pacity of the computer to arrive at apparent or real solutions of routine-learning and special problems. Increasing use of the computer in such problems is clearly necessary if our body of knowledge and information is to serve its ultimate function. Along with such use of the computer, however, will come restrictions and cautions which have not hitherto been necessary. We find that the computer is being given responsibilities with which it is less able to cope than man is. It is being called on to act for man in areas where man cannot define his own ability to perform and where he feels uneasy about his own performance—where he would like a neat, well-structured solution and feels that in adopting the machine's partial solution he is closer to the "right" than he is in using his own. An aura of respectability surrounds a computer output, and this, together with the time-balance factor, makes unqualified acceptance tempting. The need for caution, then, already exists and will be much greater in the future. It has little to do with the limited ability of the computer per se, much to do with the ability of man to realistically determine when and how he must use the tremendous ability which he has developed in automation.

Let us continue to work with learning machines, with definitions of meaning and "artificial intelligence." Let us examine these processes as "games" with expanding values, aiming toward developing improved computer techniques as well as increasing our knowledge of human functions. Until machines can satisfy the requirements discussed, until we can more perfectly determine the functions we require of the machines, let us not call upon mechanized decision systems to act upon human systems without intervening realistic human processing. As we proceed with the inevitable development of computers and means of using them, let us be sure that careful analysis is made of all automation (either routine-direct, routine-learning, or special) that is used in systems of which man is a part—sure that man reflects upon his own reaction to, and use of mechanization. Let us be certain that, in response to Samuel Butler's question (*7*), "May not man himself become a sort of parasite upon the machines; an affectionate machine tickling aphid?" we will always be able to answer, "No."

References and Notes

1. N. Wiener, *Science* **131**, 1355 (1960).
2. The study of which this article is a part is supported by the Air Force Office of Research.
3. Many basic decision units may be required by the logical-design engineer to accomplish the operation of the single basic decision.
4. D. Bergamini, *Reporter* (17 Aug. 1961).
5. D. Riesman *et al.*, *The Lonely Crowd* (Yale Univ. Press, New Haven, 1950).
6. E. Fromm, *Escape from Freedom* (Rinehart, New York, 1941).
7. S. Butler, *Erewhon* (Doubleday, New York, 1872).

News and Comment

NIH Foreign Grants: Reappraisal Seeks To Develop Policies for Supporting Research Abroad

The National Institutes of Health is reappraising its foreign grant program, which, like most NIH activities, has grown at an incredible pace over the past few years. There is no desire or intention to cut down existing support for foreign scientists, nor is it likely that the program will eventually be reduced or leveled off. But NIH, now that it is deeply involved in the support of research in the laboratories of other nations, is looking at the broader implications of its foreign involvement and is seeking to develop more clearly defined policy lines.

A spur in this direction is provided by the embarrassment of the Bertil Bjorklund case, involving a Swedish cancer researcher who was receiving NIH support at a time when he was repudiated by his Swedish colleagues. It would be incorrect to ascribe too much significance to the case, since it can legitimately be viewed as the sort of thing that easily could happen in any large-scale operation. But the case illuminates the question of what NIH is seeking to obtain when it finances research abroad. It also demonstrates that, while it is better to give than to receive, philanthropy is a difficult business, especially when the recipients are members of a foreign scientific community.

It is generally known that NIH finances most of the biomedical research in the United States, but few people have noticed that NIH has also become an important source of support for a great deal of scientific research effort abroad. NIH's foreign grant activities began in 1954 with 11 awards totaling $95,000. Last year it made 800 grants for a total of about $14 million. This year the total is expected to be about $16 million, nearly double NIH's entire budget for 1947. The foreign grants, distributed among nearly 50 countries, are trifling in comparison with the amount NIH will award for domestic grants this year (about $450 million), but in some cases they amount to a sizable percentage of the medical research expenditures in the recipient countries. For example, Sweden, where NIH has one of its largest programs, received $1.4 million last year, which was about 10 percent of the amount the Swedish government put into biomedical research. The percentage in this case is uniquely high, but even where it is lower, the NIH support takes on considerable significance within the scientific community. The largesse that is generally enjoyed by American medical research is unknown abroad, and, therefore, every source of support is important.

The reappraisal of NIH's foreign programs is being conducted by its

Office of International Research, which was established last year to coordinate activities that previously had been almost entirely in the hands of the individual Institutes. Since the foreign grants are considered to be extensions of the Institutes' domestic programs, the Institutes retain their key role in the awarding process; but the newly established office has begun to impose general policy lines that reflect concern about some of the less apparent problems arising from NIH support of foreign science.

At the heart of these problems is the question of why NIH should finance other nations' research efforts. The official answer, that it does so only to take advantage of talent and equipment not available in this country, would be difficult to test; but more fundamentally, the foreign grant program raises the issue of whether it is in the long-term interest of the United States to give other governments an excuse for not supporting their own scientists. In some of the recipient countries American support obviously makes the difference between research and no research, but in many others, Sweden among them, there seems to be little doubt that if the government shared NIH's concern for supporting a given project financial assistance would be forthcoming.

The trend of thinking within the office appears to be that it is desirable to work out a middle course between supporting promising projects abroad and encouraging foreign governments to increase support for their own scientists. The White House has left NIH to work out its own solutions in this matter, and seems to have exempted it from the pressure for federal agencies to reduce expenditures abroad. At the same time, however, there is a feeling within the administration, generated in large part by Jerome Wiesner, the President's science adviser, that the strength and future of the non-Communist world are intimately related to scientific and technical development, and that American policies should be shaped to encourage our friends and allies to provide greater support for their scientists.

Overhead Costs

One early product of the Office's reappraisal was a decision last January to discontinue the payment of indirect, or overhead, costs on foreign grants. The effect of this decision was a bit of grumbling, particularly from Israel, which has one of the larger NIH programs, but the new policy did not cause any dropouts, nor was it followed by any decline in the number of applications for grants.

Also under consideration are a number of proposals, including the adoption of dollar ceilings based on the percentage of support that a country provides for its own research, and a straight matching basis designed to encourage other nations to spend more of their own money to qualify for NIH support. Another proposal would provide an initial sum to get a project underway with the understanding that the recipient country would eventually take over the financing.

NIH Offices Abroad

NIH has also recognized that Bethesda, Md., is not the best place for appraising its foreign programs, and, as a result, it has opened offices in the Far East, Latin America, and Western Europe. In general, the task of these offices is to establish closer ties with foreign scientific communities, but specifically, NIH wants to have more information to guide its awards of foreign grants. For example, there is the key question of whether a foreign researcher could obtain funds within his own country. NIH's representatives in Europe said in a recent interview that this is an extremely ticklish one to answer, since the grant applicants and recipients are inclined to insist that without American support their work could not take place, while their own study councils are inclined to insist that if the work were really critical, they would naturally support it.

Embarrassing Case

Closely related to this is the question of whether American support for a given researcher is likely to kick up a storm within his own scientific community and cause a sour attitude toward the bearer of gifts. This is one of the effects of the Bjorklund case, which is a source of embarrassment to NIH. Bjorklund, an immunologist, received a 5-year, $250,000 grant from NIH in 1959 to finance research on a cancer vaccine. NIH felt his proposals were promising and it has not shifted from this point of view. But the support for Bjorklund has aroused the ire of many Swedish scientists, and NIH has had to admit that it was not as careful as it might have been in deciding to finance his work.

Bjorklund's work began to receive public attention in Sweden when, in an atmosphere of general disapproval from fellow scientists, he announced that he planned to conduct field trials of his vaccine. It was subsequently discovered that his Immunological Research Laboratory was an altogether independent organization, with no relationship to the State Bacteriological Laboratory, which NIH had mistakenly assumed to be Bjorklund's administrative superior. Part of the misunderstanding arose from the fact that Bjorklund's laboratory is located in one of the State Laboratory's buildings, and part apparently came from a misreading of his application.

Since NIH policy generally calls for some recognized body to provide administrative supervision over its grantees, it found itself in a difficult position, and on 31 August, it temporarily suspended further payments of the grant. In quest of a solution, it asked the Swedish Royal Caroline Institute to assume administrative responsibility, but the Institute, which contains some of Bjorklund's severest critics, unanimously rejected this proposal last week. It had earlier been suggested that the State Bacteriological Laboratories take on this task, but Bjorklund is reported to oppose this, apparently because the head of the laboratory was among those who felt that the field trials were premature.

At present, Bjorklund's only reported source of support is two small grants from insurance companies. Meanwhile, NIH is awaiting the results of efforts to locate him administratively in the structure of Swedish medical research.—D. S. GREENBERG

Fish Flour: National Academy Study Disputes the Food and Drug Administration's "Filthy" Label

The National Academy of Sciences has taken a look at whole fish flour and has concluded that the product does not deserve the "filthy" label applied to it by the Food and Drug Administration.

The Academy's verdict, which was arrived at by a seven-member study committee, has no legal effect on FDA's decision to refuse certification, but it constitutes an influential ap-