

Palisades record from the 5 August 1962 explosion in Novaya Zemlya (Fig. 3). The record indicates the existence of at least two modes separated by a break at a period of about 2 minutes. There is also evidence that the region from about 3 to 10 minutes involves more than one mode. Figures 12 and 14 also show a curvature at the long-period end which is suggestive of inverse dispersion in that an interpretation of decreasing velocity with increasing period could be given here.

### Critical Remarks

There is new evidence of inverse dispersion in certain of the records shown in Figs. 3 and 4, and in others not shown, as well as in the spectral analyses of Figs. 12 and 14. However, not all the barograms produced by a given explosion show this effect. Compare, for example, the Palisades and Honolulu barograms for the test of 5 August 1962; only the former shows inverse dispersion, although the amplitudes of the rest of the signal are equivalent in the two barograms. An examination of the cause of such differences should shed light on the origin of this effect. This can be studied by an analysis of (i) the temperature and wind

structure of the atmosphere along the different paths, (ii) the elevation of the explosion, and (iii) the distance from the source. The possibility that the observed inverse dispersion is an apparent effect resulting from the superposition of different modes should also be examined.

We should also note that the frequency resolution of the spectral-analysis procedures decreases with increasing period. In order to gain further information about the number and types of modes present and the question of inverse dispersion at the longer periods, we are currently trying to obtain increased frequency resolution (27).

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### NEWS AND COMMENT

## American Institute of Biological Sciences Accused of Misuse of NSF Grant Funds

The American Institute of Biological Sciences (AIBS) is in deep financial distress under circumstances that raise serious questions about its use of several hundred thousand dollars of government money.

The final accounting is yet to come. But the information so far available provides a disturbing view of unsanctioned use of grant funds. The bulk of these funds came from the National Science Foundation (NSF), which was largely responsible for transforming AIBS from a small organization into a \$3-million-a-year concern, charged with

administering a variety of NSF-funded projects. These ranged from a long-term multimillion dollar biology curriculum study to scientific meetings costing a few thousand dollars. Some of these were conceived by NSF and placed under AIBS administration; others,

originating with AIBS, were proposed to the Foundation.

Along the way, in line with policies that have only recently been changed, NSF itself did not audit AIBS's records or inquire into its financial operations. When NSF, last fall, did become aware of AIBS's financial situation, it swiftly cut off further funds, pending a complete audit, and demanded that AIBS present a plan for repaying the government a shortage tentatively placed by NSF at \$331,570. AIBS disputes the amount, although it concedes that a considerable amount is due.

In the meantime, under close NSF scrutiny, all but one of the projects entrusted to AIBS are continuing with

In this article, D. S. Greenberg of the *Science* staff describes the serious difficulties that face the American Institute of Biological Sciences and gives something of their history. In the following article, James D. Ebert, president of AIBS, discusses the responsibility of biologists to preserve AIBS.



James D. Ebert

Ackad



Hiden Cox

Ackad



Alan T. Waterman

Harris & Ewing



Aaron Rosenthal

funds that were previously granted. The exception is a small Russian translation project which was permitted to lapse. And whatever the outcome of the present crisis, there is a determination on the part of NSF and AIBS to assure the survival and continuity of the work that has been funded through AIBS.

AIBS's leadership—elected and appointed—does not dispute the charge that the organization used large amounts of NSF funds for purposes for which they were not intended. Officials of both organizations say that the bulk of these funds went into a recently completed and costly series of 120 biology films which AIBS hoped would ultimately produce substantial royalties. (The films have been well received but have not been on the market long enough to test AIBS's expectations.)

James D. Ebert, director of the embryology department of the Carnegie Institution of Washington, who became president of AIBS shortly after the irregularities were discovered, stated in a letter to AIBS board members that "there can be no question that AIBS is morally at fault on several counts, among them the following: most serious, NSF funds, awarded for other purposes, were diverted to support the AIBS film series, without NSF approval. Also, funds received from sale of publications, which should have been held in escrow, were not. Again, interest was drawn on NSF funds and not repaid to the government, as a directive requires.

"AIBS," Ebert continued, "has been criticized sharply for slipshod business management operations. And, finally, there have been irregularities in charges for entertainment and travel, although the sums involved *thus far*

[Ebert's italics] are relatively small. Another serious, major question . . . concerns AIBS's understanding of the use of overhead allowances, NSF taking a different position."

Ebert added that AIBS must raise at least \$250,000, "possibly substantially more," to satisfy government claims. (NSF officials have indicated that they are thinking of "substantially more," since the audit is yet to be completed.)

#### NSF Claims

As of last week, however, on the basis of what NSF calls a "selective sampling" covering 1959 through 1961, AIBS is charged with:

1) Taking excessive amounts in indirect costs for administering NSF grants. NSF claims that the excess totals \$108,637.

2) Charging off to NSF \$19,553 worth of what NSF termed "non-acceptable" items, including \$4221 for entertainment and \$2500 for international travel.

3) Collecting \$28,846 interest by investing NSF funds that had been given to AIBS for eventual use on NSF-funded projects. This was in violation of procedures which provide that interest on grant funds should revert to the government.

4) Failing to seek NSF approval for the use of \$174,534 principally from the sale of publications produced under NSF grants. Under NSF instructions, such funds were to be held in escrow and were to be used only for purposes approved by NSF. Instead, NSF charges, AIBS put this money into a general fund.

NSF's demand for the \$331,570 repayment makes no specific reference to the film series, which was partially financed by grants totaling \$262,000

from the Ford Foundation and the Atomic Energy Commission. The total cost, according to AIBS officials, was approximately \$450,000. The increase came about, they say, not only because costs exceeded estimates, but also because the concepts grew more ambitious as the project proceeded. For example, it was originally planned to employ one lecturer throughout the series. When it was completed, 70 had been employed. The difference between the Ford and AEC funds and the final costs was taken from a general fund, the bulk of which was NSF money intended for projects that AIBS administered for the Foundation. The film series was not one of these.

The presentation of these charges has been accompanied by a serious rift in AIBS's leadership, with Ebert requesting the resignation or downgrading of Hiden Cox, AIBS's executive director since it became an independent organization in 1955.

Ebert's request has been assailed by several AIBS leaders as nothing but a quest for a scapegoat, and AIBS's first president, Bentley Glass of Johns Hopkins University, declared in an interview that "if he [Cox] were sacrificed, it would be a disgrace to the entire scientific community."

It should be noted that NSF director Alan T. Waterman has stated that on the basis of the investigation to date, there is "no evidence of personal gain" resulting from AIBS's financial operations.

#### AIBS-NSF History

The question of responsibility for the present difficulties is perhaps best illuminated by going back to the beginnings of AIBS and tracing its relationship with NSF.

At the end of World War II, a number of prominent biologists were concerned that their profession was not attracting public interest or support. The nation's physicists, fresh from the Manhattan project, had firm assurances of funds for nuclear research; the chemists could rely on industry, and the medical sciences were staking out a bright future through the National Institutes of Health. The result of the biologists' concern was the establishment of AIBS, in 1947, as part of the division of biology and agriculture of the National Research Council. AIBS's "cardinal purpose," according to the minutes of one of the organizing meetings, was "the task of making biology important and ensuring the recognition of that importance."

In 1954, feeling restricted by subordination to the National Research Council, AIBS's governing board voted to establish the organization on an independent basis. It went out on its own the following year—with a \$17,000 grant from NSF for furniture, office equipment, and other initial expenses. The move was made amid warnings from its own officers that AIBS was too dependent upon grants and indirect-cost allowances to permit satisfactory growth. The member societies, however, showed no inclination to raise their contributions or lower AIBS's ambitions.

They decided that it would operate, as it had under the National Research Council, as a society of sovereign societies, rather than a direct membership organization. This arrangement continues. AIBS now has 50 member and affiliate societies—ranging in size from the 337-member American Bryological Society and up to the 6000-member National Association of Biology Teachers. The total number of individuals associated with the organization is about 80,000. The membership revenues, with the exception of a few hundred direct memberships, come through the societies on the basis of \$1 per person for member societies and a sliding scale, of up to \$1000, for the affiliates. The membership figures provide a deceptive appearance of growth and prosperity, but the fact is that membership revenues have never exceeded \$41,000 a year. In return the members receive the bimonthly *AIBS Bulletin*, a small newsletter five times annually, and a number of minor services at relatively low cost. The balance of the organization's operating budget, which was about a quarter of a million

dollars last year, came in the form of overhead—money paid to it by other organizations for administering their projects.

#### Cox Appointed

Upon AIBS's achievement of independence, Cox, who had been deputy executive director in 1953 and 1954, became executive director. In taking the job, he had to give up a professorship in botany, from which he had been on leave, at Virginia Polytechnic Institute. Glass recalls that Cox, then 38 years old, accepted the AIBS post "only after I pleaded with him and pointed out that at AIBS he could do more for the biological community than any one professor could do in the classroom."

Cox quickly established good relations with the grant-giving agencies and AIBS was soon handling a great deal of money, although it still had virtually none of its own.

Cox repeatedly pointed this out to the executive committee which was supposedly supervising his stewardship, but it is agreed now that while everyone nodded and showed concern, little was ever done to extract more money from the member societies, or to find other means of putting AIBS on sounder footing. Nor, according to one former executive committee member, was much attention paid to AIBS's internal operations. "We just figured that Hiden was taking care of it, and that was good enough for us."

#### Funds Increase

Every year the amount of money flowing through AIBS increased in large chunks—from \$56,000 in 1956 to \$3 million last year; and in the same period the staff in the Washington headquarters rose from seven to more than 70. There was no doubt that AIBS was "making biology important and ensuring the recognition of that importance."

For this, Cox reaped vast credit, as when Wallace O. Fenn, of the University of Rochester Medical School, eulogized him before the AIBS convention in 1960. Fenn, who was president of AIBS in 1957 and 1958, told his fellow biologists that "AIBS is most fortunate in its Hiden Cox and biologists owe him a great debt of gratitude. Let us remember that he gave up a university professorship with all its prestige and emoluments in order to serve biology full time as our executive director. In a position which demands

delicacy and tact of a high order, as well as a skillful organization ability, he has done a marvelously fine job and I have only unstinted praise and admiration for him. I only hope that in the long run in this position, he will find enough compensation and satisfaction to balance the substantial sacrifice which he has made."

Although NSF consistently provided the bulk of AIBS's funds, it did not examine AIBS's books until last fall. This was in line with NSF policies which seek to minimize NSF intrusions into the internal affairs of its grantees. NSF did require, and receive, regular reports on the progress of the work it was funding through AIBS. For purposes of computing AIBS's charges for overhead, it relied on the Office of Naval Research, which, from the start, funded projects through AIBS on a contract basis. Since contracts are paid *after* the work is completed, ONR had no reason to examine the manner in which NSF's grant funds were handled.

Meanwhile, in 1959 and 1960, AIBS, under Cox's direction, began to hit an impressive stride. NSF agreed to fund an important Biological Sciences Curriculum Study (BSCS) which, under the chairmanship of Glass, would undertake a thorough revamping of biology education at the secondary level. BSCS was expected to require the services of hundreds of the nation's leading biologists and educators; it was to require several years, and the ultimate cost was to be in excess of \$6 million. In return for managing this large-scale undertaking, AIBS—as with all its grants—was to be compensated through an overhead allowance that was formally set at up to 15 percent. The final amount was to be negotiated.

At about the same time, AIBS went into its film venture. And, in direct conflict with what NSF contends were proper procedures, it continued its practice of placing NSF funds in an unsegregated general fund. (It appears that the one exception was the money it invested in short-term government bonds, a practice that has ludicrous aspects since the federal government finances its operations—including grants—by selling such bonds.)

In 1961, with BSCS and the film venture in high gear, a number of other things independently occurred that had a bearing on AIBS's fortunes. Among them was the death of its long-standing controller and AIBS's inability to obtain a permanent replacement. Three persons filled the job before the present in-

cumbent arrived. During this period, AIBS's already tangled financial affairs became even more involved. At the same time, Tracy M. Sonneborn, of Indiana University, became AIBS president and started to ask some hard questions about the organization's finances. And, at NSF, a new comptroller, Aaron Rosenthal, came on the job at the request of Waterman, who felt that NSF had grown to a point where its fiscal policies required tighter management. Rosenthal, who had long government service, including the top fiscal posts at the Veterans Administration and the National Aeronautics and Space Administration, has a reputation as a tough, no-nonsense administrator with a zeal for protecting the public's money.

Meanwhile, AIBS was making withdrawals from its general fund to pay for the increasingly expensive film series. In addition, it was repeatedly plagued by NSF's delays in transferring funds for its continuing grant projects. At one point, Glass recalls, after not having received funds several months after they were due for BSCS, he first tried to get help from the lower levels at NSF, but eventually had to appeal personally to Waterman.

Some NSF officials concede that there were many occasions when the Foundation was late in sending money to AIBS. But, they contend, AIBS was also late in getting in the annual renewal forms; and they add that on occasions when AIBS was appealing for funds for continuing the curriculum study, it actually had not expended the full amounts given earlier. According to one NSF official, when the curriculum study reached its annual expiration date last 1 October, AIBS's own figures showed that \$47,000 remained unexpended. Theoretically, AIBS would be going out on a limb if it expended funds before the grant was formally renewed, but, this official explains, "it is a regular practice carried on by most of our grantees with our informal assurances that payments will ultimately be made to cover authorized expenditures."

#### **Application Late**

The difficulty arose, he explained, because AIBS did not get its renewal application to NSF until 20 August, which was too late for it to be "processed" for the 6-8 September meeting of the National Science Board, which passes on all NSF grants.

The next board meeting was 17-19 October, but NSF still had not processed

the application. It was finally presented to the 15-17 November meeting of the board. By then, AIBS's financial irregularities had been unearthed and further grants were withheld. (Arrangements have since been completed for BSCS to continue under the fiscal management of the University of Colorado, where the major part of BSCS's staff is located.)

Cox and other AIBS officials contend that their organization was hampered by NSF's financial procedures and by conflicting statements from NSF's program and fiscal personnel. It is contended, for example, that although NSF and AIBS concluded an overhead rate of around 10.5 percent for 1962, AIBS was informally told that it could skim 15 percent off its grants and keep the difference to provide it with funds for promoting various activities in behalf of the biological sciences. In an interview, Rosenthal said that "I am prepared to admit that in some cases, the letters of understanding [governing the use of grant money] were not as clear on overhead as they might have been. But," he insisted, "on BSCS there is no doubt whatsoever that the overhead was clearly spelled out."

AIBS officials also contend that while NSF fiscal officers are now citing chapter and verse of grant procedures, a quite different image of the rules was spelled out by NSF program officers in their years of dealings with AIBS.

Waterman himself acknowledges that the program and fiscal departments can give a grantee conflicting impressions. "In finance," he said, "there is one place to go for information; in programming, there are 50 voices, and sometimes, by trying to be courteous, they can create misunderstandings."

With Rosenthal expanding NSF's audit operations and Sonneborn becoming increasingly disturbed by what he had learned of AIBS's financial status, AIBS's affairs started to move toward a climax toward the end of 1961. Sonneborn recalls that upon raising questions about AIBS's financial structure, he became more concerned as his knowledge of the organization's affairs increased. "When it first was brought out at the executive committee meeting, not only I, but other members, were horrified that we had to resort to this [deficit] method of financing. Other members of the executive committee assured me that this was a common practice and sound administrative procedure when it was done on a short-

term basis. But what we did not know was that this was not a short-term transaction. I was under the impression that the check hadn't come in for one thing and we were using other money to make up the difference for a short period. And I think others shared this impression, too."

#### **Proposal to NSF**

Before his presidency expired at the end of the year, he called a special executive committee meeting to discuss AIBS's finances. Out of this meeting there came a proposal for NSF to provide AIBS with a 5-year grant of \$1,058,702 that was intended to put the organization on its feet and make it self-sustaining. The application for this grant was presented to NSF last May.

A few months later, while the application was pending, Rosenthal's auditors paid their first visit to AIBS for what was intended to be a quick check of one contract. They saw that their accounts were irregular, and then looked closer.

The result of this closer look was a hurriedly called meeting, the day before Thanksgiving, at which Rosenthal, Charles B. Ruttenberg (NSF's deputy general counsel), and Paul A. Scherer (NSF associate director for administration) confronted Frits Went, who was AIBS's outgoing president, Ebert, who was then vice president, and Paul J. Kramer, a former AIBS vice president who returned to the vice presidency this year. The AIBS officials were informed that their organization was several hundred thousand dollars short in its NSF accounts, and it was demanded, they say, that by Monday they propose a plan for repayment and protection of NSF funds that remained on hand. NSF denies that it imposed so stringent a deadline. Its officials say that the AIBS officers were told that a proposal would have to be devised, but that no time period was set.

#### **AIBS Proposal**

On the following Monday, Went responded to this request in a telegram to Scherer that proposed (i) that "Hidden Cox will relieve himself from his duties related to the management and financial operations of the AIBS"; (ii) the organization's affairs would be placed in the hands of staff members who would serve as acting executive director and "general manager or financial officer"; (iii) all NSF funds would be placed in separate accounts; and (iv)

"in the meantime we will work toward the sanitation [*sic*] of our finances to the satisfaction of both our board and the granting agencies which have supported AIBS to such a large extent."

Rosenthal replied the next day that the proposals "are unacceptable since they are not considered adequate to protect the interests of the U.S. government." He demanded that AIBS "stop all disbursements from AIBS bank accounts and agree not to make any further disbursements except upon approval of a NSF representative." The telegram was backed up by an informal warning that if AIBS failed to comply, NSF would seek a court injunction and would perhaps seek to declare AIBS bankrupt and place it in receivership.

The order was promptly heeded, and for 24 hours AIBS did not write a check. The ban was then lifted to permit AIBS to pay its staff and continue the flow of money to its various proj-

ects. But all expenditures were made under NSF scrutiny, and with Cox exercising no control. AIBS's headquarters staff was reduced about one-third, and virtually all purchasing was suspended.

Meanwhile, AIBS's elected officials, led by Went, appealed to the membership for funds. The letter, dated 6 December, pointed out that past predictions of financial disaster had now been realized. It said nothing, however, about the diversion of large sums to the film project, but rather stated that difficulties had arisen because "advanced funds have had to be used as 'capital' funds for contracts and other AIBS authorized activities for which reimbursement can be recovered only after expenses have been incurred." Went stated that this practice would no longer continue.

"Futhermore," the letter continued, "we can no longer count upon 'overhead' allowances from grants to sup-

port non-grant, non-contract activities of the AIBS, even in part." (This is a curious interpretation of the function of overhead, which, by definition, is intended only for those costs incurred while administering specific projects.)

The letter was reported to have drawn about 4000 replies by last week, with a total of approximately \$34,000 in cash or pledges. AIBS is also seeking other sources of quick revenue, and is attempting to sell the film series rather than wait for the royalties that were expected to solve its financial problems. An offer of \$100,000 has been reported.

Meanwhile, Ebert has called the AIBS governing board, composed of representatives of the member societies, to an emergency meeting in Washington on 25 January; the society presidents, as well as several AIBS past-presidents and a number of other persons, have also been invited to attend.—D. S. GREENBERG

## "Biology on the Cuff"—Is AIBS Worth Saving?

An open letter from the Institute's president.

Had the Governing Board of the American Institute of Biological Sciences foreseen that within three months after its last elections, the institute would be battling desperately against dissolution, it might have chosen as its president an attorney or certified public accountant. But, not being seers, they chose an embryologist, a blunt outspoken, and "politically" inexperienced one at that. The former characteristics, although not always a blessing, may be needed today. As for my political inexperience, I have had to learn some previously unwanted skills quickly. As a biologist, at least it is comforting to know that such acquired characteristics are not heritable.

It is customary for incoming presidents to open their terms by proclaiming their pride in their organizations. I am proud of having been elected president of AIBS. When I substituted for Frits Went in introducing Melvin Calvin at the annual meeting at Oregon State University, I found the occasion inspiring: over 5000 biologists were assembled for his unforgettable lecture. And this number represents only a fraction of my constituents, the company of biologists, held together by the common bonds of scientific curiosity and the spirit of dedicated inquiry. It has been AIBS that fostered and implemented the Biological Sciences Curriculum Study (BSCS), that initiated

the promising Commission on Undergraduate Education in Biological Sciences, whose Education Committee established the Committee on Facilities and Standards in Biology, that has carried forward the *Quarterly Review of Biology*, and has acted as spokesman for all biologists in dozens of ways that most of us do not grasp fully (for example, working toward salary equality for biologists in government service). I speak with conviction, for, as a relative newcomer to AIBS, I have been struck by its vitality and scope. It has fostered a few less important, possibly uncritical activities, but viewed as a whole, the record of achievement is remarkable. Hence my pride; and it is my pride in the achievements of the company of biologists that gives me the courage to begin this frank recital.

Since our meeting with NSF on November 21, 1962, when the charges first came to our attention, I have, as a member of the Executive Committee and since January 1, 1963, as president, made a careful study of the situation, attempting to obtain all relevant facts. It is a very complex matter, but on the basis of my study, I am now of the opinion that our earlier appeals for funds, in a letter dated December 6