Intelligence Agency Chief Seeks "Dialogue" with Academics

Breaking with his agency's 25-year policy of public silence, the director of the National Security Agency (NSA), Vice Admiral B. R. Inman, has asked for a "dialogue" with the academic community over the implications of new research in cryptography and communications security, and the circumstances in which such work should be classified.

The exclusive interview Inman gave this publication—the first press interview by any director of the supersecret NSA—follows a series of four incidents in which the NSA or its employees attempted to classify or limit unclassified research, development, and patent applications in communications privacy.

The NSA's job is to preserve the security of U.S. communications and to gather communications intelligence overseas. It is probably the world's largest reservoir of expertise in codes and communications security. But lately, exciting, unclassified developments in these fields have sparked growing commercial and scientific attention.

"There's a real question now . . . given the burgeoning interest in this field, how to protect valid national security interests," Inman told *Science*. "One motive I have in this first public interview is to find a way into some thoughtful discussion of what can be done between the two extremes of 'that's classified' and 'that's academic freedom'."

Inman explained that situations might arise where the NSA would want research performed on campuses or in the private sector to be classified. But the government has no power to do so beyond the patent and the export laws, each of which cover specialized cases. Inman said there are "discussions . . . in limited parts of the Executive Branch" on whether NSA's legal authority could be extended without impinging on academic and other freedoms. He implied, but did not promise, that the Administration might propose legislation on the issue in coming months. "By the time we get through there will be a vast array of people in the Executive that will be drawn into this. There will be a debate between the Administration and the academic community," Inman said.

Almost more important than his overture to the research community is the fact that a director of the NSA spoke to the press at all. Aside from some congressional appearances—almost all in executive session—NSA directors and officials have been notoriously inaccessible. Senator Frank Church (D-Idaho), who conducted a sweeping investigation of all intelligence agencies in 1975 and 1976, said: he "welcomed" NSA's first press interview.

> We must strive to find a proper balance between governmental accountability and executive secrecy. This interview would seem to be another step in that direction.

And F. A. O. Schwarz, chief counsel for Church's investigation, said, "I'm flabbergasted. Back when we dealt with the NSA they considered it dangerous to have even Senators questioning them in closed session."

Inman himself told *Science*:

> Security has served the national interest with respect to the NSA extraordinarily well over a long period. So a whole series of directors have taken the view that "no comment" was the best response. But as we have moved into burgeoning public interest in public cryptography, a substantial volume of unfavorable publicity has occurred with no counterbalance . . . to point out that there are valid national security concerns. This publicity troubles me because it could hurt our ability to recruit and retain some of the brightest talent in mathematics, engineering, data systems specialists, linguists. . . . We can't afford to leave an impression in the academic world of being a devious or bumbling bureauracy.

He said the agency was having "no trouble" recruiting now, but might in the 1980's when fewer engineering students will graduate.

Inman limited his comments to NSA's side of two of the four incidents in which, he said, the agency had received a "bum rap." Both were cases in which, at NSA's request, applicants for unclassified patents suddenly received government secrecy orders. After much protest and publicity, both orders were lifted. The orders applied in one case to a computer science professor at the University of Wisconsin, Milwaukee, and in the other to a group of private inventors based in Seattle, Washington. The Texas-born, 47-year-old vice admiral, who has risen rapidly through the naval and defense intelligence communities and now presides over the $1 billion, 20,000-employee supersecret agency, spoke quickly and intensely, becoming emotional only when asked about charges that NSA is limiting Americans' privacy.

In the first case, the Wisconsin Alumni Research Foundation had applied for a patent for work done by professor George I. Davida and his co-worker, David Wells, on a nonlinear "stream" cipher using very long, perhaps 10^{50} bit, keys. Inman said that the work was good and in a field of "interest" to the security community. But the issuance of the secrecy order was a bureaucratic error, because, as it turned out, the material had already appeared in the open literature and so could not be classified. Under the procedures then in effect, he said, patent applications that are referred by the Commerce Department to the NSA were decided at the "middle management" level. "We did not have any internal system to challenge a decision to classify.

Vice Admiral B. R. Inman

This is a general problem of information across government. It's easy to classify and the question is how do you challenge the validity of it."

After publicity in the press brought the Davida case to his attention, Inman began a new procedure by which any decision by middle management to request a secrecy order on a patent application would be automatically reviewed by a higher-level committee. This committee found that the secrecy order was not warranted.

Inman maintains that "there was a campaign that the imposition of the secrecy order interfered with the academic freedom of the investigators. I think that was a bum rap and I so told the Chancellor by telephone. The decision to seek a patent conveys the intent not to share the information with others except for profit, which is the right of any inventor. . . . But if the individual had elected to publish in academic journals there would have been no question of a secrecy order."

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Werner Baum, the chancellor of the university campus at Milwaukee, who had charged that the secrecy order was unconstitutional and smacked of McCarthyism ("It would be ironic if McCarthyism came back to haunt Wisconsin," he said at the time), disagrees with Inman. The academic freedom issue did not revolve around the patent itself, Baum told *Science*." The gutsy issue here was that the secrecy order's language is . . . fairly broad wording that puts a damper on a line of research."

And Davida himself, free to talk about the incident now that the secrecy order has been lifted, notes that the order's exact language forbade him to disclose "any significant part of the subject matter" of the application. "In cryptography, a significant part of the subject matter is mathematics, and if you can't do mathematics, you can't work."

Inman disputed the widespread interpretation that the order was rescinded because NSA did not intend to classify work done at universities, or work done, like that of Davida and Wells, under the sponsorship of the National Science Foundation. "We would . . . [classify] any application where we feel there is a valid national security use or concern. But we're going to be dialoguing with the Commerce and Defense Departments over whether the existing procedures are adequate. . . .

"Baum told me that Davida got a cold postcard in the mail. . . . You ought to be able to have a way to tell the person why the order is being imposed." Inman told *Science*.

In the Nicolai case, a group of four inventors led by Carl R. Nicolai, invested $33,000 of their own funds into development of a "phaserphone" device, which would add on to ordinary radios and, using a code division multiplexing technique, scramble conversations. They estimate the device could sell for less than $100 and have a large commercial market. As first reported in *Science* (8 September 1978, p. 891), they received a secrecy order requested by the NSA 6 months after filing their patent application. They were seeking legal redress, and even considering a court test of the constitutionality of the secrecy order law, when the order was lifted on 11 October.

Briefing

"Devastating Blow" Dealt Water Projects Pork Barrel

Environmental lobbyists on Capitol Hill believe that a time-honored congressional institution, the water projects pork barrel, was struck a "devastating blow" by President Carter's veto of the public works bill and the House of Representatives' rejection of the attempt by the Appropriations Committee and the House leadership to override that veto.

The vote to override was 223 to 190, or 53 votes short of the two-thirds majority which the leadership needed. Brent Blackwelder, an Environmental Policy Center lobbyist and the point man for the conservation groups in their effort to support the President on water policy reform, says that the vote to sustain the veto was large enough to undermine "the politics of retaliation" practiced so effectively by the Appropriations Committee in the past to persuade House members to go along with pork barrel legislation.

By this he means that, with 190 Democrats and Republicans voting with the President, any threat to punish them by cutting out projects in their districts in future public works bills would have a hollow ring.

At this writing, the President seems to have won a sweeping victory. The Senate Appropriations Committee already has reluctantly agreed to drop from the bill 17 projects to which the White House objected. In addition, the committee has agreed to eliminate some 2300 new jobs for the Corps of Engineers and the Bureau of Reclamation and, at the same time, to restore funds for the Water Resources Council, a planning group whose functions the President wishes to enhance. "The pork barrel will never be the same again," says Blackwelder.

Federal Nutrition Research Is Misdirected, Says OTA

The Office of Technology Assessment (OTA) has just issued a report which says, in effect, that the federal research effort on human nutrition has its priorities upside down.

"The consequences of continuing to pursue the present preoccupation with nutritional deficiency diseases will seriously affect the quality of life of present and future generations into the 21st century," the OTA report says. It adds that the emphasis should be on investigating the relationships between the abundant diet most Americans now enjoy and the increased incidence of chronic illnesses such as cancer and heart disease.

The U.S. Department of Agriculture, the Department of Health, Education, and Welfare, and five other departments are engaged in nutrition research, with total spending coming to between $50 million and $117 million a year (depending on how narrowly or broadly nutrition research is defined). Viewed overall, this research effort follows "no coherent strategy for the solution of current diet-related health problems," the report says.

According to Catherine Woteki, leader of the OTA's "nutrition cluster," among the score of academicians who served on the nutrition assessment steering committee or participated in assessment workshops there was general agreement as to the finding that present federal nutrition research priorities are topsy-turvy. The steering committee was chaired by Johnna Dwyer, director of the Frances Stern Nutrition Center at the New England Medical Center in Boston.

American Physical Society Foils Threat to Tax Status

The scientific and engineering societies have been keeping a careful weather eye on the Internal Revenue Service (IRS), and last winter the sky began clouding up ominously for the American Physical Society (APS) together with several other scientific and engineering groups. The Manhattan district office of the IRS informed the APS it was proposing that the society be reclassified from a nonprofit, charitable educational and scientific organization to a "business league" (*Science*, 23 June). Now, however, there has been a break in the weather, for the APS at least. The North Atlantic regional office of the IRS in New York recently reversed the position of the district office, concluding that the society's status as a Section 501 (c) (3) organization "should not be disturbed."

Had the district office's position been upheld by the IRS regional and Washington headquarters, the consequences for the APS could have been serious. For in-

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Inman told *Science* he personally had authorized the Nicolai secrecy order. The application "was reviewed under the new procedure and there was disagreement among the reviewing principals as to whether it merited classification or not. And, given the disagreement, I elected to ask for the secrecy order to be put on. Where there is uncertainty, I believe we should err on the side of national security."

But Inman complained that the delay in making a final determination—about which the inventors also griped—was partly the inventors' fault. "The whole process would have gone much more quickly if we had had a loan of the equipment, but they wanted an exorbitant amount of money to loan us the equipment." He was referring to the inventor's wish for $50,000 as the price of such a loan, and NSA's offer to pay the inventors $2,000.

Inman also disputed the inventors' claim that they were deprived of their rights. For instance, he said that NSA general counsel Daniel Silver wrote Nicolai that NSA was willing to talk about settling for damages. The inventors' response to this, Inman said, was to announce they were cutting all contact with the NSA.

Inman declined to comment on why the order had been lifted, for fear of commenting on the device itself and interfering in the inventors' future market. But he said that in lifting the order when it did, the agency had considered that the inventors had a 20 October deadline for filing for foreign patent rights.

In the Nicolai and the Davida cases, Inman repeated his view that new procedures might allow an inventor to be told why a secrecy order had been placed on his patent application.

In discussing both cases, Inman complained that the principals had used the press to manipulate the NSA. He denied a *Time* magazine report that the NSA had tried to hire the Seattle investigators as consultants.

Inman also said that Davida "was very bright and realized that if you go to the media you're likely to get the attention of the top faster than through routine appeals." Both Chancellor Baum and Davida deny having gone to the press. Da-

Briefing

stance, the second-class mailing privileges for its journals would have come into question, as would its right to receive tax-exempt contributions. But most serious of all in the opinion of William W. Havens, executive secretary of the APS, would have been the "impugning" of the APS's reputation as an objective scientific organization and a lessening of its credibility when it speaks out on major issues such as nuclear reactor safety and radioactive waste management.

The case made by the IRS district offices for changing the status of the APS rested on a finding that several of the society's activities were directed primarily at "promotion of the profession of physics and the common business purposes of its members." These suspect activities included the APS's job placement service and educational programs and even the work of its panel on public affairs which has been responsible for several major studies, including those on reactor safety and the nuclear fuel cycle which have been widely regarded as objective and of high quality. The president of the APS, Norman F. Ramsey of Harvard University, says that physicists can take pleasure in the fact that the IRS has now "recognized the scientific and educational character of the [society] and its role in the science of our nation."

Still pending at the regional level of the IRS are district office proposals to revoke the tax-exempt status of the American Institute of Physics and the American Chemical Society. Although the outcome of the APS case can perhaps be taken by these groups as a good omen, not all the signs are favorable. District office proposals to reclassify three engineering societies as business leagues have been upheld by the North Atlantic Regional Office and are now on appeal to the IRS headquarters in Washington. It is not clear how, if at all, the final resolution of these cases could affect other scientific and technical groups, such as the AAAS.

Inter Alia

• In the National Science Foundation Appropriations Act for fiscal 1979, Congress has decreed that the rate of pay for principal investigators under NSF grants ordinarily shall not exceed $3,958.33 a month or $47,500 a year, the pay ceiling for federal civil servants. This comes as bad news for a small but significant fraction of investigators. A fiscal 1977 survey made of 5024 investigators, or somewhat less than half of all investigators under NSF grants, showed that 342 of them (or 6.7 percent) were being paid at a higher rate than will now be allowed; 226 were paid at a rate equivalent on an annual basis to between $48,000 and $54,000, with the rate of pay for the other 116 being equivalent to between $54,000 and more than $78,000 (but with all but 12 paid at a rate not exceeding $66,000). In unusual circumstances, the NSF director may permit an investigator to be paid at a rate higher than the newly prescribed ceiling, but all such waivers and exceptions must be reported to the Appropriations Committees of the House and Senate.

• In an effort to lighten the burdens of outside reviewers and its own staff, the NSF is directing grant applicants to hold the "project description" portion of their proposals to a maximum of 15 typewritten pages, single spaced. It seems that, as the competition for NSF money has increased, so has the length of project descriptions. Those received by the agency's behavioral and neural sciences division have been running typically at about 35 pages; although those received by the mathematical, physical, and engineering directorate usually have been shorter than that, there have been occasional blockbusters coming in at up to 75 pages, long enough to give any reviewer a queasy stomach.

• Attention pot smokers! The Congress of the United States, so often stuffy and unsympathetic where your interests are concerned, seems on the point of doing you a good turn. House and Senate conferees on foreign assistance authorization legislation have approved a provision to bar any more U.S. funds from being spent on Mexico's use of the dangerous herbicide paraquat in the spraying of marijuana patches unless the chemical is made readily detectible by a colorant or odorant. Jane Aiken, an aide to Senator Charles Percy (R–Ill.) who has been a leader of the effort to protect the some 16 million regular users of "grass" from paraquat, says that the Department of State is investigating five colorants and two odorants. The most promising of these, she says, is the odorant *d*-limonene dimercaptan (an extract of orange peel) which, when the pot smoker lights up, smells remarkably like a skunk. Use of this chemical is still in an experimental stage, but Aiken says that it is expected to be ready for application in the Mexican spraying program before the end of the year.

—Luther J. Carter

vida says that he said as little as possible to the many reporters who contacted him because he felt bound by the broad language of the secrecy order. And the reporter from the Milwaukee *Sentinel*, which first ran the story, already knew about the secrecy order when he first called him, Davida said.

Inman emotionally denied inventor Nicolai's charge, which appeared in an Associated Press story, that the secrecy order "appears part of a general plan by the NSA to limit the privacy of the American people." ("That's false" Inman said emphatically. "There's no general plan, no specific plan, no any kind of plan.") Nicolai had continued, "They've been bugging people's telephones for years and now someone comes along with a device that makes this a little harder to do and they oppose this under the guise of national security." (Rereading this quote aloud, Inman said, "The NSA has never bugged people's—American citizens'—telephones. I have testified about this to Congress.")

NSA has officially stated that it does not "target the communications of American citizens"—although investigations have shown that it kept "watch lists" in the late 1960's of Americans about whom it collected information. Another continuing controversy has been what the NSA does with communications it intercepts when one party is an American or when two foreigners are discussing an American (*Science*, 9 September 1977, p. 1061). The new wiretap bill passed by Congress addresses this.

Inman declined to discuss two other incidents. In one, an NSA employee named Meyer threatened academic scientists with prosecution under the export laws if they discussed their research in cryptography. In another, later confirmed by the Senate intelligence committee, NSA convinced the National Bureau of Standards (NBS) to simplify the key to a data encryption standard NBS was approving for civilian and commercial use (*Science*, 29 July 1977, p. 439 and 30 Sepember 1977, p. 1345).

In general, Inman declined to answer questions regarding what level of cryptographic and communications security devices the NSA would like to see allowed for use by Americans. He said any comment would bear on the "communications security" aspect of NSA operations which he would not discuss.

But on the second issue, of whether first amendment rights can be reconciled with what NSA thinks necessary for national security, the NSA position does not seem so far afield from that sketched by spokesmen for the research community. Inman indicates that NSA would like authority like that the Atomic Energy Commission (AEC) (and its successor agencies) has under the Atomic Energy Act. Under the law, the AEC can classify the work of any American (and in one case they even classified the lecture of a Soviet citizen) that it thinks will jeopardize atomic energy secrets. Such clear authority does not exist, according to Inman, in the cryptologic area. In the past, Defense Department lawyers have told *Science* that such clear authority may not extend to any nonnuclear work with military applications.

Says Werner Baum, the champion of Davida's academic freedom: "It was never our position that there might not be instances in which research should be classified in the national interest. That of course is a very valid point. But if there are such cases, there should also be a burden of proof on the government, and some due process ought to be invoked. The procedure as applied now could be arbitrary or capricious." So it seems the "dialogue" that the NSA chief seeks has already begun its way down an interesting, but unknown and unprecedented, road.—DEBORAH SHAPLEY

Boon or Boondoggle: Bygone U.S. Rubber Shrub Is Bouncing Back

A few months ago, on 19 June, a scientist from Texas A & M University carried into a joint hearing at the U.S. House of Representatives a scruffy-looking plant with steel-gray branches and leaves. It appeared to be a weed. But the scientist explained that the plant had vast potential and that with proper care it might blossom into a multimillion-dollar industry.

By the time other witnesses had given their testimony, the House committees on Science and Technology and on Agriculture had apparently been impressed. The upshot? Congress is now preparing to sink some $30 million into the plant's development. It is no small sum to bestow upon a lowly shrub that grows only in the deserts of Texas and Mexico. But the guayule bush (*Parthenium argentatum*) has a remarkable talent. It makes rubber.

It also promises to make federal research dollars flow into underdeveloped areas of the southwestern United States. Therein, say several scientists and federal officials, lies danger of a megabuck boondoggle that could sidestep the careful research needed to ultimately tap the potential of the guayule bush.

The story is simple, at least in the beginning. Interest in guayule (pronounced wy-OO-lee) is currently riding high because natural rubber shortages are beginning to loom. The World Bank estimates that during the next decade, global supplies of natural rubber (from *Hevea brasiliensis*) are likely to increase at a yearly rate of 3.8 percent—while demand for rubber will increase annually by 5.9 percent. The gap cannot be filled by synthetic rubbers because of their inferiority in elasticity, resilience, and heat resistance. Aircraft tires, for example, must be made almost entirely of natural rubber, and radial automobile tires require 40 percent. In addition, synthetic rubber is made from dwindling supplies of petroleum.

Enter guayule. As a *Hevea* substitute it has been picking up followers for the past few years. In 1975 the National Academy of Sciences (NAS) sponsored a conference in Tucson, Arizona, to investigate guayule's potential (*Science*, 10 June 1977). They came out with a favorable report, *Guayule: An Alternative Source of Natural Rubber*. In some cases as much as one quarter of the plant's total weight is rubber. Furthermore, guayule can be harvested mechanically, in contrast to the *Hevea* rubber trees in the tropics, which are one of the most labor-intensive crops in the world. Defense analysts say guayule could take the edge off an interruption in Southeast Asian rubber supplies, as happened during World War II. The U.S. Bureau of Indian Affairs thinks guayule can promise Indians in the Southwest an economic base for their poverty-stricken reservations.

And the tire giants, the ultimate consumers, are also interested. Goodyear has made a small trial planting of guayule

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