Another approach to rational lawmaking and the protection of scientific research is exemplified by an advisory commission that has been established recently in Massachusetts. The commission, of which Nathan is a member, was set up by Delahunt as a body to advise the legislature on bills that would influence research. It has not been in business long enough for anyone to evaluate its performance but, on the face of it at least, it seems to be a useful step in the direction of giving scientists a voice that they have not really had before.

And, if laws governing the conduct of research continue to come into being, as is likely, the time may come when the idea of establishing some sort of quasi-legal board to advise scientists about the legality of their proposals will be one that will have to have serious consideration.

—BARBARA J. CULLITON

NIE: Beleaguered Institute Has a Stormy Past, a Cloudy Future

The National Institute of Education (NIE), the Nixon Administration's idea for laying a solid research and development base for federal education support activities, has lead a precarious and tortured life throughout the 3½ years of its existence. Last fall it appeared to be headed for extinction, but now survival for the institute seems assured, although by no means in the form or dimensions originally envisaged for it.

The institute, conceived by the then White House intellectual Daniel Moynihan, was created by Congress in the Higher Education Act of 1972. The underlying vision was that it would be a sort of NIH (National Institutes of Health) for the world of education, essentially apolitical, whose purpose would be to bring together some of the best minds in the country to orchestrate a program of research that would lead to educational reform and, as Nixon's speech on the subject emphasized, to "make educational opportunity truly equal." Even Democrats were willing to regard this as one of Nixon's better domestic ideas; many people were starting to agree with him that "throwing money at problems" would not solve all of them. There was no solid research base for many of the expensive Great Society programs of the Lyndon Johnson era, such as Head Start, that had failed to achieve the desired ends. It seemed time to pull back and regroup. In education, this meant calling on the resources of creative thinkers who were not necessarily part of the constituency of the Office of Education (OE), the "school people." OE's role, despite the fact that it had a research component, has been mainly to react to the needs of its constituency; NIE was to be free to be innovative and initiate its own projects. Nixon's idea was that NIE within a decade of its birth would have a budget of some $1.2 billion a year and a staff of up to 1000. Well, the legislation did get passed, in large part owing to the efforts of Representative John Brademas, (D–Ind.), chairman of an education subcommittee of the House Committee on Education and Labor. NIE was made separate from but equal to OE, both being within the Division of Education in the Department of Health, Education, and Welfare (HEW). And it was given a broad mandate—to advance education as an "art, science, and profession," to strengthen education's scientific and technological foundations, and to build "an effective educational research and developmental system."

Numberless problems have hindered achievement of the grand design. First of all, Congress resented being asked for funds for a fancy new R & D program, particularly one with the Nixon imprimatur, at a time when R & D money in other areas was being cut back by the Administration. The institute has been faced from the beginning with dilemmas about whether to concentrate its resources on pork barrel–tinged programs inherited from OE that seemed to have most direct relevance to present and pressing problems, or to antagonize the "practitioners," as teachers and school administrators are called, as well as Congress, by pushing into innovative enterprises that had no clear or direct application to those problems.

As yet, it has hardly had a chance to choose. After 3 years, it is still trying to pull itself together. It suffered from the fact that Nixon was preoccupied with his own survival long before the magnitude of Watergate became known. Its director, Thomas K. Glennan, was not appointed until 5 months after the institute was created; and the 15-member policy board (the National Council on Educational Research), modeled along the lines of the National Science Board of the National Science Foundation, was not appointed until July 1973. Relations with Congress were dreadful. Glennan, formerly an economist at the Office of Economic Opportunity (OEO) who left NIE last November, found himself in a double bind with Congress. On the one hand, he was being asked for specifics on what the institute intended to accomplish and how it was going to do it; yet according to the law he was not supposed to enunciate programs and policies that had not been approved by the then nonexistent board. Furthermore, the institute was caught off balance because it had been led to expect a 3-year "honeymoon" of sorts before being called to account. By the time the board was appointed, it seemed that a lot of damage had already been done. Social science research has a checkered reputation, and educational research is generally held to occupy the bottom rung in terms of quality and prestige. So Glennan, with only generalizations to go on, sounded to Congress rather fuzzy, and his organization came across as surly and even arrogant. This circumstance, combined with the worsening economic picture, resulted in appropriations far below what might have been expected from the initial 3-year authorization of $355 million. The fiscal 1973 appropriation of $110 million permitted NIE to move into a new "field-initiated" grants program despite the fact that $90 million of the funds were tied up in obligations transferred from OE. Appropriations for fiscal 1974 suffered a drop to $75 million, largely owing to dissatisfaction

on the part of Warren Magnuson (D–Wash.), chairman of the Senate appropriations subcommittee for HEW. This meant paring things down across the board. Fiscal 1975 was worse—the $70 million appropriation meant no money for research grants. No significant change is expected in the fiscal 1976 budget, but the picture looks a little brighter—with inherited contracts coming to a close, the institute will be able to spend about half its budget at its own discretion. The longer-term financial future will remain murky until Congress has hearings on a new 3-year authorization for the agency, scheduled for some time this year.

NIE's political maladroitness was no help, but a more serious problem has been that of reconciling its dreams with the fact it has been saddled with a bag of programs, some good and some not so good, inherited not only from OE but from the OEO. Support for these has taken the mammoth share of the budget and has prevented NIE from pursuing the kinds of ideas that would justify its separation from OE and give it a firm identity. Among the experimental programs transferred to NIE, most of which had 3- to 5-year lifetimes, are a career education program, an experimental schools program, a trial program providing educational vouchers allowing parents to choose where to send their children to school, support of educational laboratories and centers (mandated in 1965 as an attempt to generate new research), a computerized information service called Educational Resources Information Center, and an educational satellite (since sent over to India).

NIE has attempted to support these programs to an honorable conclusion and, through its tormented series of organizations and reorganizations, has tried to integrate them in some rational fashion with those it has initiated on its own. It has had to pare down support in order to make room for other activities called for in the legislation establishing NIE—namely, basic research and the dissemination of research findings that have been gathering dust on the shelf for want of an efficient system of getting new knowledge out in the field.

The institute, while its existence seems now guaranteed for the near future at least, is still in the grips of its identity crisis. It must bring to respectable conclusion programs such as "experimental schools" that turned out to be not very productive ideas in the first place; it must disseminate the results of others; it must administer shoulder-to-shoulder hot controversial ventures in such areas as education vouchers and educational testing with basic research on, for example, the different ways children do their "information processing." It must avoid offending special interests such as the American Federation of Teachers and the National Education Association—who are generally interested in developments that directly affect the classroom—while at the same time proving that long-term basic education research is necessary.

NIE finally decided somewhere along the way that trying to please everyone will please no one, so the institute is now attempting to narrow its exertions to "problem areas." The installation of the policy board appears to have helped achieve some focus. The board decided in 1973 that 10 to 15 percent of the institute's budget should go for basic research, this time in specific target areas rather than the free-for-all program of fiscal 1973. It also made a list of priority areas, such as "education and work" and "increased diversity of educational opportunities," that has guided the institute in effecting a reorganization that—this time, it is hoped—will stick.

New Look

In January the whole outfit was shifted from functional divisions (research, development, dissemination) and realigned according to problem areas. The new setup is supposed to reflect what is really going on and prove to Congress that NIE has finally gotten its head together. Everyone at the agency has been assigned to one of five task forces. (The offices of administration, and planning and management still oversee the show.) Basic research has been divided up according to subject matter.

One task force is called "basic skills." This includes most of the basic research on how children learn. There is heavy emphasis on developing techniques for measuring learning, and on determining something called "adequacy," or how much education is enough to enable a person to function in America today. Another task force is "equity." This encompasses compensatory education, problems of education for people based in different cultures and languages, and sex discrimination in education. "Education and work" involves development of curricula that expose students to the world of work without being "vocational education," which has the disadvantage of tying them into a particular trade and denying them the breadth of experience that permits future career choices. Then there is "organization and management," which is tied in with "finance and productivity" both of which are involved in giving local school systems assistance in making most efficient use of their resources. Included here are the voucher experiment and "individualized instruction," which involves experiments in mapping out a particular curriculum for a particular child depending on his mode of learning. Finally, there is "dissemination." This will take up a larger part of the budget than ever in fiscal 1976, as old OE contracts are concluded and their results are made available. The program includes training state agents to act as links between researchers and local educators (links hitherto never successfully forged). The system is to be modeled somewhat along the lines of the agricultural extension service, and is expected to be a good selling point on Capitol Hill where legislators are impatient for evidence that NIE's work will be having a positive effect in the classroom.

Everyone will feel more comfortable when a new director has been appointed. (Directorship of the council, formerly headed by Pat Haggerty of Texas Instruments, is also vacant.) Former OE official Robert Egbert, dean of education at the University of Nebraska, is the choice of HEW, but the White House has the final say, and it hasn't said yet. Meanwhile, most NIE people already feel more comfortable about the new reorganization and so, too, does Magnuson, who was so disgusted with the outfit that he recommended last year that they be funded at the level of zero. There remains a schism between the research people and the program people. The former tend to think that NIE would have been better off following the NIH model. These folks think NIE should have been given a clean start, unencumbered by old OE programs, and allowed to gradually build up a first-rate educational research establishment. In this way, they say, they would not also have inherited the OE constituency which demands fast concrete results and which forces them to be, in effect, a "junior OE." One research psychologist told *Science* that NIE should be allowed to really get going or be "shot in the head" rather than permitted the mar-

ginal existence that the $70 million a year budget permits. Another researcher thinks that "dissemination," which will swallow about 40 percent of the free funds in fiscal 1976, shouldn't be NIE's business at all. Others argue that dissemination is a central raison d'être of NIE, and the institute has no business taking the taxpayers' money if it is going to rumble along generating "cognopsychological" knowledge that never, in the foreseeable future at least, finds its way into classrooms.

NIE administrators, however, are sounding considerably more optimistic than they were a few months ago. The legislation allows 20 percent of the personnel to be exempted from civil service requirements, which has permitted the institute to recruit a number of well-trained and talented individuals who would never have been attracted to OE. The basic research grants program, brought to a halt in fiscal 1975 for lack of money, is to be reestablished next year, supported by funds made available by termination of old OE contracts. This time, research grants will be targeted to subject areas designated by NIE, such as how children learn to read—an area in which breakthroughs are said to be imminent.

NIE has been something of a madhouse throughout most of its existence, a victim of anti-Nixon sentiment, congressional skepticism, political maladroitness, the tardy appointment of its policy council, confusion over its basic purposes, the albatrosses inherited from other agencies, and inability, because of unexpectedly low appropriations, to formulate a long-term research program of its own.

There does, however, appear to be widespread feeling that the basic concept of a federal R & D establishment for education is a sound one—after all, as Brademas has repeatedly pointed out, only 0.3 percent of federal education funds have gone into R & D, compared with 1 percent in agriculture, 4.6 percent in health, and 10 percent in defense spending. Inasmuch as education in America is a $100 billion a year enterprise, it seems as though a few more people ought to be given the wherewithal to sit around and think about how to improve things.

Senator Magnuson indicated a softening in his attitude toward NIE last November when he said he perceived "the beginnings of a recognition and appreciation by NIE of the concerns of Congress." NIE's broad mandate theoretically gives the agency flexibility but also robs it of excuses not to stray into policy matters of interest to politicians, such as the effect of open enrollments, and collective bargaining for teachers. Brademas says he is open to suggestions for modifying the legislation so as to tighten the agency's focus and get people from more disciplines involved in "first class thinking" on the core problems. Advisory council member William Baker of Bell Laboratories agrees it might be well to write more "specificity" into the legislation. This might help NIE and Congress develop a common language, he observes—since both sides continue to suffer from failure to understand exactly what each other is talking about.

Those who envisioned NIE as a small, pristine research outfit free from political concerns will have to cancel their dreams. But NIE may be the country's best hope for giving educational research the multidisciplinary underpinnings as well as high quality brainpower that it needs to become a respectable and productive undertaking.

—CONSTANCE HOLDEN

Cruise Missiles: Air Force, Navy Weapon Poses New Arms Issues

Arms race critics and Pentagon planners have become so accustomed in the last two decades to locking horns over large-scale, costly weapons systems that a weapon of an entirely different character—small in size, relatively cheap, and barely out of the research stage—may seem hardly worthy of their attention. However, a handful of outside experts and members of Congress are viewing with increasing alarm a weapon known as the strategic cruise missile—a nuclear-armed device about the size and shape of a small telephone pole—which could dramatically alter the force structure and capability of the United States.

Critics and advocates say that the effect of the cruise missile on the bomber force may be analogous to the effect that the MIRV (multiple independently targeted reentry vehicle) is having on the ballistic missile force. The strategic cruise missile offers, in short, a way to multiply quickly and cheaply the number of nuclear warheads that bombers and submarines can deliver to targets in the Soviet Union. The United States already has a number of short-range nuclear tipped rockets and older cruise missiles aboard its bombers, and these are targeted on the Soviet Union. But on the whole these weapons are larger and less accurate and, therefore, are of less concern to critics than the new cruise missile.

The new cruise missile can be launched from airplanes, ships, or submerged submarines. Some people say that the air-launched version of the new missile has the potential to save the Air Force up to $7 billion by substituting for hundreds of its manned bombers and accompanying tanker planes. The sea-launched version, designed to be carried by all U.S. submarines, is viewed by some arms controllers as undesirable, because the missiles would give the U.S. fleet of attack submarines a nuclear capability that it does not now have and, some argue, that it does not need.

A prototype of the new cruise missile will not fly for about another year; its components are still being refined and tested. However, military officials are optimistic that the missile will perform as planned, since most of the technology it will use is already in existence. The cruise missile, now in the development stage, will be a miniature, pilotless airplane less than 20 feet long and a little more than 20 inches in diameter. Powered by an air-breathing turbofan jet engine and equipped with wings that spread out after launch (see