

plenty of helium in storage or in newly found gas reserves to meet foreseeable demand for many, many years; that there is a potential for discovering new helium reserves, especially since no systematic exploration for helium has ever been undertaken; and that improvements in technology will undoubtedly permit extraction of helium from gas sources previously considered too lean for economical use. Since these analysts foresee no shortage of helium, they consider costs the crucial question, and they conclude that the present conservation program is too costly a way to meet future needs.

Informed elements of the scientific community, on the other hand, argue that a vital element should be conserved even if the program can't pay for itself as originally planned. "It should be run like a conservation program, not like a business," says Preston E. Cloud, Jr., chairman of the National Academy of Sciences committee that produced a recent report on "Resources and Man." The members of Cloud's committee unanimously agreed that helium is an irreplaceable commodity that is being wasted in great quantities. They originally wrote a recommendation urging that the conservation program be expanded to extract helium from leaner sources. But before the committee's report was published, it was circulated, as a matter of courtesy, to the sponsors who provided financial support. One of these sponsors—the Bureau of Mines—objected. The Bureau had no veto pow-

er over the committee's recommendations, but Cloud says the Bureau claimed that more recent data than that relied upon by the committee "raised questions about our helium recommendation as originally written." Cloud said that because of the Bureau's objections, and because it is always possible that helium will eventually be produced by nuclear fusion or perhaps even by extraction from the atmosphere, he reworded his committee's report so that it simply calls for reevaluation of the conservation program and subsequent expansion if deemed necessary. However, Cloud said he strongly believes, as an individual, that conservation should be continued and expanded. "To say that something will come along [to ensure an adequate helium supply] is an act of faith that shouldn't be used as a basis for public policy," he added.

The Office of Science and Technology, headed by Lee A. DuBridge, President Nixon's science adviser, is also said to favor continued conservation, though it won't comment on the issue on the grounds that its advice is intended solely for the White House. OST is said to believe that while the conservation program may need reform, it would be a "bad mistake" to allow rich supplies of helium to escape into the atmosphere.

The cause of conservation is also being promoted by a small-scale industrial-academic complex. The companies that hold helium extraction contracts with the government have organized a

Helium Society and have enlisted more than 1100 members, mostly from the academic world. The Society has hired M. Scott Carpenter, the former astronaut, to act as its president. It will hold a symposium in Washington, D.C., on 23 and 24 March. James R. Killian, Jr., former science adviser to President Eisenhower, will act as honorary chairman, and a slew of helium experts will give papers.

The debate over helium conservation stems largely from a difference in gut feelings about the future. Conservationists view helium as an irreplaceable resource. They believe it is in danger of being wasted with no real assurance that an alternate supply will be found or a substitute material developed to meet potentially sizable future needs. Critics of the program, on the other hand, suspect that large quantities of gas are being stored at unreasonable cost to meet futuristic demands that can barely be foreseen. They believe there are cheaper ways than long-term storage to meet whatever needs may develop. Each side comes up with differing estimates of future supply and demand and differing conclusions as to whether helium conservation is necessary and desirable. Hopefully the Nixon administration and the appropriate congressional committees will sift through the conflicting claims and make certain that a precious natural resource is not squandered simply because the existing conservation program has run into severe problems.—PHILIP M. BOFFEY

Research in Britain: A Non-Weeping Formula for Living on Tight Funds

London. American research leaders might profitably interrupt their marathon last rites for science in the U.S. and examine a policy statement that outlines how their British counterparts plan to live with the common problem of a shortfall between money and scientific ambitions.

In large part, the British are pointed toward an elitist solution: support the best, concentrate expensive facilities, and let the others get along as well as they can. This, of course, is a pre-

scription that is easy to apply in Britain, where Parliament is passive, and difficult to apply in the U.S., where Congress rages for equal shares. Furthermore, British scientists remain relatively well supported and are virtually free of the violent financial fluctuations that are currently disturbing academic research in the U.S. Their support is on a long-term basis, and an appreciable annual growth rate, now 6 percent in real purchasing power, is built into the overall system. Never-

theless, they are up against the problem of making do with less than they deem desirable, and, since Britain is an old hand at funding academic science from the public purse, it is illuminating to look at the thinking behind the policies that are supposed to govern the administration of research in the coming years. This thinking was set forth in a 12,000-word policy statement by Sir Brian H. Flowers, a physicist and Fellow of the Royal Society, who chairs the Science Research Council (SRC), a \$100-million-a-year organization similar in function to the U.S. National Science Foundation.

Speaking on 6 March, at Nottingham University, on "Science in the Universities,"* Flowers committed what

* Copies may be obtained, without charge, from the Public Relations Unit, Science Research Council, State House, High Holborn, London W.C.1, England.

his American counterparts would consider a heresy: he publicly contested the "significance" of a good deal of past spending for academic research, even with the term generously defined to include "the development of the subject itself . . . the development of contiguous areas of science . . . industrial, economic or social progress, or . . . the preparation of postgraduate science and engineering students for careers whether inside or outside research laboratories."

"This may seem a liberal interpretation of what is meant by 'significant,'" Flowers stated, "but the fact is that too much of our university research has not been significant in any of these senses, it has had little relevance to the development of the subject itself, and none to any broader objective. It has often been too trivial to inspire the younger research worker with any sense of purpose or of responsibility. Much of this situation," he continued, "has arisen at a time when all over the world the emphasis has been on expanding the sheer volume of research and of numbers of scientists trained in the methods of research. There has been too little thinking, too passive an attitude of the SRC [and its predecessor organization] toward grant applications, and our resources have consequently been spread too thinly. In spite of rapidly rising expenditure, our contributions in many branches of science have therefore been less than effective."

Waning Faith in Science

In addition, he said, science has done itself political injury by failing to recognize that the great postwar growth of support for research derived from public belief in the utility of science. "Until about five years ago, budgets for university science were rising at almost the maximum rate that could be absorbed, about 12 percent per annum in real terms. The high growth rates were an indication that the nation believed—and wartime experience had given it some grounds for its belief—that science could solve many of its problems. The economic ills of recent times, and the growing recognition that scientific priorities seemed to be amiss, have now been followed by smaller growth rates. . . . But the demand on science goes on—for better communications, better health, a better environment. Whereas until recently funds for science have kept in step with demands for scientific results, we now find ourselves in a situation where the

funds are falling behind. In some way, we have to learn to improve our productivity so that even with less cash we can produce the goods. If we fail, science will seem more discredited and the funds will become even scarcer."

How is the productivity of academic research to be increased? The answer, Flowers said, is to put greater emphasis on selectivity of subjects and concentration of resources, with full recognition that great inequalities will inevitably result among Britain's 44 full-fledged universities. "The choice," he continued, "is to spread our resources of money and manpower indiscriminately, and thereby achieve excellence only rarely, if at all, or to concentrate it in the way we are doing. . . . The big question, it seems to me, is whether we should openly admit that there are at most a dozen or so universities outstanding at scientific research; that this is only to be expected, and that it is what we should plan for." Flowers added that he would sidestep the question, but went on to say that concentration of resources could in large measure be balanced by collaborative use of facilities. But he left no doubt that, while the effects of concentration might be eased to assist the have-nots, the SRC is aiming to pool its funds for excellence, rather than for equality of distribution. And he also made clear that concentration will be achieved by redistributing funds, rather than by relying on the relatively painless procedure of retaining the old and creating new activities out of new funds. "In the present financial situation," he explained, "this concentration of resources will be planned by shifting to favored areas from less favored areas rather than by simple addition. . . . With a limited growth rate for SRC as a whole it will, however, be necessary to reduce support in major areas where programs have been completed or have lost their impetus in order to provide backing for new major groups."

Flowers emphasized that selection of subjects for support would be based on surveys of scientific needs and potentialities that the SRC has been conducting over the past 2 years. And, possibly in response to allegations that small groups set British science policy behind closed doors and then emerge to confront their colleagues with immutable decisions, he noted that the criteria for these decisions will be made public and that all parties involved will be invited to make known their views. Also, he made clear that, while

NEWS IN BRIEF

● BROWN NAMES HORNIG PRESIDENT

Dr. Donald F. Hornig, former science adviser to President Johnson, was named president of Brown University last week. He will assume office shortly after the 1 June commencement ceremonies. Dr. Hornig served as a group leader in the Manhattan Project from 1944 to 1946. He then began his teaching career at Brown and moved to Princeton, leaving in 1963 to advise President Johnson. At the end of the Johnson Administration, Hornig became a vice president of Eastman Kodak Company and professor of chemistry at the University of Rochester.

● VIET DEFOLIATION CUT:

The defoliation program in South Vietnam has been gradually cut since last November by about 25 percent, according to the *Los Angeles Times*. A Pentagon official confirmed this, saying the reduction was decided at U.S. headquarters because of a lessening need for defoliation missions and because of budgetary restrictions. The 25-percent cut refers to a decrease in missions and in gallons of herbicides sprayed.

● QUARANTINE FOR APOLLO 13:

The crew of Apollo 13 will be subjected to the usual 21-day quarantine placed on crews of lunar landings. NASA had been expected to abandon the quarantine since no signs of life have been detected in materials brought from the moon. The quarantine was recommended by a panel of the Space Sciences Board—National Academy of Sciences because the landing will be on a different area of the moon and because one of the scheduled experiments involves drilling a hole 10 feet below the surface of the moon.

● EDUCATION REFORM:

President Nixon has sent Congress a message on educational reform that criticizes current programs and emphasizes research. He declared that "we are not getting as much as we should out of the dollars we spend." Nixon asked for establishment of a National Institute of Education for research into learning; renewal of the charter of the Corporation for Public Broadcasting; formation of a presidential commission on school finances; experiments with a network of child development projects; and an endorsement of the Office of Education's right-to-read program.

British science will have to live with a great deal more centralized planning, the SRC believes that "we must continue to provide support for some scientists of ability and imagination whether they work in our selected areas or not." This will be achieved, he explained,

through a new fellowship scheme that will involve a smaller number of fellows but at higher salaries. "We shall watch the careers of these young men and women with more than avuncular interest."

From an American perspective, per-

haps the most notable aspect of Flowers' address is that it concentrates on getting the most out of the available resources, rather than on lamenting government's inscrutable unwillingness to give science all it seeks.

—D. S. GREENBERG

Foundations: Taking Stock After the Tax Reform Bill

This is the season when the private foundations issue their annual reports, and the chief executives of the big foundations traditionally include their assessments of the year gone by. Foundation prose tends to be polished and polite, sometimes to the point of opacity, but there is no mistaking the fact that last year the great common experience of the philanthropies was the encounter with Congress which produced the Tax Reform Act's section taxing the foundations and regulating their operations.

In the current crop of reports a tone of reappraisal, not surprisingly, is pervasive. What lingers also in the foundation officers' statements is a sense of their shocked feeling that foundations are misunderstood and mistrusted to a degree they had never suspected. Among the larger foundations, however, there seems to be agreement that wholesale changes in program will not be necessary. In a fairly representative reference, Ford Foundation president McGeorge Bundy said the tax reform bill will "permit and protect the effective continuation of all basic programs of this foundation." On the other hand, the Carnegie Corporation's report led off with a speech which president Alan Pifer made while the tax bill was under debate, and thereby let stand his warning that the last year's "assault" on the foundations indicated that the traditional role of private philanthropic institutions in American society was "in jeopardy." Most foundations, however, are clearly learning to live with the new law. Privately, foundation officials say that the tax reform bill produced no panic in foundation offices, but that a new cautiousness is evident.

Caution, in fact, is almost obligatory in a period when regulations for the new law must be written and interpretations worked out, and foundation lawyers and their counterparts in the Treasury and Internal Revenue Service will join in a legal quadrille.

In forcing changes in the internal operations of private foundations the law is likely to have less impact on the larger, long-established foundations than on smaller ones. In addition to levying excise taxes on net investment income of foundations and requiring minimum distribution of assets or income for charitable purposes, the new law prescribes penalties for activities of two general kinds. The first is "self dealing"—that is, foundation transactions from which business advantage or financial benefit accrues to the donors of funds or to certain other people. The second proscribed activity is the exerting of political influence. Foundations must not, for example, support voter registration drives with limited targets or influence legislation. Penalties are in the form of taxes against foundations and foundation managers, which means both staff and trustees. Many small foundations have been run by the founders themselves or by members of the family, sometimes with the help of old retainers. In the past, charges of "self-dealing" have been aimed mainly at certain small foundations. Therefore, to avoid falling afoul of the new law either through "self dealing" or by failing to meet the fairly stiff requirements on fund management and program activities, many of the smaller foundations will have to alter their procedures and find full-time, well-informed staffs.

All foundations, large and small, face

a period of adjustment, however. And the tax reform bill is by no means the only thing shaking the foundations. The years after World War II were a period of rapid expansion in wealth and numbers for foundations. They also had to react to the flow of federal funds into areas of research, education, and social experimentation which had once been mainly the preserve of the private philanthropies. In most cases the foundations redesigned their programs so that they would complement government-funded activities, but recently cuts in federal budgets have resulted in new requests for support from some of the foundations' old clientele.

In the sixties, most foundations reset priorities in response to growing public concern with social problems. Much more attention was paid to such issues as poverty, population, and pollution, and the foundations became conscious, sometimes self-conscious, agents of social change.

The transformation in foundations is in many ways typified by the experience of the Alfred P. Sloan Foundation, established in the 1930's by the General Motors pioneer. The Sloan Foundation, with about \$300 million in assets, ranks as one of the larger American foundations, although it is dwarfed by Ford, the solitary superfoundation, with its \$2.5 billion in assets.

Until Alfred P. Sloan, Jr., died in 1966, the foundation operated largely as administrator of his personal philanthropies. The foundation's concentration on the fields of science, engineering technology, economics, management, and cancer research reflected the founder's interests. Fairly large grants were distributed to M.I.T., the separately endowed Sloan-Kettering Institute for Cancer Research, and other worthy and well-known institutions. The pattern in awarding scholarship funds or research grants was to give assistance to those who had demonstrated promising qualities of leadership or intellect. Like many other foundations at the time, Sloan benefactions