leagues were able to collect tissue slides from more than 80 percent of those cases, which they proceeded to evaluate to see whether their opinions about the size and nature of the cancers matched those that were on the record. They paid particular attention to cancers reported to be found by mammography alone; that is, tumors not detected by manual examination (palpation) of the breasts.

What the Thomas group discovered was that a fair number of tumors 2 cm or larger in size were missed the first time around by both mammography and physical examination. For example, 41 percent of women with tumors 2 cm or larger had negative mammograms. Furthermore, there were 19 tumors listed in HIP data as being found by "mammography alone" that turned out to be relatively large—3 cm or more. Inasmuch as every woman who had mammography also had palpation, Thomas concludes that "It is difficult to understand how or why these could have been missed on clinical examination." Thus, the Thomas group decided that those 19 cases said more about the skills of the examining physician than they did about the virtues of mammography and deleted them from the "mammography alone" category. Taking all things into account, the group concluded that the original inferences about the benefits of mammography drawn from the HIP were overblown. However, Thomas emphasizes the fact that the HIP study never was designed to separate the value of mammography from clinical examination and says that, were new data to show that mammography really can pick up very early infiltrating cancer, he would be ready to change his mind about its value in screening.

The arguments against mammography screening appear to be based on cool scientific logic. Those for it often seem to be intuitive and come from physicians and surgeons whose daily business is the treatment of breast cancer. They maintain, though they do not have the hard data to prove it, that they are finding cancer earlier than ever before, that they, therefore, can offer women less mutilating surgery than is necessary for advanced cancer; and that—in the end—they are prolonging lives.

The fact of the matter in this terribly difficult case is that there is no objective way to say who is right. Radiobiologist Upton calls this a "paradigm of the kinds of problems we're facing on the uses of technology versus social costs." Neither the HIP study nor the NCI-ACS screening project were designed to answer important questions about the benefits of mammography, or how often it should be used, or on what group of women. NCI is under considerable pressure now to initiate such a study—or possibly studies—to find out Acting Director Newell supports that idea, saying "We really have to get some clean data on this, which probably means we'll have to start some completely new controlled clinical trials."

Brian E. Henderson, an epidemiologist at the University of Southern California at Los Angeles, who was a member of the NCI's epidemiology-biostatistics working group, strongly endorses Newell's view. "I think we should use mammography as little as possible until we learn how to use it," Henderson says, adding that for screening purposes he thinks it should be used "only in controlled clinical trials—even for women over 50."

The justification given for screening women over 50 is that they are more likely to get breast cancer than younger women, and that, because of changes that occur in breast tissue after menopause, it is easier to get a good picture of their breasts than it is in younger women with denser, more hormonally active breast tissue. In addition, Upton reports that there are some data suggesting that a woman's risk from radiation exposure decreases with age. If that is so, women over 50 are less likely to get breast cancer from the x-rays of mammography. On the other hand, Henderson points out that there are data that indicate a synergistic effect between radiation and hormones. Inasmuch as many women over 50 take estrogens, thereby approximating in some ways the hormonal status of a younger woman, there may be an argument against mammography in at least that group of older women.

The upshot is that the situation is extraordinarily confusing. It seems that there is no evidence that is clear-cut, and the answer to the "should she or shouldn't she" have a mammogram question is that nobody knows for sure. Given the present state of affairs, the NCI's position seems eminently sensible.

The resolution of the controversy is not in sight. But the next chapter will be written in September when Donald S. Fredrickson hosts what is euphemistically being called a "consensus" meeting on mammography. Among other things to be decided then is the question of whether the NCI, with or without the ACS, should embark on controlled trials, the results of which would be a decade in coming.—BARBARA J. CULLITON

Smithsonian: "The Nation's Attic" Undergoing New Federal Scrutiny

These are trying times for the Smithsonian Institution. It is being pecked at by the Washington *Post*, poked into by the General Accounting Office (GAO), grilled in Congress and—the latest insult—has received Senator Proxmire's Golden Fleece Award of the month for allegedly worthless government projects (in this case, a Tzotzil dictionary).

Criticism has been directed both at the allegedly cavalier modus operandi of the secretary of the Smithsonian, patrician ornithologist S. Dillon Ripley, and at the way the institution handles its funds, 87 percent of which are supplied by the federal government.

There have been no formal accusations of illegality or impropriety in the Smithsonian's operations. Yet the cloud of question marks has prompted the institution's own Board of Regents to propose contracting for an independent study in order to clear the air. The GAO study continues.

As a semipublic, semiprivate organization, the Smithsonian has an unusual relationship to the federal government. It has always enjoyed considerably more flexibility in the use of its money than have federal agencies. In the past year or so concerns have been raised in Congress about the commingling of public and private funds; about whether the Smithsonian is relying too much on its own discretion in acquisition and disposition of properties that receive federal money; and about the nature of two private corporations administered by the Smithsonian.

The secretary himself has become an increasingly controversial figure. Some people look askance at his freewheeling travel schedule; at the fact that he served on the board of a bank where the Smithsonian holds large checking accounts; at his habit of whisking birds from the National Zoo to breed them in his private waterfowl preserve in Litchfield, Connecticut.

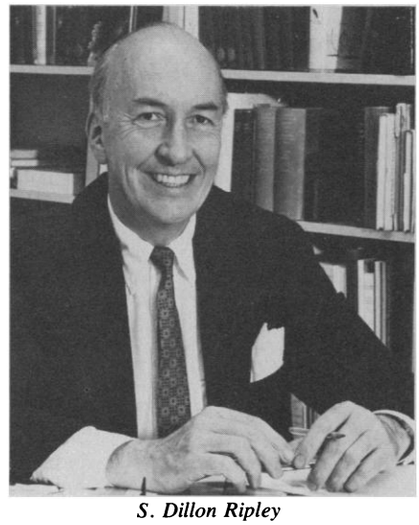
Although Smithsonian officials contend they conduct their affairs strictly in accordance with the institution's legal and historical mandate, there appears to be a growing feeling in Congress, as well as among interested members of the public, that it operates too much like an "elitist" private institution. This, they feel, is an inappropriate stance for an organization that, its mandate notwithstanding, has become for all intents and purposes a federal entity.

The Smithsonian is supposed to be an independent organization, governed by a Board of Regents of whom half are from the three branches of government (the chancellor of the board is Chief Justice Warren Burger) and half are private citizens. However, since the 1880's, over 80 percent of its budget has been supplied in the form of congressionally appropriated funds allocated for housing and maintenance of federal collections.

In the past, these appropriations were not huge by federal standards—some $17 million a year when Ripley took office in 1964. But now federal contributions have passed the $100 million mark, and a feeling prevails that certain assumptions and arrangements, however time-honored they may be, are due for a reassessment.

The Smithsonian is a unique conglomerate of research activities and museums, and its role is difficult to understand without an understanding of its history. It was set up by Congress in 1846 with a gift of $500,000 from an Englishman, James Smithson, who directed that the money be used to found "an establishment for the increase and diffusion of knowledge among men." The early course this establishment took was set by the first secretary, Joseph Henry, a physicist, who had been seeking the creation of a federal research university. The institution grew around this scholarly core as the government entrusted to its care the national collections of historical, archeological, artistic, and scientific artifacts.

When Ripley took over in 1964 the Smithsonian was a quiet, rather conventional bunch of museums. Subsequent years have seen the maturation of long-planned projects such as the opening last summer of the National Air and Space Museum (now the most heavily visited museum in the world), as well as the inauguration of a spate of new activities designed to bring the institution closer to the American public. The Smithsonian is now a sprawling, multilayered entity whose activities range from research on amphipods to running a carousel on the Mall. It comprises nine museums,* five research institutes, a zoo, a national magazine, and a multitude of programs and activities to promote scholarly research and public enlightenment. One-quarter of its 4500 employees are paid from the endowment and other private funds; the rest are Civil Service employees.



S. Dillon Ripley

Congressional willingness to continue upping federal support is a tribute to the popularity of the institution, which has become a major national tourist attraction over the past dozen years, with some 18 million visitors a year.

Now, however, Congress is less interested in popularity than it is in "accountability." The trouble dates to last year's Senate appropriations hearings where Smithsonian officials disclosed that they were skimming money of the budgets of various bureaus in order to maintain a $1 million emergency "discretionary fund" for such things as unanticipated utility bill increases. Senator Ted Stevens (R–Alaska), who has emerged as the most demanding congressional critic, didn't approve of such unauthorized "reprogramming" of funds and told them if they wanted such a fund they should ask Congress for it. The Smithsonian obeyed, requested a $500,000 fund, the OMB said no, so now there is no discretionary fund.

Nonetheless, this revelation spurred Stevens and Robert C. Byrd (D–W. Va.), the subcommittee chairman, to ask the GAO for a review to determine whether federal funds were being "effectively and properly utilized. . . ." They wanted an opinion on the discretionary fund as well as other matters such as the "reportedly extensive travel of the secretary . . . ," "the manner in which private funds are used in conjunction with Federal funding," and the Smithsonian's practice of accepting private gifts that require federal money to maintain.

The GAO investigation, the first since 1970, concluded that there was a general need to strengthen financial accountability to Congress. Its chief recommendations were that two private corporations administered by the institution, the Smithsonian Science Information Exchange (SSIE) and the Smithsonian Research Foundation (SRF), be dissolved. The SSIE, incorporated in 1971, when it was taken over from the National Science Foundation, dispenses abstracts of government research at a fee. The SRF was set up in 1966 when it became illegal for the NSF to award grants to Smithsonian employees. Its chief purpose was to compensate for this loss by trying to replicate the preexisting situation—that is, making some money available on a contract basis rather than dispensing it as appropriated funds that are subject to fiscal year spending deadlines and Civil Service requirements.

The GAO contended that these two corporations were set up to "avoid" laws governing federally appropriated funds. Some observers are even more critical, contending that the SRF was a case of the Smithsonian willfully arranging matters so it could do just what the 1966 law was designed to prevent it from doing.

Smithsonian officials, testifying at this year's Senate hearings, insisted, however, that the SRF is a legal alternative form of dispensing appropriated funds. As for the SSIE, they said they weren't benefiting from it and would be perfectly happy to let someone else take it over.

Another issue discussed in the GAO report and at the hearings was the establishment of the Cooper-Hewitt Museum of Decorative Arts and Design in New York City, which opened last year. The

*National Air and Space Museum, National Museum of Natural History, Cooper-Hewitt Museum of Decorative Arts and Design, Freer Gallery of Art, Hirshhorn Museum and Sculpture Garden, National Collection of Fine Arts, National Museum of History and Technology, National Portrait Gallery, and the Anacostia Neighborhood Museum. The National Gallery of Art, which is on the Mall, is loosely connected with the Smithsonian but has its own board and budget.

report observed that the Smithsonian erred in not notifying congressional committees of its intent to purchase the collection of the Cooper Union museum—even though that was done with privately raised money. Stevens also thought Congress should have been in on the purchase, particularly since, as it turned out, some federal appropriations were required for operations and construction (total federal contributions have been about $1.5 million). Smithsonian officials seem to have felt that the way they handled the purchase was all right since it had the approval of the Regents, six of whom are members of Congress.

Just what the Regents can approve on their own has not been cleared up. For example, Stevens appeared to be alarmed upon learning that the Smithsonian could—in theory, if not in practice—dispose of its research institute on the Chesapeake Bay (a private acquisition) without congressional sanction. "These must become federal properties if we are to continue to fund them with federal taxpayers' dollars," he opined.

Although the Smithsonian's top officials claim to be unruffled by the criticism, one official told *Science* that there is considerable concern that Congress is going to try to "federalize" the institution. Federalization, says another, would result in the termination of adventurous, public-oriented activities (such as the annual Folklife Festival and the magazine) that are supported with private funds; would result in the subordination of artistic and scholarly judgment to politics; and would constrict research. Officials also claim a change in status would violate the trust of many private donors who have made gifts with the understanding that the Smithsonian was a nonfederal institution.

However uneasy Congress may feel about the Smithsonian's independent ways, there have been few questions raised about the quality of the museum's collections or of the institution's core of research and scholarly endeavor.

The Smithsonian's scientific establishment, which includes 300 Ph.D.-level scientists, enjoys a solid reputation and, according to assistant secretary for science David Challinor, the institution is "fully competitive with universities" as an employer.

Smithsonian science is best known for its strength in systematics, which is founded on the collection of the Museum of Natural History, and astrophysics, which is done at the Smithsonian Astrophysical Laboratory in Cambridge, Mass., and at Mt. Hopkins, Arizona,

Original Smithsonian building

where the institution has a telescope. Virtually all of the 106 museum scientists are also curators who do research on the collections and go on frequent field trips. The astrophysical lab has 100 scientists, the majority of whom work on government contracts. The rest are at other labs: the Chesapeake Bay Center for Environmental Studies, the Fort Pierce Bureau for marine research in Florida; the Radiation Biology Laboratory in Maryland; the Tropical Research Institute in Panama; and the National Zoo.

Challinor claims that Smithsonian scientists do well by any measure—ability to get research money, publications, and membership in scientific societies, review committees, and the National Academy of Sciences. There are, in fact, ten NAS members in addition to Ripley himself (whose election is regarded by some as an honorific gesture, more in recognition of his position than the quality of his research), and the late astronomer Donald Menzel. The astrophysical lab's current director, George Field, turned down membership a couple of years ago to protest the fact that the NAS still takes on classified research.

The institution however, gives the impression of being something of an ivory tower because so much of its work is in basic research. It has, for instance, been monitoring ultraviolet solar radiation since 1909—long before people generally recognized the purpose of such a study. "Only the Smithsonian is crazy enough to do a nonsexy long term thing like this," says Challinor.

Science absorbs about $40 million of the total annual budget of about $120 mil-

Warnke Stuck with Verification Task

A little-noticed amendment to the Arms Control and Disarmament Agency (ACDA) authorization bill that passed the House on 3 May would require ACDA director Paul C. Warnke to file "timely" reports to Congress on the country's ability to verify all existing and proposed arms control agreements. He would also have to notify Congress of any "degradation" in that capability. But the motives and likely impact of the amendment are widely believed to signify further hard going for Mr. Warnke, whose Senate confirmation nearly foundered on charges he was too "soft."

In introducing the amendment, its sponsor, Edward J. Derwinski (R–Ill.), limited his explanation to a few colorless comments about the need for more "effective" verification reporting to the Congress. But Robert Lagomarsino (R–Calif.), rising to support the amendment, spoke what was probably on many of the congressmen's minds. He noted Warnke's decision, effective days before, to abolish the ACDA Verification Bureau, and, in a pointed disagreement, said the amendment was needed "so that there is no misunderstanding in anyone's mind that the United States has not downgraded the importance of verification."

The amendment's impact, some congressional liberals fear, could put Warnke into conflict with the Central Intelligence Agency (CIA), which now performs verification on several treaties, coordinates the verification activities of other intelligence agencies, and reports on the subject to Congress. Liberals further fear that the lengthy, exhaustive ACDA reports which would be required on all arms control proposals could be used by his foes to harass Warnke, whose past statements on verification issues were subjected to lengthy, hostile cross-examination during the confirmation battle.

The amendment is given some chance of surviving House-Senate conference since the House passed it by a hefty margin of 259 to 148, and since Warnke and ACDA are lying low on the subject. "The Director feels that the agency can do the job if the Congress so wishes," says an agency official in a less-than-hair-raising comment. ACDA apparently sees the amendment's language as sufficiently vague that it could comply without creating too much of a stir. But whatever difference the amendment eventually makes, at the moment it indicates the hair-trigger sensitivity of congressional conservatives to Warnke's every move.—D.S.

lion (this includes $10 million in government grants and contracts). Some scientists have complained in recent years that too much money was going to the arts—in particular, the new Hirshhorn Museum of contemporary art, but most agree that Ripley has made the Smithsonian a much more attractive place for scholars and scientists. Indeed, he told *Science* he thought his greatest contribution had been in affording them the status and opportunities equivalent to department heads in universities through such means as allowing researchers to establish teaching ties with universities and bringing in doctoral and postdoctoral students to assist in research.

Porter Kier, director of the Museum of Natural History, is full of praise for Ripley on this score. "Pre-Ripley," he says, "this was a bureaucratic place with hardly any academic freedom." Papers had to be reviewed by three layers of superiors before being submitted to journals; head curators (now called department chairmen) were selected by seniority and stayed till death. Scientists were starved for students. Now, he says, "we are run like a university."

On another front, Ripley is credited for bringing what a press release calls "unorthodox museological ideas" to what had been a rather musty assortment of collections. His view is that museums aren't just for staring at but for learning and involvement in as well. For example, as Julian Euell, assistant secretary for public programs, relates, "It's not enough to have Louis Armstrong's trumpet if you don't understand the man and his contributions." You also get someone to play the trumpet—the Smithsonian holds concerts with its instrument collections—and you also make records for sale to the public.

The Smithsonian has enjoyed considerable success in making itself more accessible to the public. There is now a traveling exhibition service; the 40,000-member Resident Associates program which offers classes, trips, and special events; and the *Smithsonian* magazine, started in 1970 so out-of-towners could be associates. Ripley pushed the magazine idea over a wall of doubters and it has turned into a strikingly successful (and profitable) publishing enterprise, with some 1.5 million subscribers.

Although Ripley's accomplishments as secretary are widely acclaimed, there are many people who just don't like the man or his style. His detractors have described him as arrogant, autocratic, snobbish, a wheeler-dealer, devious, stubborn, and petty. He is accused of fashioning the Smithsonian into an empire run by a hand-picked cadre of Yale-educated WASP's. He has been criticized for spending 3 or 4 months a year at his 100-year-old farm in Litchfield and for taking lengthy ornithological forays to India accompanied by cases of champagne and specially made Abercrombie & Fitch tents. No stranger to the good life, his activities have sometimes made for interesting copy—a few years ago, for example, syndicated columnist Jack Anderson depicted Ripley on a sumptuous Aegean cruise, in the company of a group of his "aristocratic friends," on a leisurely search for something called Audouin's gull, all on a grant that was intended for a symposium on Bronze Age culture.

That criticism is overdrawn—the cruise actually did have something to do with the symposium and was undertaken with the donor's approval. And the GAO, which found Ripley had averaged about 100 days a year on "official travel," apparently agreed with the Smithsonian's contention that all this was in accord with the secretary's international role and membership in dozens of organizations. As for the stays in Litchfield, it is said that Ripley conducts regular business from his farm. The bird-watching is justified by the fact that all secretaries have been scientists who traditionally continue their research while in office.

The men with whom Ripley surrounds himself† do have somewhat the look of an uppercrust clique—all are tall, erudite, middle-aged, and charming. But the group has varied backgrounds. They include a black, a Jew, and a Frenchman, and only three have Yale connections. Most of them were extravagant in their praise (as they might well be, since he selected them), depicting him as charming, generous, loyal, open-minded, full of ideas, a man of vision, and brilliant.

In an interview with *Science*, Ripley, attired in his favorite wild turkey tie, was urbane and affable as billed. He has a feeling for history and for continuity with his predecessors, and his respect for the past is mixed with a good sense of fun. For example, there was an academic procession in 1965 to celebrate Smithson's 200th birthday, and "we posed the speakers in front of the carousel because I felt life was a carousel." He joked about being considered an elitist, proposing that "an elitist snob is anyone who has a reading ability beyond the 9th grade and an attention span beyond the length of a TV advertisement." He was asked about a recent story in the Washington *Post* that took him to task for writing a rave review of a bird book authored by his son-in-law Robert Ridgely. Could he see that he might be thought arrogant to assume that no prejudice should be suspected? Ripley thought his only fault, if any, was "not arrogance—innocence." Whether the reply was naive or disingenuous, it reflected the impression, held by many, that Smithsonian officials regard their conduct as above reproach and expect other people to accept this assessment without question.

Well, Stevens of the Senate Appropriations Committee, for one, is disposed to question. He has called for a full-scale congressional review of the Smithsonian's operations. Meanwhile, the GAO continues its probe into the Smithsonian's financial practices. The Board of Regents has already appointed an Audit Review Committee, headed by Senator (and regent) Henry M. Jackson (D–Wash.) to assess the GAO report, and Jackson recently announced that the board, with the blessing of Ripley, will authorize an independent study of the Smithsonian's "organization, management and procedures" and its relationship to Congress.

At the very least, the various reviews should result in explicit clarification of just what the Smithsonian can and can't do without getting congressional approval, and witnesses will be spared exchanges such as the one before the House appropriations subcommittee where Representative Sid Yates (D–Ill.) was trying to figure out who was responsible for the Smithsonian. Yates: "You're making me (that is, the Congress) part of the overall conglomerate of the trusteeship?" Counsel Peter G. Powers: "I think so."

It is to be hoped that troublesome matters can be sorted out without destruction of the pleasing and in some respects 19th-century ambience of the Smithsonian, which owes much to its privileged if somewhat ambiguous status as a semi-private institution.

Certainly Congress is finding the ambiguity less easy to tolerate. A House staff member complains that officials, when they make their case in Congress "wear whatever hat, public or private, that suits their purpose. . . . Ripley has been doing pretty much what he wants—they will find that Congress is now going to flex its muscles." Says Ripley: "There's nothing like being popular . . . I call it joining the cold shower club."

—CONSTANCE HOLDEN

†The Smithsonian is run by an executive committee composed of five assistant secretaries, the treasurer, the general counsel, the secretary, and his assistant (a woman).