or both, of the incident light beam. When these problems have been solved, the polarimeter will be useful in studying many absorbing and scattering systems—perhaps the living cell itself.

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News and Comment

High-Energy Physics: Major Fight Brewing as Midwestern Legislators Take Stand on MURA Accelerator

A high-energy scientific-political row is shaping up in Washington as the deadline approaches for the administration to say yes or no to a proposed $150-million, 12.5-Bev proton accelerator near Madison, Wisconsin.

For a decade, a high energy accelerator has been the principal *raison d'être* for the 15-institution Midwestern Universities Research Association (MURA). With the construction time estimated at 7 years, and accelerator technology moving fast, the time is getting close to build it or forget it. If it's the latter, the project's supporters argue emotionally, the administration will, in effect, be endorsing second-class status for the Midwest as a scientific and technical center. It can be argued that the Midwest, with its long-standing industrial emphasis on mass consumer products, has no one to blame but itself if the East and West Coasts have run away with basic research and advanced technology. But the midwesterners, with considerable justification, contend that they are the victims of a closed system—that federal money goes east and west because federal money helped establish a level of quality, east and west, that inevitably attracts more federal money. Their agitation over this cycle has been mounting for some time, and now, with the MURA proposal—which calls for one of the costliest single pieces of federally-financed research hardware ever built—as a rallying point, the midwesterners are lobbying with a ferocity and skill that would command the respect of any aerospace manufacturer.

Their efforts have enlisted the active support of at least 50 of the region's congressmen and senators, and these, in turn, have directed their energies toward the Atomic Energy Commission, the White House Office of Science and Technology, and the Bureau of the Budget. Interestingly, the MURA issue has created (or, more probably, simply revealed) some splendid rifts among leaders of the scientific community, rifts sufficiently wide and deep to provide permanent burial for any still-quivering remnants of the notion that the elder statesmen of science approach their duties with dispassion, disinterest, and precision.

There is a lot of power, prestige, and money riding on the MURA decision, and the attendant scientific politiking and maneuvering are themselves in the Bev range. Not surprisingly, a great deal of this originates with MURA's Chicago neighbor, the AEC's Argonne National Laboratory, which contends that its 12.5-Bev Zero Gradient Synchrotron, now nearing completion, will do very nicely for the Midwest. MURA rejects this claim as self-serving nonsense and charges that not only will Argonne be overwhelmed by requests for its machine but that the MURA accelerator would provide intensities far beyond Argonne's reach. Argonne, however, has enlisted the support of many of the AEC's other national laboratories, which have their own ideas of what could be done with $150 million.

As a result of all this agitating, it is generally agreed that John F. Kennedy himself, who, for all his talents, wouldn't know an accelerator from an automated olive stuffer, will issue the final verdict. (This will have to be in hand before the end of the year for inclusion in the fiscal 1965 budget, which goes to Congress in January.) For despite the most pious assertion that technical considerations alone will dictate the outcome, no one concerned with the issue can get away from the fact that the *politics* of MURA cannot be extracted from the technology of MURA; that whatever the technical merits of the MURA proposal, it has become the symbol of Midwest bitterness over the distribution of the nation's research budget, and that the midwesterners in Congress are not only promoting MURA but threatening grim reprisals against other accelerator proposals if the MURA machine doesn't come off the drawing boards.

These threats, significantly, are not at

all the blanks that are regularly fired off from Capitol Hill to impress faraway constituents, for the midwesterners are bitter and potent, and the nation's accelerator program is at a point where a multi-billion-dollar commitment will have to be made soon if the present line and pace of research are to be continued. The Wisconsin, Illinois, Indiana, and other midwestern legislators, not only "can call spirits from the vasty deep" but can give reasonable assurance that the spirits will appear—for the congressional terrain favors the opposition, regardless of what it's opposed to, and the MURA advocates have the numbers and positions to make their sentiments felt.

The intensity of these sentiments is such that the normally veiled language of Capitol Hill pork-barrel correspondence has been forsaken for direct threats. For example, 2 weeks ago, in a letter to Jerome B. Wiesner, the President's science adviser, Senator William E. Proxmire (D–Wis.) pointed out that he recently became a member of the Senate Appropriations Committee—which is like a rich uncle reminding a poor nephew of the financial facts of life. "The failure to approve an accelerator for the midwest," Proxmire went on, "would seriously compromise the prospects for approving a $250 million accelerator on the east or west coasts a few years from now. I say this not with any notion that there might be some kind of political reprisal. I say this from the standpoint of realism," Proxmire explained, leaving the President's high priest of science to ponder just what the Senator might have in mind.

Opposing Forces

Under these circumstances it might appear to be the course of wisdom for Kennedy to go out to Wisconsin fast and turn the first spade of soil for MURA, but pressures in the other direction are not easily discounted. At the moment, these are mainly fiscal and scientific, but since research and development facilities are the pork barrel of this era, it is reasonable to expect that legislators from other regions will eventually be brought into the fray by their constituents.

The fiscal pressures arise from the administration's intense efforts to keep its election-year budget below the politically vulnerable $100-billion mark. The amount of illusion contained in the orthodox budget presentation is incredible, and Kennedy has been trying hard to get the public to accept the fact that there are more rational ways of measuring the federal government's role in the nation's economic life. But the fallacy persists that a government, like a family or a business, cannot safely permit outgo to exceed income, and this article of faith, coupled with assaults on the Democrats as the "spender's party," has led the administration to put aside a lot of its ambitions and strain for a bargain-basement budget of $99.98 billion. The result is that massive pressure is being applied to all agencies to keep down spending, and if MURA protests "Why me?" it is only joining a chorus that encompasses every federal department, from the Bureau of Mines to the Air Force. For the coming fiscal year, it is true, MURA would require only $6 million for construction and preoperating costs; but thereafter the annual expenditures would swell greatly, to $10 million, $21 milllion, $47 million, and $52 million; as construction neared completion, the annual cost would go down to $37 million. Once the facility was completed, however, the annual operating expenses would be expected to rise from $16 million in 1970 to $64 million by 1981. The realism of these figures is, of course, open to question, since it is almost a hard-and-fast rule of research-facility construction that everything costs more than had been anticipated, no matter how generous the original estimates may be. (The Argonne accelerator, originally budgeted at $27 million, is now expected to cost close to twice that figure.) And, although Congress isn't yet paying much attention to the 1981 budget, its budget choppers are acutely aware of the rubbery nature of such estimates and are eager to pounce on any expenditure that is, in effect, a commitment to spend vastly greater sums. Thus, no one is led astray when MURA supporters argue that the $6 million requested for the forthcoming fiscal year is a piddling amount when the federal research and development outlay next year will exceed $16 billion. It is, indeed, a piddling amount, but ultimately it would become one of the largest single items in the entire annual R&D outlay. Such was the view implicit in a letter that Kermit Gordon, director of the Bureau of the Budget, wrote last July to a number of Midwest congressmen who urged his sympathetic appraisal of the MURA proposal. "Given a situation of limited resources," Gordon stated, "it will be necessary to assess carefully the requirements of high energy physics against those of other fields of science, and to balance the requirements of science as a whole against other needs for federal funds . . . With regard to . . . the middle west, I would note as a matter of interest that the . . . accelerator at the Argonne National Laboratory in Illinois, shortly to be in operation, is the second most costly project of this sort ever to be undertaken in the United States. A major factor in the selection of the Argonne site was that this machine would serve the needs of the midwestern universities, and I am confident that it will be successful in this regard." Gordon went on to say that the final decision was yet to come, but it would seem that if the bookkeepers and budgeteers were to have their say, MURA would be relegated to a filing cabinet.

Ramsey Report

As a scientific venture, the proposal has aroused great enthusiasm in the Midwest (outside of Argonne) and in a number of other places, but despite MURA's claims, a careful reading of a proposed master plan for the nationwide high-energy physics program shows something less than ecstasy over the Wisconsin accelerator. The plan, known as the Ramsey Report after Norman F. Ramsey of Harvard, who chaired a presidential panel on high-energy-accelerator physics, unquestionably endorses MURA. But it does so in curious fashion. In addressing itself to machines for higher energy, it unequivocally recommends the "earliest possible" authorization of a 200-Bev proton accelerator at California's Lawrence Radiation Laboratory, and "intensive and extensive design and experimental studies" for a 600- to 1000-Bev proton accelerator at New York's Brookhaven National Laboratory, with a specific request for authorization to come within 5 or 6 years. Both these steps, the panel suggested, should be regarded with "equal urgency"; this might reasonably be interpreted as tying Lawrence's "earliest possible date" to the Brookhaven design and experimental studies. However, in addressing itself to MURA's proposal and the "high intensity frontier," the panel stated that "authorization for construction [should] be given as soon as possible, provided this is not expected to delay significantly the authorization of steps toward higher energy recom-

mended above." It added that "the highest priority in new accelerator construction should be assigned to the recommended steps toward highest attainable energy," but that the MURA machine "is an essential component of a balanced program and should be constructed provided that it will not delay the authorization of the steps toward higher energy."

The panel's language is, of course, open to various interpretations, and MURA supporters naturally interpret it to be an unqualified endorsement of their proposal. But within the administration the budgeteers appraising the Ramsey report are, not unreasonably, concluding that the panelists were taking a roundabout way of saying that, while MURA would be nice, it's not altogether essential.

Presidential Advisers

In this they are supported by a number of White House advisers who contend that the great and expensive machines should be looked upon as national rather than regional resources, available to all researchers, with the physicist around the corner having no more access to it than his colleague across the country. This is an admirable goal, but the reality of it is questionable. It's true that jet travel and airline scheduling probably make it easier to get from Chicago to Brookhaven, N.Y., than from Chicago to Madison, Wisconsin, but this overlooks the fact that when a $150-million reseach facility is planted on the countryside, all sorts of usually desirable things start to happen to the surrounding area. New industry rushes to the area—as it is now doing, for example, at the previously barren site surrounding NASA's Manned Spacecraft Center in Houston. And other federal agencies take to placing facilities and funds in the region, which is part of the story of the Cambridge and California phenomenon.

In connection with the Midwest's dissatisfaction over the distribution of research funds, a pertinent question would be whether, if $150 million is to be spent in the area, it might not be more fruitful to spend it on something other than the proposed accelerator. However, the issue hasn't been cast in those terms, and with the Midwest legislators afflicted by what might be called a Cambridge-California complex, they are taking their stand on the MURA proposal.

—D. S. GREENBERG

New Overseers for Federal Science

The House Science and Astronautics Committee, which has devoted itself primarily to bringing up NASA, is moving into broader fields of federal science.

A new ten-man subcommittee on science, research, and development has been organized, and the chairman of the full committee, Representative George P. Miller (D–Calif.), has announced that the new subcommittee will have the following ambitious objectives.

1) Overall evaluation of scientific research and development.

2) Strengthening of congressional sources of information and advice in the fields of science and technology.

3) Achievement of the most effective utilization of the scientific and engineering resources of the United States in the effort to "accomplish" goals which affect the lives of all Americans.

4) Congressional oversight of the National Science Foundation.

Chairman of the new subcommittee is Representative Emilio Q. Daddario, a third-term Connecticut Democrat who represents the Hartford district. The 45-year-old Daddario has served on the Science and Astronautics Committee since it was created in 1958. He has demonstrated a special interest in bioastronautics and is credited with exercising influence on federal policy in this field, unusual for an individual member operating without a chairmanship or other means of leverage which seniority bestows.

The ranking minority member of the committee is R. Walter Riehlman (R–N.Y.), who had relevant experience as chairman of the House Government Operations military subcommittee during the first Eisenhower administration, when there was a Republican majority.

A Well-Distributed Membership

Other members of the committee are Democrats J. Edward Roush of Indiana, Thomas G. Morris of New Mexico, John W. Davis of Georgia, Joe D. Waggoner, Jr., of Georgia, and Edward J. Patten of New Jersey and Republicans Charles A. Mosher of Ohio, Alphonzo Bell of California, and James D. Weaver of Pennsylvania. The fairly broad geographical spread of the subcommittee membership may well reflect the growing awareness of the regional effects of federal contracting for R&D.

The Science and Astronautics Committee has had three subcommittees dealing with different aspects of the space program, and creation of a fourth regular panel is a logical result of Chairman Miller's declared intention to extend his committee's active suzerainty to science as well as astronautics.

In the broader perspective of Congress as a whole, the new subcommittee constitutes further evidence of the quickening interest in Congress in restoring legislative control to the research budget, an interest which has resulted in the spawning of several new panels and special studies.

A practical effect of the subcommittee's creation is likely to be to bring the National Science Foundation under the more or less continuing scrutiny of a legislative committee. NSF is one of the agencies which operate under a continuing authorization. Each year the NSF appropriation is examined by the appropriations committees of both houses, but its policies and operations have been only intermittently reviewed by the House space committee, which has been preoccupied with NASA.

The subcommittee will hold its first hearings next week on the general subject of the relations of science and government. Three star witnesses are scheduled: Frederic Seitz, president of the National Academy of Sciences, will appear on Tuesday; Jerome B. Wiesner, presidential science adviser and director of the Office of Science and Technology, on Wednesday; and physicist Edward Teller, professor at large at the University of California and well-known adviser and critic on nuclear policy, on Friday.

Then, on 23 October, NSF director Leland J. Haworth is scheduled to appear before the subcommittee to discuss the operations of his agency.

—J.W.