assurance that the recipients of IAEA assistance will abstain from turning their peaceful capabilities to warlike purposes. The means for guaranteeing this, by force if necessary, are at present beyond the reach of any international consensus. However, as a result of U.S. efforts to promote atomic technology, the capacity to produce weapons is within the reach of several nations, and has been brought years closer for many others. It can be argued that there are no secrets in science and that ultimately any industrialized nation can build a bomb if it wants to pay the price, but as one Defense Department official put it, "There is no question that Indonesia, for instance, can eventually build a bomb, but I think it is in everybody's interest that the eventually is 25 years from now, rather than 5 or 10. It seems," he continued, "that we've been working to make it sooner rather than later."

Consistently running parallel to the U.S. penchant for bringing the peaceful atom to the world has been a policy of preventing the spread of the military atom, but even here the thrust of the peaceful program has been sufficiently powerful to win out in cases where the two uses overlap. The United States has withheld enough atomic assistance from France to infuriate de Gaulle, but in the meantime it has inexplicably provided the French with a number of things, atomic and otherwise, that have unquestionably furthered de Gaulle's nuclear ambitions. The most puzzling involved a decision, early in the Kennedy administration, to fulfill a French request for a fleet of American aerial tanker planes. This decision was justified on the grounds that the French could build tanker planes or get them one way or another if the U.S. turned down the request. In the long run, they probably could have, but the short-term effect was to give the French the capacity to transform their first-generation fleet of atomic bombers from a one-way suicide force into a far more credible striking arm.

Similarly, the United States has provided France with some 740 kilograms of enriched uranium for its peaceful energy program. Since this material is subject to inspection, the U.S. has assurances that it has not been diverted to military purposes. But this in no way changes the fact that one effect of these supplies is to lessen the strain that the French weapons program is placing on that country's efforts to develop economical atomic energy.

Another case also illustrates the inconsistencies of U.S. proliferation policy. De Gaulle, in the face of U.S. opposition, is committed to developing a Polaris-type nuclear force. The U.S. has refused to sell France certain inertial guidance equipment and computers that could be used for the development of rockets and hydrogen warheads. But it has approved the sale of a land-based nuclear submarine training reactor, on the grounds that "a reactor of this type has no appreciable capacity for performance of research and development and can make no appreciable contribution to the development of military reactor technology." Nevertheless, like a great many other things in the effort to promote atomic energy, the reactor isn't putting off the day when nuclear weapons and their delivery systems will be more widespread.

Following Communist China's entry into the nuclear club last October, the administration set up a committee under Roswell L. Gilpatric, former deputy secretary of defense, to study the proliferation problem. The committee, which recently completed its work, is not expected to make its findings public, but what must frankly be described as no more than rumors have been circulating about its recommendations. For what these rumors are worth, they suggest a proposed deceleration of U.S. efforts to promote atomic technology abroad. The study, it is understood, recognized that in many countries the U.S. is too deeply committed to the development of atomic energy for any sudden reversal to be feasible. But it is reported to have recommended that, instead of pushing these developments, as we have been doing, we drag our heels a bit—until some sort of comprehensive political agreements have been devised to make certain, as one official put it, that we are not creating a situation in which "plowshares will be beaten into swords."—D. S. GREENBERG

Academic Degrees: Universities Ask Strict Control on Federal Agencies' Power to Grant Them

Because pluralism reigns in American higher education we have grown accustomed to judging academic degrees not only at face value—associate, bachelor, master, doctor—but also by the institution which awards them. In recent years the problem of putting degrees on a sort of academic gold standard has been complicated by the aspirations of certain federally operated educational and research institutions to award conventional degrees.

Legal authority to grant degrees can only be given to colleges and universities by states and, in certain cases, by the federal government (the Service academies provide the best-known examples). But a network of accrediting agencies has grown up through which an institution gets or does not get from its peer institutions a seal of approval which largely governs recognition, formal and informal, throughout academia.

In recent years this concern in the academic community about degree-granting qualifications in general and the ambitions of federal organizations in particular has motivated two leading national groups in higher education to formulate detailed policy statements on the subject. The National Commission on Accrediting and the American Council on Education, late last year published their statements in tandem in a pamphlet titled "The Integrity of the Academic Degree."

Authority Sought

The ACE statement notes that during the last decade "the academic community has been confronted by a series of proposals from various branches of the armed services that military installations be permitted to award graduate degrees for certain of their education and training programs." The Air Force Academy, for example, would like to add master's degree programs, and the Judge Advocate General's School at Charlottesville, Virginia, and the Walter Reed Army Medical Center in Washington, D.C., have sought authority to begin graduate level programs in their special fields.

In addition, the ACE statement mentions proposals made in Congress in the past decade for establishing a degree-granting Foreign Service Academy or "Freedom Academy" and, more recently, for establishing a Science Academy to be operated along the lines of the existing Service academies.

Legislation for a Science Academy has been introduced again in this session of Congress by Representative Peter W. Rodino, Jr. (D–N.J.). The bill (H.R. 153) calls for setting up of a National Science Academy and also a scientific career service, in which graduates of the academy would be required to serve for a period at least equivalent

to the time spent in training, and which would be intended to provide the sort of career framework offered by the Public Health Service.

The ACE statement goes on to point out that none of these proposals have been recommended by the executive agencies involved, and it is fair to say that there is no real head of congressional steam behind any of them.

It should be noted, however, that the federal government is already providing graduate-level education and is, in a small way at least, in the business of granting advanced degrees.

One of the most flourishing examples is the Air Force Institute of Technology at Wright Field, Dayton, Ohio. The institute awards the bachelor's degree in mechanical and aeronautical engineering and the master's degree in a number of major engineering fields. The institute's program is accredited by the North Central Association of Colleges and Secondary Schools and approved by the Engineers' Council for Professional Development. A doctoral-level program in space sciences has been launched, and partisans of the program feel it should win accreditation in 4 or 5 years.

Doctoral Accreditation

The Naval Postgraduate School at Monterey, California, already has the authority and the accreditation for doctoral programs, but in practice it grants few doctor's degrees, perhaps one or two a year. The school was founded at Annapolis in 1909 but began awarding formal degrees only after World War II. Engineering and management subjects are its specialty.

The Army's Command and General Staff School at Fort Leavenworth, Kansas, has also won "preliminary" approval of a master's-level program from the North Central Association, but the program seems to be in limbo, since authority to grant a master's requires legislation and that legislation has not been sought. This delay has been interpreted by observers as indicating that a serious appraisal of policy on extension of degree-granting authority within federal institutions is going on inside the Pentagon and has not been completed.

The ACE, at the close of its statement, summarizes its policy views this way.

"The American Council recognizes the desire of certain Federal agencies to establish educational programs for in-service training which, because they lead to the award of an academic degree, encourage those participating in the program—instructors as well as trainees—to a high quality of performance. Nevertheless, the Council believes that there must be appropriate safeguards within the structure of the Federal Government and within the academic community at large to prevent indiscriminate establishment of graduate degree programs by Federal agencies and installations and to provide a more rigorous check on the quality of instruction offered in such Federal programs than would be the case with self-governing non-Federal institutions. To the objection that this establishes a double standard of academic performance, it must be pointed out that a federally operated educational program is not subject to the kind of review of standards and control over the instructional process that is carried out in a non-Federal institution by its faculty and administration within a framework of policy set forth by the institution's governing board."

To insure tighter controls the ACE recommends the strengthening of present arrangements under which the Office of Education reviews proposals by federal agencies to grant degrees, and that Congress authorize no extension of degree-granting authority without an Office-of-Education recommendation.

In the National Commission on Accrediting statement, the matter of independence is stressed, and the commission asserts that an academic institution cannot meet its responsibilities unless it enjoys an autonomy of which the following five characteristics are said to be the sign.

1) The institution should operate through a board of visitors or a board of control serving the public interest with adequate powers and continuity to safeguard the integrity of the educational enterprise. Not only must the governing board perform its task of setting institutional purposes and approving policy; it must also serve to protect the long-run educational interest of the students and of society against inimical pressures from both without and within the institution. The board thus may be the most important element in assuring educational autonomy, for if it fails its trust, all else within the institution will suffer.

2) The institution should be organized on a nonprofit basis. That is, an academic institution should be assured freedom from proprietary self-interest. Its income should be used to further the academic enterprise rather than to benefit any special interest group such as the trustees or the administration.

3) Faculty members should have an active role in the governance of the institution by participating in the creation of academic policies, the development of the curriculum, and the selection and advancement of students and other members of the faculty.

4) Provision should exist for the freest possible inquiry into the fields of knowledge included in the curriculum and for the dissemination of the results. Most institutions have established faculty tenure policies to assure this freedom, but the right of both professors and students at every degree-granting institution to dispassionate inquiry and instruction must be assured.

5) Although the degree-granting institution should have wide latitude to experiment with educational ideas and procedures and to develop degree programs in new or old areas of knowledge, it should require for its degrees attainment of extensive knowledge and intellectual skill distinctly beyond that developed by the secondary schools, and it should have adequate human and material resources to help students meet these requirements.

For federal institutions to meet these criteria unequivocally would obviously be difficult. The good possibility that a doctoral candidate's thesis at a federal installation might be classified and that the principle of free inquiry and wide dissemination of results would thus be violated is perhaps the most often cited of examples. It is also true that, if the five characteristics were rigorously applied to nonfederal institutions, many of them would show serious defects when tested on criteria of academic freedom and academic excellence.

Another Aspect

While the discussion of particular difficulties which arise out of the educational activities of federal agencies—particularly the military services—is certainly justified, it may divert attention from another aspect of the problems surrounding the academic degree. In the era of Big Science, the universities' need has grown—not only for federal funds for the support of research and graduate education but, in some areas of science, for the use of federal facilities.

In a speech in 1963, Atomic Energy Commission chairman Glenn T. Seaborg summed it up this way:

"The past twenty years have witnessed the emergence of two technico-scientific undertakings on the part of the United States which are having major impact on the technical, economic, sociological and political future of our country and the world and on mankind in general. I am speaking of those two highly related domains at

opposite ends of the dimensional cosmos—nuclear energy as the microcosmos, and the adventure into space as the macrocosmos. While these activities, one sponsored by the Atomic Energy Commission and the other by the National Aeronautics and Space Administration, are highly practical in their end objectives, the pursuit of both of these objectives is an exciting adventure calling for the highest levels of dedication and intellectual achievement. Both are highly dependent on the research and educational output of our universities and upon the excellence of our national research centers."

In the fields of atomic energy and space the universities, despite massive federal support, still must resort to government facilities for some kinds of high-level research. AEC facilities such as Brookhaven, Argonne, and Oak Ridge have resources which even the best-endowed universities do not have, and the same is true with space research, since NASA, in short, has the boosters.

In Big Science, research involves graduate education, and it is the conduct of graduate education in the big federal laboratories which provides another source of contention.

The American Council on Education statement noted, "It has also been suggested, although unofficially, that other federal installations be given power to grant graduate degrees. For example the Oak Ridge Laboratory of the Atomic Energy Commission might conduct graduate programs leading to an advanced degree . . . ."

The reference to Oak Ridge was pretty clearly inspired by a lecture by Alvin M. Weinberg, director of the Oak Ridge National Laboratory, given in an NSF series in January 1962 (*Science*, 6 Apr. 1962) and still providing grist for discussion.

In the lecture Weinberg observed that the government, through its Big Science policies, had created a shortage of scientific and technical manpower and had a responsibility to help overcome the shortage.

His remarks were interpreted by many to mean that some federal labs should be converted into graduate schools, and this caused a considerable stir in the universities. What Weinberg says he was driving at was greater cooperation between the labs and the graduate departments for their mutual benefit.

Weinberg and others note that instances of collaboration—with the universities keeping control of their students—have been multiplying.

At the Oak Ridge Institute of Nuclear Studies, which serves a consortium of universities in the region, there are now about 80 students working on their Ph.D.'s. Forty of them are students from universities and 40 are Oak Ridge employees. A number of Oak Ridge scientists have faculty standing at the University of Tennessee. Effective collaboration, almost everybody seems to agree, has to be a two-way street. A Ford Foundation grant administered by the university helps make the program possible.

Argonne and Brookhaven have had strong ties with universities for years, and Argonne has even begun a program admitting undergraduates for part-time study. In California, scientists at the AEC's Livermore Laboratories have established such a strong link with the young Davis campus of the University of California that it is being facetiously called "Teller Tech" after physicist Edward Teller, who was a prime mover in establishing the relationship.

Much the same thing seems to be happening at NASA installations, although relations with universities do not seem to have advanced as far as in the case of the older AEC laboratories.

The principle of collaboration in the space and atomic energy fields seems to be firmly established, to the general satisfaction of the parties concerned. Doubts unquestionably persist—for instance, as to the possible erosion of university control over its graduate students, or on the question of whether a graduate student will fall into civil service hours at a time when he should be totally immersed in his work.

But the policy statements represent both an admission that the federal labs and the universities need each other and an attempt by the universities to protect their vested interests and their principles.—JOHN WALSH

Congress and Drugs: Political Interest in Drug Problems Is at Lowest Point in Five Years

In its studies of drugs Congress seems to be like the bear who climbed over the mountain only to be confronted with another one. Since the beginning of the Kefauver investigation in 1959, congressional investigators have accumulated thousands of pages of testimony, held searching hearings, and generally subjected the industry to a more intense examination than has been the lot of any other sector of American business. In the process, attention has shifted steadily from the concern with drug prices that initially motivated Kefauver to the questions of drug safety which came to preoccupy his successors. Now, however, the activity is drawing to a close, and though there are a variety of peripheral investigations both under way and contemplated, none of them is likely to have the impact or significance of the earlier work. For a number of reasons, Congress is showing no inclination to tackle the next mountain, and industry executives and lobbyists are anticipating their most restful season in years.

The key condition for the decline of congressional interest in drugs is the departure of Hubert Humphrey from his role as chairman of the subcommittee on reorganization of the Senate Government Operations Committee. Humphrey got drawn into drug problems in 1962 when his interest in the coordination of information between government agencies, together with his interest in drugs, led him to examine the drug information aspects of thalidomide. He quickly concluded that the information problem was not the central question in drug safety, and from 1962 to 1964 he held a series of hearings in which he examined other contributing factors, from the practices of the Food and Drug Administration (FDA) to the attitudes of the medical profession.

Although the hearings were brief, partly because of the press of Humphrey's other responsibilities as Democratic whip, much of the committee's work went beyond the visible surface, and it became a continuing forum for discussion of drug problems. Humphrey also used the committee to force FDA to account for its activities, making it a conscious counterforce to industry complaints that the agency was doing "too much." He also produced a stream of outspoken memoranda, giving an encouraging nod when he saw improvement in federal drug policies, a headline-making howl at evidence of bad management, lack of concern, or danger.

Two other activities deserve mention. First, each volume of hearings (the seventh and last volume, together with a final report, will be issued shortly)*

* The seven volumes, entitled *Interagency Coordination in Drug Research and Regulation*, are available from the Government Printing Office, Washington 25, D.C.