kilometers, where the range of densities reaches a factor of 200.

Past attempts to represent the semiannual density variation in the heterosphere as a consequence of temperature variation have run into difficulties in two height regions: below 200 kilometers and above 1000 kilometers. A new analysis of the semi-annual density variations at different height levels fails to show a dependence of the amplitude with the sunspot cycle. All difficulties are removed if it is assumed that the semiannual density variation is not a direct consequence of temperature variations.

These are some highlights of science and technology at SAO in 1971. Meanwhile, the Observatory is planning new programs and new instrumentation to meet the challenges of astrophysics through the rest of the 1970s. One innovative project, conducted jointly with the University of Arizona, would result in the construction of a relatively inexpensive telescope of six 72-inch mirrors having the light-collecting capability of a 175-inch conventional instrument. SAO also expects to enter the field of millimeter astronomy, an exciting new venture.

Smithsonian Tropical Research Institute

Fiscal Year 1971 was a year of rapid growth for the Tropical Research Institute (STRI). Salaries and expenses grew by 20 percent, permanent staff grew by 21 percent, visitor days grew by 76 percent, staff seminars grew by 22 percent, and major new assets were acquired.

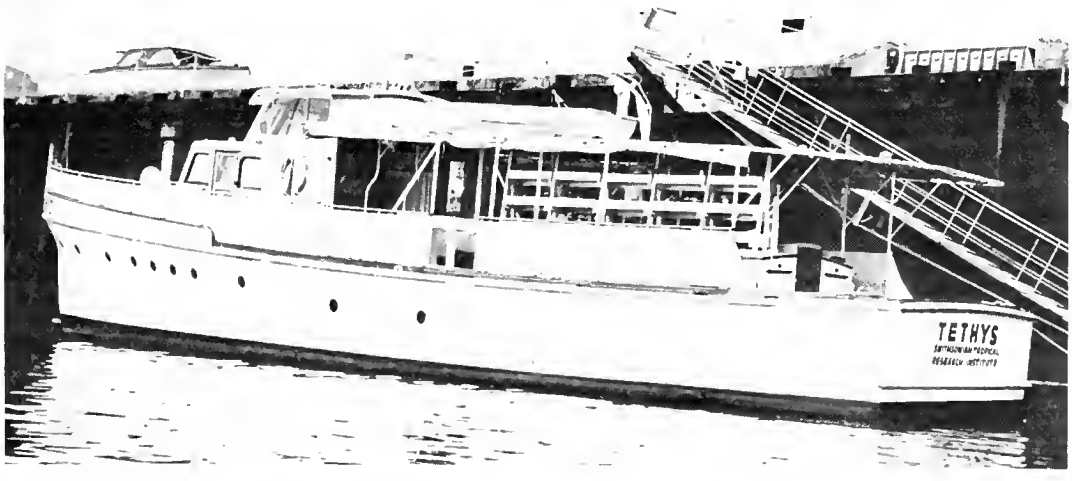
NEW ASSETS

The most significant development at STRI in this fiscal year has been the construction of a new laboratory building on Naos Island. The building, scheduled for completion on 30 June, has 4700 square feet of floor space and is being constructed at a cost of $110,000.

Included are six general laboratories, a chemistry lab, three offices, and a conference room. The new building will be occupied by both marine and terrestrial biologists; the exchange of ideas and regular comparison of the different ecologies is something STRI has desired for some time. STRI will continue to operate its facilities at Barro Colorado Island, Balboa, Galeta Point, and Cali, Colombia.

A marine launch was obtained by STRI from the Panama Canal Government on intergovernmental transfer in August. Valued at $29,000, the new ship can sleep eleven and range 400 miles. A research award from the Research Foundation was obtained for operating costs. The launch, formerly the Governor's yacht, has been converted to a research vessel and christened *R. V. Tethys*. Initial doubts have been dispelled as to the *Tethy's* utility for research; over 3000 miles have already been logged in both oceans and as knowledge of her availability grows, unscheduled time is becoming nonexistent. STRI now has 13 other boats, ranging from a launch licensed for 45 passengers to a cayuco licensed for none and used only by the courageous.

Barro Colorado Island has been a national preserve for biological research since 1940. Its limits have recently been redefined by the Canal Zone Government to include the waters out to the channel markers on all sides of the island. This will give STRI game wardens authority to eliminate such things as fishing and killing of crocodiles and tapirs in waters which are essential to the ecology of the Island. In addition, three large points of land across the ship channel from Barro Colorado Island have been leased to STRI by the Canal Zone Government. Large portions of this land have been cleared fairly recently for lumber and cultivation. Grasslands and secondary



R. V. Tethys **at home port at Rodman Naval Base, Canal Zone (Pacific side).**

growth research, and investigations comparing the biota and environment to Barro Colorado Island are planned for this area.

A land lease to an extensive bunker system on Flamenco Island in Panama Bay was obtained. The bunkers will require extensive rehabilitation but are expected to be the eventual location of a Radiation Biology Laboratory monitoring site.

RESEARCH

STRI can fairly be considered the most outstanding research center investigating tropical evolutionary biology in the world. In fiscal 1971 two new programs have provided the stimulus for the development of an equally significant emphasis in ecological research. One has been a two-phase contract from the Environmental Protection Agency to study the effects of oil pollution on tropical shores, including Atlantic and Pacific intertidal reef communities, mangrove swamps, and sandy beaches. The first phase has provided a base analysis of temporal and spacial variability of species in community structures. The second phase (the coming year) will involve monitoring the same variables while introducing bulk oil into experimental areas. The research team, which works mostly at the Galeta Point installation, includes three biologists and two technicians.

The other significant new program has been the STRI component of the Environmental Sciences Program. The program is measuring physical-meteorological factors and correlating them with cycling and variation of the biota. The terrestrial portion of this program has included the initiation of rainfall, wind, humidity, evaporation and temperature measurement at various points on Barro Colorado Island and the evapotranspiration and nutrient loss from a stream basin. Measurements are being made in the same area of organic decomposition and population of soil organisms. Litter fall and the times of flowering, fruiting, and leaf production in the area are being extensively studied. Studies of insect abundance and diversity and the biota of some temporary, unstable ponds and a bat roost have also been included in the first year's study.

In the marine area, tide pool analysis of species abundance, diversity, reproductive periods, and recruitment is being carried on. These data, together with a large portion of the data already gathered for the Environmental Protection Agency contract, will be correlated with a wide range of physical monitoring beginning in fiscal year 1972.

Large wier constructed on Barro Colorado Island by Environmental Science Program employees. Evapotranspiration, nutrient loss, and stream bed biota are being monitored.

There is a strong possibility that a major program on the tropical forest biome will soon be launched by the International Biological Program and that Barro Colorado Island will be one of the primary sites. Research projects are expected to be carried out on the island by numerous visiting scientists as well as STRI staff members. Several STRI research projects in human ecology and paleoecology will be correlated with the International Biological Program.

The crown-of-thorns starfish (*Acanthaster planci*), which has recently been so destructive to western Pacific coral reefs, has been the subject of continued study by Dr. Peter Glynn since his discovery of them in Central America in April 1970. Results show a stable population and that one large reef area, which was 80-percent consumed by *Acanthaster* had in large part been recolonized by young corals within a year. Dr. Glynn notes, however, that these reefs are free from human over-collecting, pollution, and coastal destruction, as well as from violent storms, all factors which have been cited as contributing to the devastation of western Pacific reefs.

Significant progress has been made in comparative studies of the

Old World Tropics. Six members of our staff traveled to Europe, Asia, and Africa during the fiscal year in an effort to coordinate research programs with different institutions to encourage local scientists to pursue research projects in their areas. Dr. Moynihan made an extensive visit to establish contacts with various administrative officials and biologists at several educational and research institutions in the Ivory Coast, Madagascar, India, and New Guinea. As a result, STRI has presented a substantial proposal for research in India using Public Law 480 funding.

The use of the Colombia station in Cali quadrupled during the past year. More of our staff have visited Colombia with a view toward establishing new programs. Agreements with the University of El Valle and the Departmental Museum of Natural History have been initiated and considerable cooperation and progress has been attained.

PERSONNEL

Deputy Director Edward H. Kohn left STRI in May to become a special assistant to Mr. Bradley. During Mr. Kohn's 30 months at STRI, the bureau work force grew by 36 percent and the number of visitors increased by 39 percent. Mr. C. Neal McKinney joined the staff in February as administrative officer. Mr. McKinney's background has been in personnel administration, most recently with the Environmental Protection Agency. In August, Dr. Judith Lang joined the staff. A specialist in deep water (slope) coral communities, she will continue to work primarily in Jamaica. In June, Dr. Hindrik Wolda joined the staff. A specialist in population ecology, Dr. Wolda was a faculty member at the University of Groningen.

Radiation Biology Laboratory

The biosphere is an extremely complex dynamic structure which requires a large number of parameters to describe even partially its characteristics at any given geographical location or for a particular point in time. Nevertheless, organisms regulate their growth patterns to a large extent by responding to changing and interacting physical factors in the environment. Laboratory experiments in which environmental variables are precisely controlled have indicated clearly that light quality, intensity, and duration are important signals or stimuli. In its new facility in Rockville, Maryland, the Radiation Biology Laboratory is continuing to probe these and

other regulatory responses toward a better understanding of the molecular, biochemical, and biophysical processes occurring in living organisms at the cellular and subcellular levels.

It is becoming increasingly more evident that a great deal more information is needed about daily and seasonal changes in spectral quality and also about differences in duration and quality of sunlight that occur naturally and about how these factors are instrumental in regulating growth and development.

From one latitude to another the light of the sun reaches the earth at different angles, consequently having traveled longer or shorter distances through the atmosphere. The quality of incident sunlight, because of these variances, and certainly the lengths of days, can be expected to differ significantly from one geographical location to another. In cooperation with the Environmental Sciences Program of the Smithsonian a solar radiation monitoring station was established at Barrow, Alaska, this year. Automatic measurements of the irradiance within six biologically important light wavelength bands are made at three-minute intervals from near sunrise to near sunset. Measuring at this high northerly latitude, with its relatively long light paths and comparing with values obtained at other latitudes will permit assessment concerning the significance of this environmental parameter in controlling growth and distribution of biological systems. Such data also contribute to estimates of perturbations in daylight caused by man's intervention in the environment. There appear, from time to time, applications for these measurements of sunlight that have value and significance in other than biological fields. It is interesting to note, for example, that data were furnished for analysis in connection with possible environmental effects on the atmosphere by the projected supersonic transport.

Light, in order to be effective in initiating regulatory responses, must be absorbed by cells of plants and animals. This year in the Radiation Biology Laboratory the pigment structures (phycobilisomes) in the red alga *Porphyridium cruentum* have been isolated for the first time in a pure state. When dissociated and analyzed they are composed almost entirely of the pigments phycoerythrin and phycocyanin.

Carotenoids are found in almost every organism. The degradation product of one of these carotenoids, for example, is needed for vision in man and other vertebrates. In lower organisms light is often required for the synthesis of these pigments. The sequential biochemical pathway of carotenoid synthesis as regulated by light is being studied. Several new mutants of *Neurospora crassa,* albinos,

yellows, and one pink, have been found that synthesize altered carotenoid contents. It has also been discovered that D,L, para-fluorophenylalanine, L-ethionine and D-ethionine inhibit the synthesis of carotenoids in light, and these compounds are being utilized to map the pathway of synthesis.

Chloroplasts of higher plants are required for photosynthesis. The use of the antibiotics chloramphenicol and the cycloheximide in following the synthesis of chloroplast protein suggests that the enzyme ribulose-1, 5-diphosphate carboxylase occurs in part in the chloroplasts and in part in the cytoplasm. In contrast, the synthesis of chloroplast ribosomal proteins appears to occur entirely in the cytoplasm. It has further been found that the inability of aged leaves to photosynthesize is related to the loss of manganese. In addition, the process of electron transport leading to photosynthetic oxygen evolution has been found to consist of at least two steps.

In addition to these selected new research findings, it can be reported that laboratory facilities have been about 90 percent completed. The major portions of the research activities of the Laboratory have been reported at scientific meetings, both national and international and have been published in scientific journals.

National Zoological Park

Zoos are challenged to become net producers rather than net consumers of wildlife. As more species become rare or endangered in the wild, zoos cannot continue to replenish losses by additional captures. Acquisitions of some species are now restricted to zoos which seem competent to propagate them.

While most species kept in zoos have reproduced, at least occasionally, sustained reproduction of most has not yet been achieved. In many cases, captive-born adults fail to mate and reproduce as well as wild-caught specimens. Each year, however, some additional progress is achieved.

This year the Division of Scientific Research reported the first captive breeding of the pacarana, second-generation captive births of the long-tailed tenrec, and third-generation births of *Sminthopsis macrura,* a mouse-like marsupial. Significant births and hatchings in the main collection included a pair of golden marmosets, a species in grave danger of extinction; two kagus, a rare bird from New Caledonia; and a tree kangaroo.

The most significant additions to the collection were a group of

bongos, rare antelopes seldom seen in zoos. Three were trapped by John Seago in Kenya, the culmination of a capture and conditioning effort that began in 1968. A fourth was obtained in West Africa. The Government of India presented the Zoo with a female lesser panda, a prospective mate for our single male.

The scientific program yielded a number of staff publications reporting earlier research. Resident Scientist John F. Eisenberg initiated a study of sloths in Panama, using radio telemetry to track them in the rain-forest canopy. The new method indicates density of sloths exceeding estimates made by earlier methods.

During the year, the National Zoological Park began to emerge from a period of austerity. While there had been no reduction in the number of positions authorized by the Congress, personnel ceilings imposed in previous years required that a number of positions be left vacant. Recent increases in professional staff were, to some extent, made at the expense of other categories. Since standards of animal care could not be compromised, the pinch was left chiefly in maintenance of buildings and grounds. At the end of the fiscal year, the ceiling had been increased to 234 permanent positions, whereas the total authorized was 249.

For the fourth consecutive year, there was no appropriation for capital construction, in keeping with wartime restrictions on federal building. Approximately $1.4 million of funds previously appropriated were frozen, pending Congressional approval of revised construction plans, although sums were appropriated for renovations and repairs.

In anticipation of future appropriations, the firm of Faulkner, Fryer and Vanderpool, Architects, and Lester Collins, Landscape Architect, were retained to redesign the Zoo's master plan. They will be guided by the admonition of the Commission of Fine Arts to emphasize the exhibition of animals in well-designed landscape settings and minimize the visual impact of buildings. Preliminary site plans had been completed at the end of the year.

Attendance continued to increase, exceeding five million for the year. Since the zoo is open without charge, with multiple entrances, visitor counts are based on a sampling formula. The formula was developed some time ago, and there is reason to believe it now overestimates attendance. However, the increasing congestion of the zoo, and especially of its parking lots and roads, is evidence that crowds are larger each year.

A firm of consulting engineers, having studied the traffic and parking problems, submitted a report with two principal recommen-

dations. The first would replace the present scattered parking lots with a multi-level garage, providing more spaces. The second was an interim plan to improve traffic flow, making only minor modifications in present roads and parking lots. Both are under study, as is the further recommendation that a fee be charged for parking to offset costs of construction and service.

In March, a new Department of Zoological Programs was established, combining the animal exhibit divisions and the divisions of Scientific Research, Animal Health, and Pathology. The new post of Assistant Director for Zoological Programs was created. Dr. John Eisenberg was named Acting during the recruiting period.

Dr. Sam Weeks joined the staff as curator of birds and Mr. Harold Egoscue as curator of small mammals and primates.

The Friends of the National Zoo (FONZ) expanded their activities in education and public service. More than 17,000 school children were conducted on planned tours by trained FONZ guides. FONZ continues to man information posts and provide volunteers for after-hours "preg-watches" and "tiger sits." The area-wide school art show received many entries. The trackless trains began a second year of successful operation. At year's end, a new and much larger sales building for gifts, souvenirs, and balloons was completed and ready to open.

Office of Environmental Sciences

Studies of the consequences of man's major alteration of his environment were initiated during this year, such as the study of the biology of the intermediate hosts of human parasitic diseases; schistosomiasis in relationship to the development of the Mekong River; the impact on their respective environments of the Volta River in Ghana, the Nairobi National Park in Kenya, the Special City of Seoul, Korea, the offshore oil exploration in Indonesia, and the Belem-Brazilia highway in Brazil.

PROGRAM OFFICE OF ECOLOGY

Remote sensing studies of vegetation of the Rhode River watershed were carried out under a contract with NASA. A detailed survey of the vegetation of the watershed served as "ground truth" for environmental sensing from helicopters and aircraft using color and infrared film and image scanning in infrared. Identification of deciduous forest species by changes in spring and fall foliage colors

was correlated with air photographs. A symposium for the Agency for International Development was convened to evaluate the potential contribution of remote sensing in resource development and in environmental planning in developing countries.

A research program on biological control of nonagricultural pests was initiated, with an 8-month study of sciomyzid fly larvae which attack and kill snails. Studies were accomplished in Peru, Ghana, Indonesia, Australia, and the Mekong area in Thailand.

Satellite tracking studies of migrating elk were carried out on contact with NASA. One wild elk was located by a satellite (Nimbus III) for one month and an additional animal was tracked by satellite during its early migration.

An environmental program was developed, including recruitment and assignment of research ecologists, environmentalists, conservationists, and biologists as Peace Corps volunteers. Participants with Masters or Doctors degrees or candidates for the degrees carry out research programs in the host countries which request them. To date 120 volunteers have applied; fifteen countries have requested various types of research specialists, and volunteers have been sent or are preparing for their assignments.

PROGRAM OFFICE OF OCEANOGRAPHY AND LIMNOLOGY

Acquisition of the acrylic and aluminum research submersible, *Johnson-Sea-Link,* has provided a new Smithsonian capability for research in the marine environment. Conceived, engineered, and constructed in part by Edwin A. Link, and donated to the Smithsonian, the vehicle incorporated a 66-inch diameter acrylic sphere, developed by the Navy, with an 8-foot cylindrical aluminum diver compartment, similar to the diver lockout system of *Deep Diver.* The pilot and an observer in the forward compartment will have a full opportunity to place the vehicle into close proximity with the marine situation to be examined. Three divers are pressurized for excursions from the aluminum chamber, especially to collect geological and biological specimens and data.

In support of the submersible, the Smithsonian, in cooperation with Mr. Link, and the Harbor Branch Foundation, has acquired and is developing a marine facility near Fort Pierce, Florida. Consisting of about 250 acres of land on the Indian River Inland Waterway, the improvements include two warehouse buildings for maintenance of the submarine and for associated underwater activities. A laboratory building is under construction to house scientific in-

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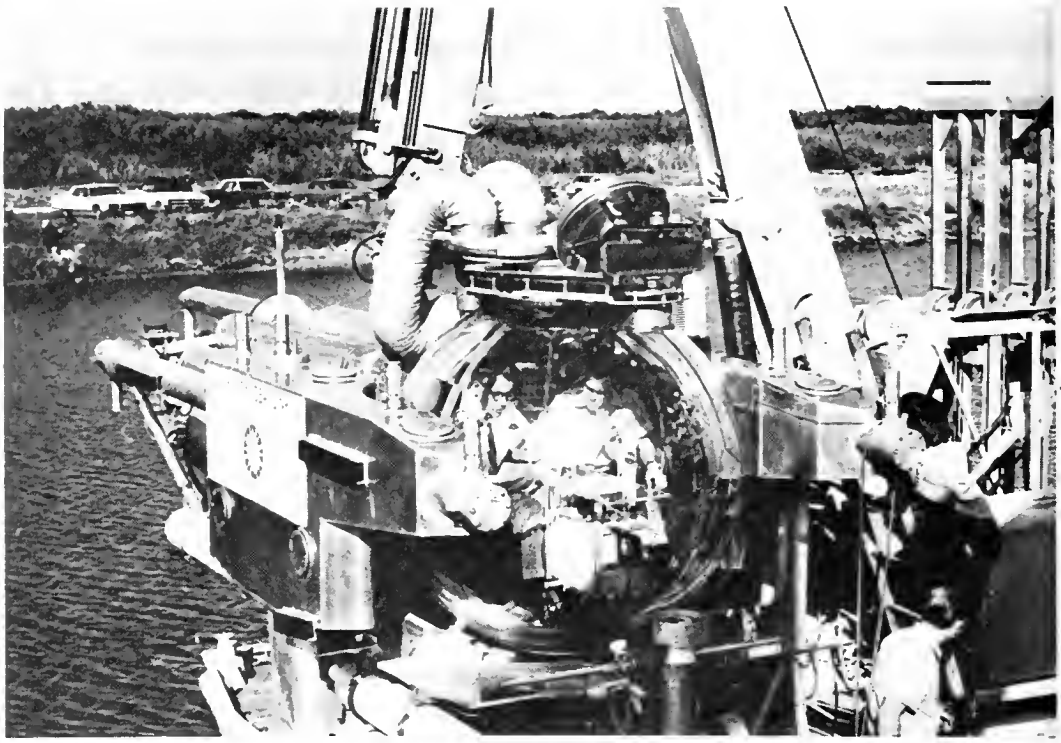


After the commissioning on 29 January 1971, submersible pilot John Fike and Florida Lieutenant Governor Thomas Adams, within the acrylic bubble, prepare for the launching of *Johnson-Sea-Link* from Mr. Edwin A. Link's vessel, *Sea Diver*.

vestigations especially related to the field programs. A former Coast Guard Cutter, now called *R/V Johnson,* has been acquired and is being fully rebuilt at the facility for oceanographic work and as a submarine tender.

In connection with the commissioning ceremonies for *Johnson-Sea-Link,* which were held on 29 January, Mr. Ripley awarded a newly established Smithsonian Institution medal to Mr. Link and to Mr. Seward Johnson, who had not only provided substantial support to the project but also gave an endowment for its operation.

During the year, the Smithsonian Oceanographic Sorting Center (SOSC) sent 219,708 specimens of algae, invertebrates, vertebrates, oceanic rocks, and photographs of the ocean bottom to 368 scientists for studies of the kinds, distributions, and populations of organisms of the world ocean. At the request of national and international organizations, SOSC sent its supervisors to the Antarctic, the Pacific coast of Colombia, Staten Island, the Galapagos Islands, Panama, and many other localities to make collections or to obtain records of collections of scientific interest.

The Smithsonian research vessel *R/V Phykos* spent the year in

Yugoslavia undergoing conversion into a modern oceanographic vessel. She will begin operations early next fiscal year as the principal biological collections vessel for the Cooperative Investigations of the Mediterranean.

THE CHESAPEAKE BAY CENTER FOR ENVIRONMENTAL STUDIES

A plan for a complete ecosystem study of the Rhode River Watershed was developed as the primary research program of the Center, in cooperation with the Johns Hopkins University, The University of Maryland, and the U. S. Geological Survey. The plan integrates the Center's scientific research program with data on land-use history, ecosystem structure and function, and socioeconomic trends and attitudes in such a way that predictions can be made of the possible effects of proposed changes in land use in the watershed, as they occur with increased population density and diversification of human activities. The information gathered will be used in managing the land and water resources of the estuary and its watershed, and should be applicable as a methodology for the study of other portions of the Chesapeake Bay. The study is expected to be a part of a major study of the total bay in cooperation with many other agencies.

Substantial data has been gathered to aid management decisions regarding planning and zoning in Anne Arundel County, Maryland, and in the management of the Chesapeake Bay as a natural resource. Scientific information, collected by the Center, was instrumental in planning for the construction of tertiary sewage-treatment facilities for a housing project in the watershed, and for the planning of erosion control during construction of a powerline right-of-way. These actions represent valuable precedents in the application of research-produced information for purposes of environmental management by industry and public agencies.

The facilities of the Center were substantially expanded during the year with the addition of 507 acres of land, of leases, offices and of a small research vessel.

Educational activities were accelerated with the offering of a course in estuarine ecology by the Biology Department of The Johns Hopkins University. Two postdoctoral fellows were supported at the Center by the Smithsonian Research Foundation. Six universities in the Baltimore-Washington area utilized the Center for field work and the Center continued to provide instruction for children at

the Human Resources Development Center of the Community Action Agency in Anne Arundel County.

CENTER FOR SHORT-LIVED PHENOMENA

The Center for Short-Lived Phenomena expanded its reporting network which now includes over 3000 scientists, scientific institutions, and field stations located in 148 countries on every continent and ocean of the world.

The Center continues to communicate data and information on significant changes in biological and ecological systems, including rare or unusual animal migrations, population explosions, and major mortalities of flora and fauna, as well as volcanic eruptions, the birth of new islands, major fireball events and meteorite falls, and environmental pollution events such as major oil spills, and pesticide and herbicide contaminations.

During 1970, the Center reported 113 short-lived events that occurred in 48 countries. Scientific teams investigated at least 84 of the events. Forty-nine earth science events were described, as well as 47 biological and 15 astrophysical events.

Specimens of all six meteorites were recovered promptly and sent to laboratories for radioisotope analysis. Delay between the time of the fall of the objects and the time they arrived in measuring laboratories ranged from a few days to a few weeks. In addition, fireball ablation products were sampled in the atmosphere by high altitude air collection aircraft shortly after two major fireball events.

The Center also reported other unusual geological events, including submarine volcanic activity in the Tonga Islands, major landslides in Hungary and Nigeria, the Pozzoulli uplift near Naples in Italy, the Wolenchiti fracturing in Ethiopia, major floods and storm surges in Ecuador and Rumania, the drainage of a glacial lake in Alaska, a major typhoon in the Philippines and a series of major tidal waves in East Pakistan, as well as the discovery of the Guajaki tribe of Paraguay.

A science teacher event-notification program was inaugurated to provide science teachers with up-to-date information on fast breaking natural events that would be of interest in their classrooms. Hundreds of science teachers use the Center's daily event cards as teaching tools to show the dynamic nature of the earth. The Center has also been involved with a number of international programs concerned with global environmental monitoring, such as the International Biological Program, UNESCO's "Man and the Biosphere"

program, and the National Academy of Sciences Environmental Monitoring Program.

Center for the Study of Man

During the past year the Center for the Study of Man has continued to provide leadership for anthropologists and other scientists, who are seeking to bring their special skills and knowledge to the solution of major world problems. From 14–19 May 1971, International Advisory Board members of the Center met with members of two "task forces" on human fertility and environmental degradation. Members of the Task Force on Human Fertility, representing 24 institutions, prepared and discussed papers defining ways in which anthropologists could contribute to an understanding of the population problem. The result of their efforts is a forthcoming handbook containing guidelines for population research, including suggestions for analyzing and recycling field notes.

The Task Force on the Environment, representing 15 institutions, mapped out a procedure for concentrating anthropological research on environmental problems. Present knowledge in this field was summarized and plans for future research were sketched. A conference will take place in October to further consolidate the efforts of this task force.

At the urging of the International Advisory Board a third task force on education will be assembled during the coming year. This task force will conduct basic research on the problem of cultural transmission from generation to generation in the context of rapid culture change.

The Center's American Indian Program has continued to serve Indians and the American public by distributing scholarly materials to them. A research program on Indian economic development is now also underway. All volume editors for the 18-volume *Handbook of North American Indians* have now been selected. The content for each volume is determined and contributors are now in the process of researching and writing.

Results of the Center's Urgent Anthropology Program continue to be received, such as Frank Lobo's work with four of the last surviving Ahashamen Indians of San Juan Capistrano who still possess some knowledge of the Ahashamen language. Throughout the past year a total of 15 grants were made to carry out urgent anthropological research in 12 different countries.

From 29 October to 1 November 1970, the Center brought together a working group of 20 anthropologists and film-makers. This three-day session developed guidelines for evaluating proposals involving anthropological film-making; it examined long range requirements for educational films in anthropology; and it planned the development of a National Anthropological Film Archive for research in anthropological film records and for the development of new educational films in anthropology.

Science Information Exchange

The Exchange completed seven years under the contractual authority of the National Science Foundation. Beginning in FY 1972 the total responsibility for support and operation of the Exchange will be centered under the authority of the Smithsonian Institution. During the year the Science Information Exchange (SIE) was incorporated under the laws of the District of Columbia.

Demand for SIE services increased substantially, especially in catalog and thesaurus development. Several new output products were designed to make SIE information more readily available to scientists and research administrators. A complete microfilm record of ongoing biomedical research accompanied by a printed index was introduced to be printed and distributed by a commercial contractor. Pre-run searches on timely topics were announced in appropriate journals and newsletters, with very good results and expanded demands for this new information product.

Particularly noteworthy has been the increasing interest in the Exchange's data bank by overseas organizations. Negotiations have been initiated for sale of tape records in several foreign countries. It is anticipated that the international information exchange will accelerate.

All records, in full text, are now in computer storage and can be selected and printed on demand. Information input and output is via video terminals that can be readily adapted to on-line remote interrogation whenever demand develops.

An intensified program of articles about SIE and announcements by mail have substantially increased awareness and usage of SIE services throughout the scientific and lay communities.

HISTORY AND ART

As shown by the individual reports that follow, the past year was one of satisfying accomplishments by the history and art bureaus of the Institution. Some milestones, such as the completion of the first volume of the *Joseph Henry Papers* and the preparation of the first complete guide to the archives of the Smithsonian, were reached during the year. Additions to the national collections of historical, artistic, and archival material continued at an impressive rate. Exhibitions both major and minor in the Museum of History and Technology, the National Collection of Fine Arts, and the National Portrait Gallery were well received by critics and the public alike. The educational and scholarly activities that form so important a part of the responsibilities of our museums and other bureaus received continuing emphasis and led to a number of distinguished publications.

The past year was also notable in terms of new physical facilities. Early in the year the Cooper Hewitt Museum accomplished its move from the Cooper Union to the Carnegie and Miller Houses with almost miraculous economy and efficiency. Construction continued on the Hirshhorn Museum, which by year's end had emerged above ground level; the opening of the Hirshhorn Museum and Sculpture Garden is planned for 1973. Basic work on the Renwick Gallery was completed and an opening is planned for the winter of 1971, following the final restoration and decoration of the interior and the installation of exhibits.

A special word should be said about the Smithsonian's plans for the Bicentennial of the American Revolution, which involve many parts of the Institution in addition to its history and art bureaus. The Bicentennial offers the Smithsonian a unique opportunity and an urgent duty. We must use our vast resources, and enlist the resources of others, to help rediscover and illuminate our national achievements. The theme of the Smithsonian's Bicentennial celebration is the American experience; its purpose will be, in President Nixon's words, "a new understanding of our heritage."

For this effort, the Smithsonian Institution is providentially well prepared. It is a remarkably comprehensive group of enterprises

surveying every aspect of man's life and work—his social, political, and military institutions; his fine arts, his applied arts, his performing arts; his use of natural resources; and his adventures of exploration on this planet and into outer space. The Smithsonian Institution has a long and rich tradition of free interchange of ideas with the world of learning. It has been a center for the study of resources, natural and human, of the whole continent. The Smithsonian, as the repository for myriad objects sacred to our history and illustrative of the American experience since the beginning, is preeminent among the museums of the world and second to none in the number of its visitors. All of this gives us a special responsibility of which we are deeply mindful.

During the past year, preliminary work was begun on a number of special Bicentennial activities. These included special exhibitions in the Museum of History and Technology, the Museum of Natural History, the Arts and Industries Building, and the National Air and Space Museum. Planning continued for the development of Bicentennial Park on the banks of the Potomac, and authorizing legislation to this end was submitted by the Regents on the advice of the National Armed Forces Museum Advisory Board. The Institution's art bureaus are collaborating in the preparation of an unprecedented Bicentennial Survey of American Art, which will include an inventory of American paintings before 1914, a catalog of revolutionary era portraits, and a bibliography of American art. With continuing support from the Congress and the American Revolution Bicentennial Commission, the Smithsonian's role in the celebration of the 200th birthday of our nation will receive increasing emphasis in the years between now and 1976.

The National Museum of History and Technology

In the fiscal year 1971 a major endeavor of the professional staff of The National Museum of History and Technology was the development of plans for a variety of ambitious exhibitions and special projects to commemorate the forthcoming American Revolution Bicentennial. These will be concerned not only with the personalities and events of the era of the Revolutionary War, but will provide a broader understanding of American achievement over the succeeding two centuries. A preliminary step to planning was the successful completion of an inventory of the national collections to identify and select available and appropriate materials for the projects in progress.

An opportunity to undertake a major revision of the exhibition halls in the central segment of the third floor made possible a reorganization of subject content under the conceptual theme of communication. Existing exhibits are being modified and supplemented, as well as relocated, and a major portion of the Museum's exhibit effort in the forthcoming year will be directed to the completion of this project.

Two major events which highlighted the Museum's activities during the year were special exhibits developed in the Department of Cultural History. Both were memorable because of the novelty of their subject matter and their reminiscent appeal.

"Do It The Hard Way: Rube Goldberg and Modern Times," which opened in November, was dedicated to the famous cartoonist whose name has become part of the language. The exhibit featured a montage of Goldberg's original drawings and published cartoons, his sculpture, realizations of some of the fantastic comic-page inventions for which he was widely known, and other memorabilia illustrating the cartoonist's many-faceted social commentaries and observations on the absurdities of human nature. A film supplemen-

Rube Goldberg's elaborate picture-taking contraption with which visitors were photographed.

ting the tangible elements of the exhibit captured the essence of Goldberg's personality and achievements. Produced by Karen Loveland and Benjamin W. Lawless of the Office of Exhibits, the film won a CINE Golden Eagle Award and has been submitted to three international film festivals. The attractive catalog describing the exhibit, produced by Peter C. Marzio and Anne C. Golovin, received a Certificate of Award from the Printing Institute of America in the one and two color brochure and catalog category. Among the most popular aspects of the exhibit were a Goldberg signature-machine which visitors could operate, and an elaborate picture-taking contraption by which visitors were photographed.

"Music Machines—American Style," which opened in April, is an ongoing special exhibit depicting the development of mechanical and electronic devices and machines by means of which popular music was recorded, reproduced, and transmitted in America. A theater within the exhibition presents a program of clips of famous musical productions of the 1930's and of the period 1940–1960.

The past year also witnessed the opening of two permanent

By the 1890s talking machines shown in "Music Machines—American Style" were entertaining thousands of Americans at home, penny arcades, and phonograph parlors.

exhibition halls and the creation of several popular special exhibits, representing a wide range of curatorial interests. The first segment of the new Hall of Electricity which was opened in December focuses on the mystery and fascination of electrical science through the mid-nineteenth century. Featured are a working reproduction of an electric motor designed by Benjamin Franklin, and a number of visitor-operated displays. Dominating the entrance is a tableau

The entrance to the Hall of Electricity is dominated by this operating reconstruction of a typical 18th-century parlor demonstration: The Electric Kiss.

demonstrating the "electric kiss"—a preoccupation of the 18th century. The first in a series of changing exhibits entitled "Contemporary Counterparts of Early American Craftsmen" was added to the popular Hall of Everyday Life in the American Past. A major segment added to the Hall of Ceramics and Glass was a unique collection of yellow-glazed English earthenware of the 1785–1835 period donated by Eleanor and Jack Leon.

Three hundred years of South Carolina paper currencies was the subject of an exhibit in the Hall of Numismatics. A joint venture was undertaken with the philatelic services of five Scandinavian countries in the production of an exhibit on the "Stamps and Posts of Scandinavia." A splendid collection of ceramic and silver tureens from the Campbell Museum collection was featured in a special exhibit which opened in June.

The historical significance of American holidays is the theme of an ongoing series of colorful popular exhibits at the Mall entrance to the Museum. These have included among others, an exhibit about Fourth of July celebrations, which featured music, slides, and original objects relating to the Declaration of Independence, and a dual exhibit commemorating the birthdays of George Washington and Abraham Lincoln, again showing many original objects associated with these patriots.

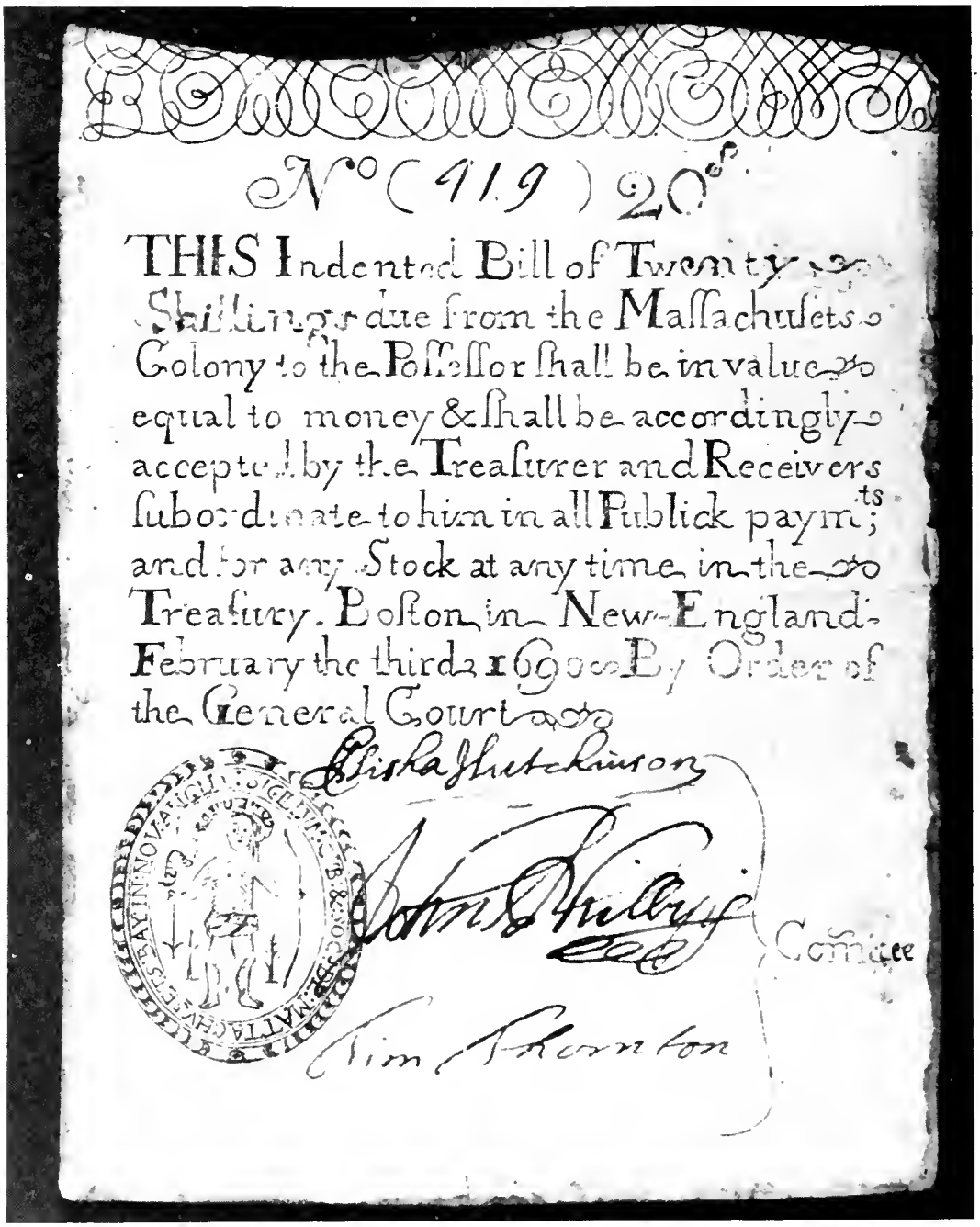
An innovation is a series of departmental exhibit cases changed monthly by the curatorial staff in which recent additions to the national collections are displayed and acknowledged.

Numerous small individual exhibits reflected a wide range of interest in various parts of the Museum, ranging from the photographic work of Stephen Whealton and of Janine Niepce to the national concern for accurate measurement and protection of the country's water supply. Yet others ranged from the 100th anniversary of the civil engineer, Benjamin Wright, to "Poetry of the Body," a series of anatomical drawings by Paul Peck.

The Division of Musical Instruments continued to supplement their displays of instruments with a program of three concerts produced in cooperation with the Smithsonian Associates. The Energy Conversion Exhibit was reassembled into a colorful traveling version, representing the first technical traveling exhibit from this Museum, and it has been enthusiastically received.

The presentation of the Secretary's Gold Medal to Howard I. Chapelle, Senior Historian of the Department of Science and Technology on 30 November marked the retirement of one of America's

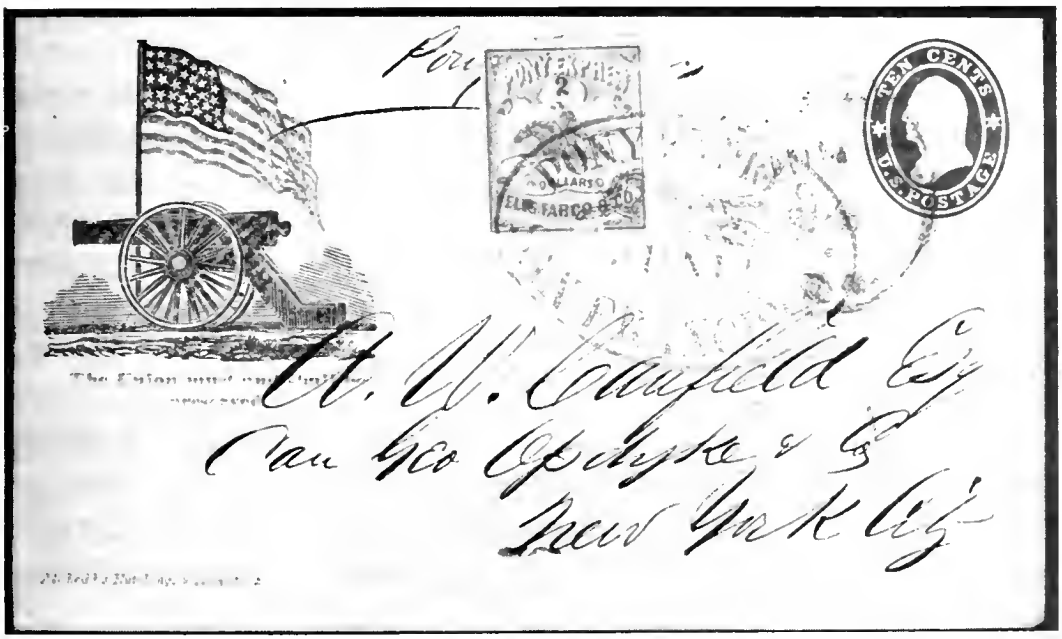
Figure of Benjamin Franklin, circa 1780–1790 by Ralph Wood, Jr. This fine figure is important not only because of its American association, but also because it is an outstanding example of 18th-century English ceramic art and technology.



Massachusetts Bay Colony note dated 3 February 1690, acquired for the numismatics collections.

most distinguished marine historians. Mr. Chapelle will, however, continue to work in the Museum as Historian Emeritus.

John T. Schlebecker, Jr., curator of the Division of Agriculture and Mining, received the American Library Association's Oberley prize for his bibliography on the history of agriculture. He also completed a catalog of agricultural implements in the Museum's collections.



Envelope carried by the famed Pony Express in June 1861. The cover bears a patriotic emblem of a type popular during the Civil War period, a two-dollar Wells Fargo stamp, and an embossed ten-cent U.S. stamp.

Two Smithsonian Research Foundation grants were given, for the purpose of examining baroque organs in Mexico, and another to study family records of a 19th century mid-western German immigrant cabinetmaker.

During the summer of 1970 an institute for college teachers on the history of technology was conducted. The annual meeting of the National Society for Historical Archeology, locally sponsored by the Department of Cultural History, was held in Washington with participation by several members of the Museum staff.

Staff interest and involvement in the Museum's Bicentennial planning greatly influenced the maintenance and expansion of the national collections, to which 540,939 objects were added within the past year. Significant additions relating to the Revolutionary War period included an appliqued quilt-top made of rare examples of early American textile printing, typical of the designs of John Hewson, Philadelphia textile printer and patriot of the American Revolution. A Dutch loom, dated 1730, presently being restored, will be displayed in the Hall of Textiles to demonstrate the production of 18th-century fabrics. Other significant acquisitions include a Revolutionary War period sweetmeat dish manufactured by America's premier porcelain manufacturer, Bonnin and Morris of Philadelphia, and a figure of Benjamin Franklin modeled between

1780 and 1790 by Ralph Wood, Jr. An important collection of 18th century clothing was acquired by the Division of Costume.

An important acquisition was a Massachusetts Bay Colony note dated 3 February 1690. This note is of extraordinary importance since it typifies an American venture in publicly-authorized paper money which predates the issuance of paper currencies by the Bank of England in 1694 and the Bank of Scotland in 1696 highlighting the difference between a publicly authorized issue and an issue by privately owned and operated banks. America was to become the proving ground for paper economics.

The Division of Political History received an unusually important donation of a group of sixty-five pieces of china owned by President Millard Fillmore. An interesting group of documents, photographs, and campaign memorabilia was the gift of the League of Women Voters.

A noteworthy acquisition by the Division of Postal History was an envelope carried by the storied Pony Express in the period 1860–1861, as well as an airmail stamp of Newfoundland, issued in 1919 for the first nonstop transatlantic flight.

Archives of American Art

The past year, the first spent by the Archives of American Art as a bureau of the Smithsonian Institution, was a period of establishing residence, organizing a Washington office staff, and working out new procedures in the handling of both administrative and archival details. By July 1971 it had become an integral part of the Smithsonian's research facilities and its resources were being intensively used by staff and fellows of the National Collection of Fine Arts, the National Portrait Gallery, and the National Gallery of Art, by faculty and graduate students at local universities, and by scholars from such places as New York, Chicago, San Francisco, New Orleans, Seattle, London, and Stockholm.

The year was also marked by the establishment of a branch office in Boston, an addition to other regional offices in New York and Detroit where researchers regularly consult Archives resources duplicated on microfilm. Branch offices are also the chief means of acquiring collections of artists' and dealers' personal and business papers. The opening of the Boston office thus represents an important new source of archival records which, after being organized and filmed at the Washington center, are offered to scholars on a national basis.

Among significant collections of papers received by the Archives

during the year are those of John Taylor Arms, Arthur G. Dove, Guy Pene Du Bois, G. P. A. Healy, J. Alden Weir, and of two major New York dealers, the Kootz Gallery and the Howard Wise Gallery.

The Archives also continued its oral history project, a large portion of it under a grant from the New York State Council on the Arts. Extended tape recorded interviews, later transcribed, were conducted with ten art administrators and ten printmakers, photographers, and craftsmen, all from the New York area. Other individuals participating in this project were Leo Castelli, Ralph Colin, Huntington Hartford, August Heckscher, James Thrall Soby, and E. M. M. Warburg.

Freer Gallery of Art

Research, curatorial, and exhibition activities of the Freer Gallery of Art continued this year as in the past. We were all saddened by the death of Mrs. Agnes E. Meyer who was both a good friend and patron of the Gallery. Mrs. Meyer was born in New York City in 1887. During most of her lifetime she had a keen interest in Far Eastern art and published *Chinese Painting as Reflected in the Thought and Art of Li-Lung-Mien* in 1923. Mrs. Meyer first met Mr. Freer in January, 1913, and from that moment on their lives were closely allied in the search and study of Far Eastern art. Following Mr. Freer's death in 1919, Mrs. Meyer continued to serve as an advisor and was mentioned in Mr. Freer's will as one of the five people who were permitted to make gifts of objects to the collection. Mrs. Meyer was the last living person officially associated with the Gallery who also knew Mr. Freer. During her lifetime and as part of her bequest, Mrs. Meyer greatly enriched the collection of the Freer Gallery of Art.

In the course of the year a committee known as the Visiting Committee of the Freer Gallery of Art was established. It will be chaired by The Honorable Hugh Scott, Senator from Pennsylvania, and the other members are as follows: Laurence Sickman, Director, William Rockhill Nelson Gallery of Art; Mrs. Jackson Burke, collector; Chang Kwang-chih, Professor, Department of Anthropology, Yale University; Miss Edith Ehrman, Manager, Foreign Area Materials Center, State Education Department, University of the State of New York; Marvin Eisenberg, Professor, History of Art, University of Michigan; Mrs. Katharine Graham, Publisher, The Washington Post; John Rosenfield, Professor of Oriental Art, Harvard University. They will meet regularly and serve in an advisory capacity.

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A major achievement was the publication of *Museums of the World, The Freer Gallery of Art, Part I; China, and Part II: Japan,* printed in Japanese in collaboration with Kodansha, Tokyo. The English edition of Part I has also been released and Part II will follow in the coming year.

National Collection of Fine Arts

The Director reported to a Congressional Committee in July that the mission of the National Collection of Fine Arts (NCFA) is to preserve, study, and make known the art of the nation. To preserve art, however, is not to maintain a static situation; a museum is too often misunderstood as a mausoleum, the antithesis of creative activity. Although the physical objects must indeed be protected with care, they cease to be of value (in fact, to be works of art) if the spirit that marked their creation does not persist. Creativity is an action and can be apprehended only by an active mind, a mind set free to explore, discover, savor, and judge. It is this creative spirit, with its many shades and directions weaving through our changing culture over the past three hundred years, that the museum in its varied activities wishes to keep alive, to make accessible to the general public, the children and youth in the schools, and the specialized scholar.

The creative spirit of America in the 19th century can be seen in new accessions such as those of Rembrandt Peale, Philip Tilyard, and William Henry Rinehart, and in the 20th century in such recent acquisitions as Helen Frankenthaler's acrylic, *Blessing of the Fleet,* and new print acquisitions of Werner Drewes, George Rickey, Robert Rauschenberg, Carol Summers, and others, all shown in new gallery arrangements. In the course of the year, 583 works were acquired.

Two creative Americans who lived abroad at a time when they were little appreciated at home were restored to public attention through comprehensive exhibitions: "H. Lyman Sayen (1875–1918)," and "Romaine Brooks (1874–1970)." The first director of the NCFA, William Henry Holmes, was honored by an exhibition of his watercolors in the new print and drawing gallery. Among other exhibitions were "Jasper Cropsey," "John Marin," "Small Sculpture and Drawings of Paul Manship," "Prints from the Venice Bienale Workshop," arranged by the International Art Program, and "West Coast Print Makers," an exhibition circulated by the Smithsonian Institution Traveling Exhibition Service.

School children recreating Alexander Liberman's sculpture, *Equipoise* (in background) during an "improvisational tour" in the National Collection of Fine Arts.

A formal program for research scholars was begun under the leadership of a coordinator of research, and seven scholars are now studying, lecturing, and publishing at NCFA in the field of American art history. "Walking Seminars," a program using the museum to supplement college art departments in the Washington area, was begun in the spring, and exhibitions of "High School Graphics II" and "Early Work—Art by Students in D.C. Grade Schools" were

organized and exhibited at the NCFA. Any notion that the museum is regarded as a mausoleum was wiped out forever on 8 May when an awesome 7,600 children and parents actively participated in the "fun-filled day of art experiences" which was Children's Day at the National Collection of Fine Arts.

As the year ended, the 27 June opening of the major summer exhibition, "Hidden Aspects of the National Collection of Fine Arts," attracted 2,300 visitors. This exhibition of more than 200 objects was intended to acquaint the public with the surprising range of the NCFA collections. It included Renaissance jewelry, ancient Chinese glass, European paintings of the 17th through 19th centuries, and the American folk art masterpiece by James Hampton, "Throne of the Third Heaven of the Nation's Millennium General Assembly."

During this past fiscal year the Smithsonian Institution Traveling Exhibition Services (SITES) has been re-designated an office of the National Collection of Fine Arts and has moved its offices from the Mall to the Studio House of Alice Pike Barney which was given to the Smithsonian by her daughters.

SITES circulated 116 exhibitions to museums and educational institutions throughout the United States and Canada. Smithsonian units are contributing more than ever before to the organization of exhibitions for circulation by SITES. "Indian Images," "The Genteel Female," "Creative Printmaking in Pakistan," "Energy Conversion," "James Weldon Johnson," and "Paintings by Edwin Scott" are new SITES exhibitions which have been originated by Smithsonian departments. These exhibitions have had their initial showings at the Smithsonian before beginning their tours. "U. S. World War I Posters" was prepared from Smithsonian collections especially for a SITES tour. The addition of these exhibitions to those already in circulation brings the total of Smithsonian exhibitions in SITES' program to 14.

SITES has acquired for travel 28 new exhibitions and has returned 23 exhibitions to their lenders. The tours of the returned exhibitions have ranged from 18 months to 6 years. Thirty-five of SITES' exhibitions are of foreign origin; five of these are new exhibitions.

National Portrait Gallery

During the past year the Gallery mounted two major exhibitions, as well as two smaller undertakings designed primarily for our secondary school audience, and acquired fifty portraits.

"The Life Portraits of John Quincy Adams" was the exhibition held at the Gallery in the fall. It coincided with the publication of a book on the same subject by Andrew Oliver, a member of the National Portrait Gallery Commission, published by the Belknap Press of Harvard University. On the afternoon of the opening, President and Mrs. Nixon gave a party at the White House for about 40 members of the Adams family as well as members of the Gallery's staff. A five-minute filmed review of the exhibition was shown on the NBC nightly news by John Chancellor. The portraits of Henry Benbridge, a comparatively little known painter of the period of the American Revolution whose major activity was in Charleston, South Carolina, were shown in the Spring. Both exhibitions were accompanied by full scale publications; the former, designed by Miss Crimilda Pontes of the Smithsonian Institution Press, was chosen as one of the twenty-two most handsomely produced university publications of the year by the Association of American University Presses.

The two secondary school oriented exhibitions were devoted to the pioneering conservationist John Muir and the composer and civil rights leader James Weldon Johnson. Brochures were produced for both of these exhibitions.

The most notable acquisitions of the year were two presidential

James Monroe by John Vanderlyn (NPG. 70.59).

portraits. The first of these is Gilbert Stuart's painting of John Adams, begun during Adams' presidency in 1798, but not completed until about 1815 or later by the artist's daughter Jane Stuart. The second is an 1816 portrait of James Monroe by John Vanderlyn. Both were acquired from direct descendants of the subjects.

Several portraits were transferred from The National Museum of History and Technology. Perhaps the most important of these is a self-portrait of Eastman Johnson, one of the greatest American painters of the 19th century. A Thomas Hicks portrait of *Edwin Booth as Iago* was loaned by the Cooper-Hewitt Museum of Decorative Arts and Design.

Joseph H. Hirshhorn Museum and Sculpture Garden

During fiscal year 1971, thirty percent of the construction of the Joseph H. Hirshhorn Museum and Sculpture Garden was completed and preparations continued for the opening in 1973. A change in the design of the sculpture garden has been agreed upon which will place it parallel to the building rather than traversing the Mall.

The director and his staff examined several thousand paintings and selected about 600 for possible inclusion in the opening exhibition, scheduled for May 1973. Present plans call for approximately 500 paintings and 500 sculptures to be included. Initial selection of sculpture will begin shortly. These preliminary selections will be researched, processed, and pertinent background data compiled on each work of art.

Preparation was begun of the opening exhibition catalog, with decisions being made as to format, size, and selection of photographs. The task is a formidable one because of the large number of works of art to be included in the opening show.

Approximately 70 percent of the collection has been inventoried and photographed. The documentation of each work of art provides detailed data for location, identification, and condition. Methods are being developed to permit electronic retrieval of photographs and data.

Although the present interim period is one in which it is difficult for the staff to provide information and loans, more than 225 requests for research information and photographs were answered. Some 100 scholars, artists, and officials visited the museum office and warehouse in New York. Seventy-three paintings and sculptures were loaned to 45 museums, galleries, and institutions. Approximately 1,200 persons attended 15 benefit tours for educational,

Head of a Queen. Bronze, 18½ inches high. Benin, Nigeria.

cultural, and philanthropic organizations at the Hirshhorn Sculpture Garden in Connecticut.

Cooper-Hewitt Museum of Decorative Arts and Design

Many months were spent preparing for Cooper-Hewitt's move to the Carnegie and Miller houses on upper Fifth Avenue. The study collections were installed in Miller House and are open to the public by appointment. The staff is engaged in planning for the Museum's reopening following the renovation of the Carnegie mansion. A grant of $100,000 from the New York State Council on the Arts has enabled the Museum to launch studies and conferences leading to a clear definition of direction.

In order to continue maximum display and interest in the collections, extended loans were made to the Metropolitan Museum, National Collection of Fine Arts, Brooklyn Museum, Philadelphia Museum, Hudson River Museum, University of Michigan, and the Fogg Art Museum at Harvard University.

Four special exhibitions were sent to the following: Wellesley College, "Master Drawings: The Kingdom of the Two Sicilies"; Ithaca College, "Drawn from Nature/Drawn from Life"; New York Cultural Center, "Selections from the Cooper-Hewitt Museum"; American Federation of Arts, a circulating exhibition, "Master Printmakers from the Cooper-Hewitt Museum."

Objects from the collection were also included in major exhibitions at museums in this country and abroad: National Gallery of Art, Metropolitan Museum, Morgan Library, High Museum, Museum of American Folk Art, Finch College, Cranbrook Academy, Victoria & Albert Museum, Brighton Pavilion, Montreal Museum of Fine Arts, and the Musée des Arts Décoratifs in Paris.

The Museum has acquired 1,522 works of art through the kindness of its friends. The most outstanding of these are 104 costume and stage designs, gifts of the designers, which include Charles Le Maire, Ben Edwards, Miles White, Robert O'Hearn, and Freddy Wittop; 59 prints by Luigi Rossini; 49 Daumier lithographs; 27 embroidered samplers from the Coe collection; a Persian 17th-century fragment of textile; a 1930s silk screen panel by Ruth Reeves; 560 embroideries and laces from the collection of Marian Hague; an English mahogany breakfront of the mid-18th century; a Louis XVI *Sécretaire à abattant;* a 19th-century cabinet by L. Soubrier & Cie.; a combination birdcage-fishbowl of the early 19th century; a pair of Belter armchairs; 14 pieces of Greek ceramics ranging from 14th century B. C. to 4th century B. C.

One hundred seventy-six volumes were added to the library. The most noteworthy gifts were 21 cartons of auction catalogs and decorative arts books from the Queens College Library and 38 books on 19th century world fairs from the Cooper Union Library. The Museum received a $92,000 grant from the Samuel H. Kress Foundation for a Textile Conservation Laboratory.

The American Institute of Interior Designers has elected Mrs. Lisa Taylor, the director, to honorary membership. Mrs. Elaine Dee, curator of Prints and Drawings, and Mrs. Catharine Frangiamore, assistant curator of Decorative Arts, were awarded grants to participate in international conferences abroad.

As a new neighbor in Carnegie Hill, the Museum has sponsored

a series of tours, lectures, children's classes, festivals, and other events as a means of winning new friends and cultivating prospective supporters. An initial membership group has been formed involving neighborhood families who use the garden and assist in various volunteer capacities.

The Museum has provided facilities for the Guggenheim Museum's summer program for inner-city children and for activities of the Museums Collaborative and a number of other professional organizations.

An Outdoor Sculpture Symposium, the first of its kind in New York, is underway on the grounds. Four master sculptors, Phillip Pavia, Minoru Niizuma, Karl Prantl, and Paul Jenkins are delighting sidewalk superintendents with their work.

Visitors have increased since the Cooper-Hewitt moved to its new location. The staff looks forward to the formal opening of the "national museum of design" and hopes that the Museum will be an even larger force in the future than it has been in the past.

National Armed Forces Museum Advisory Board

Legislation in the form of S. 2153 was introduced into the 92nd Congress to authorize establishment of a National Historical Museum Park, to be known as Bicentennial Park, and to designate the study center authorized under Section 2 (a) of Public Law 87–186 as the Dwight D. Eisenhower Institute for Historical Research.

The Institute, commemorating our thirty-fourth president, who contributed so much to the shaping of a free world, is intended to promote study of the interaction of military thought and policy with the overall American historical experience. During the Bicentennial period, special emphasis will be placed on study of the American Revolution, not only as a military contest but as a profound social upheaval with consequences touching every aspect of human life.

Staff members and visiting scholars would participate in a broad program of conferences and lectures held under the auspices of the Institute, probing the revolutionary experience, not just as a matter of battles lost or won, but from the point of view of its full impact upon the new and the old worlds—militarily, politically, economically, culturally, and scientifically.

Bicentennial Park and the Eisenhower Institute together will offer a rare opportunity to develop integrated collections and programs designed to contribute to a broader understanding of the

American past—an understanding vitally necessary in order to advance intelligently and confidently into the future.

Woodrow Wilson International Center for Scholars

The Woodrow Wilson International Center for Scholars, created by the Congress in October 1968 to be a living memorial "expressing the ideals and concerns of Woodrow Wilson . . . symbolizing and strengthening the fruitful relation between the world of learning and the world of public affairs" opened its doors on 19 October 1970, with some 25 scholars from this country and abroad.

The theme of the Center's fellowship program is designed to accentuate those aspects of Wilson's ideals and concerns for which he is perhaps best remembered a half century after his presidency: his search for international peace and the imaginative new governmental approaches he used to meet pressing issues of his day. In the opening period the Board of Trustees is particularly encouraging substantial studies on (1) the development of international understanding, law and cooperation in ocean space; (2) man's relations and response to his deteriorating environment, with special attention to the new forms of international cooperation needed to address effectively those environmental problems that transcend boundaries; and (3) various approaches to the problems of international peacekeeping and post-Vietnam United States foreign policy.

On 18 February 1971, the Center was officially dedicated by President Richard M. Nixon.

Throughout the first 8 months of its life, the Center has sponsored a number of seminars, symposia, and public discussions in fulfillment of its Congressional mandate to be a "bridge" between the world of learning and the world of public affairs.

Joseph Henry Papers

Volume I of the Joseph Henry Papers was completed, and the text prepared for transmission to the Smithsonian Press, during this fiscal year. The approximately 250 items start with Henry's baptismal record and end with his resignations from offices in Albany, New York, in preparation for his departure to Princeton in 1832. In addition to many letters of great biographic importance, the volume will contain three unpublished lectures, notes of scientific work, and

documents of both the Albany Institute and the Albany Academy. Approximately one half of the volume will consist of the editor's commentary and annotations. Perhaps the most significant theme in the volume is Henry's view of science and its relations to society. As a case study in provincial culture, the volume has much fresh evidence on American culture and society as it is by no means limited to the detailing of Henry's scientific work.

Office of American Studies

The Office of American Studies conducts a formal graduate program in material culture of the United States which is directed to the original Smithsonian purpose: "the increase and diffusion of knowledge among men." Graduate students from George Washington University, Georgetown University, American University, the University of Maryland, Catholic University, and the University of Texas participated in the program, gaining academic credit toward advanced degrees at those universities. The basic seminar in "Material Aspects of American Civilization" this year examined the material culture of the working class. Research seminars in "American Technology and Its Cultural Impact" and "The Physical City: An Approach to American Urban History" were also given, all under the direction of Harold Skramstad.

During the spring semester, a seminar in "Historical Uses of Vernacular Architecture" was conducted by Cary Carson, Coordinator of Research of the St. Mary's City Commission. The Office of American Studies is cooperating with the St. Mary's City Commission in a long-range project to study St. Mary's City, the 17-century capital of Maryland, by means of historical archeology, architectural history, and archival research. In addition to participating in formal seminars, individual graduate students carried on reading and research projects under the direction of members of the staff of the Office of American Studies and of the various Smithsonian museums.

Office of Academic Studies

The Office of Academic Studies, formerly the Division of Graduate Studies of the Office of Academic Programs, is directed by the newly established Board of Academic Studies in the conduct of the Institution's higher education programs. The programs include fellowship

and administrative support for pre- and post-doctoral Visiting Research Associates engaged in independent research, for graduate and undergraduate students in directed research and internship assignments, for short-term visitors studying in the Smithsonian's collections, and for departmental seminars.

For the academic year 1971–1972, 27 postdoctoral and 18 predoctoral fellowships were awarded. For several years the Institution has cooperated with universities in jointly funding fellowships for graduate students pursuing course work partly at their home university and partly at the Smithsonian. This year two such fellowships have been awarded in American Civilization at Georgetown University and one at the University of Texas. In addition, two doctoral candidates in the History of Science and Technology are being jointly supported with the University of Maryland and with Harvard University, marking the first such cooperative venture with Harvard.

Support for graduate interns, previously offered only during the summer months, has been extended to a year-round program of one to three month appointments for research and study under the supervision of a member of the professional staff.

Several successful seminars, developed and conducted within departments and divisions of the Institution, have been supported, in part or in full, by the Office of Academic Studies.

Smithsonian Institution Archives

In spring 1971 the Archives completed a major reorganization of its holdings, culminating in completion of the *Preliminary Guide to the Smithsonian Archives,* now in press. The guide presents to the scholarly community the first comprehensive statement of the holdings of the Archives.

The re-ordering which was accomplished in preparation for the guide clearly designates records according to their source; and a numbering system, also used in the guide, permits easier location of records in the stacks. In addition to the guide, a file for other finding aids was set up, keyed to the guide-stack numbering system.

As the staff completed the guide for publication, plans were made for finding aids of much greater depth, which would be machine adaptable. Problems were discussed with National Archives staff in charge of SPINDEX, a national computer system for manuscript collections, and with the Smithsonian Information Systems Division.

Prototype collection descriptions were produced and two collections were described under the new processing standards. Although actual machine application lies in the future, the Smithsonian Archives finding aids will be ready for the computer when that day arrives.

Emphasis during this year was on internal reorganization, but several accessions were made. Most important were early records of Smithsonian book exchanges, records of the director of the Museum of History and Technology, additional records of the Exhibits Editor's office, and fiscal records from the Treasurer's office. The program for microfilming selected archives continued with a much expanded activity projected for the near future.

Office of Seminars

The Office of Seminars cooperated in the planning and management of an international symposium held 16–19 November 1970, on "Cultural Styles and Social Identities: Interpretations of Protest and Change." The Charles F. Kettering Foundation and the Rockefeller Brothers Fund provided financial support. The symposium reflected the Institution's long-standing interests in the processes of culture change as studied both by historians and anthropologists. It also served as a sequel to the 1969 symposium, "Man and Beast: Comparative Social Behavior," which concentrated on the biological bases of behavior in human and other animal societies. The 1970 symposium, chaired by Professor Michio Nagai of Japan, will be published by the Smithsonian Institution Press under the title *The Cultural Drama*. The 1969 symposium volume *Man and Beast* was published 18 June 1971, under the editorship of John F. Eisenberg and Wilton S. Dillon. Planning began in 1971 for the next international symposium to be held in 1973, in cooperation with the National Academy of Sciences, to commemorate the 500th anniversary of the birth of Copernicus and his impact on scientific discovery, including space exploration in the twentieth century. The 1973 symposium will be the fifth in the Smithsonian's international symposia series.

With the opening of the Woodrow Wilson International Center for Scholars in 1970, the Office of Seminars served as a link between the work of the visiting Fellows and scientists and other scholars in the Smithsonian, arranging a series of small discussions and seminars on topics related to ecology and the environmental sciences.

Antonio Zarco, senior elder of the Choco Indian nation of Panama, and Michael Collins, former astronaut and new director of the National Air and Space Museum, at a meeting sponsored by the Office of Seminars.

One seminar, involving government, foundation, and university participants, speculated on the environmental implications of new highways and hydroelectric dams in the tropics and what Americans might learn from such development schemes. Another dealt with innovations in university curricula—both in the United States and overseas—to accommodate increasing faculty and student interests in problems of environmental quality. Such activities are carried out in close cooperation with the Smithsonian's Office of Environmental Sciences.

Antonio Zarco, senior elder in the Choco Indian nation of Panama, and former teacher of jungle survival techniques to U. S. air and space personnel, was invited by the Office of Seminars to visit the Smithsonian research and museum facilities in June 1971, while visiting the United States as a guest of the Air Force. He held discussions with Michael Collins, director of the Air and Space Museum, his former pupil in Panama, and with scientists at the National Museum of Natural History, to which he contributed the beginnings of a collection of artifacts of Choco culture.

SPECIAL MUSEUM PROGRAMS

THE SMITHSONIAN in its special museum programs during the past year has extended its historic mission of service and concern for the condition and objectives of museums both at home and abroad. United States membership in the International Centre for the Preservation and Restoration of Cultural Property (Rome Centre) has been authorized by the Congress, due in part to the support of the Smithsonian Institution. Similarly, the Smithsonian has continued to support the principles of the proposed UNESCO Cultural Property Convention designed to stem the rising tide of illegal international trade in objects of art, antiquities, and cultural materials.

An activist role of educator, conservator, and communicator is shared increasingly by museums, and each year these common objectives bring the museums of the world closer together as custodians of cultural values and enhancers of the quality of life. To this end the Smithsonian has continued its assistance to the American Association of Museums and the U. S. National Committee of the International Council of Museums, an effort which has resulted in an increased appreciation of the opportunities, goals, and achievements of museums.

Continuing its tradition of worldwide exchange of ideas, the Smithsonian staff has collaborated with and supported museum administrators, technicians, and cultural specialists from Africa, Asia, and Europe interested in establishing or expanding their national museum programs. Particularly gratifying has been the assistance provided museum professionals from developing countries who have come to the Smithsonian to observe and study techniques and methods in conservation, exhibition, and registrar functions.

Through the National Museum Act, information and advice have been given in response to approximately 5000 requests in the last year. Some of these, as suggested above, have been of an international character, but by far the great majority have come from the small museums of the United States. This alone indicates the critical need of the museum profession for concrete data, professional advice, and opportunities for training.

Office of Museum Programs

On 23 January 1971, Mr. Frank A. Taylor retired from the Smithsonian Institution after forty-eight years of service. Engineer, lawyer, curator, museum administrator, and recipient of the Henry Medal, Mr. Taylor will continue to serve the Institution as a Research Associate, as a consultant to the Secretary for special projects, and as the Smithsonian's ambassador-at-large to the museum world.

The Office of Director General of Museums, with Mr. Taylor's retirement, now operates as the Office of Museum Programs. On 25 January 1971, Mr. Peter C. Welsh was appointed director of this office and charged with the supervision of the Office of Exhibits Programs, the Office of the Registrar, the Conservation-Analytical Laboratory, and the execution of programs under the National Museum Act.

In December of 1970 the Congress extended the National Museum Act and authorized funding up to one million dollars for its purposes which, broadly stated, encompass cooperative studies of technical problems, training of museum personnel, and development of museum techniques. An advisory committee of museum professionals will recommend to the Secretary procedures and policies for carrying out the purposes of the act.

In the past year the Smithsonian has supported the regional museum conferences of the American Association of Museums. Preliminary study for the American Association of Museums Documentation Center has been aided. The American Association for State and Local History has received assistance for the preparation of a guide to instruct its membership in the planning and preparation of exhibits relative to the Bicentennial of the American Revolution. Evaluating and testing the effectiveness of exhibits and exhibit techniques have been furthered through a cooperative program with the Carnegie Museum and the University of Pittsburgh. Other cooperative ventures—one with the New York State Historical Association and the Rome Centre and another with the International Institute for Conservation of Historic and Artistic Works—will aid and promote studies in conservation.

The Office of Museum Programs continues to receive innumerable requests from museums for technical assistance and advice. Since the inception of the Museum Act in 1966 these requests have increased by more than 300 percent. Such questions as how to raise money for a museum project, how to plan and utilize exhibit space, how to begin an exhibition program, how to organize a museum

education program, how to find and train museum personnel, and how to care for and manage collections increase as the influence and role of museums become more important in the community. The Office of Museum Programs continues to accumulate and refine data relating to museums and their activities. The *Smithsonian Visitor,* published in May, interviews nearly 5000 visitors to the National Museum of Natural History and the National Museum of History and Technology and gives a statistical view of the visitor's experiences.

Training in museum exhibits techniques, conservation practices, and museum administration continues under the National Museum Act. Last year over 1000 persons received training in the Smithsonian exhibition laboratories. Trainees have come from most of the Fifty States and many foreign countries. The Office of Museum Programs has continued its interest in the efficacy of museums in education and has participated actively in assessing the contributions museums can make in this field.

Office of Exhibits Programs

Despite rising costs and the resulting reductions in both materials and manpower, the Office of Exhibits Programs not only acquitted its traditional, diverse responsibilities but continued to expand the scope and intensity of those responsibilities.

The 56 special and temporary exhibitions that opened in fiscal year 1971 included the spectacular "Music Machines—American Style" and "Do It the Hard Way: Rube Goldberg and Modern Times" presentations in the National Museum of History and Technology. "Music Machines" is a multimedia masterwork, with synchronized lights and sounds guiding the visitor through the development of the machines that have revolutionized music in America. A special film on Rube Goldberg was one of the seven that the Exhibits Film Unit produced in conjunction with exhibitions.

Segments of the Electricity Hall in the History and Technology Building and the Physical Geology Hall in the National Museum of Natural History were opened to the public, as work continued on additional areas of these halls. Work was also continued in 56 other halls of the National History and Technology, Natural History, and the National Air and Space museums. At the same time, an exhibition on the Apollo 11, recreating the drama of man's landing on the

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moon, was being readied. Also underway are the proposed multifaceted analysis of drug usage and its impact on society; the proposed Hall of Living Things, a major ecologic undertaking; planning and designs for programs in conjunction with the Bicentennial of the American Revolution; continued assistance to the Renwick Gallery and Anacostia Neighborhood Museum; extensive upgrading and maintenance of exhibitions throughout the Smithsonian complex; and publications ranging from a Philately and Postal History Hall guide to leaflets supplementing exhibit labels; and training of museum careerists from all over the world.

Conservation-Analytical Laboratory

Last year's conservation effort has been tripled within our constricting walls. Upon request we have advised eight bureaus, other museums, and the public on safe environments for many different kinds of objects, and methods of mounting and of cleaning them; cleaned, repaired and chemically stabilized documents, graphics and objects—of wood, leather, metal, pottery, hair—collected or excavated, ranging in date from prehistoric to recent and in culture from Attic to modern American. Causes of damage have included corrosion, unchecked decay, insects, fire, and flood.

A visiting research associate has studied and analyzed metal artifacts for credit towards a diploma in conservation. Members of the staff attended courses in infrared spectrophotometry and chromatography, are researching paper treatment for credit in a Master's degree, took active part in seminars on paper conservation and the study of silver and metals generally, and lectured regularly on conservation to fifty interested persons and irregularly to numerous special-interest groups, as well as maintaining active relationships with national and international organizations concerned with artifact conservation.

Analytical facilities have been applied to about 130 submitted samples, resulting in almost 4000 semiquantitative estimations spectrographically on metals and minerals, almost 200 quantitative estimations on pottery by neutron-activation, and 350 by X-ray fluorescence. Micro-analysis, X-ray diffraction, and infrared spectrophotometry have also served to identify corrosion products, substances present in commercial materials proposed for long-term contact with artifacts, and painted house-plasters and fragments from religious objects that have also been studied in cross-section.

Office of the Registrar

The work of the Office of the Registrar this year, although varied in detail, was characterized by a unity of function. The tasks of keeping records, moving mail, shipping freight, and fielding a multitude of questions from an inquisitive public, fit nicely together. As an example, consider the single instance of our scientists going to Liberia on a project to study an outbreak of monkey pox in humans, this office was typically involved in the following: (1) obtaining work and entry permits from the foreign government for the individuals and equipment, (2) obtaining passports and visas, (3) preparing requests for immunizations, (4) preparing letters of introduction, (5) recording and shipping necessary field equipment to Monrovia, (6) handling shipping and customs requirements for the return of the field equipment plus any specimens collected, (7) recording the accession of specimens acquired for the national collections, and (8) correlating and forwarding to the professional staff future inquiries concerning the project that may be addressed to the Smithsonian Institution.

Mail service was extended this year to the Barney House and the Renwick Gallery and shifted to accommodate the move of several Smithsonian offices from the Pension Building to the Liberty Loan Building. An estimated 11,000 individual freight shipments were handled including more than 100 entries accomplished through the U.S. Customs. Assistance was given to 238 official travelers. Approximately 84,500 public inquiries were received; 418 involved objects referred for professional identification. Documentation was made of 2,785 accession memoranda substantiating the ownership of many thousands of historically and scientifically significant objects.

Smithsonian Institution Libraries

The Libraries' cataloged collections grew by a net of nearly 16,000 volumes, and the reference staff responded to nearly 44,000 queries, both up 30 percent over the previous year. Nearly one-third of the Libraries' recorded circulation was of books and journals borrowed from other libraries. Over 2700 requests were filled by photocopying. The first phase of the serials automation project was completed, providing computerized control and analysis of fiscal transactions for purchased serials.

The National Museum of Natural History and the National

Museum of History and Technology established library advisory committees, and the Remington Kellog Library of Marine Mammalogy officially became a part of the Smithsonian's library system. Materials from several other branch libraries are being incorporated into the Kellog collection. The Director of Libraries served as a consultant to the Indonesian Institute of Sciences for the development of that nation's information service in science and technology.

Four library school students worked on academic projects in the Libraries under the supervision of the Director's Office. One produced a study of decision processes in library collection development that is expected to influence the libraries' organization for this function.

The Libraries experimented with a task force concept of library service in the National Museum of Natural History. A small team of librarians and technical assistants were assigned as needed to perform service and maintenance tasks in departmental libraries on flexible schedules. Manpower was thus matched closely to urgent library problems as they arose. This technique at manpower utilization will be extended to other bureaus of the Institution.

International Exchange Service

During the year publications were received from approximately 400 organizations in the United States for exchange with organizations in more than 100 countries. Approximately one-half of these organizations were libraries exchanging medical and dental publications with organizations in other countries. Packages of exchange publications weighing more than 100,000 pounds were received from the foreign exchange bureaus for distribution in the United States.

The daily issues of the *Congressional Record* and the *Federal Register* were sent on exchange to 137 foreign libraries in exchange for their parliamentary journals.

More than 400,000 pounds of official United States publications were transmitted on exchange for the official documents of other countries. The agreements with four recipients of partial sets were terminated during the year, and one recipient of a full set of official documents was changed to a recipient of a partial set.

Publications were forwarded by ocean freight to 38 exchange bureaus in other countries for distribution to the addressees. Publi-

cations were mailed to the addressees in countries that do not have exchange bureaus.

Many requests are received for assistance in sending publications to libraries in other countries. The Service has not been able to assist in these programs. It must restrict its activity to the exchange programs and to limit the amount of assistance furnished in this field.

PUBLIC SERVICE ACTIVITIES

IN MARCH OF THE YEAR UNDER REVIEW, *Smithsonian* magazine enjoyed its first anniversary. By that time the Institution's first popular monthly publication had a circulation of 220,000, a figure which magazines closest in character to *Smithsonian* normally take several years to reach. All subscribers automatically become National Members of the Smithsonian Associates, since it has been the Institution's intention from the beginning to create through the magazine a full and varied membership program on a national scale. Accordingly, efforts were made in 1971 to develop benefits beyond the magazine which might create closer ties between the member-subscribers and the Institution. These included a Reception Center in the Great Hall of the Smithsonian Building to assist National Members in planning their visit to the Institution and the Washington area in general, discounts on Museum Shops articles or Smithsonian Institution Press publications, and the opportunity to subscribe to a wide variety of study tours, both domestic and international, conducted by Smithsonian staff members.

The Anacostia Neighborhood Museum began work on a novel urban studies project funded by generous grants from the Carnegie Corporation, the Department of Housing and Urban Development, and the Cafritz Foundation. In essence the project is aimed initially at having the residents of Anacostia themselves determine the social, economic, and educational problems which most affect their lives, through surveys conducted in situ by volunteers, with limited staff assistance. Once these problems are clearly defined and articulated, the Neighborhood Museum will seek to present them through a program of exhibits, with related educational materials, for school and community use. This experimental project is being closely watched as a model for other communities, which have similar neighborhood museums, many of which have received planning assistance from Anacostia.

Towards the close of the period under review the first television documentary under the series known as "Smithsonian Adventure," produced in collaboration with CBS, was broadcast to a prime-time Sunday night national audience. It concerned the excavations con-

ducted by Dr. Iris Love on the island of Knidos and her search for Praxiteles' renowned statue of Aphrodite. The documentary was favorably reviewed by *Life* magazine and produced an enormous volume of correspondence, most of it from students asking the Institution about careers in archelogy or for further information on the Knidos excavation. Other subjects which the Institution plans to treat in this series include Major Powell's exploration of the Colorado River and human evolution, the latter featuring Dr. T. Dale Stewart, Curator Emeritus of Physical Anthropology and former Director of the Museum of Natural History.

The Division of Performing Arts held its fourth annual Festival of American Folklife, with a special "pavillion" or presentation from the state of Arkansas. It brought a record crowd of over 500,000 to the Mall during its five day span, leading up to the fourth of July. The Festival was widely praised in editorials as a common and peaceful meeting ground for both Honor America Day participants and radical youth demonstrators. At the end of the period under review, the Division began a summer long folklife festival in the United States pavillion at the "Man and His World" exposition site in Montreal, as part of and supported by the Department of Commerce's "Visit the United States" program.

Smithsonian Associates

"There is always something going on at the Smithsonian which invites participation" observed one of our more than 15,000 Associate members in a letter of appreciation.

As of January 1971, the Smithsonian Associates completed its fifth year of programs and activities created to involve people of all ages in active participation at the Smithsonian. Throughout the year, some 20,000 persons took part in over 170 members' events, including lectures on such diversified subjects as whale communication, beasts of mythology, and man and machines; musical, dance, and poetry performances; films; special events such as the Annual Kite Carnival and the first National Kite Competition, the Boomerang Workshops, Capital Mall history tours, and Zoo Night; and finally, the annual field trips in the museums and outdoors.

In addition, some 6500 attended six special receptions, including two Museum Shop openings, openings for the Rube Goldberg, Music Machines, and the Campbell collection exhibits, the Renwick Gallery Benefit sponsored by the Woman's Committee for the

Third place prize winner, 16-year-old Associates member John Umhow, shows off his winning kite and trophy at the first National Kite Competition held on the Mall 10 April 1971. (Photo by Douglas Stewart.)

Scholarship Fund; and Mondays at the Museum—a series of five lectures on great collections. Another 1500 took day tours and extended study trips throughout the country.

The Associates classes and craft workshops offered more than 3300 people the opportunity to study and work directly with Smithsonian and visiting scholars and professional craftsmen. Of these, over a thousand were young people, ages four to twelve (100 were scholarship students). A total of 89 classes and 14 workshops on subjects ranging from animal behavior, anthropology, osteology, and the history of democracy to fabric construction and weaving were offered.

Through these programs the Associates' provide an opportunity for individual and human discovery, learning, and growth within the boundaries of the Smithsonian Institution.

Office of Public Affairs

Divisions of the Office of Public Affairs (OPA) used film, tape, and print to communicate the story of the Smithsonian and its diverse activities in the past year. Production was completed on a half-hour color motion picture about the Institution, *Around the Clock at the Smithsonian,* produced under a grant from the Corporation for Public Broadcasting for presentation nationally over educational television. The first of a series of documentaries by the Columbia Broadcasting System under the title "Smithsonian Adventure" was telecast 13 June and brought a flood of 1400 favorable letters from viewers. It was one of many productions filmed in recent months by various producers with cooperation from OPA and other Smithsonian staff members, who are now working with the British Broadcasting Corporation on two major series, "The Ascent of Man," and "America." The office started an archival film record of construction on the Joseph H. Hirshhorn Museum and Sculpture Garden. Fifty more stations began broadcasting "Radio Smithsonian" in the past year. The series is now heard over sixty educational radio stations in thirty-five states, the District of Columbia and Canada, and over the armed forces network overseas. The OPA news bureau issued more than 200 news releases and forty-nine public service radio announcements, aided news media in coverage of special events, and published *The Smithsonian Torch* and the monthly *Calendar of Events.* A total of 36,500 callers used the Dial-A-Museum answering service, and 109,500 used the Dial-A-Phenomenon service. The OPA publications section began issuing a revised series of information

leaflets, and produced for the first time orientation leaflets for visitors in French and Spanish (see Appendix 8).

Office of International Activities

The Office continued to foster new dimensions of Smithsonian programs abroad, particularly through development of cooperative programs in environmental research and conservation. The Office organized an Indian-American Ecology Symposium in New Delhi in conjunction with India's University Grants Commission. A team of distinguished American ecologists headed by Secretary Ripley and the Acting Assistant Secretary for Science met during February 1971 with Indian counterparts to consider approaches to ecological research and training which would also serve the critical needs of governmental planning.

To assist in development of such joint research opportunities, the Office assigned a representative for South Asia to New Delhi for an initial period of six months. One of his assignments of special urgency is the development of a joint Indo-American program of research and conservation.

The Office Director traveled to Ceylon to review progress of the Smithsonian's baseline ecological studies embracing elephant, primate, botanical, and entomological research there. The Director also represented the Smithsonian at the meetings in England of the Charles Darwin Foundation of which he is the American Secretary (Administrative), the World Wildlife Fund World Congress, and the Aldabra Committee of the Royal Society. The Office represented the Institution at the International Conference on the Biology of Whales. Closing its sixth year, the Foreign Currency Program had awarded nearly $13 million in "excess" foreign currency grants to over sixty American institutions of higher learning.

Program accomplishments over the six-year period include more than 111 research publications, 214 postdoctoral research opportunities for Americans, 220 field-training opportunities for doctoral candidates, and research collections for the Smithsonian and many of the American grantee institutions.

Division of Performing Arts

The Division of Performing Arts continued to expand its activities in enlivening the Mall and in creating an open experience in

the arts for museum visitors. The Fourth Annual Festival of American Folklife featured the State of Arkansas and Indians of the Southern Plains. The more than 700,000 people who attended this living exhibition of folk creativity made it perhaps the most-attended single event in Washington. "A Festival of American Folklife" was directed and produced in Montreal for the "Man and His World," exhibition at the original United States Pavilion. Continuing from 11 June through 6 September the presentation was sponsored by the United States Travel Service, U. S. Department of Commerce, in cooperation with the Discover America Travel Organizations.

Among the programs presented with the Smithsonian Associates were the famed Kathakali Dance Company from Kerala, India; an evening of black poetry by Joanna Featherstone; and the Perceptions 3 series in contemporary performing arts: The Electric Stereopticon, Yvonne Rainer and the Grand Union, The Paul Sanasardo Dance Company, and the New Music Choral Ensemble III. The Division co-sponsored with other organizations 6 jazz concerts, 5 folk music concerts, and 30 productions of the American College Theatre Festival.

The Touring Performance Service presented four productions: The American Folklife Company; The Black Experience; The Concept; The Waywardly Wandering Wagonful of Banjo and Jack; and Neighbors. These were seen at the Smithsonian and by audiences from Maine to Florida and as far west as Iowa. The Service worked with State Arts Councils for colleges, universities, and civic organizations with minimal budgets wishing to acquire these programs. After smoke damage delayed the scheduled opening, the Smithsonian Resident Puppet Theater reopened on 24 March. The Waywardly Wandering Wagonful of Banjo and Jack, based on Kentucky folktales, played to enthusiastic audiences.

Smithsonian Museum Shops

The Smithsonian Museum Shops continued its program of offering museum visitors a wide variety of articles carefully selected to reflect the exhibits of each museum, where possible with special emphasis on articles for children. Visitors response to books and publications necessitated a further expansion of the book sections of the shops in the Arts and Industries Building and the National Museum of History and Technology. New publications of staff

members issued during the year were featured in exhibits, with appropriate artifacts, and over four hundred new titles were added to the extensive book collections available in the shops.

The sales exhibition program began its year with a large variety of traditional crafts offered in the shops of the National Museum of History and Technology, opening the first day of the Folklife Festival and continuing during the summer. Contemporary craftsmen of Georgia were featured in the second sales exhibition honoring the crafts and craftsmen of the United States. The exhibition featuring pottery, weaving, wood carving, and jewelry done by thirty Georgia craftsmen was shown in the Arts and Industries Museum Shop throughout the fall. Botanical prints by Henry Evans and jewelry made with minerals and gems by Fridel Blumenthal were featured in the Natural History Museum Shop sales exhibits.

The Museum Shops staff gave assistance, advice, and guidance to sixteen museums in the United States that sought help in establishing museum shop programs during 1970–1971.

Belmont Conference Center

The Belmont Conference Center is presently in its fifth year of operation, with the growing prospect of more conferences each year. During fiscal 1971, there were 69 conferences held at Belmont in comparison with 58 the previous year, and reservations are being made up to 18 months in advance. The Center accepts conferences from all types of groups, the majority being governmental agencies, but including academic, industrial, international, labor, and philanthropic organizations as well. It has welcomed nearly 1500 participants during this year.

Our Smithsonian guests have included the Smithsonian Council, the Interdisciplinary Communications Program, the Office of Academic Programs, a pre-Symposium '70 seminar, and a meeting sponsored by the Anthropology Department. The Center has been host to groups as diversified as the U.S. Department of State and the Baltimore Mutual Investment Company, while guests have included Dr. Margaret Mead of the American Museum of Natural History; His Excellency Nobuhiko Ushiba, Ambassador from Japan; The Right Reverend Monsignor Bordelon of the U.S. Catholic Conference; Dr. Robert Marston, Director of the National Institutes of Health; Dr. M. C. Shelesnyak, Director of the Interdisciplinary

Communications Program; Ambassador Armin Meyer, American Ambassador to Japan; Dr. John Clark, Director of the Goddard Space Flight Center; Dean L. G. Cowan of the State University of New York; Sir Solly Zuckerman of the British Cabinet Office; James Kilpatrick, columnist; His Highness the Maharaja Gaekwar of Baroda; and Nobel Prize winner Dr. Murray Gell-Mann.

Belmont accommodates twenty-four resident guests with facilities for meetings and meals for thirty people. Yearly improvements to this 240 year-old manor house and surrounding 365 acres make it more comfortable and enjoyable each year.

Conference operations continue to be directed toward the needs of small groups which require the kind of attractive, secluded, and exclusive setting which Belmont provides, together with the advantages of easy access to Washington's National and to Baltimore's Friendship airports.

Anacostia Neighborhood Museum

The story of black Americans, both slaves and free men who fought in the War for Independence, was retold in the Anacostia Neighborhood Museum's exhibit "Black Patriots of the American Revolution." Over 3000 booklets describing the exhibit in story form for children were distributed to school tour groups and in response to requests from teachers and parents.

The Museum and the Lorton Reformatory cooperated in a presentation of visual and dramatic arts done entirely by the men from Lorton who worked along with the exhibits staff in mounting their own paintings and handicrafts. Research for "Lorton Reformatory: Beyond Time" was undertaken during several staff visits to the prison.

The Mobile Division offered a bussing program which takes mini-editions of current exhibits to inner-city playgrounds and churches in summer and schools in winter. Another project provided teachers with a portable library of Afro-American books and shoebox specimens and puzzle maps on such subjects as black scientists and places to visit in Washington of interest to black Americans. The Speakers Bureau offers a list of lecturers on various subjects who are available to schools and community groups.

The Center for Anacostia Studies, operating under a grant from the Carnegie Corporation, conducted an opinion survey at the request of the Museum's Neighborhood Advisory Committee, which

disclosed that crime, drugs, housing, unemployment, and education were prime concerns. Interviews with old-time residents have been completed in preparation for an oral history of Anacostia and an exhibit.

Smithsonian

Although only a year old with the March 1971 issue, *Smithsonian* progressed toward being an institution within *the* Institution via membership in the Smithsonian Associates.

It is a circulation success with 245,000 *net paid* subscribers at the end of the fiscal year. Surveys show that our readership enjoys a high educational level. A survey indicates that 85 percent of subscribers are college educated, that their median income is above $19,000 a year.

Editorially, *Smithsonian* follows the lines of the Secretary's original concept—being interested in what interests the Smithsonian Institution. This, of course, starts with the Institution itself. Through the July 1971 issue there have been 76 articles related to the Institution. They have been from one to eleven pages long. The Institution staff also checks material obtained from the outside.

Outside the Institution *Smithsonian* has had such authors as Isaac Asimov and Theodore H. White; photographers such as Lee Boltin, Fritz Goro, Gjon Mili, Carl Mydans, and David Plowden; cartoonist-illustrators such as Richard Erdoes and Robert Osborn.

Unfortunately, a subscription fulfillment concern turned in a thoroughly unacceptable job. Through a court injunction, the magazine's address tapes have been transferred to another company. That growing pain has been satisfactorily eased.

There will be by-products. There is material for a book on man's environment, including his attempt to learn more about ecology and conservation. The infinite opportunities in *Smithsonian's* assigned fields will continue to be pursued vigorously.

Smithsonian Institution Press

Much of this year's effort was concentrated on launching the three-level organic publication program recommended by the Visiting Committee as described in *Smithsonian Year 1970*. Detailed inventories were taken and quality evaluations made for publications

of level one (leaflets, available at the exhibits of public museums, for the purpose of exhibit interpretation) and level two (booklets and other educational materials, for students and the public at large). Uniform, but highly attractive, design and format will be used for these publications, and they will be made available through vending devices at exhibit locations. Numerous leaflets, five booklets and four recordings are in preparation.

An agreement reached with Museum Shops will enable certain publications and recordings, heretofore available only in our museum stores, to receive national, indeed international, distribution.

By cooperative arrangement with *Smithsonian* magazine, Press books have been offered to all subscribers at a discount of 20 percent, and more attractive offerings are planned for the coming year.

The Life Portraits of John Quincy Adams, a catalog designed by Miss Crimilda Pontes, was chosen as one of the twenty-two outstanding design and production publications of the year by the Association of American University Presses. The exhibit of these twenty-two books will be sent to libraries, educational institutions, cultural centers, book fairs, and special graphic art events in Europe, Asia, Africa, and Latin America.

Production costs of 98 publications were funded in whole or in part by Federal appropriations in the amount of $227,337.80; 13 were supported wholely or partly by Smithsonian Institution Press private funds in the amount of $101,764.65; and 5 were subsidized variously by Smithsonian or other private funds in the amount of $20,321.30. The total output of 113 titles is listed in Appendix 5. The Press warehouse, the U.S. Government Printing Office, and George Braziller, Inc. (the Press's sales and distribution agent) shipped, on order and subscription, a total of 204,935 publications during the year. In addition, 1237 records were distributed by the Press.

Reading Is Fundamental

The National Reading Is Fundamental Program (RIF) is now operating in its fourth year as an independent unit under Smithsonian sponsorship, with support by the Ford Foundation. RIF's purpose is to motivate disadvantaged youngsters and adults to want to read, by making available a wide variety of interesting and relevant, inexpensive paperbacks. The program stresses self-selection and pride of ownership in the belief that "the right to read" should

Pre-schoolers at a "Reading Is Fundamental" day-care center in Washington, D.C., show their book choices to Mrs. Robert S. McNamara, RIF's Board Chairman.

be the birthright of all America's children. National RIF provides technical assistance and information to those interested—school systems, libraries, and community agencies—in developing a local project.

During 1970–1971, the number of local projects grew from eleven to eighteen, including both urban and rural areas and various ethnic groups—Blacks, American Indians, and Mexican-Americans. The local sponsoring groups throughout the country were responsible for funding, selection of book titles, and distribution. National RIF also acts as liaison with the publishing industry, federal and local governments, schools, and libraries about book programs and provides general information to all who seek it.

New publications (see Appendix 6) are made available upon request. During 1971–1972, plans call for a national media campaign with the endorsement of the Advertising Council, a greater emphasis on corporate sponsorship of local programs, and a close working relationship with USOE's "Right to Read."

The current Ford Foundation grant of $400,000 covers adminis-

trative support for National RIF as a Smithsonian activity for the three year period, 1970–1973. Policy guidance for RIF is provided by a National Advisory Board composed of more than thirty distinguished Americans from many walks of life. The founder and chairman of RIF is Mrs. Robert S. McNamara; Secretary Ripley serves *ex officio* as a member of the RIF Board.

Division of Elementary and Secondary Education

The increase of escorted visits for local school children continues apace. The figures for school tours during the academic year 1970–1971 reflect a substantial increase in all the museums of the Smithsonian.

Several innovations to the usual lecture tour for school groups were introduced to enhance the opportunity for children to learn on their own. A study tour of early man in the National Museum of Natural History offered students a chance to examine firsthand the permanent exhibits, slides, fossils, and artifacts, which demonstrate the principles of human evolution. A series of seminars, under the direction of a research docent and guide by museum specialists in the field of anthropology, was conducted for a class of high school students from a girls school in Maryland. The students were able to follow in their free time and on their own initiative in-depth studies of subjects not generally offered to high school students. In the Museum of History and Technology a two hour "touch-it" tour was specially arranged on request related to Colonial life studies. Similarly, on the subject of the Industrial Revolution, a two-hour visit was arranged to encompass several halls.

For Museum Education Day in March a gathering of several hundred volunteers, teachers, Smithsonian staff members, students, and representatives of several museums beyond the Washington area met to discuss questions concerning how best to provide effective education in a museum environment. The discussions were carried out in groups of 40–50, with panels of "experts" served by docent moderators.

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ADMINISTRATIVE MANAGEMENT

> Perhaps there is no more important area of human activity than management, since its task is that of getting things done through people. Our modern civilization has increasingly become one of cooperative endeavor. Whether in business, government, the church, philanthropic institutions or other forms of enterprise, the effectiveness with which people work together toward the attainment of their joint goals is largely determined by the ability of those who hold managerial positions. It is to little or no avail to have advanced scientific knowledge, engineering skills, or technical abilities unless the quality of management in organized groups permits effective coordination of these human resources.*

This principle has particular application in the Smithsonian Institution in the essential day-to-day interaction between administrators of our bureaus and program offices and the managers of our support activities. The management direction of these discrete, yet interlocking segments, must assure the accomplishment of goals that can be attained by group, rather than individual, action.

In November 1970, a director of Support Activities was appointed in the Office of the Under Secretary. This important step was taken this year to further strengthen the efforts of the support group and to assure the recognition of an administrative framework in which they are joined systematically in a common purpose. The Director, in addition to other related assignments, was given immediate and continuing responsibility for the supervision and executive direction of the following organizations: Administrative Systems Divsion, Buildings Management Department, Contracts Office, Information Systems Division, Office of Equal Employment Opportunity, Office of Personnel Administration, Photographic Services Division, Supply Division, and Travel Services Office. Again this year, despite judicious allocation of always-limited funds, this group, as an entity, did not receive increases in positions or funds corresponding with the growth of the program elements of the Smithsonian. A review of their total accomplishments reveals that this group, despite these

*Harold Koontz and Cyril O'Donnell, "Preface," *Principles of Management* (New York: McGraw-Hill Book Company, Inc., 1959).

handicaps, successfully completed a remarkable amount of excellent work.

PROGRAM SUPPORT ACTIVITIES

The Administrative Systems Division issued in January the Smithsonian Staff Handbook—540—*Stock Catalog*. This publication lists not only items stocked in the SI Supply Division but also provides policies and guidelines for ordering, issuing, stocking, and controlling expendable property. Work continued on another handbook in this series, which will furnish policy and procedural guidelines covering internal supporting services. A *Time and Attendance Reporting Handbook* is being compiled to furnish timekeepers with succinct and accurate guidelines for recording employee attendance. Publication early in fiscal year 1972 is anticipated.

Over 310,000 copies of administrative materials concerning some 230 separate subjects were distributed to the staff. These covered policy and major procedural matters as well as special interim instructions and ephemeral information. Staffing and functional statements about the Smithsonian Institution were furnished to over 30 external publishers. The first *Smithsonian Directory* developed with computer support is in final stages of preparation and will be published in July 1971.

With the appointment of a new director of the Photographic Services Division, an innovative arrangement was made that provided for the assignment of a management analyst to the director for a temporary period of 3 to 4 months. The remarkable success of this effort was most encouraging and it is hoped that, staff permitting, similar assignments can be made when other key positions are filled.

The Forms Management unit processed, in-house, 452 requests from over 70 discrete organization segments for a variety of essential management and program-related forms and form letters. In addition 156 orders were placed with the Government Printing Office and other external services.

The Buildings Management Department is responsible for the operation, construction, improvement, maintenance, and protection of the physical plant and facilities, which consist of nearly 3.5 million square feet of floor space. This includes exhibition halls, as well as office, laboratory, and research facilities. The Department also is responsible for assuring that the over 13 million visitors to the

Smithsonian Institution each year, have safe and secure visits to the buildings, grounds, and exhibits.

The past year has been devoted to implementing organization and program changes, developed after considerable study and analysis of the Department's management and operations. A work control branch was established, staffed, and placed in operation to provide more effective utilization of resources and improved service to the Smithsonian.

Second generation programs were implemented through automatic data processing to improve control over manpower, material, and equipment and to provide timely operational information to the Director and other levels of management and supervision within the Department.

Over 2000 special events at the Smithsonian Institution required substantial support and participation by Department personnel. These included the annual Folklife Festival and the opening of new exhibits such as the Rube Goldberg Hall and the Hall of Music Machines in the History and Technology Building.

The numerous demonstrations in the Mall area throughout the year placed an additional burden on the Department. These unusual happenings resulted in expenditures for payroll and special equipment in addition to regularly planned and programmed outlays.

The Engineering and Construction Division and the Facilities Planning Office provided major design, review, and engineering services as well as contract supervision for major projects including alterations to the Arts and Industries Building and the Renwick Gallery, construction of the Joseph H. Hirshorn Museum and Sculpture Garden, and the History and Technology Building fire-damage restoration. These units also furnished design and engineering services for constructing and remodeling over 500,000 square feet of building space, for modifying the mechanical plant, and for making preliminary studies for future projects.

As a result of a redesign of existing parking lots, the Department is providing parking spaces for 112 more employees than in fiscal year 1970. The employee parking program as well as other Department-wide programs have been placed in the newly created Office of BMD Programs.

Based on recommendations made by the Director of the Information Systems Division, the Smithsonian Institution entered into an agreement to purchase a computer system similar to the one we have been renting. As a result, immediate savings will be realized

each month and the hourly rate charged to Smithsonian and other users of computer time will be reduced.

The Division is developing a generalized systems package that will enable members of the professional research staff to enter information into a computer as a standard means of recording, updating, and retrieving data.

The National Portrait Gallery has implemented a system that will provide biographically oriented indexes to artists and sitters contained in the Catalogue of American Portraits. A system was developed to provide indexes to the National Collection of Fine Arts' Bicentennial Inventory of American Paintings.

A library of advanced mathematical software packages is being expanded to make the latest calculation capabilities available to each scientist. The Division sponsors seminars in statistical applications to augment the value of these computer programs. Other automated systems that have had major enhancements are the accounting for foreign currency funds and expansion of the property management system from a physical inventory control system to a financial-inventory system. Federal and private accounting systems were revised to handle an accrual method of reporting, and the regional Smithsonian Associates mailing system went to an automated billing process.

As a service to the museum community at large, the Division published two editions of their technical bulletin *(Smithsonian Institution Information Systems Innovations)* to acquaint the reader with automated systems specifically designed to solve the collection/research problems of museums and herbaria. In addition, many members of the community from home and abroad have visited and/or requested information pertaining to automated systems at the Smithsonian.

Under the leadership of the Secretary, the Office of Equal Employment Opportunity has maintained a responsible and viable plan for providing equality of opportunity in all official actions of the Smithsonian Institution.

The continuing affirmative policy for the realization of equal opportunity objectives resulted in over 136 consultations with various supervisory and other staff members regarding the Merit Promotion Program and candidate selection. Additionally, matters of personal concern to a number of employees were reviewed, factual information developed, and necessary adjustments made to the satisfaction of those involved. In two instances, formal complaints were filed and investigatory steps taken.

Upon request, special advisory services were provided to employees aspiring to positions of greater responsibility. Respective interested personnel were furnished with current information about educational opportunities, the methods for adding specific educational credits, the requirements for career advancement, along with the availability of extracurricular schooling in the metropolitan D. C. area.

Four special training Work Shops were conducted for employees assigned to supervisory positions. These discussions concerned all levels of supervision relating to the acceptance, fulfillment, and continuing support of the equal employment program philosophy.

The Office of Personnel Administration continued to develop its role as a consultant resource to the managers of the Smithsonian allowing them to assume more fully their responsibilities and exercise their authorities in personnel management. This approach to personnel management requires close cooperation between the personnel staff and the management officials of the various operational units. An example of such cooperation involved the first significant reduction-in-force at the Smithsonian. Although a total of 25 employees were affected, the Office of Personnel Administration was able to place 22 employees in other organizations, thus continuing their careers with the Smithsonian.

A member of the staff in conjunction with the Civil Service Commission modified the qualifications standards for museum technicians. The revisions in the qualifications standards will enable the Smithsonian Institution to draw upon a larger source of qualified applicants.

The orientation of new employees is of continuing concern to the Smithsonian Institution. Orientation is not viewed merely as a meeting of new employees to discuss personnel policies and organization, but in terms of a system which includes the activities involved before the employee actually reports to his new job, his initial processing, his introduction to his new organization, a more or less formal meeting (in the traditional orientation sense), and continuing follow-up during his first few months on the job. As part of this system a *New Employee Handbook* is being prepared and will be given to each new employee when he reports for duty. It is expected that copies also will be given to all current employees.

A pilot program of supervisory training was initiated at the National Zoological Park. This program, which was developed and conducted by the Office of Personnel Administration consultants at the request of Zoo management officials, was different from super-

visory training programs in the past because all supervisors at the National Zoological Park were brought into the intensive training program as a group. The program included orientation to supervisory responsibilities, labor management relations, human behavior in the work situation, and the administration of a personnel program at the working level.

Since the issuance of the new Merit Promotion Policy by the U.S. Civil Service Commission in 1969, the Smithsonian's total merit promotion program has been reviewed by office staff. As one result of this review, a Secretarial Skills File has been established. This file aids organizations in recruiting for secretarial help. When a vacancy occurs in the secretarial field, the Office draws from this file the best qualified candidates for the position. The amount of time required to fill secretarial vacancies has been reduced considerably.

The Office has established a pool of clerical resources as a service to Smithsonian organizations. These services are used when regular office help is not available, when an office's extra work load needs to be handled, or when a vacancy is being filled. The pool has been an effective means of providing essential office assistance when an expressed need arises.

In June, the Secretary approved the reorganization of the Photographic Services Division recommended by the new director, who had joined the Smithsonian Institution in the spring. The new organization, which will be effective 1 July 1971, makes maximum use of all resources, reinforces the service-oriented philosophy, and utilizes the advantages of centralized and decentralized operations. Wet processes, such as film and paper processing and printing, have been centralized, and the dry process—the photography or camera work—is decentralized and accomplished at the site or in studios located in the major buildings. Two new sections have been established, one to centralize and manage the negative files and the other to centralize, manage, and expand the pay-order function. A production control officer will schedule the daily work of the four cohesive working sections.

Following a careful and informed study made by an *ad hoc* group of cognizant Smithsonian staff members, modest increases were made this year in the processing fees for photographic materials sold to the public.

The Division continued its active participation in and support of the Smithsonian's exhibition program. Exhibits worked on during the year included: the Rube Goldberg Hall, Music Machines—

American Style, Gandhi Exhibit, Energy Conversion, and Women in Politics.

Production figures are: orders, 5,408; negatives, 19,800; color, 10,412; microfilm, 67,900; and prints, 96,500.

The Supply Division continued to process a large volume of procurements and to take full advantage of the redistribution of excess government property. Also, in keeping with the principles of consolidation and uniformity, effective in February, all procurement for the National Zoological Park was taken over officially by the Division. Prior to that, the Division's responsibility for the Zoo's procurement was, in general, confined to those instances when continuing construction funds were used.

The Division's diverse functions include procurement of supplies, materials, contractural services and equipment; operation and maintenance of an active personal property management program; acquisition of excess property in lieu of new procurement whenever possible; and ordering, controlling, and issuing laboratory, office, and shop supplies. The successful accomplishment of these assignments on a day-to-day basis throughout the year contributed immeasurably to the attainment of the Smithsonian's objectives in research, exhibition, education, publication, and related activities.

The Travel Services Office continued to experience growth in virtually all of its major activities, i.e., air and rail reservations booked were up 10 percent; travel itineraries issued, up 9 percent; transportation requests prepared, up .3 percent; hotel reservations made, up 51 percent; and the dollar value of all transportation purchased was some $35,000 higher than last year.

Much closer liaison had to be maintained with the airlines to accomplish increasingly complex travel performed under foreign currencies. Of particular interest was the "International Symposium of the Biology of the Sipuncula" held in Kotur, Yugoslavia. Program planning assistance, travel management advice, and a wide variety of travel services and technical guidance were provided to support major national and international symposia, meetings, expeditions, and special programs.

During the year the Office of Audits; which reports directly to the Under Secretary, issued three audit reports on audits conducted by its staff members. Recommendations made in these reports resulted in improved management procedures and controls, sometimes pointing to potential dollar savings.

In addition, the Office coordinated the development of an in-

Smithsonian Visitors During Fiscal Year 1971—1 July 1970–30 June 1971

Fiscal Year	*Smithsonian Building* [1]	*Arts & Industries Building*	*Natural History Building*	*Air & Space Building*	*Freer Gallery of Art*	*History & Technology Building*	*Fine Arts and Portrait Galleries*	*Totals*
1970								
July	Closed	308,235	422,206	208,536	24,264	856,160	18,922	1,838,323
August	121,841	318,423	446,926	225,347	27,864	857,010	17,493	2,014,904
September	48,662	117,376	169,042	70,986	13,352	304,307	10,212	733,937
October	50,606	113,925	201,591	68,370	11,872	328,872	11,528	786,764
November	25,584	101,667	259,326	77,801	12,639	347,593	14,979	839,589
December	31,747	67,908	150,471	40,140	8,779	250,669	13,461	563,175
1971								
January	30,991	68,281	135,697	40,351	7,975	220,890	12,434	516,619
February	40,350	93,136	180,450	65,717	10,107	328,250	12,946	730,956
March	48,436	131,303	245,825	81,621	12,017	361,989	17,647	898,838
April	127,655	279,661	567,983	185,384	23,146	821,456	18,224	2,023,509
May	75,906	176,273	359,345	121,017	18,305	607,108	25,441	1,383,395
June	79,477	209,544	317,893	152,175	20,105	670,824	21,181	1,471,199
Totals	681,255	1,985,732 [2]	3,456,755 [3]	1,337,445 [4]	190,425	5,955,128 [5]	194,468 [6]	13,801,208 [7]

[1] Building closed for renovation during July 1970.

[2] Slight decrease due to curtailed night hours.

[3] The American Folklife Festival contributed to an increase in the number of visits for July 1970. Academic tours also increased by about 50 percent.

[4] Curtailed night hours caused minor decrease in visits.

[5] The American Folklife Festival contributed to an increase in the number of visits for July 1970. The increase also was partially due to wide interest in the "Rube Goldberg" special exhibit.

[6] Metro construction caused a decrease in the number of visits.

[7] This reflects an overall increase from 1970 of 218,000 visits.

tegrated personal property system, the updating of authorizations to Smithsonian contracting officers, and the publication of a list of authorized Smithsonian contracting officers.

The Office also reviewed and closed out 84 foreign currency grants, which were awarded in the total amount of $2.3 million. The close out of these 84 grants resulted in $516,000 of unused funds being made available for current research projects.

CONSTRUCTION PROGRESS

National Museum of History and Technology

Fire Damage. A contract to restore that part of the third floor which was damaged by the fire which occurred on 30 September 1970, was awarded to the Spradlin Construction Company.

Calder Stabile. A lighting system was installed by the Washington Electric Company. Final work on this project was completed in February 1971.

Sprinkler System. A contract to install additional sprinkler systems in the building was awarded to the High Point Sprinkler Company. Completion of this work is anticipated in the fall of 1971.

National Museum of Natural History

Fumigation Chamber. Associated Builders, Inc., was awarded the contract for installation of this facility on 12 May 1971. It is expected that their work will be completed in July 1971.

Arts and Industries Building

Mezzanine Construction. Designs and specifications for decking the Northwest Range were completed in June 1971. Design work for the Southwest Range was also commenced during the same month. It is expected that actual construction will commence during the fall of 1971.

Joseph H. Hirshhorn Museum and Sculpture Garden

The Piracci Construction Company continued their work on the museum building. Recent changes in the location and design of the Sculpture Garden have resulted in an expected delay in the completion of the overall project.

National Zoological Park

Heating Plant. The heating plant was completely renovated and converted from coal burning to gas burning furnaces.

Restoration and Renovation of Buildings

Smithsonian Institution Building. The firm of Paintrite, Inc., was awarded the contract to paint those office areas not renovated under the overall renovation project which was completed in June 1970. This work was completed 18 September 1970.

Buildings Management Department personnel continued to work on the renovation of basement space in the Smithsonian Institution Building. It is anticipated that this work will be completed during the next fiscal year.

Renwick Gallery. The contract for furthering the restoration work was completed by Associated Builders, Inc., on 22 October 1970. Also the firm of Schewigert, Inc., completed the installation of a new air conditioning unit on 15 June 1971.

National Zoological Park. Contract work was completed on the waterproofing of Delicate Hoofstock Building, Numbers 1 and 2.

Feasibility Studies

Parking. The final report of the study made by Wilbur Smith and Associates for Mall garages and Zoo parking was received and is now being considered.

National Museum of History and Technology. Victor Lundy and Associates completed a study leading to the preparation of a design for facilities necessary for the celebration of the Bicentennial of the American Revolution. The proposed designs were rejected and that part of the planning for the celebration was abandoned.

NATIONAL GALLERY OF ART

J. Carter Brown, *Director*

THE NATIONAL GALLERY OF ART, although technically established as a bureau of the Smithsonian Institution, is an autonomous and separately administered organization. It is governed by its own Board of Trustees, the statutory members of which are the Chief Justice of the United States, chairman, the Secretary of State, the Secretary of the Treasury, and the Secretary of the Smithsonian Institution, all *ex officio;* and five general trustees. Paul Mellon continued as president of the Gallery and John Hay Whitney as vice-president. The other general trustees continuing to serve were Dr. Franklin D. Murphy, Lessing J. Rosenwald, and Stoddard M. Stevens. During the fiscal year 1971 the Gallery had 1,597,723 visitors.

A number of important acquisitions were made. Among them: *Antony Valabrègue* by Paul Cézanne; the magnificent series of four large paintings by Thomas Cole, *The Voyage of Life;* a bronze of Louis XIV by Francois Girardon; and a painting, *Mount Katahdin,* by Marsden Hartley. Major acquisitions in the graphic arts have included a rare landscape drawing by Anthony van Dyck and a complete set of the *Kleine-Welten* series by Wassily Kandinsky. A total of 61 loans were made to institutions in this country and abroad. Expert opinions were given on 1341 objects.

Some of the more notable exhibitions held at the Gallery were "Paintings and Sculpture from the Nathan Cummings Collection," "Mary Cassatt," "American Paintings from the Museum of Fine Arts, Boston and The Metropolitan Museum, New York," "British Painting and Sculpture 1960–1970," "Ingres in Rome," "Paintings by William Hogarth from the Collection of Mr. and Mrs. Paul Mellon," and Dürer in America: His Graphic Work."

The Gallery's new multimedia education program "Art and Man," published by Scholastic Magazines Inc. reached 5000 classes with more than one million magazines; 72,000 reproductions, 12,000 recordings, and 12,000 filmstrips were also distributed as part of the program.

The Extension Service materials were viewed by a total audience of more than 3,238,705. These materials include films, exhibitions, and slide lectures. For the first time, the Extension Service published a catalog of its 61 offerings, all of which are available on loan to schools and communities at no cost.

Through the Extension Service, Kenneth Clark's film series *Civilisation* was shown to a national audience through grants from the Xerox Corporation and the National Endowment for the Humanities. The film has been seen by 400 colleges and universities with enrollments under 2000. It is estimated that about 2.25 million people have seen the films. For his work on *Civilisation,* Lord Clark was awarded the National Gallery's Medal for Distinguished Service to Education in Art on 18 November 1970.

Total attendance at talks given by the Gallery's Education Department and for the programs presented in the auditorium was 83,403 for 2,530 separate tours and events. The Gallery's regularly scheduled events include the Sunday auditorium lectures and films, the Tour of the Week, and Painting of the Week. There were 35 guest lecturers who spoke at the Gallery during the last fiscal year. They included the distinguished British art historian and educator T.S.R. Boase, the 20th annual A.W. Mellon Lecturer in the Fine Arts, who gave a series of six talks entitled "Vasari, the Man and the Book."

Through its self-service sales facility, the Gallery made available eight new publications, as well as seven catalogs of exhibitions shown at the Gallery and published three posters in connection with those exhibitions. During the year over 375,744 customers were served. Under the supervision of Richard Bales, forty concerts were given in the East Garden Court at the new hour of 7 p.m. Ten of these were by the National Gallery Orchestra which played a special concert of American music in honor of the Thirtieth Anniversary of the Gallery on 14 March 1971. Two compositions were commissioned for the occasion. All the concerts were broadcast in their entirety by radio station WGMS, AM-FM.

The scientific investigation of the causes of deterioration of museum objects and methods of conservation continued in its twentieth year at the Carnegie-Mellon University, Pittsburgh. The Gallery's long-term research program completed accelerated-aging evaluation tests in the past year on a number of polymers that hold considerable promise in protective coatings and adhesives. Studies of traditional and modern artists' pigments by Mossbauer and infrared spectroscopy, neutron-activation analysis, isotope-ratio mass spectros-

copy, and radioactive-decay dating methods are yielding valuable new methods to characterize and identify artists' pigments.

After two and a half years of intensive planning, the National Gallery has completed final design plans for the addition to its present building. The groundbreaking ceremony for the East Building was held on 6 May, when architectural plans, renderings, and models were presented to the public. Final completion of the East Building is planned for 1975.

JOHN F. KENNEDY CENTER FOR THE PERFORMING ARTS

William McC. Blair, Jr., *General Director*

OUR COUNTRY will witness the much anticipated debut of its national center for the performing arts on 8 September when the world premiere of Leonard Bernstein's "Mass" inaugurates the Kennedy Center opera house.

The opening has been the goal of the past year, with concentration on completing construction and on the exciting program for the Center's first season. The staff has been expanded, additional construction funds raised; there have been new gifts from nations abroad, and a new fund established to provide low-cost tickets to students and those with limited incomes.

The inauguration of the Kennedy Center will bring to reality a long held dream of many Americans. It was initiated as the National Cultural Center in 1958 by President Eisenhower and ardently supported by President Kennedy. President Johnson signed the 1964 law designating the Center as President Kennedy's official memorial in Washington, and the Center has received the continued interest and active support of President Nixon.

The Kennedy Center is administered separately by a 45-member Board of Trustees appointed by the President to ten-year terms, together with members *ex-officio* from pertinent public agencies and from the United States Senate and House of Representatives. Members of the Board at the end of fiscal 1971 are as follows:

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Robert O. Anderson
Ralph E. Becker**
K. LeMoyne Billings
Edgar M. Bronfman
Mrs. Edward Cox*
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Jack J. Valenti
William Walton
Walter E. Washington
Lew R. Wasserman
Edwin L. Weisl, Sr.

*Appointed by President Nixon on 14 September.
**Reappointed by President Nixon on 14 September.

The 114-member Advisory Committee on the Arts, appointed by the President, includes 10 new members appointed by President Nixon on 7 May. During the year the Committee has provided extensive counsel on the Center's promotion, programming and its educational aims, and also has secured donations of $1 million toward the completion of the Eisenhower Theater.
The Executive Committee of this group is as follows:

Mrs. J. Willard Marriott, *Chairman*
Robert S. Carter, *Secretary*
Raymond A. Lamontagne, *Special Counsel*
Vernon B. Stouffer, *Chairman, Finance*
Mrs. David E. Bradshaw, *Vice Chairman, Finance*
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Mrs. D. Eldredge Jackson, *Northeast Regional Chairman*
Harvey B. Cohen, *Southern Regional Chairman*
Mrs. William A. McKenzie, *Western Regional Chairman*
John H. Myers, *Midwest Regional Chairman*

Construction of the Kennedy Center stands about 90 percent complete at the end of fiscal 1971, with the opening of the opera house and concert hall scheduled for 8 and 9 September, respectively, and the opening of the Eisenhower Theater tentatively set for October. The Film Theater is scheduled for completion in 1972.

The three roof-terrace restaurants—La Grand Scène, a gourmet dining room; the Gallery, a café, and the Promenade, a buffeteria—will open to the public in August. They are managed by Canteen Corporation. Two of the three levels of underground parking have been in use since January of this year, with management by APCOA.

New staff appointments during the year include Norman L. Fagan,

formerly executive director of the West Virginia Arts and Humanities Council, as Director of Education (4 January); Michael Sean O'Shea, widely experienced press representative in the performing arts, as Director of Publicity and Promotion (1 February), and J. Charles Gilbert, formerly managing director of the Civic Opera House and Civic Theater in Chicago, as General Manager of the Center's theaters (1 May.) Julius Rudel, who has been the Center's Music Advisor since 1968, was named Music Director in January.

The appointment of Willis Conover, widely known broadcaster for the Voice of America, as Consultant for Jazz Programs was announced on 10 July. The appointment of a 10-member Jazz Advisory Panel was also announced on that date with the following membership: Julian (Cannonball) Adderley, David Baker, Co-chairman, Topper Carew, Willis Conover, Co-chairman, Stanley Dance, Ernest Dyson, Julian Euell, John Lewis, Tahir Sur, and Clark Terry.

Katherine Dunham, dancer-choreographer-educator, was engaged as the Center's Technical Advisor for Inter-Cultural Communications in June.

The National Symphony Orchestra, under the leadership of its distinguished new director Antal Dorati, will give its regular season of concerts in the Center, it was announced on 9 December. The Orchestra, under Mr. Dorati's direction, with Isaac Stern as soloist and the Paul Hill Chorale and the Washington Choral Arts Society, will open the Concert Hall on 9 September.

The American College Theatre Festival, presented for the third consecutive year by the Center with the Smithsonian, brought ten of the nation's best college theater companies to perform at Ford's Theatre and the George Washington University Center Theater between 21 March and 4 April. The Festival was produced by the American Educational Theatre Association with Frank Cassidy as Executive Producer. American Airlines, American Express, and American Oil were sponsors.

The American College Jazz Festival, presented for the second year by the Center in cooperation with the Krannert Center on the Champaign-Urbana campus of the University of Illinois, brought together almost 300 of the nation's top student jazz musicians to perform on 14, 15, and 16 May. American Airlines and American Express were sponsors for the event.

Natalia Makarova, who defected from the Soviet Union in October and joined the American Ballet Theatre as a prima ballerina shortly thereafter, visited the Kennedy Center on 19 May. Ballet Theatre,

the official Kennedy Center dance company, will make its first appearance in the opera house on 11 September.

The Gala Preview of the Center on 27 May attracted 3500 people from Washington, from almost every state and from 30 nations abroad for an "early bird" look at the Center complemented by dancing, a buffet supper and fireworks at midnight. The evening announced that the Center was nearly ready to open, honored the ambassadors of the countries who are making gifts to the Center, and raised about $240,000 to initiate the Special Ticket Fund, which will provide low-cost tickets to Center events for students, the elderly, and others with limited incomes.

Almost 50 internationally prominent performing artists have accepted the invitation of the Trustees to become Founding Artists of the Kennedy Center. The Founding Artists, comprising the classical and popular fields, will donate a concert during the Center's premiere season to benefit the Special Ticket Fund, and will have their names etched in marble within the Center.

More than 30 nations are making contributions to the Center and during the year four of these were announced.

Ambassador Walter Loridan of Belgium announced on 9 March that his country would donate mirrors for the Center's grand foyer, concert hall and opera house lobbies, and the restaurant area.

Israel will furnish and decorate the concert hall lounge with specially commissioned artworks illustrating the continuous bond between Judaism and music from Biblical times to the present. The gift was announced by Mrs. Yitzhak Rabin, wife of the Ambassador of Israel, on 29 April.

The presentation of the gift of France—two tapestries by Henri Matisse and two sculptures by Henri Laurens—was made by Chargé d'Affaires Emmanuel Margerie during a brief ceremony in the Center on 24 May.

Ambassador Olavi Munnki of Finland presented his country's gift of Finnish designed chinaware, including complete dinner service for the Promenade and Gallery restaurants, during a brief ceremony on 14 June.

Several of the gifts from other nations were installed during the year including the crystal chandeliers from Norway, Sweden, Austria, and Ireland. The red and gold silk stage curtain from Japan was taken out of storage in preparation for installation in the opera house this summer.

The Center opened its doors for two public tours in October and the enthusiastic visitors, numbering about 10,000, were treated to a

concert by the U.S. Army Band and the U.S. Navy Band. Princess Sophia of Spain, escorted by Center Trustee Tricia Nixon Cox, and Mrs. Ferdinand Marcos, wife of the President of the Philippines, were among the foreign dignitaries visiting during the year. Special tours were also conducted for cabinet wives, Congressional wives, Smithsonian staff members, representatives of performing arts organizations, and other groups with a special interest in the Center.

The Friends of the Kennedy Center, established as an auxiliary organization by the Trustees in 1966, have increased their membership to more than 6000, representing 48 states, with 29 regional and state chairmen. The annual meeting of the Friends, normally held in the spring, was postponed to September to coincide with the Center's opening.

Officers at the close of the fiscal year are as follows: Mrs. Polk Guest, Chairman, Mrs. Norris Dodson, Jr., Vice Chairman, Mrs. Eugene C. Carusi, Secretary, and Mr. Henry Strong, Treasurer.

The Friends sponsored a three-day Blues Festival at Howard University on 5, 6, and 7 November, helped enable Katherine Dunham to bring a young dance group from East St. Louis, Illinois, to perform during the White House Conference on Children in December, and held their Founders Day Luncheon, attended by 750 people, on 16 January in the Center, the first such event. Ongoing projects of the Friends include the Information Center adjacent to the building, the Speakers Bureau, a regular newsletter, and a weekly radio program on station WGMS.

APPENDIXES

Appendix 1

SMITHSONIAN FOREIGN CURRENCY PROGRAM GRANTS AWARDED IN FISCAL YEAR 1971

Archeology and Related Disciplines

American Institute of Indian Studies, Philadelphia, Pennsylvania. Continued support for Poona Center, Benares Center for South Asian Art and Archeology, and American Institute of Indian Studies research fellowships.

American Research Center in Egypt, Princeton, New Jersey. Continued support for a program of research and excavation in Egypt, research in Arabic literature, support for operation of Cairo Center, expedition to Fustat, epigraphic and architectural survey of Luxor, maintenance of a stratified Pharonic site at Mendes, excavation at the ancient city of Memphis, and excavation of the ancient city of Hierakonpolis.

American Schools of Oriental Research, Cambridge, Massachusetts. Archeological activities of the American Schools of Oriental Research.

Brooklyn Museum, Brooklyn, New York. Egyptological projects of the Brooklyn Museum.

Carnegie Museum, Pittsburgh, Pennsylvania. Excavations at Tel Ashdod, Israel.

Cornell University, Ithaca, New York. Academic research and field work in biological anthropology and prehistoric archeology.

Denison University, Granville, Ohio. Excavation of the Roman imperial metropolis at Sirmium.

Dumbarton Oaks Center for Byzantine Studies, Washington, D.C. Excavations leading to the publication of a corpus of ancient mosaics of Tunisia.

Harvard University, Cambridge, Massachusetts. Publication of the ethnological contribution of Milenko S. Filipovic.

Hebrew Union College, Jerusalem School of Archeology, Cincinnati, Ohio. Excavation of an archeological site at Gezer, Israel.

Indiana University, Bloomington, Indiana. Excavations at Nin, Dalmatia, Yugoslavia.

Rutgers University, New Brunswick, New Jersey. Studies in ancient Roman glass excavated at Salona, Yugoslavia.

Rutgers University, Douglass College, New Brunswick, New Jersey. Archeological excavations at Salona, Yugoslavia.

Smithsonian Institution, Department of Anthropology, Washington, D.C. Ethnographic research on selected Tibetan artifacts.

Smithsonian Institution, Department of Anthropology, Washington, D.C. Study of disappearing traditional crafts, industries, and technologies in Pakistan.

UNIVERSITY OF ARIZONA, TUCSON, ARIZONA. Excavations at the site of Tabun, Israel.

UNIVERSITY OF KENTUCKY, LEXINGTON, KENTUCKY. Metric and morphological traits in the dentition and calvaria of neo-eneolithic crania from Wislica, Poland.

UNIVERSITY OF MICHIGAN, ANN ARBOR, MICHIGAN. Excavations of a middle paleolithic site in northern Bosnia, Yugoslavia.

UNIVERSITY OF MINNESOTA, MINNEAPOLIS, MINNESOTA. Excavations of the Palace of Diocletian at Split, Yugoslavia.

UNIVERSITY OF MISSOURI, COLUMBIA, MISSOURI. Investigations of ancient glass-manufacturing sites in Israel.

UNIVERSITY OF NEW MEXICO, ALBEQUERQUE, NEW MEXICO. Studies of Majolica pottery in Morocco.

UNIVERSITY OF PENNSYLVANIA, UNIVERSITY MUSEUM, PHILADELPHIA, PENNSYLVANIA. The Akhnaten Temple project.

UNIVERSITY OF PENNSYLVANIA, UNIVERSITY MUSEUM, PHILADELPHIA, PENNSYLVANIA. The Dra Abu el-Naga project.

UNIVERSITY OF PITTSBURGH, PITTSBURGH, PENNSYLVANIA. Study of early food-producing cultures in Yugoslavia.

UNIVERSITY OF TEXAS, AUSTIN, TEXAS. Archeological investigations at Stobi.

Systematic and Environmental Biology (Including Paleobiology)

AMERICAN UNIVERSITY OF BEIRUT, NEW YORK, NEW YORK. Zoogeography and community structure of Sand Beach Meiofauna in the Mediterranean Sea.

DUKE UNIVERSITY, DURHAM, NORTH CAROLINA. Studies of *ramalina* lichens in Morocco.

NATIONAL ACADEMY OF SCIENCES, WASHINGTON, D.C. Research, planning, and training for International Biological Program personnel in the "excess" currency countries.

PHILADELPHIA ACADEMY OF NATURAL SCIENCES, PHILADELPHIA, PENNSYLVANIA. Study of specimens of marine ostracods in Tunisia.

PRINCETON UNIVERSITY, PRINCETON, NEW JERSEY. Structure and function of tropical avian communities.

PRINCETON UNIVERSITY, PRINCETON, NEW JERSEY. Studies in comparison of tropical forest structures.

SMITHSONIAN INSTITUTION, WASHINGTON, D.C. DEPARTMENT OF BOTANY. A flora of the Hassan District, Mysore State, India.

SMITHSONIAN INSTITUTION, WASHINGTON, D.C. DEPARTMENT OF INVERTEBRATE ZOOLOGY. Studies on the systematics and physiological ecology of Tunisian sponge communities.

SMITHSONIAN INSTITUTION, WASHINGTON, D.C. DEPARTMENT OF VERTEBRATE ZOOLOGY. Geographical and ecological study of the mammals of Morocco.

SMITHSONIAN INSTITUTION, WASHINGTON, D.C. DEPARTMENT OF VERTEBRATE ZOOLOGY. Serological and ectoparasite survey of migratory birds in northeast Africa.

SMITHSONIAN INSTITUTION, WASHINGTON, D.C. DIVISION OF BIRDS. Preparation of a manuscript for a handbook of Indian birds.

SMITHSONIAN INSTITUTION, WASHINGTON, D.C. DIVISION OF BIRDS. Migratory bird survey in India.

SMITHSONIAN INSTITUTION, WASHINGTON, D.C. OFFICE OF ECOLOGY. Symposium on recent advances in tropical biology.

SMITHSONIAN INSTITUTION, WASHINGTON, D.C. OFFICE OF OCEANOGRAPHY AND LIMNOLOGY. Study in Israel of biological interchanges between the eastern Mediterranean and the Red Sea through the Suez Canal.

SMITHSONIAN INSTITUTION, WASHINGTON, D.C. OFFICE OF OCEANOGRAPHY AND LIMNOLOGY. Survey of the marine fauna and flora of Morocco.

SMITHSONIAN INSTITUTION, WASHINGTON, D.C. OFFICE OF OCEANOGRAPHY AND LIMNOLOGY. Support for the Mediterranean Marine Sorting Center in Tunisia.

SMITHSONIAN INSTITUTION, WASHINGTON, D.C. OFFICE OF OCEANOGRAPHY AND LIMNOLOGY. Refitting of the research vessel *Phykos*.

SMITHSONIAN INSTITUTION, WASHINGTON, D.C. Support for the first Indian-American ecology symposium in New Delhi.

TEXAS A & M UNIVERSITY, COLLEGE STATION, TEXAS. Study of the ecology and behavior of gazelles in Israel.

UNIVERSITY OF CALIFORNIA, BERKELEY, CALIFORNIA. Biosystematic research on bees of the genus *Ceratina* (Hymenoptera: Apoidea).

UNIVERSITY OF CALIFORNIA, BERKELEY, CALIFORNIA. Biosystematic studies of Moroccan flora.

UNIVERSITY OF COLORADO, BOULDER, COLORADO. Studies of the cytotaxonomy of the Yugoslavian flora.

UNIVERSITY OF HAWAII, HONOLULU, HAWAII. Studies and collection of lizards on Yugoslavia's Adriatic Islands.

UNIVERSITY OF THE STATE OF NEW YORK, STONY BROOK, NEW YORK. Study of the ecology of an Eilat coral reef in Israel.

UNIVERSITY OF WASHINGTON, SEATTLE, WASHINGTON. Research on the biology and control of the wild boar of West Pakistan.

YALE UNIVERSITY, NEW HAVEN, CONNECTICUT. Habitat relationships and distribution of wild ungulates in the Gir Forest, India.

Astrophysics and Earth Sciences

SMITHSONIAN INSTITUTION, ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASSACHUSETTS. Theories of planetary motion.

SMITHSONIAN INSTITUTION, ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASSACHUSETTS. Multicolor photoelectric observations of flare stars at the Uttar Pradesh State Observatory, Naini Tal, India.

SMITHSONIAN INSTITUTION, ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASSACHUSETTS. Observation of Uttar Pradesh State Observatory at Naini Tal, India.

SMITHSONIAN INSTITUTION, ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASSACHUSETTS. Study of the collective behavior of self-gravitating systems.

SMITHSONIAN INSTITUTION, ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASSACHUSETTS. An astronomical observing program in Israel.

Museum Programs

SMITHSONIAN INSTITUTION, DIVISION OF MECHANICAL AND CIVIL ENGINEERING, WASHINGTON, D.C. Research on early machine tools, early materials handling equipment, and interchangeable manufacture in Poland.

SMITHSONIAN INSTITUTION, WOODROW WILSON INTERNATIONAL CENTER FOR SCHOLARS, WASHINGTON, D.C. Research in international ocean studies.

Appendix 2

MEMBERS OF THE SMITHSONIAN COUNCIL 30 JUNE 1971

DR. ROGER ABRAHAMS. Professor of English and Anthropology, Afro-American Research Institute, University of Texas, Austin.

MR. H. HARVARD ARNASON. Vice President for Art Administration, Solomon R. Guggenheim Foundation, New York City.

DR. HERMAN R. BRANSON. President, Lincoln University, Pennsylvania.

PROFESSOR FRED R. EGGAN. Department of Anthropology, University of Chicago, Illinois.

PROFESSOR DONALD S. FARNER. Chairman, Department of Zoology, University of Washington, Seattle.

PROFESSOR ANTHONY N. B. GARVAN. Chairman, Department of American Civilization, University of Pennsylvania, Philadelphia.

DR. MURRAY GELL-MANN. Robert Andrews Millikan Professor of Theoretical Physics, California Institute of Technology, Pasadena.

DR. PHILIP HANDLER. President, National Academy of Sciences, Washington, D.C.

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PROFESSOR JAN LARUE. Department of Music, Graduate School of Arts and Sciences, New York University, New York City.

MR. CLIFFORD L. LORD. President, Hofstra University, Hempstead, Long Island, New York.

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DR. PETER M. MILLMAN. National Research Council of Canada, Ottawa, Ontario. Meteoritic Specialist.

MR. ELTING E. MORISON. Professor of History and Master, Timothy Dwight College, Yale University, New Haven, Connecticut.

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MR. PHILIP C. RITTERBUSH. Chairman, Organization Response, Washington, D.C.

MR. ANDRÉ SCHIFFRIN. Managing Director, Pantheon Books, New York City.

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DR. JOHN D. SPIKES. College of Science, University of Utah, Salt Lake City.

PROFESSOR STEPHEN E. TOULMIN. Department of Philosophy, Michigan State University, East Lansing.

DR. WILLIAM VON ARX. Senior Scientist, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts.

PROFESSOR WARREN H. WAGNER, JR. Department of Botany and Matthaei Botanical Gardens, The University of Michigan, Ann Arbor.

DR. RAINER ZANGERL. Field Museum of Natural History, Roosevelt Road and Lakeshore Drive, Chicago, Illinois.

Appendix 3

SMITHSONIAN ASSOCIATES MEMBERSHIP 1970–1971

Our deepest gratitute is extended to our members for their interest and generous support of the Smithsonian Associates this year, and especially to those listed below, who have contributed amounts in excess of the membership dues.

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Mr. Gyo Obata
The Honorable and Mrs. Jefferson Patterson
Mr. Charles Emory Phillips
Dr. and Mrs. Ernest G. Rafey
Mr. James H. Ripley
Mr. William H. Scully
Mrs. John Farr Simmons
Dr. and Mrs. T. Dale Stewart
Mrs. Edward C. Sweeney
Mrs. Mary Davidson Swift
Martha Frick Symington, Inc.
Mr. and Mrs. David G. Townsend
Mr. and Mrs. A. Buel Trowbridge
Mr. George C. Webster
Mr. and Mrs. William S. Weedon
Mr. and Mrs. J. H. Wilkinson, Jr.
Mr. and Mrs. Mark Winkler

Supporting Members

($50 and up)

The Reverend and Mrs. F. Everett Abbott
Mr. and Mrs. Stanley N. Allan
Mrs. Carol P. Banks
Dr. and Mrs. Montgomery Blair
Mr. Herbert Block
Mr. and Mrs. Emanuel Boasberg III
The Honorable Frances P. Bolton
Mr. and Mrs. Philip Bonsal
Mrs. Albert J. Bowley
Mrs. Linda C. Burgess
Mr. and Mrs. Horace W. Busby, Jr.
Mr. and Mrs. Frank Caplan
Mr. and Mrs. James G. Chandler
Mr. and Mrs. David Sanders Clark
Mrs. Chester Dale
Captain and Mrs. Robert F. Doss
Mr. and Mrs. Lionel Epstein
Mrs. Julius Fleischmann
The Honorable Peter Freylinghuysen
Mr. John W. Galston
Mr. and Mrs. Melvin Gelman
Mr. and Mrs. Ernest W. Grove
Mr. Tom Hart
Mr. and Mrs. Louis Hausman
Mr. and Mrs. Randolph A. Hearst
Mr. and Mrs. John W. Hechinger
Mrs. Rex D. Hopper, Sr.
Mr. H. T. Howard, Jr.
Mr. and Mrs. James H. Hughes
Mr. and Mrs. James D. Hurd
Mrs. George C. Keiser
Mr. J. A. King
Miss N. P. Kuhn
Mr. and Mrs. Thomas Liggett
Dr. and Mrs. Charles U. Lowe
Miss Katharine Magraw
Mrs. Isabel C. Mahaffie
Mr. and Mrs. Gershom R. Makepeace
Major and Mrs. George S. Mansfield
Mr. and Mrs. Sheldon I. Matzkin
Dr. and Mrs. Francis Mayle, Jr.
Dr. and Mrs. Edgar H. McPeak
Mr. and Mrs. Mylon Merriam
Colonel and Mrs. Kenneth L. Moll
Mrs. E. P. Moore
Miss Lee Muth
Mr. and Mrs. V. M. Newbold
Mr. and Mrs. J. Lloyd Niles
Nutrition Today
Mrs. Carolyn C. Onufrak
Mr. Estrada Raul Oyuela
Miss Ruth Uppercu Paul
Mrs. Duncan Phillips
Mr. Donald H. Price
Mrs. Albert J. Redway
Dr. Michael J. Reilly
Mr. R. D. Remley
Mr. and Mrs. John Richardson, Jr.
Mrs. John Barry Ryan
Mr. and Mrs. Herbert Salzman
Mr. and Mrs. Frank M. Sanger, Jr.
Mr. Michael F. Sawyer
Dr. and Mrs. George L. Sigalos
Mr. and Mrs. Richard R. Sigmon
Mr. and Mrs. Murray Socolof
Mrs. Beck Stein
Mr. and Mrs. Richard L. Sugarman
Mrs. Sally Sweetland
Mr. and Mrs. E. Russell True, Jr.
Mr. and Mrs. John D. Walker
Mr. and Mrs. Robert B. Watson
Mrs. Norma Christine Wertz
Mr. and Mrs. Anthony Wilson
Mrs. Mark Winkler
Mrs. Leslie H. Wyman
Mrs. Maury Young

Appendix 4

STAFF OF THE SMITHSONIAN INSTITUTION 30 JUNE 1970

Secretary's Office and Related Activities

The Secretary	S. Dillon Ripley
Executive Assistant	Christian C. Hohenlohe [1]
Under Secretary	James Bradley
Administrative Officer	Dorothy Rosenberg
Director of Support Activities	Richard L. Ault
Assistant to Under Secretary	Edward H. Kohn
Director, Office of Audits	Chris S. Peratino
Director General of Museums, and Director, United States National Museum	Frank A. Taylor [2]
Assistant Secretary (Science), Acting	David Challinor [3]
Assistant Secretary (History and Art)	Charles Blitzer
Assistant Secretary (Public Service)	William W. Warner
Treasurer	T. Ames Wheeler
Assistant Treasurer	Betty J. Morgan
Director, Office of Programming and Budget	John F. Jameson
Chief Accountant	Allen S. Goff
General Counsel	Peter G. Powers
Assistant General Counsels	Alan D. Ullberg
	George S. Robinson
	L. Wardlaw Hamilton
	Mrs. Suzanne D. Murphy
	Mrs. M. Malaro
Special Projects, Office of the Secretary	
Special Assistant to the Secretary	Richard H. Howland
Special Assistant to the Secretary	Woodruff M. Price [4]
Director, Office of Development	Lynford E. Kautz
Editor, Joseph Henry Papers	Nathan Reingold
Director, Office of Equal Employment Opportunity	Joseph A. Kennedy

[1] Replaced John H. Dobkin on 1 June 1971.

[2] Retired 23 January 1971.

[3] Replaced Sidney R. Galler on 11 January 1971.

[4] Appointed 1 February 1971.

Support Activities	
Chief, Administrative Systems Division	Ann S. Campbell
Director, Buildings Management Department	Andrew F. Michaels
Contracting Officer, Contracts Office	Elbridge, O. Hurlbut
Chief, Duplicating Section	Joseph E. Freeman
Director, Information Systems Division	Stanley A. Kovy
Director, Office of Personnel Administration	Vincent J. Doyle [5]
Director, Photographic Services Division	Arthur L. Gaush [6]
Chief, Supply Division	Fred G. Barwick
Chief, Travel Services Office	Mrs. Betty V. Strickler
Honorary Research Associates	Charles G. Abbot, Secretary Emeritus
	Leonard Carmichael, Secretary Emeritus
	Paul H. Oehser
	Alexander Wetmore, Secretary Emeritus
Honorary Fellow	John A. Graf

Science

Assistant Secretary	David Challinor
Special Assistants	Helen L. Hayes
	Michael R. Huxley
	Harold J. Michaelson
	Paula E. Ullmann

National Museum of Natural History

Director	Richard S. Cowan
Assistant Director	Paul K. Knierim
Assistant to Director (ADP)	James F. Mello
Assistant to Director (Exhibits)	Ronald S. Goor [7]
Administrative Officers	Mabel A. Byrd
	John C. Townsend
Anthropology	
Chairman	Clifford Evans
Senior Physical Anthropologist	T. Dale Stewart [8]
Senior Archeologist	Waldo R. Wedel
Senior Ethnologist	John C. Ewers
Archivist	Margaret C. Blaker

[5] Replaced Leonard Pouliot 13 December 1970.

[6] Replaced Otis H. Greeson (Retired) 28 February 1971.

[7] Appointed 23 August 1970.

[8] Retired 28 May 1971.

Latin American Anthropology	
Associate Curator	Robert M. Laughlin
Curator	Clifford Evans
Associate Curator	William H. Crocker
Old World Anthropology	
Curator	Gordon D. Gibson
Curator	Saul H. Riesenberg
Curator	Gus W. Van Beek
Associate Curators	Eugene I. Knez
	William B. Trousdale
North American Anthropology	
Associate Curator	William W. Fitzhugh [9]
Curator	William C. Sturtevant
Associate Curator	Paul H. Voorhis [10]
Physical Anthropology	
Curator	J. Lawrence Angel
Associate Curator	Donald J. Ortner
Associate Curator	Lucile E. St. Hoyme
Museum Specialist	Douglas H. Ubelaker
Research Associates, Collaborators, and Affiliated Scientists	Hans-Georg Bandi (Archeology) W. Montague Cobb (Physical Anthropology) T. Aidan Cockburn (Physical Anthropology) Henry B. Collins (Archeology) Wilson Duff (Ethnology) Roger I. Eddy (Ethnology) Don D. Fowler (Archeology) Marcus S. Goldstein (Physical Anthropology) Sister Inez Hilger (Ethnology) C. G. Holland (Archeology) Neil M. Judd (Archeology) Richard T. Koritzer (Physical Anthropology) Ralph K. Lewis (Archeology) Olga Linares de Sapir (Archeology) Betty J. Meggers (Archeology) George S. Metcalf (Archeology) Philleo Nash (Ethnology) Walter G. Putschar (Physical Anthropology) Victor A. Nunez Regueiro (Archeology) Mary Slusser (Archeology) Wilhelm G. Solheim (Archeology)

[9] Appointed 31 August 1970.

[10] Resigned 10 September 1970.

441-283 O - 71 - 10

Research Associates, Collaborators, and Affiliated Scientists—Continued	T. Dale Stewart (Physical Anthropology)
	Matthew W. Stirling (Archeology)
	Robert Stuckenrath (Archeology)
	Douglas Taylor (Ethnology)
	William J. Tobin (Physical Anthropology) [11]
	Theodore A. Wertime (Archeology)
	Edwin F. Wilmsen (Archeology)
Botany	
Chairman	Edward S. Ayensu
Senior Botanist	Lyman B. Smith
Senior Botanist	Conrad V. Morton [12]
Phanerogams	
Curators	John J. Wurdack
	Velva Rudd
	Wallace R. Ernst
	F. Raymond Fosberg [13]
Associate Curators	Dan H. Nicolson
	Marie-Helene Sachet [14]
	Stanwyn G. Shetler
Assistant Curator	Dieter C. Wasshausen
Ferns	
Associate Curator	David B. Lellinger
Grasses	
Associate Curator	Thomas R. Soderstrom
Cryptogams	
Curator	Harold E. Robinson
Curator	Mason E. Hale, Jr.
Associate Curator	Arthur L. Dahl [15]
Plant Anatomy	
Curator	Richard H. Eyde
Curator	Edward S. Ayensu
Research Associates, Collaborators and Affiliated Scientists [16]	W. Andrew Archer (Flowering Plants)
	Chester R. Benjamin (Fungi)
	John A. Churchill (Flowering Plants)
	Paul S. Conger (Diatomaceae)
	José Cuatrecasas (Flora of Tropical South America)
	James A. Duke (Flora of Panama)
	Emily W. Emmart (Plants of Mexico)

[11] Died 3 March 1971.

[12] Effective 9 August 1970.

[13] Reassigned 1 July 1970.

[14] Reassigned 1 July 1970.

[15] Appointed 14 September 1970.

[16] National fungus collections are curated by Department of Agriculture staff.

Research Associates, Collaborators, and Affiliated Scientists—Continued	Marie L. Farr (Fungi) Howard S. Gentry (Economic Plants of Northwestern Mexico) Charles R. Gunn (Fungi) William H. Hathaway (Flora of Central America) Frederick J. Hermann (North American Flora) Robert M. King (Compositae) Paul L. Lentz (Fungi) Elbert L. Little (Dendrology) Alicia Lourteig (Neotropical Botany) Kittie F. Parker (Compositae) Julian C. Patiño (Flora of Colombia) Clyde F. Reed (Ferns) James L. Reveal (Ferns) Marie L. Solt (Melastomataceae) William L. Stern (Plant Anatomy) John A. Stevenson (Fungi) Edward E. Terrell (Phanerogams) Francis A.Uecker (Fungi) Egbert H. Walker (Myrsinaceae, East Asian Flora)
Entomology	
Chairman	Paul D. Hurd, Jr.[17]
Senior Entomologists	Karl V. Krombein J. F. Gates Clarke
Neuropteroids	
Curator	Oliver S. Flint, Jr.
Lepidoptera and Diptera	
Associate Curators	Donald R. Davis W. Donald Duckworth
Assistant Curator	William D. Field
Coleoptera	
Associate Curator	Paul J. Spangler
Assistant Curator	Terry L. Erwin [18]
Hemiptera and Hymenoptera	
Associate Curator	Richard C. Froeschner
Myriapoda and Arachnida	
Curator	Ralph E. Crabill, Jr.
Research Associates, Collaborators, and Affiliated Scientists	Charles P. Alexander (Diptera) William H. Anderson (Coleoptera) Doris H. Blake (Coleoptera) Franklin S. Blanton (Diptera) Frank L. Campbell (Insect Physiology)

[17] Appointed 31 August 1970.

[18] Appointed 1 July 1970.

Research Associates, Collaborators, and Affiliated Scientists—Continued	
	Oscar L. Cartwright (Coleoptera)
	K. C. Emerson (Mallophaga)
	John G. Franclemont (Lepidoptera)
	Frank M. Hull (Diptera)
	William L. Jellison (Siphonaptera, Anoplura)
	Harold F. Loomis (Myriapoda)
	Carl F. W. Muesebeck (Hymenoptera)
	Thomas E. Snyder (Isoptera) [19]
	Robert Traub (Siphonaptera)
Invertebrate Zoology	
Chairman	Raymond B. Manning
Senior Zoologists	Fenner A. Chace, Jr.
	Horton H. Hobbs, Jr.
	Harald A. Rehder
Crustacea	
Curators	Thomas E. Bowman
	J. Laurens Barnard
	Louis S. Kornicker
Associate Curator	Roger F. Cressey
Echinoderms	
Curator	David L. Pawson
Associate Curator	Klaus Ruetzler
Worms	
Curators	Meredith L. Jones
	Marian H. Pettibone
	Mary E. Rice
Associate Curator	W. Duane Hope
Mollusks	
Curator	Joseph Rosewater
Associate Curators	Joseph P. E. Morrison
	Clyde F. E. Roper
Visiting Curator	Frederick M. Bayer
Research Associates, Collaborators, and Affiliated Scientists	Willard W. Becklund (Helminthology) [20]
	S. Stillman Berry (Mollusks)
	J. Bruce Bredin (Biology)
	Isabel C. Canet (Crustacea)
	Maybelle H. Chitwood (Worms)
	Ailsa M. Clark (Marine Invertebrates)
	Elisabeth Deichmann (Echinoderms)
	Mary Gardiner (Echinoderms)

[19] Died 31 July 1970.

[20] Died 18 October 1970.

Research Associates, Collaborators, and Affiliated Scientists—Continued	
	Roman Kenk (Worms)
	Anthony J. Provenzano, Jr. (Crustacea)
	Waldo L. Schmitt (Marine Invertebrates)
	Frank R. Schwengel (Mollusks)
	I. G. Sohn (Crustacea)
	Donald F. Squires (Echinoderms)
	Gilbert L. Voss (Mollusks)
	Mildred S. Wilson (Copepod Crustacea)
Mineral Sciences	
Chairman	Brian H. Mason
Curator	George S. Switzer
Meteorites	
Curator	Kurt Fredericksson
Associate Curator	Roy S. Clarke, Jr.
Geochemist	Robert F. Fudali
Chemists	Eugene Jarosewich
	Joseph A. Nelen
Mineralogy	
Associate Curator	Paul E. Desautels
Crystallographer	Joel E. Arem [21]
Petrology	
Associate Curator	William G. Melson
Research Associates, Collaborators, and Affiliated Scientists	Howard J. Axon (Meteorites)
	Vago F. Buchwald (Meteorites)
	Tomas Feininger (Petrology)
	Edward P. Henderson (Meteorites)
	John B. Jago (Mineralogy)
	Peter Leavens (Mineralogy)
	Rosser Reeves (Mineralogy)
	Thomas E. Simkin (Petrology)
	Geoffrey Thompson (Petrology)
	Harry Winston (Mineralogy)
Paleobiology	
Chairman	Porter M. Kier
Senior Paleobiologists	G. Arthur Cooper
	C. Lewis Gazin [22]
Collections Manager	Frederick J. Collier
Invertebrate Paleontology	
Curators	Martin A. Buzas
	Richard S. Boardman
	Alan H. Cheetham
	Erle G. Kauffman

[21] Appointed 1 July 1970.

[22] Retired 31 July 1970.

Invertebrate Paleontology—Continued	
Curators—Continued	Richard Cifelli
	Richard M. Benson
Associate Curator	Thomas R. Waller
Geologist	Kenneth M. Towe
Vertebrate Paleontology	
Curators	Clayton E. Ray
	Nicholas Hotton III
Associate Curator	Robert J. Emry [23]
Paleobotany	
Associate Curators	Walter H. Adey
	Leo J. Hickey
	Francis M. Hueber
Sedimentology	
Geological Oceanographer	Daniel J. Stanley
Curator	Jack W. Pierce
Research Associates, Collaborators, and Affiliated Scientists	
Invertebrate Paleontology	Arthur J. Boucot
	Anthony C. Coates
	C. Wythe Cooke
	J. Thomas Dutro
	Robert M. Finks
	Mackenzie Gordon, Jr.
	Richard E. Grant
	John W. Huddle
	Ralph W. Imlay
	Harry S. Ladd
	N. Gary Lane
	Kenneth E. Lohman
	Sergius H. Mamay
	James F. Mello
	William A. Oliver, Jr.
	Axel A. Olsson
	John Pojeta, Jr.
	Norman F. Sohl
	Margaret Ruth Todd
	Wendell P. Woodring
	Ellis L. Yochelson
Paleobotany	Patricia J. Adey
	David Child
Sedimentology	Gilbert Kelling
	Frederic R. Siegel
Vertebrate Paleontology	Douglas Emlong
	Charles A. Reppening
	Frank C. Whitmore, Jr.
Vertebrate Zoology	
Chairman	George E. Watson

[23] Appointed 16 February 1971.

Fishes	
Curators	Robert H. Gibbs, Jr.
	Ernest A. Lachner
	Victor G. Springer
	Stanley H. Weitzman
Associate Curator	William R. Taylor
Reptiles and Amphibians	
Curator	James A. Peters
Assistant Curator	George R. Zug
Birds	
Curator	Richard L. Zusi
Associate Curator	Paul Slud
Mammals	
Curator	Charles O. Handley
Curator	Henry W. Setzer
Associate Curator	Richard W. Thorington, Jr.
Research Associates, Collaborators, and Affiliated Scientists	John W. Aldrich (Birds)
	Richard C. Banks (Birds)
	William Belton (Birds)
	James E. Böhlke (Fishes)
	Robert L. Brownell, Jr. (Mammals)
	Leonard Carmichael (Psychology, Animal Behavior)
	Daniel M. Cohen (Fishes)
	Bruce B. Collette (Fishes)
	George J. Divocky (Birds)
	John F. Eisenberg (Mammals)
	Robert K. Eenders (Mammals)
	Herbert Friedmann (Birds)
	Crawford H. Greenewalt (Birds)
	Arthur M. Greenhall (Mammals)
	Brian A. Harrington (Birds)
	Philip S. Humphrey (Birds)
	David H. Johnson (Mammals)
	Clyde J. Jones (Mammals)
	Gwilym S. Jones (Mammals)
	E. V. Komarek (Mammals)
	Roxie C. Laybourne (Birds)
	Richard H. Manville (Mammals)
	J. A. J. Meester (Mammals)
	Edgardo Mondolfi (Mammals)
	Russell E. Mumford (Mammals)
	John R. Napier (Mammals)
	Storrs L. Olson (Birds)
	Dioscoro S. Rabor (Birds)
	S. Dillon Ripley (Birds)
	Leonard P. Schultz (Fishes)
	Frank J. Schwartz (Fishes)
	Alexander Wetmore (Birds)
	David B. Wingate (Birds)

National Air and Space Museum

Director	Michael Collins [24]
Deputy Director	Melvin B. Zisfein
Administrative Officer	John Whitelaw
Acting Assistant Director (Aeronautics)	Louis S. Casey
Curator (Aircraft Propulsion)	Robert B. Meyer
Assistant Director (Astronautics)	Frederick C. Durant III
Assistant Director (Information)	Ernest W. Robischon
Advisory Board	S. Dillon Ripley, Chairman *(ex officio)*
	Major General Nils O. Ohman, USAF
	Vice Admiral Thomas F. Connolly, USN
	Brigadier General James L. Collins, USA
	Brigadier General H. S. Hill, USMC
	Rear Admiral Roderick Y. Edwards, USCG
	Vacancy, NASA
	General Gustav Lundquist, FAA
Honorary	Olive A. Beech
	William E. Hall
	Elwood R. Quesada

Astrophysical Observatory

Director	Fred L. Whipple
Assistant Director (Management)	Robert V. Bartnik
Assistant Director (Science)	Charles A. Lundquist
Scientific Staff	Kaare Aksnes
	Arthur C. Allison
	Eugene H. Avrett
	Prabhu Bhatnagar
	Nathaniel P. Carleton
	Frederic Chaffee
	Jerome R. Cherniack
	Giuseppe Colombo
	Allan F. Cook
	Alex Dalgarno
	Robert J. Davis
	James C. DeFelice
	William A. Deutschman
	Dale F. Dickinson
	Giovanni G. Fazio
	Darrell Fernald
	Edward L. Fireman
	Giuseppe Forti

[24] Appointed 12 April 1971.

Scientific Staff—Continued

Fred A. Franklin
Edward M. Gaposchkin
Owen Gingerich
Antanas Girnius
Mario D. Grossi
Katherine Haramundanis
Gerald Hawkins
Henry F. Helmken
Paul W. Hodge
Luigi G. Jacchia
Wolfgang Kalkofen
Douglas Kleinmann
Yoshihide Kozai
David Latham
Myron Lecar
Carlton G. Lehr
Martin Levine
A. Edward Lilley
Marvin Litvak
Richard E. McCrosky
Brian G. Marsden
Ursula B. Marvin
George H. Megrue
Donald H. Menzel
Lawrence W. Mertz
Henri E. Mitler
Paul A. Mohr
James Moran
Carl S. Nilsson
Yasushi Nozawa
Robert W. Noyes
Costas Papaliolios
Cecelia H. Payne-Gaposhkin
Michael R. Pearlman
Douglas T. Pitman
Annette Posen
Harrison E. Radford
John Reid
George B. Rybicki
Winfield W. Salisbury
Rudolph E. Schild
Zdenek Sekanina
Chen-Yuan Shao
I. Shapiro
Jack W. Slowey
Richard B. Southworth
Gert Spannagel
Frank Steinbrunn
Shephen E. Strom
Wesley A. Traub
Robert Vessot

Scientific Staff—Continued	Richard B. Wattson
	George Weiffenbach
	Trevor C. Weekes
	Charles A. Whitney
	John A. Wood
Consultants	Robert N. Anthony
	John Danziger
	Stanley Ross
	Robert Stein
	Pol Swings
	George Veis
	Natarajan Visvanathan
Fellows	Hiram Levy II
	G. Jeffrey Taylor
Director, Central Bureau for Satellite Geodesy	George Veis
Director, Central Bureau for Astronomical Telegrams	Brian G. Marsden

Smithsonian Tropical Research Institute

Director	Martin H. Moynihan
Special Assistant to Director	Adela Gomez
Assistant Director (Science)	Ira Rubinoff
Administrative Officer	C. Neal McKinney
Biologists	Robert L. Dressler
	Peter W. Glynn
	Judith Lang
	Egbert Leigh
	A. Stanley Rand
	Michael H. Robinson
	Roberta W. Rubinoff
	Neal G. Smith
	Henk Wolda
Honorary	Charles F. Bennett, Jr.
	John F. Eisenberg
	Carmen Glynn
	Carlos Lehmann
	Robert H. MacArthur
	Giles W. Mead
	Ernst Mayr
	Barbara Robinson
	Patricio Sánchez
	W. John Smith
	C. C. Soper
	Paulo Vanzolini
	Martin Young

Radiation Biology Laboratory

Director	William H. Klein
Assistant Director	Walter A. Shropshire, Jr.
Biochemists	David L. Correll
	Maurice M. Margulies
	Robert L. Weintraub
	Homer T. Hopkins
Biologist	Elisabeth Gantt
Geneticist	Andrew W. Snope
Anthropologist	Robert Stuckenrath
Geochemist	James Mielke
Physicist	Bernard Goldberg
Plant Physiologists	John Edwards
	Victor B. Elstad
	Rebecca Gettens
	Leonard Price

National Zoological Park

Director	Theodore H. Reed
Assistant Director	John Perry
Special Assistant to the Director	Warren J. Iliff
Administrative Officer	Joseph J. McGarry
Captain, Police Division	Anthony J. Kadlubowski
Head, Planning and Design Office	Norman C. Melun
Head, Information and Education Office	Sybil E. Hamlet
Curator, Division of Birds	Sam E. Weeks
Curator, Division of Small Mammals and Primates	Harold J. Egoscue
Curator, Division of Reptiles	Jaren G. Horsley
Resident Scientist, Division of Scientific Research	John F. Eisenberg
Veterinarian, Division of Animal Health	Clinton W. Gray
Pathologist, Division of Pathology	Robert M. Sauer
Chief, Operations and Maintenance Department	James H. McAllister
Head, Automotive Division	Jesse Batts
Head, Grounds Division	John Monday
Head, Maintenance Division	Robert Ogilvie
Head, Mechanical Division	Theodore Runyan
Head, Labor Division	Carl F. Jackson
Associates in Ecology	S. Dillon Ripley
	Lee M. Talbot
Research Associates	Jean Delacour
	Gerald G. Montgomery
	George McKay
	Devra G. Kleiman
	Bernard C. Zook

Collaborators	F. M. Garner
	Leonard J. Goss
	Carlton M. Herman
	Peul Leyhausen
	Charles R. Schroeder

Office of Environmental Sciences

Director	I. Eugene Wallen
Ecology Program	
Director	Dale W. Jenkins
Senior Scientist	Helmut K. Buechner
Resident Ecologist	Lee M. Talbot [25]
Visiting Ecologist	Clifford O. Berg [26]
Oceanography and Limnology Program	
Director	Robert P. Higgins
Director, Mediterranean Marine Sorting Center	William P. Davis
Director, Smithsonian Oceanographic Sorting Center	H. Adair Fehlmann
Oceanographer	Dail W. Brown
Chesapeake Bay Center for Environmental Studies, Director	Francis S. L. Williamson
Center for Short-Lived Phenomena	
Director	Robert Citron

Center for the Study of Man

Acting Director	Sol Tax
Program Coordinator	Sam Stanley

Science Information Exchange

Director	Monroe E. Freeman
Deputy Director	David F. Hersey
Associate Directors	
Life Sciences	Willis R. Foster
Physical Sciences	Frank J. Kreysa
Data Processing	Martin Snyderman
Special Assistant	Richard C. Reeser
Executive Officer	V. P. Verfuerth
Administrative Officer	Evelyn M. Roll
Life Sciences Division	
Chief	Willis R. Foster
Deputy Chief	Charlotte M. Damron

[25] On leave to Council for Environmental Quality during FY 1971.

[26] Served 1 October 1970 to 31 May 1971.

Life Sciences Division—Continued	
Chief, Medical Sciences Branch	Faith F. Stephan
Chief, Biological Sciences Branch	James R. Wheatley, Jr.
Chief, Agricultural Sciences Branch	William T. Carlson
Chief, Behavioral Sciences Branch	Rhoda Stolper
Chief, Social Sciences and Community Programs Branch	Barbara F. Lundquist
Physical Sciences Division	
Chief	Frank J. Kreysa
Chief, Chemistry Branch	Samuel Liebman
Chief, Earth Sciences Branch	Joseph P. Riva, Jr.
Chief, Electronics Branch	John J. Park
Chief, Engineering Branch	Inder Jit Bhambri
Chief, Materials Branch	William H. Payne
Chief, Physics and Mathematics Branch	Robert Summers
Data Processing Division	
Chief	Martin Snyderman
Deputy Chief	Bernard L. Hunt
Chief, Registry Branch	Angelo Piccillo
Chief, Data Edit Branch	Mary Rumreich
Chief, Report Services Branch	Olympia Merritt
Chief, Systems and Programming Branch	Robert A. Kline
Chief, Computer Operations Branch	Paul Gallucci

History and Art

Assistant Secretary	Charles Blitzer
Deputy	Richard Grove

The National Museum of History and Technology

Director	Daniel J. Boorstin
Assistant Director	Silvio A. Bedini
Assistant Director for Administration	Robert G. Tillotson
Special Assistant to the Director	Ladd E. Hamilton
Administrative Officer	Virginia Beets
Senior Scientific Scholar	Robert P. Multhauf
Special Assistant (Bicentennial Planning	John J. Slocum
Principal Investigator (Computer History)	Henry S. Tropp [27]
Historians	Peter C. Marzio
	Harold K. Skramstad, Jr.[28]
Applied Arts	
Chairman	Carl H. Scheele

[27] Appointed 21 April 1971.

[28] Appointed 21 February 1971.

Graphic Arts and Photography	
Curator	Eugene Ostroff
Associate Curator	Elizabeth M. Harris
Assistant Curator	David E. Haberstich
Numismatics	
Curator	Vladimir Clain-Stefanelli
Curator	Elvira Clain-Stefanelli
Postal History	
Curator	Carl H. Scheele
Associate Curator	Reidar Norby
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441-283 O - 71 - 11

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[29] Appointed 17 August 1970.
[30] Appointed 17 August 1970.
[31] Appointed 19 January 1970.
[32] Appointed 3 January 1971.

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[33] Retired 23 January 1971.

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[34] Appointed 12 July 1970.

[35] Appointed 8 September 1970.

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[36] Appointed 23 August 1970.
[37] Appointed 12 July 1970.
[38] Resigned 6 March 1971.
[39] Appointed 18 April 1971.
[40] Resigned 29 May 1971.
[41] Appointed 26 April 1971.
[42] Retired 29 May 1971.

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	Harriette Hughes [46]
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[43] Transferred 11 January 1971.
[44] Appointed 11 January 1971.
[45] Transferred 11 January 1971.
[46] Appointed 16 February 1971.
[47] Transferred 11 January 1971.

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[48] Effective 26 October 1970.

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[49] Appointed 1 November 1970.
[50] Effective 16 April 1971.
[51] Effective 15 February 1971.

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Appendix 5

PUBLICATIONS OF THE SMITHSONIAN INSTITUTION PRESS IN FISCAL YEAR 1971

Research in Art, History, and Science

Non-Series Publications

Eisenberg, J. F., and Wilton S. Dillon, editors. *Man and Beast: Comparative Social Behavior.* 401 pages, 29 figures, 3 tables. 18 June 1971. Cloth, $11.50.

Green, Constance McLaughlin, and Milton Lomask. *Vanguard: A History.* Foreword by Charles A. Lindbergh. xviii + 309 pages, 46 illustrations, 3 tables. 27 April 1971. Cloth, $12.50.

Scheele, Carl H. *A Short History of the Mail Service.* 250 pages, 14 figures, 13 tables. Originally published 15 March 1970, reissued January 1971. Cloth, $6.95.

Stewart, T. D., editor. *Personal Identification in Mass Disasters.* 158 pages, 40 figures, 59 tables. 16 October 1970. Cloth.

Stites, Raymond S. *The Sublimations of Leonardo da Vinci.* x + 422 pages, 311 illustrations. 1 December 1970. Cloth, $14.95.

Swanton, John R. *The Indian Tribes of North America.* vi + 726 pages, 5 maps. Bureau of American Ethnology Bulletin 145, originally published 1952, reissued 15 April 1969, reprinted January 1971. Cloth, $16.50.

Smithsonian Annals of Flight

4. C. Fayette Taylor. "Aircraft Propulsion: A Review of the Evolution of Aircraft Piston Engines." viii + 135 pages, 72 figures. 29 January 1971.
6. Robert B. Meyer, Jr., editor. "Langley's Aero Engine of 1903." xi + 193 pages, 44 figures. 30 March 1971.

Smithsonian Contributions to Astrophysics

12. Bertil-Anders Lindblad. "Two Computerized Stream Searches Among Meteor Orbits: 1. Among 865 Precise Photographic Orbits; 2. Among 2401 Photographic Orbits." 24 pages, 4 figures, 14 tables. 23 June 1971.
13. Cecilia H. Payne-Gaposchkin. "The Variable Stars of the Large Magellanic Cloud." 41 pages, 13 tables. 3 June 1971.

Smithsonian Contributions to the Earth Sciences

1. George Switzer and William G. Melson. "Partially Melted Kyanite Eclogite from the Roberts Victor Mine, South Africa." 9 pages, 5 figures, 6 tables. 15 April 1969. [Not reported in 1970.]
2. Paul A. Mohr. "Catalog of Chemical Analyses of Rocks from the Intersection of the African, Gulf of Aden, and Red Sea Rift Systems." 271 pages. 16 December 1970.
3. Brian Mason and A. L. Graham. "Minor and Trace Elements in Meteoritic Minerals." 17 pages, 1 figure, 17 tables. 17 September 1970.
4. William G. Melson, Eugene Jarosewich, and Charles A. Lundquist. "Volcanic Eruption at Metis Shoal, Tonga, 1967–1968: Description and Petrology." 18 pages, 13 figures, 3 tables. 16 October 1970.
5. Roy S. Clarke, Jr., Eugene Jarosewich, Brian Mason, Joseph Nelen, Manuel Gómez, and Jack R. Hyde. "The Allende, Mexico, Meteorite Shower." 53 pages, 36 figures, 6 tables. 17 February 1971.
6. Daniel J. Stanley and Noel P. James. "Distribution of *Echinarachnius parma* (Lamarck) and Associated Fauna on Sable Island Bank, Southeast Canada." 24 pages, 8 figures, 6 plates, 1 table. 27 April 1971.

Smithsonian Contributions to Paleobiology

3. J. Thomas Dutro, Jr., editor. "Paleozoic Perspectives: A Paleontological Tribute to G. Arthur Cooper." 390 pages, illustrated. 22 February 1971.
5. Arthur D. Watt. "Catalog of the Illustrated Paleozoic Plant Specimens in the National Museum of Natural History." 53 pages. 17 September 1970.

Smithsonian Contributions to Zoology

38. Roger F. Cressey. "Copepods Parasitic on Sharks from the West Coast of Florida." 30 pages, 110 figures, 1 table. 30 December 1970.
43. Norman Marston. "Revision of New World Species of Anthrax (Diptera: Bombyliidae), Other than the Anthrax albofasciatus Group." 148 pages, 135 figures, 6 plates, 27 maps. 6 July 1970.
45. Charles P. Alexander. "Bredin-Archbold-Smithsonian Biological Survey of Dominica: The Crane Flies (Diptera: Tipulidae)." 59 pages, 68 figures. 17 September 1970.
49. W. D. Williams. "A Revision of North American Epigean Species of *Asellus* (Crustacea: Isopoda)." 80 pages, 57 figures, 5 tables, 31 December 1970.
51. Dennis M. Devaney. "Studies on Ophiocomid Brittlestars. I. A New Genus (*Clarkcoma*) of Ophiocominae with a Reevaluation of the Genus *Ophiocoma*." 41 pages, 50 figures, 5 tables. 2 December 1970.
52. Marian H. Pettibone. "Revision of the Genus *Euthalenessa* Darboux (Polychaeta: Sigalionidae)." 30 pages, 16 figures. 16 July 1970.
53. Marian H. Pettibone. "Revision of Some Species Referred to *Leanira* Kinberg. (Polychaeta: Sigalionidae)." 25 pages, 12 figures. 6 August 1970.

54. Arthur G. Humes and Ju-Shey Ho. "Cyclopoid Copepods of the Genus *Pseudanthessius* Associated with Crinoids in Madagascar." 20 pages, 90 figures, 1 table. 16 July 1970.
55. Ellsworth H. Wheeler, Jr. "Atlantic Deep-Sea Calinoid Copepoda." 31 pages, 109 figures, 4 tables. 18 August 1970.
56. J. F. Gates Clarke. "The Lepidoptera of Rapa Island." 282 pages, 175 figures, 29 plates. 11 June 1971.
57. Doris H. Blake. "A Review of the Beetles of the Genus *Metachroma* Chevrolat (Coleoptera: Chrysomelidae)." 111 pages, 175 figures. 31 December 1970.
59. Ernest A. Lachner, C. Richard Robins, and Walter R. Courtenay, Jr. "Exotic Fishes and Other Aquatic Organisms Introduced into North America." 29 pages, 4 figures, 1 table. 30 September 1970.
60. Oliver S. Flint, Jr. "Studies of Neotropical Caddisflies, X: *Leucotrichia* and Related Genera from North and Central America (Trichoptera: Hydroptilidae). " 64 pages, 249 figures. 21 October 1970.
61. J. Laurens Barnard. "Gammaridean Amphipoda from a Deep-Sea Transect off Oregon." 86 pages, 48 figures, 1 table. 4 January 1971.
62. William L. Peters. "A Revision of the Leptophlebiidae of the West Indies (Ephemeroptera)." 48 pages, 212 figures, 1 table. 10 March 1971.
64. Maureen E. Downey. "Zorocallida, New Order, and *Doraster constellatus*, New Genus and Species, with Notes on the Zoroasteridae (Echinodermata: Asteroidea)." 18 pages, 11 figures, 2 tables. 30 July 1970.
65. Michael H. Robinson and José Olazarri. "Units of Behavior and Complex Sequences in the Predatory Behavior of *Argiope argentata* (Fabricius): (Araneae: Araneidae)." 36 pages, 15 figures, 3 tables. 21 May 1971.
66. Peter W. Glynn. "On the Ecology of the Caribbean Chitons *Acanthopleura granulata* Gmelin and *Chiton tuberculatus* Linné: Density, Mortality, Feeding, Reproduction, and Growth." 21 pages, 10 figures, 9 tables. 16 October 1970.
67. Maurice T. James. "A Partial Revision of the Oriental *Isomyia* of the Viridaurea Group (Diptera: Calliphoridae). 14 pages, 1 figure. 17 September 1970.
68. D. L. Deonier. "A Systematic and Ecological Study of Nearctic *Hydrellia* (Diptera: Ephydridae)." 147 pages, 142 figures, 2 tables. 11 May 1971.
69. James A. Peters. "Biostatistical Programs in BASIC Language for Time-Shared Computers: Coordinated with the Book 'Quantitative Zoology.'" 46 pages. 10 March 1971.
70. T. J. Spilman. "Bredin-Archbold-Smithsonian Biological Survey of Dominica: Bostrichidae, Inopeplidae, Lagriidae, Lyctidae, Lymexylonidae, Melandryidae, Monommidae, Rhipiceridae, and Rhipiphoridae (Coleoptera). 10 pages, 7 figures, 1 table. 4 January 1971.
71. Raymond B. Manning. "Keys to the Species of *Oratosquilla* (Crustacea: Stomatopoda), with Descriptions of Two New Species." 16 pages, 4 figures. 14 January 1971.
72. Victor G. Springer. "Revision of the Fish Genus *Eesenius* (Blenniidae. Blenniinae, Salariini)." 74 pages, 36 figures, 18 tables. 30 March 1971.
73. William F. Smith-Vaniz and Victor G. Springer. "Synopsis of the Tribe Salariini, with Description of Five New Genera and Three New Species (Pisces: Blenniidae)." 72 Pages, 51 figures, 6 tables. 30 March 1971.

74. James F. Greene. "A Revision of the Nearctic Species of the Genus *Psammotettix* (Homoptera: Cicadellidae)." 40 pages, 23 figures. 25 May 1971.
75. James A. Blake. "Revision of the Genus *Polydora* from the East Coast of North America (Polychaeta: Spionidae)." 32 pages, 16 figures, 1 table. 5 February 1971.
77. Klaus Rützler. "Bredin-Archbold-Smithsonian Biological Survey of Dominica: Burrowing Sponges, Genus *Siphonodictyon* Bergquist, from the Caribbean." 37 pages, 11 figures, 9 plates, 2 tables. 24 February 1971.
78. Neil C. Hulings and John S. Gray, editors. "A Manual for the Study of Meiofauna." 83 pages, 13 figures, 1 table. 28 April 1971.
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441-283 O - 71 - 15

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————. "Conservation of Metals." 2 day seminar. Cooperstown Graduate Program, New York State Historical Society, April 1971.
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and the Picture Division of the Special Libraries Association, San Francisco, California, June 1971.

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"Jacquard Woven Tapestries." Division of Textiles, Information Leaflet 71–14.

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Appendix 7

ACADEMIC APPOINTMENTS 1970–1971

Postdoctoral Visiting Research Associates

Program in American History

LEONARD P. CURRY. Roots of American urbanism, 1800–1850, with Dr. Wilcomb Washburn, American Studies Program, from 15 August 1970 to 14 August 1971.

Program in Anthropology

JAMES T. RAUH. An investigation of the structure of the Borgia group of manuscripts, with Dr. Clifford Evans, National Museum of Natural History, from 1 December 1970 to 31 August 1971.

MARIO JOSE SANOJA. Ecology and cultural areas in pre-Columbian Venezuela, with Dr. Clifford Evans, National Museum of Natural History, from 1 September 1970 to 31 August 1971.

DAVID GENTRY STEELE. A re-evaluation of the within-group variation of the family Tupaiidae, with Dr. Lawrence Angel, National Museum of Natural History, from 1 July 1970 to 30 June 1971.

Program in Environmental Sciences

CLARKE BROOKS. Analysis of algal biliproteins, with Dr. Elizabeth Gantt, Radiation Biology Laboratory, from 1 July 1970 to 30 June 1971.

JACK H. BURK. Production and energy status of deciduous tree species with regard to annual cycle of energy utilization and standing crop, with Dr. Francis S. L. Williamson, Chesapeake Bay Center for Environmental Studies, from 1 September 1970 to 31 August 1971.

STEPHEN I. ROTHSTEIN. An experimental investigation of host preferences in the brown-headed cowbird, with Dr. Francis S. L. Williamson, Chesapeake Bay Center for Environmental Studies, from 1 September 1970 to 31 August 1971.

PENELOPE WILLIAMSON. Foraging behavior of the starling, *Sturnus vulgaris*, with Dr. George Watson, National Museum of Natural History, from 15 September 1970 to 14 September 1971.

Program in Evolutionary and Behavioral Biology, Tropical Zones

ALICIA BREYMEYER. Ecology of grasslands environments in tropical zones, with

Dr. Martin Moynihan, Smithsonian Tropical Research Institute, from 1 November 1970 to 30 April 1971.

JEFFREY B. GRAHAM. Studies in the biology of the amphibious clinid, *Mnierpes macrocephalus,* with Dr. Michael Robinson and Dr. Ira Rubinoff, Smithsonian Tropical Research Institute, from 1 September 1970 to 31 August 1971.

IAN N. HEALEY. The role of animals in decomposition processes in the tropical forest, with Dr. Martin Moynihan, Smithsonian Tropical Research Institute, from 1 January 1971 to 31 December 1971.

JAMES R. KARR. Comparisons of structure of avian communities in selected tropical areas, with Dr. Neal Smith, Smithsonian Tropical Research Institute, from 1 January 1971 to 30 June 1971.

EUGENE MORTON. Ecological aspects of communication in birds, with Dr. Neal Smith, Smithsonian Tropical Research Institute, from 1 January 1971 to 30 June 1971.

Program in Evolutionary and Systematic Biology

O. SYLVESTER ADEGOKE. Tertiary paleontology of southern Nigeria and ecology and distribution of living Foraminifera in the Gulf of Guinea, with Dr. Richard Cifelli, National Museum of Natural History, from 1 August 1970 to 31 July 1971.

ARNFRIED ANTONIUS. Occurrence and distribution of stony corals in Venezuelan waters, with Dr. Klaus Ruetzler, National Museum of Natural History, from 1 August 1970 to 31 July 1971.

JAMES A. DOYLE. Studies on angiosperm pollen and megafossils of the Potomac Group (Cretaceous) of Maryland and Virginia, with Dr. Leo J. Hickey, National Museum of Natural History, from 1 October 1970 to 30 September 1971.

TER-CHIEN HUANG. Deep sea sedimentation in the western Mediterranean Sea, with Dr. Daniel Stanley, National Museum of Natural History, from 1 January 1970 to 1 January 1971.

JERRY A. POWELL. Biosystematic study of Neotropical Sparganothidini (Lepidoptera: Tortricidae), with Dr. Donald Duckworth, National Museum of Natural History, from 1 September 1970 to 31 August 1971.

Program in History of Art and Music

ROBERT E. ELIASON. Early American wind instruments and their makers, with Mrs. Cynthia Hoover, National Museum of History and Technology, from 15 July 1970 to 14 July 1971.

FRANCIS V. O'CONNOR. Historical studies of American art of the 1930s, with Dr. Joshua C. Taylor, National Collection of Fine Arts, from 1 September 1970 to 31 August 1971.

Program in History of Science and Technology

SANDRA S. HERBERT. Erasmus Darwin's materialistics physiology and its importance for his grandson Charles' discovery of evolution through natural selection, with Dr. Audrey Davis, National Museum of History and Technology, from 1 June 1970 to 31 May 1971.

Program in Physical Sciences

MARTIN R. FLANNERY. Theoretical investigations of certain atomic and molec-

ular processes relevant to the earth's atmosphere, stellar and planetary atmospheres, and H I, H II regions of the sun, with Dr. Alexander Dalgarno, Smithsonian Astrophysical Observatory, from 1 September 1970 to 1 March 1971.

JOHN J. GURNEY. Electron microprobe studies of kimberlite and its associated ultrabasic xenoliths, with Dr. Brian Mason, National Museum of Natural History, from 1 November 1970 to 31 October 1971.

LAWRENCE N. MERTZ. Development of astronomical instrumentation, with Dr. N. P. Carleton, Smithsonian Astrophysical Observatory, from 1 July 1970 to 30 June 1971.

JEFFREY TAYLOR. Petrological and chemical research on lunar samples and theoretical interpretation and research on the metallic minerals in chondritic meteorites, with Dr. John Wood, Smithsonian Astrophysical Observatory, from 1 September 1970 to 31 August 1971.

Predoctoral Visiting Research Associates

Program in American History

MARTHA E. DOTY. Popular images of the American Indian, with Dr. Wilcomb Washburn and Mr. Richard Ahlborn, American Studies Program, from 1 January 1971 to 30 June 1971.

WILLIAM B. FLOYD. An historical study of Thomas Sully, with Dr. Wilcomb Washburn, American Studies Program, from 1 July 1970 to 31 June 1971.

RAYNA D. GREEN. The Image of the Indian in the popular imagination, with Dr. Wilcomb Washburn, American Studies Program, and Dr. Sam Stanley, Center for the Study of Man, from 1 September 1970 to 31 August 1971.

YVONNE M. LANGE. Santos, the wooden household saints of Puerto Rico, with Mr. Richard Ahlborn, American Studies Program, from 1 August 1970 to 31 July 1971.

PETER H. SMITH. The Great American Wheel Conspiracy: Hoopes Bros. and Darlington, 1890–1920, with Mr. Robert Vogel, National Museum of History and Technology, from 1 September 1970 to 31 August 1971.

ARTHUR TOWNSEND. Pattern and change in the material culture of Junction City, Kansas, between 1888 and 1922, as seen through the life and lens of Joseph Judd Pennell, photographer, with Dr. Wilcomb Washburn, American Studies Program, from 1 September 1970 to 1 June 1971.

Program in Anthropology

IRAIDA VARGAS. Aboriginal cultural development in eastern Venezuela and their relationships with the Lesser Antilles, with Dr. Clifford Evans, National Museum of Natural History, from 1 September 1970 to 31 August 1971.

Program in Environmental Sciences

CHRISTEN E. WEMMER. Behavioral concomitants of morphology and the relationship of the form-function complex to social organization and habitat utilization, with Dr. John Eisenberg, National Zoological Park, from 1 July 1970 to 31 July 1971.

Program in Evolutionary and Behavioral Biology, Tropical Zones

A. Ross Kiester. Studies on the ecology and social behavior of Panamanian Gecko, *Gonatodes albogularis,* with Dr. A. Stanley Rand, Smithsonian Tropical Research Institute, from 1 September 1970 to 31 August 1971.

John E. McCosker. Substrate preferences and comparative functional morphology of eels of the family Ophichthidae, with Dr. Ira Rubinoff, Smithsonian Tropical Research Institute, from 15 August 1970 to 14 August 1971.

William B. Ramirez. Ecological relationships and specificity between fig wasps (Agaonidae) and *Ficus,* with Dr. Robert Dressler, Smithsonian Tropical Research Institute, from 1 October 1970 to 30 September 1971.

Program in Evolutionary and Systematic Biology

David R. Budge. Study of late Ordovician and Silurian rocks and their contained coral fauna in the eastern Great Basin, with Dr. William S. Oliver, National Museum of Natural History, from 1 September 1970 to 31 August 1971.

Anne C. Cohen. Geographic variation and sexual dimorphism in the squid *Loligo pealei,* living from Canada to Columbia near the continental shores of western north Atlantic, Gulf of Mexico, with Dr. Clyde Roper, National Museum of Natural History, from 15 August 1970 to 30 June 1971.

Jean T. DeBell. Electron microscopy of the body wall of *Macracanthorhynchus hirudinaceus* (Acanthocephala), with Dr. W. Duane Hope, National Museum of Natural History, from 9 October 1969 to 9 October 1971.

Theodore Gary Gautier. Cryptostome Bryoza from the Permian (Leonardian) of the Glass Mountains, Texas, with Dr. Richard S. Boardman, National Museum of Natural History, from 1 July 1970 to 30 June 1971.

Walter Scott Gray. Studies of Antarctic Gammaridea (Amphipoda), particularly the families Eusiridae, Calliopiidae, and Pleustidae, with Dr. J. L. Barnard, National Museum of Natural History, from 15 February 1970 to 14 February 1971.

Eckart Hakansson. The free-living Cheilostomata from the White Chalk of Denmark, with Dr. Alan Cheetham, National Museum of Natural History, from 15 October 1970 to 14 October 1971.

Catherine J. Kerby. A life history study of the polychaetous annelid, *Sabella microphthalma,* with Dr. Meredith L. Jones, National Museum of Natural History, from 1 August 1970 to 31 July 1971.

Miloslav Kovanda. Preparation of a monographic electronic data bank of Campanula section Heterophylla, with Mr. Stanwyn Shetler, National Museum of Natural History, from 1 July 1970 to 30 June 1971.

Jackson Lewis. A study of genus *Calappa* (Decapoda: Oxystomata) as represented by recent species in the United States National Museum collections and by Miocene fossils from Florida, with Dr. Fenner A. Chace, Jr., National Museum of Natural History, from 1 September 1970 to 31 August 1971.

Program in History of Art and Music

Shelley Fletcher. Pigment analysis of the American painting collection at the National Collection of Fine Arts, with Mr. Charles Olin, NCFA Conservation Laboratory, from 1 July 1970 to 30 June 1971.

Robert Hunter. Study of Stuart Davis in the 1930s, with Dr. Joshua C. Taylor,

National Collection of Fine Arts, from 1 September 1970 to 31 August 1971.

WILLIAM D. MORGAN. Henry Vaughan, 1845–1917, Gothic revival architect, with Dr. Joshua C. Taylor, National Collection of Fine Arts, from 15 January 1971 to 30 June 1971.

RICHARD N. MURRAY. A study of figurative mural painting, public and private in the United States, 1890–1920, with Dr. Joshua C. Taylor, National Collection of Fine Arts, from 1 September 1970 to 31 August 1971.

PHYLIS NORTH. Max Weber paintings, 1905–1920, with Dr. Joshua C. Taylor, National Collection of Fine Arts, from 1 January 1971 to 30 June 1971.

CHRISTINE S. SCHLOSS. Study of the 18th-century American primitive painters, with Dr. Joshua C. Taylor, National Collection of Fine Arts, from 1 September 1970 to 30 June 1971.

Program in History of Science and Technology

STEPHEN COOPER. History of American science and technology with emphasis on interrelationships between science and government, with Dr. Nathan Reingold, Joseph Henry Papers, from 1 August 1970 to 31 July 1971.

BARBARA KAPLAN. The relevance of alchemical and hermetic ideas to 13th and 14th century medicine in western Europe, with Dr. Sami Hamarneh, National Museum of History and Technology, from 1 September 1970 to 31 August 1971.

JOHN RICHARD KERWOOD. The editing of documentary sources in American History, with Dr. Nathan Reingold, Joseph Henry Papers, from 1 September 1970 to 30 June 1971.

SALLY G. KOHLSTEDT. The American Association for the Advancement of Science, 1840 to 1860; the formation of a national scientific community, with Dr. Nathan Reingold, Joseph Henry Papers, from 1 September 1970 to 31 August 1971.

Program in Museum Studies

JOAN W. MISHARA. Conservation studies of metals, particularly metallic objects of art, with Mr. Robert Organ, Conservation Analytical Laboratory, from 1 July 1970 to 31 January 1971.

RICHARD PRUITT. Pictorial and bibliographical studies of Black American notables, with Dr. Sidney Kaplan, National Portrait Gallery, from 1 September 1970 to 1 July 1971.

JON ALLEN SEGER. A long-range plan for the "third generation" of exhibits in the National Museum of Natural History, with Mr. Nathaniel Dixon from 21 September 1970 to 20 September 1971.

ELAINE F. SLOAN. Studies of the collection development policies of the Smithsonian Institution Libraries, with Dr. Russell Shank, Smithsonian Institution Libraries, from 1 September 1970 to 1 June 1971.

ROBERT N. WORKS. Studies in museum administration and in the history of American art, with Mr. Marvin Sadik, National Portrait Gallery, from 1 September 1970 to 31 August 1971.

Program in Physical Sciences

DUANE F. CARBON. Theoretical studies of non-gray model atmosphere for stars of intermediate and late spectral types, with Dr. Owen J. Gingerich, Smithsonian Astrophysical Observatory, from 1 July 1970 to 30 January 1971.

ERIC G. CHIPMAN. Formation of spectral lines in the solar atmosphere, with Dr. E. H. Avrett, Smithsonian Astrophysical Observatory, from 1 July 1970 to 30 June 1971.

J. STEPHEN DUERR. Formation of plessite in metallic meteorites, with Dr. Charles A. Lundquist, Smithsonian Astrophysical Observatory, from 1 July 1970 to 30 June 1971.

JAMES ELLIOTT. Investigation of atmospheric fluorescence as a means of detecting transient X-ray phenomena from cosmic sources, with Dr. G. G. Fazio, Smithsonian Astrophysical Observatory, from 1 September 1970 to 30 June 1971.

WILLIAM R. FORMAN. Study of magnetic field structure in the Crab Nebula, with Dr. R. B. Southworth, Smithsonian Astrophysical Observatory, from 1 September 1970 to 30 June 1971.

JONATHAN E. GRINDLAY. Studies of high energy cosmic gamma rays and cosmic X-rays and their respective air showers, with Dr. G. G. Fazio, Smithsonian Astrophysical Observatory, from 1 July 1970 to 30 June 1971.

ROBERT L. KURUCZ. Studies in model atmospheres, with Dr. Wolfgang Kalkofen, Smithsonian Astrophysical Observatory, from 1 July 1970 to 30 June 1971.

ELIA LEIBOWITZ. The emission spectrum of heavy ions in planetary nebulae, with Dr. Leo Goldberg, Smithsonian Astrophysical Observatory, from 1 July 1970 to 30 June 1971.

DOUGLAS D. NELSON. Clay mineralogy and sedimentation of the Outer Banks, North Carolina, with Dr. J. W. Pierce, National Museum of Natural History, from 15 September 1970 to 14 September 1971.

Summer 1970 Graduate and Undergraduate Research Participation Appointments

Names marked with an asterisk indicate students whose research was supported through grants from the National Science Foundation's Undergraduate Research Participation Program (grants GY7622: Social Sciences and GY6056: Biological Sciences).

Program in American History

BETH MICHELE GROSVENOR, Mount Holyoke College. Research in political slogans in 19th century presidential campaigns, with Dr. Wilcomb Washburn, Office of American Studies.

KATHERINE CORA HANCOCK, Mills College. Studies of costumes in the Annapolis area during the 18th century, with Mrs. Claudia Kidwell, National Museum of History and Technology.

CATHERINE MARY SCHOLTEN, University of California at Berkeley. Bibliographic and documentary studies, with Mr. Richard Ahlborn, National Museum of History and Technology.

Program in Anthropology

*RICHARD BLAIR ALLEN, University of Illinois. Studies of Iranian and Afghan archeological ceramics and preservation techniques of ethnological specimens, with Mrs. Bethune Gibson and Dr. William Trousdale, National Museum of Natural History.

*Anita Marie Barrow, University of Pittsburgh. A study of the social organization of the Southwestern Bantu, with Dr. Gordon Gibson, National Museum of Natural History.

*John Thomas Bruer, University of Wisconsin. Studies of urban metaphysical movements, with Dr. Irving Zaretsky, National Museum of Natural History.

*Lianne Iddings Burke, George Mason College of the University of Virginia. Inventory of selected anthropological manuscripts, with Mrs. Margaret Blaker, National Museum of Natural History.

*Robert Spencer Corruccini, University of Colorado. Studies in paleopathology and Paleoecology, with Dr. Donald Ortner, National Museum of Natural History.

*Wendy Joan Frosh, Pitzer College. Studies relating to a dictionary of the Tzotzil language, with Dr. Robert Laughlin, National Museum of Natural History.

*Laura May Kaplan, Rice University. Sex differentiation in human long bones, with Dr. Lucile St. Hoyme, National Museum of Natural History.

*William Greg Myers, Duke University, A study of the historical contributions of the English to West Pakistan anthropology, with Dr. Eugene Knez, National Museum of Natural History.

*Mary Alice Nation, University of Chicago. A study of the Japanese ceramic collections in the National Museum of Natural History comparing American and Japanese concepts of Japanese ceramic art 1875–1920, with Dr. Eugene Knez, National Museum of Natural History.

*Jane Wierdsma, Smith College. An historical study of Kiowa art, with Mr. John Ewers, National Museum of Natural History.

Program in Environmental Sciences

Judith Lynn Bishop, University of California at Davis. Literature research concerning drug immobilization in exotic animals, with Dr. Clinton W. Gray, National Zoological Park.

Program in Evolutionary and Systematic Biology

*Susana Barros, George Washington University. Analysis of bamboos, with Dr. Thomas Soderstrom, National Museum of Natural History.

George Joseph Divoky, Michigan State University. A study of the seasonal distribution of marine birds, with Dr. George Watson, National Museum of Natural History.

Mary Beth Moore, Michigan State University. Research and data gathering for Flora North America project, with Mr. Stanwyn Shetler, National Museum of Natural History.

*Frieda Virginia Osborne, California State College. The taxonomy of Indo-Pacific mollusks, with Dr. Joseph Rosewater, National Museum of Natural History.

*Ricardo Rebollar, DePaul University. A study of light intensity and quality, temperature and pH effects on respiration and photosynthesis in corralines, with Dr. Walter Adey, National Museum of Natural History.

Program in the History of Art and Music

Diane Lynn Arkin, University of Chicago. Studies in 19th century landscape painting in America, with Dr. Joshua Taylor, National Collection of Fine Arts.

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CATHERINE BETH LIPPERT, University of Michigan. Study of American painting 1900–1904, with Dr. Joshua Taylor, National Collection of Fine Arts.

Program in the History of Science and Technology

*CRAIG BUCK ANDREWS, Claremont Men's College. Studies of ship plans and machinery, with Dr. Melvin Jackson, National Museum of History and Technology.

*JOHN FRANCIS CONNORS, Cincinnati Bible Seminary. Study of technical history of World War I aircraft in the National Air and Space Museum collections, with Mr. Louis Casey, National Air and Space Museum.

*JOAN M. HARLOW, Smith College. Studies in American spectroscopy in the second half of the 19th century and French and British chemistry in the 18th century, with Dr. Jon Eklund, National Museum of History and Technology.

*JOHN THOMAS KELLY, Harvard University. Study of the History of Science and technology in the War of Independence, with Mr. Silvio Bedini, National Museum of History and Technology.

*HOWARD SANDER KOCH, University of Miami. Study of cable telegraphy in the 19th century with Dr. Bernard Finn, National Museum of History and Technology.

*JOSE M. RODRIGUEZ, University of Miami. A study of maser and laser history, with Dr. Bernard Finn, National Museum of History and Technology.

*DAVID ALAN ROSENBERG, University of Chicago. Studies of the 1924 flight around the world, with Dr. Richard K. Smith, National Air and Space Museum.

*FRANCES RUTH SCHARTENBERG, University of Pennsylvania. A study of the technological development of microscopes as related to the development of Darwinism, with Dr. Audrey Davis, National Museum of History and Technology.

*DIANE SENDERS, Antioch College. Analysis of natural dye stuffs using textiles from Smithsonian collections, with Miss Rita Adrosko, National Museum of History and Technology.

*JOANNE BETH SHORE, University of Pennsylvania. An historical study of early engineering structures on the Baltimore and Ohio Railroad, with Mr. Robert Vogel, National Museum of History and Technology.

*BARBARA LEVY SIMON, Goucher College. Research on the history of 19th century science, with Mr. Richard Lytle, Smithsonian Archives.

Program in Museum Studies

JUDITH ANN CALVERT, University of California at Berkeley. Research and bibliography on the stylistic origins of Shaker furniture, with Mr. Carl Alexander, National Museum of History and Technology.

CAROLINE LEVERT MASTIN, University of Delaware. Research participation and studies of special exhibits, with Mr. Peter C. Welsh, U.S. National Museum.

CAROLYN LOUISE RUSCH, Sweet Briar College. Studies relating to methods of conservation of museum objects including documentation, with Mr. Robert Organ, National Museum of History and Technology.

Appendix 8

PUBLIC AFFAIRS

News Releases Issued

Smithsonian To Present "Musick," Pageantry of American Revolution	6 July 70
Textile Designer Will Be Accorded Retrospective Show	7 July 70
Model Rockets, Planes To Be Flown on National Mall, Sunday, July 12	8 July 70
Daguerreotype Portraits of Webster, Clay and Houston Given to Smithsonian	14 July 70
National Collection of Fine Arts Shifts Entrance Because of Subway	15 July 70
Smithsonian Computer Awaiting Your Questions about Reptiles	20 July 70
National Collection of Fine Arts To Hold "Artists Abroad" Exhibition	29 July 70
Smithsonian Museum Schedules "Vibrating World" Exhibition	31 July 70
Indian Photographs on View at Smithsonian	3 Aug. 70
Space Art Show at Smithsonian	4 Aug. 70
Astronomical Art at Smithsonian	4 Aug. 70
Smithsonian Conducting Global Survey of Environmental Monitoring System	4 Aug. 70
Historic Equipment, Fabrics Display in New Textile Hall	11 Aug. 70
Oil Painting of Apollo 11 Crew Being Given to Portrait Gallery	11 Aug. 70
Moon Rock Research Is Explained in Exhibit	12 Aug. 70
Smithsonian Exhibit To Mark Centennial of Gandhi's Birth	13 Aug. 70
Global Photographic Show on Woman Scheduled	18 Aug. 70
A Computerized Data Bank on Plants Is Planned	19 Aug. 70
Freer Sculptures from India Described in New Volume	1 Sept. 70
Free Jazz/Gospel/Soul Music Festival Scheduled at Douglass Home September 12–13	1 Sept. 70
"Deep-Ocean" Fossils Back Continental Drift Theory	1 Sept. 70
Smithsonian Seeks Volunteers To Guide School Groups	1 Sept. 70
"Curtain Raiser"—A Most Unusual Benefit Oct. 2	1 Sept. 70
Smithsonian, Left Bank Society Plan Series of 7 Jazz Concerts	11 Sept. 70
Smithsonian Display of Paper Money Documents South Carolina's History	15 Sept. 70
Smithsonian To Show Art of H. Lyman Sayen	16 Sept. 70
Wilson Center Sets Deadline for Fellowship Applications	16 Sept. 70
Smithsonian, Left Bank Society Sponsor Jazz Quartet Concert	21 Sept. 70
Lithographs Depict Romantic View of 19th Century Women	21 Sept. 70
"Pinocchio" To Open September 30 at Smithsonian Puppet Theatre	21 Sept. 70
Freer Lectures To Begin With Talk on Indian Art	22 Sept. 70

Freddie Hubbard Quintet Will Appear November 31	16 Nov. 70
National Collection of Fine Arts To Show 83 Works by 19th Century Landscape Painter	16 Nov. 70
Dr. Pennington To Demonstrate Ornamentation of Messiah Solos	16 Nov. 70
Left Bank To Present Trumpeter Lee Morgan	17 Nov. 70
Lewis Mumford Will Receive Smithsonian's Hodgkins Medal	19 Nov. 70
NCFA Will Show 65 Drawings and Sculptures by Paul Manship	23 Nov. 70
National Portrait Gallery Acquires Rare Painting of President Monroe	25 Nov. 70
Smithsonian Will Present "The Electric Stereopticon"	1 Dec. 70
Smithsonian, Left Bank Jazz Society Will Present Last Poets at Howard	1 Dec. 70
Dr. Harold P. Stern Named Director of Freer Gallery	2 Dec. 70
Apollo 12 "Atomic Battery" To Be Given to Smithsonian	3 Dec. 70
Wilson Center Sets Deadline for Fellowship Applications	4 Dec. 70
Romaine Brooks: "Thief of Souls"	7 Dec. 70
Three Distinguished Scholars Named Wilson Center Fellows	9 Dec. 70
Two Famous Planes Exhibited at Smithsonian	11 Dec. 70
Apollo 11 Spacecraft on View on the Mall	11 Dec. 70
Smithsonian To Show Pakistani Prints	15 Dec. 70
Smithsonian Offers Puppet Theatre for Washington Area Performances	15 Dec. 70
Memorial Fund To Be Established at National Museum of Natural History	15 Dec. 70
Challinor Named Smithsonian Deputy Assistant Secretary	18 Dec. 70
Joanna Featherstone To Present Program of Afro-American Poetry	21 Dec. 70
Smithsonian Commissions Submersible Oceanographic Vessel	21 Dec. 70
Experts To Talk on Print Collecting at National Collection of Fine Arts	22 Dec. 70
Smithsonian Will Exhibit "100th Street" Photo Show	23 Dec. 70
Teaching Exhibit on Naturalist John Muir is Scheduled	23 Dec. 70
Portraits by 18th Century Painter To Be Shown by Smithsonian Museum	23 Dec. 70
Wilkinson To Lecture at Freer on Drinking Vessels of Persia	23 Dec. 70
Oceanography at the Smithsonian	28 Dec. 70
J. Seward Johnson—Biography	28 Dec. 70
I. Eugene Wallen—Biography	28 Dec. 70
Edwin A. Link—Biography	28 Dec. 70
Smithsonian Will Present Sanasardo Dance Company	28 Dec. 70
Personnel Chief, Associate Appointed at Smithsonian	7 Jan. 71
Smithsonian Exhibits Art Inspired by Space Program	11 Jan. 71
Anacostia Exhibit Traces Move ". . . Toward Freedom"	11 Jan. 71
"The First Two Years": A Photographic Impression of the Presidency	12 Jan. 71
Environmental Law Conference Will Be Held at Smithsonian	12 Jan. 71
Paintings of John Henry Legend on Display at Smithsonian Museum	13 Jan. 71
Smithsonian To Present Second "Music from Marlboro" Concert	15 Jan. 71
National Collection of Fine Arts Will Show Venice Biennale Prints	21 Jan. 71
Smithsonian Gives First Maury Medal for Ocean Science to Link, Johnson	21 Jan. 71

Annual Smithsonian Boomerang Competition Scheduled for June 5 on Monument Grounds	28 May 71
Summer Film Series at National Collection To Focus on Eight Modern American Artists	4 June 71
Smithsonian's Science Hotline Issues Annual Report for 1970	4 June 71
Campbell Museum Collection Shows Tureens as Fine Art	7 June 71
Smithsonian To Present Talk on Mexican Organs	7 June 71
Movies by Teenagers From D.C. Area Will Be Screened at Museum Festival	7 June 71
Mack McCormick Appointed Director of Smithsonian's Festival of American Folklife in Montreal, Canada	8 June 71
Portrait Gallery Plans Exhibition on "Black Sounds of the Twenties"	9 June 71
Richard Lahey To Talk at National Collection on the Noted American Artists He Has Known	9 June 71
Bust of Labor Leader John L. Lewis Will Be Given to Portrait Gallery	10 June 71
423-Carat Logan Sapphire Will Be Unveiled June 22	10 June 71
First Synthetic Gem-Quality Diamonds Will Be Given to Smithsonian June 17	10 June 71
Dancers, Drummers, and Actors To Honor Black Educator In Courtyard Festival at National Portrait Gallery	14 June 71
July 4 Exhibit at Smithsonian Will Feature Marquetry Flags	14 June 71
Oregon Arts Administrator Appointed Chief of Smithsonian Traveling Exhibition Service	15 June 71
Public Invited to Art Show at Swiss Embassy June 25–28	16 June 71
NASM To Receive Painting From Spanish Ambassador	17 June 71
Open House Scheduled at National Collection	17 June 71
Indians of Northwest To Demonstrate Traditional Culture at Smithsonian Institution Folklife Festival July 1–5	18 June 71
Unknown Art Masterpieces Will Be Unveiled in National Collection of Fine Arts Show	21 June 71
Puerto Rican Dance Company To Appear at Folk Festival	23 June 71
Concerts Set for Smithsonian's Museum of History and Technology	23 June 71
Sol Tax Named To Direct Center for Study of Man	24 June 71
Concert Set for Smithsonian's Museum of History and Technology	25 June 71
Smithsonian Scientist Named To Link Foundation Trustees	29 June 71

"Radio Smithsonian" Programs

JULY 1970

"Jacquard Mechanism and Nineteenth Century Jacquard Woven Coverlets." "India Chintz."

"Hamilton College Choir and Brass Choir."

"Division of Musical Instruments Record" (two programs).

AUGUST 1970

"Recital of Twentieth Century Piano Music by Pierre Huybregts."

"The Princeton Chamber Orchestra."

"Tarr and Kent Concert."
"The 1970 American Folklife Festival" (two programs).

SEPTEMBER 1970

"Conversation with Joseph H. Hirshhorn and Abram Lerner," Director of the Joseph H. Hirshhorn Museum and Sculpture Garden.
Interviews: Roy Strong, Director of the National Portrait Gallery, London; Dr. Sidney R. Galler, Assistant Secretary for Science, Smithsonian Institution.
Benjamin Ruhe, Press Officer: "Boomerangs—It All Comes Back to Me Now"; Paul Garber, Air and Space Historian: "The Art of Kites."
Dr. J. Lawrence Angel, Physical Anthropologist: "Working With Prehistoric Remains and Sleuthing for the FBI"; Paul V. Gardner, Curator of Ceramics: "Collectables."

OCTOBER 1970

Erwin Swann: "Thomas Nast: Influential Political Cartoonist or Artist?"; Robert M. Vogel, Curator of Mechanical Engineering: "Our Inventive Past."
His Excellency Lakshmi Jha, the Ambassador of India: "Gandhi."
Lucy Kavaler, author of "Freezing Point": "She Ventured in the Cold"; Dr. Gordon Gibson, Curator of Old World Anthropology: "Scientific Safari."
Dr. Lee Talbot, of the President's Council on Environmental Quality: "Environment: What Are You Doing?"; Dr. Joshua Taylor, Director of the National Collection of Fine Arts: "What Have We Created?"

NOVEMBER 1970

"The Music of Erik Satie."
Benjamin Read, Director, Woodrow Wilson International Center for Scholars: "A Living Memorial"; Dr. Ray Smith: "A Temple for the Goddess Nefertiti.
"Chamber Music," by the U.S. Air Force Ensemble.
"Our Future Environment: Will We Have One?" (two programs selected from the General Assembly of the International Union of Biological Sciences).

DECEMBER 1970

Rube Goldberg: "Do It the Hard Way!"
"Concert of Baroque Music." Alarius Ensemble of Brussels.
"Early Christmas Music," with James Weaver, Concert Director for the Smithsonian Division of Musical Instruments.
"Do Snakes Have Souls?" with Dr. James Peters, Curator of the Division of Reptiles and Amphibians; "Reclaiming World War II Planes Downed in Netherlands Waters," Lt. Col. A. P. DeJong, Director of Information for the Royal Netherlands Air Force.

JANUARY 1971

"The Jazz Scene" (three programs). Julian Euell, former bassist, sociologist, and now Special Assistant for Public Service at the Smithsonian, and Dr. Donald Byrd, noted jazz trumpeter, composer, and Chairman of the Department of Jazz Studies at Howard University, in a musicated conversation about jazz and jazzmen.

"Bugging the Bugs," Dr. Barnard Burks, Research Entomologist in the Systematic Entomology Laboratory; "Curtain Going Up," William Blair, General Director of the John F. Kennedy Center for the Performing Arts.

"Talking to the Animals," Warren Iliff, Special Assistant for the Director, National Zoological Park; "Commodore Perry: East to the Rising Sun," Roger Pineau, Managing Editor of the Smithsonian Press.

FEBRUARY 1971

"The Alarius Ensemble of Brussels," a concert ranging from contemporary to baroque music presented at the Smithsonian.

"A Collection of Millions?", Dr. Richard S. Cowan, Director of the National Museum of Natural History; "You Are More Attractive With a Flat Head!," Dr. T. Dale Stewart, Senior Physical Anthropologist.

"Council on Worms," Dr. Meredith L. Jones, Curator of the Division of Worms; "Scientists at Sea," Dr. I. Eugene Wallen, Director of the Office of Environmental Sciences.

"Indians." A look at a major area of Smithsonian scholarship, the American Indian, his culture, and some of his problems today.

MARCH 1971

"Indians," Part II.

"What If the Pacific Flows Into the Atlantic?," Dr. Ira Rubinoff, Assistant Director for Marine Biology, Smithsonian Tropical Research Institute; "The Unicorn Is Alive and Well, Living in Washington (also Kansas City, London and Mars)," Dr. John White, author and specialist in mythical animals.

"The Birds and the Bees." A program in honor of the coming of spring.

"The American Museum," Ian McCallum, Director of the American Museum in Britain; "I'll Give You a Dollar for That Penny," Dr. and Mrs. Clain-Stefanelli, Curators of Numismatics.

APRIL 1971

"American Bandsman." Selected music of John Philip Sousa with discussion by James Weaver, Concert Director, Division of Musical Instruments.

"Toward a Lasting Peace." President Richard M. Nixon and Senator Hubert H. Humphrey speaking at the dedication of the Woodrow Wilson International Center for Scholars.

"Global Crusade." Discussion of a joint international environment program with Robert K. Poole, Director, Environmental Programs, Peace Corps, and Dr. Dale W. Jenkins, Director, Ecology Program, Smithsonian Office of Environmental Sciences.

"Thief of Souls." A Discussion of the art of Romaine Brooks with art student Gerald Adelman; "Henry Moore," a conversation with the great British sculptor.

MAY 1971

"Concert" by Frans Brueggen, recorder virtuoso, assisted by James Weaver, Smithsonian Concert Director, on the harpsichord, playing works by Corelli and Loeillet.

"Who First Called it Jade?" A visit with Senator Hugh Scott of Pennsylvania.

"Know Thyself." Dr. Raymond Stites, formerly with the National Gallery of Art, discusses the subject of his recent book *The Sublimations of Leonardo da Vinci;* Derek Rogers, Keeper of Art at the Brighton Pavilion, "Who Would Have Thought of an Oriental Pavilion in England?"

"Sing While You Labor!" Tapes and talks on American work songs with Archie Green, Institute of Labor and Industrial Relations.

"Do You Know About the Tinamu Bird?" Discussion with Dr. Sam Weeks, Curator of Birds at the National Zoological Park; "Are Plastic Spoons Progress?" Dr. Eugene Knez, Old World Anthropology Department, National Museum of Natural History, revisits a Korean village.

"Folk Concert." Margaret MacArthur, folk singer and song collector from Vermont, with self-accompaniment on the dulcimer and the folk harp.

"Concert." Bach and Handel Music, presented by the United States Air Force String Orchestra.

"Music Machines—American Style" (two programs). A survey of popular styles in American music from barrel organs and player pianos to the most up-to-date high fidelity equipment.

JUNE 1971

"Folk Concert." Margaret MacArthur, folk singer and song collector from Vermont, with self-accompaniment on the dulcimer and the folk harp.

"Concert." The United States Air Force String Orchestra, in concert at the Smithsonian, playing works by Bach and Handel.

"Music Machines, American Style, Part I." A look at American music machines, from barrel organs and player pianos to the most up-to-date stereo equipment.

"Music Machines, American Style, Part II."

Appendix 9

SMITHSONIAN EXHIBITS

Special Exhibits

History and Technology Building

American Holidays—
- Discovery Day
- Founders' Day
- Fourth of July
- Labor Day

Antique Toys
Automat
Benjamin Wright
Campbell Museum Collection
Civil Engineering
Cyrus Field
Do It the Hard Way
Embryology
George Washington Carver
Ghandi Exhibit
Graphic Arts
Jacquard Loom
Leon Collection
Mexican Stamps
Mr. Zip
Music Machines—American Style
Nixon Photographs
Objects of the Month
Perry Exhibit
Plastic Surgery
Poetry of the Body
South Carolina Currency
Stephen Whealton
Women, Cameras, and Images (V)

Natural History Building

Drake Birds
Fiberglass Show
Flora of North America
Indian Images
Japanese Armor
Moon Rock
OEP Posters
Reptiles' Photos

National Air and Space Museum

Aerial Explorations
Apollo 14
Early Bird
NASA Benefit
NASM Art Exhibit
Robert McCall Art Exhibit
Space Art

Arts and Industries Building

Art Protis
Bruce Davidson's Photos
Dorothy Liebes
Finnish Design
Genteel Female
The Hand of Man in America
Vibrating World
Woman

Anacostia Neighborhood Museum

Black Patriots

Jewish Museum, New York

Software

Traveling Exhibit

Energy Conversion

PERMANENT EXHIBITIONS

History and Technology Building

American Heroes
Armed Forces Chronology (Navy)
Autos and Coaches
Ceramics
Electricity
Iron and Steel
Maritime History
Textiles
Underwater History

Natural History Building

Age of Mammals (Quaternary)
Archeology
Dinosaurs
Gems
Native Peoples of the Americas
Physical Geology
Life in the Sea
Tiger

National Air and Space Museum

Air and Space Building
Beech Aircraft
Goddard Exhibit

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