

would have been .75, .68, .69, and .61, respectively. The  $P$  value for the first three of the correlation coefficients would have been  $P < .001$ , and  $P < .005$  for the fourth.

17. It might be argued that, in calculating the correlation coefficients, the subject areas should be weighted proportionally to the number of questions relating to that area in the national examination. Since the correlation being investigated is that between independent variables, the appropriateness of such weighting is questionable. Moreover, if applied, it would not alter the conclusions of this study, although it would lower somewhat the values of the various correlation coefficients reported (to .58, .50, .59, and .43, respectively). The  $P$  values for these four correlation co-

efficients would be  $P < .01$ ,  $P < .05$ ,  $P < .01$ , and  $P = .065$ , respectively.

18. This contention is supported by the fact that calculation of the correlation coefficients between a measure of the difficulty of the various subject areas (namely the mean performance of the nationwide sample in these areas) and (i) class performance on the national examination, (ii) class performance or departmental examinations, (iii) student ratings of content and organization, and (iv) student ratings of presentation, gives values for  $r$  of 0, .18, .14, and  $-.01$ , respectively.

19. C. McGuire, *J. Med. Educ.* **38**, 556 (1963); in *1963 Yearbook: National Council on Measurement in Education* (Lansing, Michigan, 1963), pp. 7-16.

20. B. Hoffman, *The Tyranny of Testing* (Collier, New York, 1964); R. Cox, *Nature* **237**, 489 (1972).

21. Although efforts might be made, as indeed they were in this study [see (15)], to exclude from computation questions on material not covered in the course, such efforts would likely not be foolproof.

22. The author is grateful to D. S. Riggs for the classification of the National Medical Board Examination questions by subject area and to him and N. Solkoff, T. Gessner, F. J. Bruce, and C. H. Ehret for helpful comments on the manuscript. He also wishes to thank R. Spangler and W. J. Walbesser for suggestions regarding the mathematical treatment of the data.

## NEWS AND COMMENT

# Arms Control Agency: Fred Iklé, New Captain of a Disabled Ship

Congress established the U.S. Arms Control and Disarmament Agency (ACDA) in 1961 as a modest step toward redressing the balance in a government then still feverishly engaged in building up the nation's strategic weaponry. The director of ACDA was assigned, by law, to serve as the President's principal arms control adviser and to assume, under the Secretary of State's direction, "primary responsibility within the government" for arms control matters.

No miracles were expected of ACDA, and none were performed. But this small agency, with a staff of never more than 270 people and an annual budget of never higher than \$10 million, has proved its value by playing a key role in bringing about agreements such as the Non-Proliferation Treaty of 1968 and the ABM treaty of 1972. Today, however, ACDA seems to be on the Nixon Administration's list of agencies marked, if not for extinction, for obscurity. A number of members of the Senate Foreign Relations Committee will give voice to their growing concern over this situation at the public hearings, now set for 9 May, on the confirmation of ACDA's newly designated director, Fred Charles Iklé.

Iklé's confirmation itself does not appear in any danger, for Iklé is a political scientist with a respectable if not luminescent record of scholarship into questions of modern weaponry and international negotiations. Indeed, the recent White House announcement of Iklé's nomination was received with re-

lief by those who had feared that the nominee might be someone wholly unqualified, such as one particular Republican senator from the West who was defeated for reelection last November. Iklé, once a professor at Massachusetts Institute of Technology, comes to ACDA from the Rand Corporation where he has been head of the social science department. If some professionals in the field of arms control are uneasy at certain of Iklé's ideas, they at least recognize him as one of their own kind and as someone with whom they can communicate.

The real significance of the upcoming hearing is that it will give senators their first opportunity to question an administration spokesman closely, and publicly, as to ACDA's future. If Iklé is unable to provide satisfactory answers, the committee or its arms control subcommittee can proceed from there, scheduling other Administration officials to testify about ACDA and possibly considering legislation intended to enhance the agency's status and influence.

ACDA seems to be undergoing a transition from an agency entrusted with important arms control negotiations to one discharging a modest advisory role, yet apparently without being allowed to keep the tools necessary to perform even that latter role adequately. First, note how ACDA has been stripped of a major part of its role in negotiations.

A few months ago the agency was denied the leadership in SALT II ne-

gotiations when the White House named a career diplomat, Ambassador-at-Large U. Alexis Johnson, to head this second round of strategic arms talks with the Russians. In fact, Gerard C. Smith, who in January resigned as ACDA director, last May was cut out of the final negotiations for SALT I—which he had led for some 2 years—and was not invited to be present in Moscow with President Nixon and Henry A. Kissinger when the SALT agreements were signed.

ACDA will provide some staff support for SALT II, but whether this will be done largely through Johnson's negotiating team or through Kissinger's National Security Council staff is not yet clear. What is clear is that, in its new advisory and staff support role, ACDA's influence on policy will probably be weak by comparison with what it would have been if the agency were still actually leading negotiations. (The ACDA official currently assigned to the SALT negotiating team is Sidney N. Graybeal, the agency's deputy assistant director for science and technology.) ACDA remains in charge of U.S. participation in the multilateral arms control negotiations going on at the United Nations Conference of the Committee on Disarmament (CCD) in Geneva, but whether this will continue to be so if these negotiations should suddenly begin moving toward important agreements appears very much a question.

Just the fact that Iklé is an academician without practical diplomatic or high-level governmental experience itself suggests that he was named to head a think tank of sorts and not an agency with the "primary responsibility" for arms control. His qualifications are in marked contrast to those of his two predecessors. William C. Foster, director of ACDA from 1961 to 1969, served as director of the Economic Cooperation Administration and as deputy secretary of defense during the

Truman Administration. Gerard Smith was a high State Department official during the Eisenhower years, having served as an assistant secretary and director of policy planning. Henry Kissinger came to the White House from a background similar to Iklé's, but, clearly, Kissinger is, in many ways, something of a *nonpareil*.

Senator Henry M. Jackson of Washington, who was consulted by the White House prior to the Iklé nomination, is quite openly of the conviction that ACDA has a selfish bureaucratic interest in arms control agreements and definitely *should not* be in charge of negotiations. Jackson has supported past arms control agreements, but his general orientation on arms control has been more that of a hawk than a dove. Iklé's own views are subtle and not easily characterized, but, for whatever it means, his nomination was warmly endorsed by Jackson, who had known Iklé as a consultant to his Government Operations subcommittee on national security. Henry Kissinger also has known Iklé for some time.

If ACDA and Iklé are to be confined largely to an advisory role, then it is all the more pertinent to note some severe losses of human and financial resources that will handicap the agency and its new director in performance of that role. Consider the following:

- The General Advisory Committee on Arms Control and Disarmament, established by law as an adviser to the director, the Secretary of State, and the President, includes among its 15 members some of the most experienced men in the nation in arms control matters—people such as John J. McCloy (the chairman), William Foster, James Kilian, and Dean Rusk. The White House has asked *all* of the members to submit their resignations. Apparently destined to undergo a complete change of membership, the committee may go a long time before again asserting itself confidently, even if people of high caliber can be persuaded to serve on it.

- Much of ACDA's senior staff is being wiped out by forced resignations. One whose resignation the White House has accepted is Spurgeon M. Keeny, Jr., the assistant director for science and technology. Keeny has worked on arms control problems under four different administrations, beginning in 1958 when he was a member of the U.S. delegation to the Geneva Conference on Nuclear Test Detection. Arms control liberals respect his quiet competence.

- ACDA's budget has been cut from \$10 million down to \$6.6 million—at the same time the President seeks a \$4.2-billion increase in military spending. ACDA expenditures for contract research will decline by 75 percent, going from \$2 million to only \$500,000. ACDA can and has made effective use of research done by other agencies, and the value of some of its contract research can be questioned. But, as shown in past attempts by the Pentagon's Advanced Research Projects Agency to obscure the significance of advances in methods for discriminating between earthquakes and underground explosions, ACDA needs a strong independent research and research-evaluation capability.

#### Foster Is "Horried"

Taken altogether, these various changes at ACDA are viewed by many people in the arms control field with a sense of distress. "I am horrified at what's happening to the agency," William Foster, now chairman of the board of the Arms Control Association, told *Science*. "I think they are trying to abolish it, by indirection." Just who "they" are, Foster cannot say. "Who is doing the crucifixion act, I don't know. Nobody seems to know."

That Iklé is assuming the helm of a badly listing—if not a sinking—ship takes a certain edge off of any inquiry into his ideas. Nevertheless, the senators on the Foreign Relations Committee will want to know his views as to how ACDA can contribute to SALT II and whether there is any prospect of new U.S. proposals at the CCD on issues such as a comprehensive ban on nuclear testing (the U.S. position on the test-ban question has not changed essentially since 1963, despite the fact that, given available seismic detection technology, underground nuclear explosions of yields as low as 1 or 2 kilotons can now probably be verified with high confidence, and without onsite inspections).

More generally, Iklé is sure to be questioned about his article in the January 1973 issue of *Foreign Affairs*, entitled "Can nuclear deterrence last out the century?" Here, in passing, Iklé expressed concern about the possibility of a nuclear war starting by accident or by an unauthorized launching of weapons. He observes: "In the 1950's, prior to the missile age of Russia's massive buildup of her nuclear forces, one heard a great deal about the risk of accidental war. Now, when

American and Soviet missiles by the thousands are poised in constant readiness, this concern has curiously diminished." The article's main thrust, however, is to question what Iklé sees as the premises on which the theory of mutual deterrence (the "balance of terror") is based, as in the following:

When leaders of a powerful country are credited with a willingness to gamble on some scheme for nuclear surprise attack—a scheme whose calculations they cannot validate, whose assumptions they cannot test and whose failure would mean the end of their regime or even their country—how rational a decision are we assuming in our posture of deterrence? When the prevailing American view of mutual deterrence postulates that both the Russian nuclear posture and our own must be designed to deter an opponent of such degraded rationality, why stop at this particular degradation in judgment?

Having said this, however, Iklé makes himself not at all clear as to what to do about it. In calling for rejection of "the dogma that to deter nuclear attack, the threatened response must be the mass killing of people," Iklé seems to advocate some kind of counterforce strategy. That is, nuclear forces should be targeted against Soviet "military, transportation, and industrial assets" instead of against population centers.

To be sure, Iklé certainly does not want the United States to do anything that could cause the Russians to fear for the survivability of their deterrent. Yet, if the United States is to have missile forces large and accurate enough to respond to an attack by striking deliberately and selectively and destroying all or part of the Soviet Union's war-making potential, then the Russians might well believe that these forces have been designed to have a first-strike potential. The problem here is typical of the difficulties that arise when a strategic theorist turns his mind to the fine-tuning of nuclear war.

Senator Hubert H. Humphrey (D-Minn.), a member of the Senate Foreign Relations Committee and sponsor of the ACDA legislation 12 years ago, may want Iklé's views on a piece of legislation which the senator and his staff are now formulating. It would require the preparation of "impact statements" for all major new military systems, analogous to the environmental impact statements required for federal projects under the National Environmental Policy Act. A number of agencies would contribute such statements, looking at military projects from the standpoint of their budgetary, economic,

social, and strategic impacts. ACDA would have the key role of analyzing proposed projects from the standpoint of their impact on the future of the arms race.

From the viewpoint of arms control

people, such legislation would have the virtue of formalizing ACDA's advisory role, now possibly the only role the agency is to be allowed to play. For Congress to go beyond this and demand that ACDA be restored to a po-

sition of leadership in arms control negotiations would no doubt be futile. If the President is determined to remove ACDA from such a role, there probably is nothing Congress can do about it.—LUTHER J. CARTER

## Cancer Virus: Link to Disease in Man Reported Again

One sure way for a scientist to make news is to announce that he has discovered a human cancer virus. In the last few years, more than half a dozen investigators have enthusiastically claimed to have caught the elusive cancer-causing virus, and, although some of those claims were duly modified by "maybe's," the implication always was that with just a bit more work the data would be conclusive and the cautionary note could be discarded. As it turned out, it was the claims that had to be discarded.

But past failures are no deterrent, and the search for a human cancer virus goes on. One of the first persons to proclaim success was Albert Sabin, who said he had found the virus shortly after he switched to cancer research in 1962. But what he found was not a virus after all, and talk about an exciting lead was quietly dropped.

The latest person to proclaim success is also Albert Sabin. At the annual meeting of the National Academy of Sciences, he reported that he has nailed down, once and for all, the long-suspected link between herpesviruses and cancer. Sabin, who is something of a showman, summarized his findings at a press conference and later spelled out his evidence in a contributed paper that he coauthored with Giulio Tarro of the University of Naples in Italy. Tarro, feeling slighted, has said that he was not invited to participate in the meeting with the press. However, he did show up at the press conference after things were under way. He is miffed by a news account that he feels failed to give him due credit.

Sabin's claim and the circumstances surrounding the research have become matters of some contention among persons close to the situation.

To begin with, Sabin seems to be the only one who regards the experimental evidence as conclusive proof that herpesviruses play a role in causing certain cancers. John B. Moloney, associate scientific director for viral oncology at the National Cancer Institute (NCI), which funded the studies under the Special Virus Cancer Program, accompanied Sabin to the academy press conference, at which he toned down some of Sabin's more definitive remarks. Moloney said the Sabin-Tarro findings "provide additional evidence suggesting that herpesviruses may be causally implicated" in some cancers. However, he added that, before one could say the etiological role of the viruses was proved, there must be further studies involving larger numbers of patients to determine the statistical significance of the relation between the viruses and tumors. In addition, the sensitivity of the test for picking up evidence of the viruses must be increased, and the nature of the protein (called a nonvirion antigen) that is used to indicate the presence of the virus must be defined. Tarro agrees that it is too soon to say that a cause and effect relationship has been proved beyond doubt and is satisfied with saying that the evidence looks very, very good.

In experiments that were completed only 3 days before the presentation at the academy, Sabin and Tarro showed that ordinary herpes simplex and herpes genitalis viruses are specifically associated with nine types of human cancers. Herpesviruses are extremely common in nature, and most people harbor them. They are known to cause fever blisters, or cold sores, and genital sores. Now, Sabin and Tarro are saying that these same viruses, which are transmitted from person to person, "may in certain individuals under special condi-

tions play a role in inducing some human cancers in a manner comparable to that obtaining for the cancers *experimentally* [in animals] produced by other DNA viruses."

In a telephone interview, Sabin stressed the fact that there must be co-factors of some as yet unidentified nature involved in producing malignancy—that the virus does not act alone. But, he added, this is the "first demonstration that an ordinary virus is associated only with cancer and not with infection."

Sabin and Tarro have not actually found the herpes simplex and genitalis viruses (also known as herpes type 1 and type 2, respectively) in the serums of cancer patients. Instead, they found evidence that the viruses had been there by identifying antibodies to nonvirion antigens specific to those viruses. A nonvirion antigen is simply a protein which is produced by a cell that has been infected by the virus and that uses a piece of DNA from the virus in the production process. Thus, it is the viral information that codes for production of the antigen which, while specific to that virus, is not a structural part of the virus itself. These nonvirion antigens, like any other antigens, stimulate antibody production.

In experiments conducted during February, March, and April at the NCI's Frederick Cancer Research Center in converted Fort Detrick, Sabin and Tarro screened a variety of human serums for antibody to the nonvirion antigen. They found it in serums from patients with advanced cancers of the following nine types: lip, mouth, oropharynx, nasopharynx, kidney, bladder, prostate, cervix, and vulva. There was no antibody in serums from patients with 20 other types of cancer, including cancer of the lung, stomach, colon, and breast, as well as a couple of types of leukemia. Nor was it present in fetal tissue, thereby discounting the possibility that the antigen in question is really an embryonic one that is frequently associated with various cancers. Studies of persons with active herpes infections—but no malignancy—were also negative.