This development, which I believe lies within our grasp, would surely place the IAEA in the forefront of institutions responsible for world peace and would constitute an impressive demonstration of the contribution which international scientific cooperation can make toward the maintenance of peace.

International Meeting Ground

A major accomplishment of the agency, which was foreseen by its founders as one of its principal purposes, is the function of serving as a constructive and cordial meeting ground of scientists and political leaders of East and West. On the basis of my own experience, the agency has been exceptionally successful and profoundly important in fulfilling this purpose. Its success cannot be measured simply in statistical terms by the numbers of meetings, conferences, and symposia attended by scientists from both East and West. Rather, its success must be viewed in terms of the quality of the contacts which have taken place and the relationships which have been established. I know of no other international organization in which there has been as much constructive cooperation between scientists of East and West, for such an extended period of time and on such a wide variety of topics, as in the IAEA.

I have personally valued the opportunities which my annual attendance at the General Conference of the IAEA has given me to meet and hold cordial discussions with my counterparts from many nations—both East and West. This experience is duplicated many times over in practically every conference and activity of the agency. Of equal if not greater importance are the lasting relationships which come out of these contacts. I am convinced that the strong scientific interchange between East and West in the peaceful uses of nuclear energy, which is so much in evidence today, would be much less intense were it not for the opportunity to meet and know each other which the agency has afforded to myself and my counterparts, our predecessors, and scientists in many different fields.

The IAEA represents, in an institutional sense, one of the most significant and promising developments in many years in international relations—the emergence of science and scientists as an important factor in the determination and execution of national policy. Scientists are by their very nature internationalists. They deal on a daily basis with laws and phenomena which are universal in their occurrence and application. They attack problems with a presumption that solutions are possible and that solutions will not be arbitrarily limited by political boundaries. Finally, they bring to the solution of problems the long history of scientific objectivity and rationalism that has served us so well in advancing the frontiers of knowledge. In short, there is an international language of science which, as a minimum, makes it possible for scientists to discuss with each other problems that often defy communications between people of other disciplines.

I do not suggest that science holds easy solutions to all or most of the profound problems which beset us. But I do suggest that through its capabilities for bettering the tragically inadequate conditions under which so much of the world's population lives today—through its methodology of problem-solving which has application to issues far beyond the normal realm of science and, perhaps above all, through the ability of scientists themselves to communicate with their fellow scientists of every nationality—science is one of the powerful forces that we can put to work to build a better world. The International Atomic Energy Agency is perhaps a test tube in which this hypothesis is being proved.

NEWS AND COMMENT

Money for Research: Prospects for Next Year Are Gloomy

Nikita Khrushchev probably spoke for all politicians who must deal with money-seeking scientists when some years ago he declared that scientists "always want more than they can get—they are never satisfied."

So, let us assume that dissatisfaction is the universal base line in science money matters, and then go on to register the following: Among the people in Washington who staff the fiscal and administrative command posts of research, next year's money prospects have caused dissatisfaction to be replaced by an unprecedented funereal gloom. Laboring in the innards of the federal budgetary process is, of course, not conducive to the development or retention of a sunny disposition. This is especially so in the science policy area, where the staff people, who frequently are talented and sought-after researchers or administrators, find themselves ground between insatiable professional colleagues and skeptical political bosses. To which must be added the cruel hours, the edibility gap in government cafeterias, and sleepless, 3 a.m. suspicions that, if their offices closed down forever, only the janitors might notice.

However, the principal source of gloom is the realization that, after several years of relatively tight financial rations, the national scientific enterprise now can at best look forward to still another year of the same, but is more probably moving from a phase of manageable scarcity into a period of disruptive privation. Relative to other segments of American society—let's face it—research is not, nor is it ever likely to be, badly off. Thus, if one is shedding tears for those who must tithe for the costs of the Vietnam war, the post-doc who lost a trip to a foreign conference might properly take a place behind the slum kid who had a Head Start program budgeted out from under him.

Nevertheless, taking the national research enterprise in terms of scientific and technical performance and potential, as well as the integral part it plays

in efforts to deal with a variety of ills that plague the nation, the fact is that a very productive and admirable structure is now destined for a severe battering.

Since the flow of money from the U.S. Treasury across the American landscape defies exact and timely measurement in even the most placid of times, it is difficult to assess the details of the situation, and this is especially so in the case of academic research, which is financially linked to government by an intricate and slow-moving capillary system. This is further complicated by the fact that Congress has been laggard in getting out its money bills, with the result, for example, that the NSF and NIH budgets which were designed for the fiscal year that began last July are yet to emerge from the Capitol. Under these circumstances the rules dictate that a federal agency may spend only as much as was contained in its most recently approved budget. Thus, in October 1967, NSF and NIH are laying out money on the basis of budgetary totals that were approved for the fiscal year that began in July 1966. The plans for that budget, it might be noted, were completed at the end of 1965. On top of this, as the economic and political fortunes of the administration rise and fall, the Bureau of the Budget now and then dictates that spending for certain purposes is to be accelerated, slowed, or stopped. Such was the case last week when, amidst violent congressional gyrations over government spending, the Bureau put a freeze on new construction "except where the national security is involved," and on anything else that can be postponed without disrupting "orderly government."

Consequently it is difficult, perhaps impossible, to describe the present or assess the future financial situation with any precision. But, on the basis of conversations with persons who are situated inside the federal bureaucracy at some of the key junction points of the research-money flow, the following broad picture emerges.

Without any master plan, and, in fact, without any general realization of what was happening, federal expenditures for research and development swelled from about $5.8 billion in fiscal 1959 to about $14.6 billion by 1964. Activities related to space, defense, and atomic energy accounted for the bulk of this growth; along the way, basic research kept pace at a rate of about

LBJ Meets Professors on Vietnam

President Johnson seems to be spending more time talking to his Vietnam critics these days. For instance, late in the afternoon of 26 September, the President met in a confidential session with a group of senior Harvard and Radcliffe professors and administrators at the White House to discuss Vietnam. The distinguished list included Franklin L. Ford, dean of the Faculty of Arts and Sciences, Nobel Prize-winning scientists Edward M. Purcell and Robert B. Woodward, and Radcliffe College president, Mary I. Bunting, who served Johnson for a year as a commissioner of the Atomic Energy Commission.* Four chemists, three physicists, six social scientists, and an engineer were in the Harvard contingent.

These academicians are not known as out-spoken "doves" on Vietnam. For the most part, they have kept their views out of the press. They are, as one professor noted, representatives of "the troubled middle." In August, the group wrote the President asking what they could do to help him resist the pressure for extension and intensification of the Vietnam war. Much to the group's surprise, the President responded that such matters were difficult to discuss in formal letters and invited them to visit him in Washington. The meeting was arranged by John P. Roche, a White House aide who formerly taught political science at Brandeis. (The New York *Times* reported on 8 October that the President had introduced Roche on another occasion as the White House "anti-intellectual in residence.")

These representatives of "the troubled middle" came to Washington, in the words of Franklin Ford, "because of deep foreboding about the present drift of United States policy in Vietnam." The Harvard group agreed in advance that they would not discuss the nature of the meeting with the President. When criticized by the *Harvard Crimson*, the student newpaper, for not divulging the meeting's contents, Ford wrote a letter to the *Crimson* (published 4 October) explaining the reasons for the meeting and for the group's silence.

The confidential White House meeting lasted for almost 2 hours. The group made a formal presentation of its position at the beginning of the session, and then the President took over. It was somewhat difficult for the professors to get a word in after that point. "You know how the President is," one participant noted, "After a while I felt a little bit like a fourth grader being lectured." The participants largely seem to share Ford's view that the events and official statements of Administration policy over the summer have increased worries about Vietnam and that "the recent expedition to the capital did nothing to diminish them."

A White House aide said that there was nothing unusual about the meeting with the Harvard professors. "The President meets with all kinds of people all the time," he said. "He is not setting out to convert the academic types as such."

In addition to his talk with the professors, the President has had fairly cordial exchanges at the White House recently with some of the Democratic Senators who have argued against his escalation of the war. In a period when his popularity is rapidly plummeting, it is difficult to see how the President can do anything but help himself by meeting with those who differ with him. The President will not win any converts until he drastically changes his directives for Vietnam, but at least his personal conversations with his critics are likely to muffle the loudness of their cries of protest.—BRYCE NELSON

*The other professors at the meeting and their disciplines are: Paul D. Bartlett, chemistry; Abram Bergson, economics; Paul M. Doty, chemistry; Howard W. Emmons, mechanical engineering; Merle Fainsod, government; Wassily W. Leontief, economics; Robert G. McCloskey, government; Talcott Parsons, sociology; Robert V. Pound, physics; John H. Van Vleck, physics; and Edgar B. Wilson, Jr., chemistry.

NEWS IN BRIEF

• **FAMILY PLANNING:** Both the British Parliament and the French National Assembly have approved legislation expanding their governments' roles in family planning. The *International Planned Parenthood News* notes that the British legislation gives local authorities in England and Wales the authority to supply family planning advice and contraceptives on social as well as medical grounds. The French National Assembly repealed the law against the manufacture, import, and sale of contraceptives that had been on French law books since 1920. The law is expected to be replaced by a measure legalizing family planning and providing government control over the manufacture and sale of contraceptives as well as the establishment of government information centers.

• **MEDICAL SCHOOL TUITION:** The dean of the Cornell University Medical College has asserted that private medical colleges should consider reducing or abolishing tuitions. John E. Deitrick noted in the fall issue of Cornell's *Alumni Quarterly* that the tuitions charged impose a financial burden on the students, even though the revenue brought in by them pay only a fraction of the total costs of running the schools. Last year's budget at Cornell Medical College, he said, was $14.3 million and tuition provided only $661,000, or 4.6 percent of the college's income. Cornell Medical College charges $1800 in annual tuition, and is one of 13 private medical schools that charge $1800 or more for tuition. Cornell dispensed more than half the amount it received from tuitions last year in scholarships and student loans. Scholarships totaled $306,772 and student loans $80,700.

• **WILSON FELLOWSHIP REDUCTION:** The number of Woodrow Wilson fellowships that will be granted in 1968 will drop to about 15 percent of the number granted in recent years. Sir Hugh Paylor, president of the Woodrow Wilson Fellowship Foundation, said the cutback was due to a $4.3 million-a-year reduction in funds from the Ford Foundation. The Ford Foundation has provided $52 million for the fellowships over the past 10 years and has indicated it will provide only $2.4 million for the next 2 years. The $3000, 1-year fellowships are awarded to American and Canadian graduate students who are seeking a college teaching career. Most recipients have been in the humanities and social sciences. A Wilson Foundation spokesman said the cut in funding will mean that only about 150 of the fellowships will be given next year compared with about 1000 that have been awarded annually in recent years. The foundation, however, plans to name 1000 persons, in addition to the 150 recipients, as "Woodrow Wilson designates" with the hope that universities will recognize them with fellowships. A Ford Foundation official said that support was curtailed because the federal government now finances fellowships in the humanities and social sciences whereas it did not when the program was started. He said the government now provides about 3000 federally supported fellowships in those fields annually.

• **"ENVIRONMENTAL" HIGHWAY:** A study to evaluate both the environmental and functional aspects of a proposed 24-mile highway in Baltimore, Md., has been announced by the U.S. Department of Transportation. Financed by a $4.8 million contract from the department, a team of highway, traffic, and safety engineers, architects, city planners, sociologists, psychologists, political scientists, and economists will design and route a section of the interstate highway system through the city. Secretary of Transportation Alan S. Boyd said that "with early planning consideration of the highway's social, economic, historic and functional impact this will become not just a road through a city but an integral part of the city," and he predicted that the study may set the pattern for the design of future highways throughout the country. The urban design concept team that will make the study will be drawn from four private firms. Among the tasks slated to be performed by the team will be to establish design criteria and to determine the characteristics of neighborhoods through which the highway will pass. During the 2 years the study is under way, the team is also expected to study the entire pattern of Baltimore traffic and to evaluate the city's mass transit and commercial transportation problems.

10 percent of total R & D expenditures. As a consequence of these expenditures, a huge and expensive research enterprise came into being. It is important to note, too, that this was an expansion-minded enterprise, for, driven by memories of prewar neglect, inspired by the scientific and technical opportunities that lay ahead, and encouraged by the government's seemingly unlimited willingness to spend on R & D, great emphasis was placed on the construction of new research facilities and the support of trainee and fellowship programs for producing new generations of scientists. By 1965, however, the pace of growth began to level off, partly as a result of congressional reaction to the rapid rise, and partly as a result of the Executive branch's efforts to replace the pell-mell rush into R & D with some ordering of priorities. Thus, between 1963 and 1964, R & D expenditures rose from $11.9 billion to $14.6 billion; but 1965 brought only a slight increase, the smallest in years, for a total of $14.8 billion. In 1966 the figure rose to slightly over $16 billion. By then, however, the attempt to restrain and order the federal role in R & D was joined by three still more powerful factors—the financial demands of the Vietnam war, a somewhat confused but nevertheless potent emphasis on utilitarian research, and the political certification, in the form of a presidential order, of demands for broader geographic distribution of federal R & D support. The combined effect of these factors was an attempt to get many more slices out of a budget that was increasing only slightly. Expenditures for 1967 were planned to total $16.5 billion, but the full returns are not yet in, and it is doubtful that the administration actually permitted the sum to go. For the current fiscal year, planned expenditures were to be something over $17 billion, but again, it is doubtful that the administration will permit that amount to be spent.

Now, among those in the federal bureaucracy who are responsible for overseeing the relationship between science and government, the politically induced stresses and strains and the deceleration of federal support for R & D were no source of joy—especially after years of what, at least in retrospect, amounted to an open season on public funds. And, in appearances before congressional committees and in addresses to their professional colleagues, they stated grounds for concern.

Privately, however, there was a general sharing of the view that the rapid growth up to 1965 or so had deposited a fair amount of fat in the system, and that, while hardships might occur here or there as a result of the decelerating and redirection of support, research on the whole could stand—and perhaps might even benefit from—a year or two of relatively lean diets.

This was not the sort of view that an academic in government service could readily offer his panic-prone professional community, and it certainly was not the sort of thing he wanted to have get back to Congress. But, over the past 2 years, in moments of privacy and candor, many of the key scientific figures in Washington would concede that their public rhetoric about a financial crisis in research did not altogether reflect their personal perceptions as to the effects the money situation was having on the quality and development of research.

It was acknowledged that reliable information on the effects of financial changes was often spotty. But at the same time credence was given to the view that a general tightening of money might have a variety of effects that were deemed beneficial. Among those sometimes cited were pressures on long-term postdoctoral researchers to teach or go into industry; greater attention to scientific quality in the support of basic research; and greater reliance on cost-effectiveness techniques in developmental research. [Whether these are reasonable expectations is a separate question. Last spring, for example, H. Bentley Glass, academic vice president of the State University of New York, at Stony Brook, argued that old-time retainers were so well tied into the granting system that in times of tight money they continued to prosper, while unknown but promising young researchers often went unsupported (*Science*, 19 May).]

Whatever the case, the fact is that research money has now been fairly tight for 2 years. It is generally felt that the often-cited fat has now been consumed, and, as details are completed on the budget the President will present to Congress in January, the word at the staff levels is that an unprecedentedly difficult situation is taking form. Thus, one staff man, on the eve of his recent departure from federal service, said, "I was willing to work here while things were standing still, but now we're actually going to go backwards, and I don't want to be a part of it."

Another, viewing the science-government relationship from the perspective of long years of federal service, observed, "We've heard lots of complaints in the past, but I think that when the new budget comes out, there will really be something to complain about." To which he appended, "In the past, scientists could argue that the Russians or some other country were ahead of us in this or that field of research. But now we've run away from everybody, and they can't argue that line any more."

One of the paradoxes of the situation is that, while scientists ruefully anticipate next year's money prospects, the view from Capitol Hill is that R & D is an overstuffed field of federal activity and merits a vigorous trimming. Thus, last week, when Wilbur Mills, chairman of the House Ways and Means Committee, demanded that Johnson substantially reduce federal spending if he wants Congress to go along with the administration's request for a tax surcharge, he cited the $17-billion R & D figure as a good place to begin pruning. In making his point, Mills stated, "Any professor who wants a vacation in the woods can get a grant to make a study of the formation of leaves and then he may write a report or he may not." This being his view of the matter, it might as well be noted that Wilbur Mills, as chairman of the House Committee that writes the tax laws for this nation, is one of the most powerful men in the U.S. government, and, if that's the way he sees the matter, the scientific community has done a deplorable job of conveying how it sees the matter.

Though a thriving conference circuit regularly resounds with boasts and warnings that science is really taking over the control posts of government, the fact is that the men who serve science in Washington are at best peripheral to the decision-making process in government. Now and then, a carefully coordinated effort, accompanied by good luck, enables them to cope effectively with Congress's blunderbuss treatment of research. But, by and large, they remain passive, anguished spectators as political forces crash over their carefully devised and intricate science policy formulations.

—D. S. GREENBERG

Dams and Wild Rivers: Looking Beyond the Pork Barrel

In the 1930's, when the U.S. Army Corps of Engineers began changing a considerable part of the American landscape with its program of dam construction, the Corps' role, as it was then understood, was relatively simple. Its mandate, as the nation's largest water development agency, was to prevent floods, produce power, and open up rivers to navigation and, generally, to support economic development. In the Depression years, few people were thinking about leisure, esthetics, or whether the economic benefits from developing a river should be foregone in the interest of keeping the stream wild and free-flowing.

Now, however, the Corps is having to respond to the demands of a different era, and, despite encouragement from its top leadership, the old ways of thinking and doing are not being abruptly abandoned. Bureaucratic inertia and old habits of mind, especially in the field but also at Corps headquarters, combine to resist sudden change. The Corps holds to its traditional bias in favor of meeting water needs by building dams and other structures which it, as an engineering organization, has been chartered to provide. Moreover, in Congress, the "pork barrel" from which senators and representatives dispense water projects for their constituents is a cherished institution that won't be easily given up. The pork barrel is intimately associated with the old helter-skelter way of building dams and navigation projects one by one, often without priorities or any