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NEWS AND COMMENT

200-Bev: The Academy Committee Knew Where It Was Going

The burghers of the posh Chicago suburb of South Barrington last week forced the removal of their manicured acres from the small list of finalists in the great accelerator competition, charging, among other things, that an influx of scientists would "disturb the moral fiber of the community."

The residents, whose neighborhood was volunteered by the Governor of Illinois, did not specify the present condition of the fiber or the direction in which it might be disturbed. But outside of this admirably perverse refusal to trade rustic charm for a $375-million laboratory, there was little strong reaction to the announcement that, from 85 proposals, covering some 150 tracts in 43 states, an evaluation committee of the National Academy of Sciences had selected, for final consideration, six sites (or, depending on how you count, seven, since South Barrington was listed along with an alternate site in the Chicago area.) These were, Ann Arbor, Michigan; the Brookhaven National Laboratory, Upton, Long Island, N.Y.; Denver, Colorado; Madison, Wisconsin; the Sierra foothills, near Sacramento, California; and South Barrington, or Weston, near Chicago.

The proximity of the finalists to major northern universities or research centers inspired senators Sparkman, of Alabama, and Russell, of Georgia, to scriptural sarcasm, with Sparkman declaring, "For unto every one that hath shall be given, and he shall have abundance . . . ," and Russell concluding, "But from him that hath not shall be taken away even that which he hath." But though they were joined by Symington, of Missouri, and Mansfield, of Montana, in lamenting the geographic distribution of the finalists, the senators

did not apply real fervor to the issue.

The mild reaction could be attributable to many things, including the fact that the Vietnam agony and its domestic consequences have come to dominate public affairs. But, in large part, the lack of furor can be attributed to the performance of the Academy committee, which managed to produce some rationality and sense from the botched affair that was bestowed upon it by the Atomic Energy Commission.*

The committee, which was organized at the request of the AEC, was originally told that the AEC would screen the site proposals and then pass along the most promising dozen or so; from these the committee was to select a few for final consideration by the AEC. But when the number of proposals reached the unexpectedly high total of 126, spread across 46 states, and the intensity of politicking similarly rose, the AEC came to the preposterous, but politically safe, conclusion, that some two-thirds of the proposals, covering 43 states, "met the basic criteria established for the site." Just how this could be was difficult to establish, since even in this well-developed country there aren't 85 places that offer a combination of 3000 level, stable acres in reasonable proximity to a major airport, a first-class university, and an industrial research and development center, as well as suitable housing and cultural and educational facilities for 2000 professional families, plus adequate water and power for the big accelerator. By refusing to apply its own criteria, the AEC was, in effect, telling the Academy to do its political dirty work, a move which caused some convulsions in that august and noncombative institution.

What then passed between the Academy and the AEC is not clear, but the AEC later announced that, since it was giving the Academy committee a bigger chore than was originally anticipated, it would furnish site evaluation teams that would examine the 150 tracts and report their findings to the committee. What is clear, however, is that, from that point on, the Academy committee proceeded to function in a fashion which suggested that it had had enough of the AEC's timidities and gymnastics. In Chairman Piore, comfortably based in the upper echelons of IBM, the committee had a leader who is neither timid nor inexperienced in Washington science politics. Piore served in Washington during World War II, later succeeded Alan Waterman as Chief Scientist of the Office of Naval Research, and has been a member of the President's Science Advisory Committee, as well as chairman of various ad hoc trouble-shooting committees, including the committee that helped unravel the Mohole controversy.

As things worked out, members of the Academy committee visited selected portions of only six of the competing 43 states, and, curiously enough, the six finalists were in those selected portions. Furthermore, three of those visits took place *prior* to the visits of the AEC evaulation teams that were supposed to report to the committee. And one visit took place 2 days after the AEC team was there, which makes it doubtful that the AEC had had time to prepare a report that might have inspired a closer look by the Academy committee.

In the cases of Ann Arbor and Brookhaven, the AEC teams preceded the Academy committee members by at least a few weeks. But the Academy visited Denver on 28 September; the AEC did not arrive until 29 November. The Academy was in Madison on 10 September; the AEC, on 1 December. The Academy looked at the Chicago sites on 9 and 10 September; the AEC did not get there until 30 November. The northern California region that encompasses the Sierra site was examined by the AEC on 5 November; the Academy members arrived 7 November.

What might be inferred from this chronology is that the Academy committee knew where it was going before it got there, but it must also be pointed out that the committee members were chosen because they came to the assignment with some experience in the factors that contribute to the success of a new laboratory. For window-dressing purposes, it might have been useful for them to pore over all 150 tracts, while representatives of the local chambers of commerce anxiously scrutinized their facial expressions. But when the final report was in, the six they chose turned out to represent a skillful balance of the scientific and political realities of high-energy physics. And if the AEC ever gets itself properly untangled to make a final decision, it will find that the committee's explanations of its six choices constitute firm ground for defense against any attacks.

In paring down the proposals the Academy committee rigorously applied a number of criteria that automatically excluded most of the sites. The most fundamental was that the site must be free from stability or settlement problems or any other physical characteristic that would require special construction features. Then, taking a rather interesting matter into its own hands, the committee departed from the AEC's 3000-acre specification and required that the site be expandable to 5000 acres to allow for uncertainties in the growth of high-energy apparatus. This could reflect no more than caution, or, possibly, it might have something to do with a still-simmering debate over whether the 200-Bev goal is too modest and should be leapfrogged in favor of a bigger and more powerful machine. CERN, the European high-energy consortium, is talking about a 300-Bev machine, and a number of American physicists feel that the technology for going directly to even higher energies is within reach.

Finally, in assigning criteria for the site, the committee flatly rejected the concept that the $375-million construction project and the $60-million annual payroll be placed with a view to the effects they might have on regional economic development. The prime consideration was a location conducive to the swiftest possible construction and the best particle physics; thus was ruled out the argument that it might be desirable to place the machine in Appalachia or some backward area of the Deep South. It remains to be seen how this judgment jibes with the presidential directive which says, "We must . . . devote ourselves purposefully to developing and diffusing—throughout the nation—a strong and solid scientific capability . . ." (*Science* 24 September 1965). How much value the AEC attaches to this goal is not clear. There was no reference to such matters in the AEC's original criteria, but last November the AEC put out a document that "recast and further highlighted" the site-selection criteria. The very last sentence of this 9-page document stated that the "desirability of broadening the educational base of the nation should be considered." The presidential directive is, of course, open to various interpretations. But it would

* The committee was chaired by Emanuel R. Piore, vice president of IBM. Other members were Robert F. Bacher, Caltech; Harvey Brooks, Harvard; Val F. Fitch, Princeton; William B. Fretter, Berkeley; William F. Fry, Wisconsin; Edwin L. Goldwasser, Illinois; G. Kenneth Green, Brookhaven; Crawford H. Greenewalt, DuPont, and Herbert E. Longenecker, Tulane.

appear that the Academy committee was not paying much attention to it, and since the AEC later announced that it will choose from the committee's list, it presumably isn't paying much attention either.

With geology and scientific productivity the basic values, other limiting factors inevitably followed in narrowing the choices for sites. Since scientific talent tends to cluster, the committee concluded that it would be advantageous to select a site near a center with existing strength in high-energy-physics research and design. In the committee's view, this would make it easier to attract the people whose services are needed for designing and building the machine, but who themselves would not be able to benefit from it until it is in full operation, sometime in the early 1970's. Since 75 percent of the machine's users will be nonresident, the committee insisted upon relatively easy access to nationwide air connections. And for users in residence, as well as for the supporting staff, it specified the presence of a major university nearby, where the residents might continue their studies and associate with scientists in other fields.

For those who might argue that this adds up to rather precious specifications for a relative handful of people who want the taxpayers to provide them with $375 million, the committee answers that high-energy physics is a vitally important field of science, only a few people have competence in it, they are much in demand, and it would therefore be prudent, and, in the long run, most productive scientifically, to place the machine in what they will consider to be an attractive scientific setting.

Here we get down to some of the fundamental tensions between the basic research community and its governmental patron. Is science so valuable and so specialized in its requirements that society must support science on the terms of the practitioners of science? In general, science has pretty much had its own way, but as it becomes more costly and, at the same time, more closely associated with regional economic prosperity, there are increasing political pressures for science to compromise some of its demands.

It can be inferred that the Academy committee was not unmindful of these tensions and pressures. Since the Midwest has provided the most fervent regional agitation for a larger helping of federal research expenditures, it is not surprising that three of the six choices fall in that area. The choice of Brookhaven, in New York, was something of a surprise to *aficionados* of high-energy strife, since Brookhaven not only has what is now the most powerful machine but is undertaking a construction program to add to its energy; furthermore, Brookhaven has aspirations to build a 600- to 1000-Bev machine, which, according to one grand design of high-energy physicists, is supposed to come after the 200-Bev.

Nevertheless, Brookhaven figures in some of the many uncertainties to be resolved before ground is broken for the 200-Bev machine. Samuel Devons, chairman of the physics department at Columbia, has proposed a cost-cutting plan that would employ the present 33-Bev machine at Brookhaven as an injector for the 200-Bev. The plan failed to stir much enthusiasm in the AEC or in Associated Universities, Inc., the nine-university consortium that runs Brookhaven. But Devons' plan is a stripped-down, plain pipe-racks approach that attracts attention because it harmonizes with concern about the rapidly mounting costs of this field of

Education: Keppel To Leave HEW

Francis Keppel, Assistant Secretary of Health, Education, and Welfare (for education), will resign from the government in a few months, reportedly to join a new educational research organization being formed by Time-Life Inc. and the General Electric Company. As this was written, however, there still was no official confirmation of his resignation either from HEW or the White House.

Keppel, who was named Commissioner of Education in 1962 and an Assistant Secretary of HEW in September 1965 (*Science,* 31 December 1965), has been able to devote full time to his duties as assistant secretary since Harold Howe II took over the commissionership at the beginning of this year. As Assistant Secretary, Keppel is HEW Secretary John W. Gardner's principal adviser on education policy, and, as chairman of the Interagency Committee on Education, was expected to bring about better coordination of federal education programs.

It is as a key participant in developing new education programs and as a persuasive lobbyist for those programs on Capitol Hill that Keppel has made his principal contribution in Washington. For example, he played an important part in obtaining passage of last year's elementary and secondary education act—the first major general aid program ever approved—and of measures benefiting higher education.

Keppel is, by his own self-assessment, more of an idea man and advocate than he is an administrator. Accordingly, his former duties as commissioner would appear to have been more congenial than his current assignment, which is to see that the $8.7 billion in education programs run by numerous federal agencies constitute a coherent federal effort in the field of education. Shortly after Keppel's impending resignation was reported last week, a HEW official was quoted anonymously as saying that he was not surprised at Keppel's decision. "He's been a man without a program," the official said.

The Gardner-Keppel-Howe triumvirate at HEW has been notable in that it has put at the controls of the national education effort three dedicated experimenters who are never satisfied with the status quo. Keppel, as dean of Harvard's School of Education, was a champion of educational reform long before becoming commissioner of education. Gardner came to HEW from his post as president of the Carnegie Corporation of New York, which has supported such important undertakings as James Conant's study of the American high school. Howe, also, has been identified with a number of innovative efforts, most recently as director of the Learning Institute of North Carolina, which has been concerned with such matters as the school dropout problem and racial integration of school faculties.

With Gardner and Howe remaining, Keppel's departure is unlikely to shake HEW's commitment to educational experimentation and change. However, it may well delay the task of improving the coordination of the overall federal education effort.—L. J. C.

research. If pressures mount to cut costs by skipping directly to energies beyond 200 Bev, Brookhaven, with the plans, site, and staff, would find itself in a very strong position.

As for the Denver site, the Academy included it as a kind of dark horse, well endowed with suitable real estate, good transportation, and pleasant climate. But to the chagrin of the Colorado people, who are trying hard to build up their universities, the committee stated that Denver "has neither the university strength nor the existing design group that is considered desirable." Why was it included? The answer is not readily apparent, but if a deadlock should develop among the existing powers in high-energy physics, or if importance should be attached to the presidential directive for building new centers of academic strength, there sits Denver as a reasonable compromise.

The sixth site was the Sierra foothills, 20 miles east of Sacramento, a choice which pays court to some of the most painful sensitivities of high-energy physics. The much-contended-for 200-Bev machine is a creation of the Lawrence Radiation Laboratory, at Berkeley, which, until science fell into the pork barrel, had every reason to believe that the machine it was designing would ultimately be built in its own neighborhood. Such had been the prevailing pattern of design and construction with all other machines, and all along there were indications, though never promises, that LRL would get the machine on which its design staff, now totaling some 60 full-time persons, has been laboring for several years. In 1963, for example, a joint panel of the President's Science Advisory Committee and the General Advisory Committee of the AEC recommended a two-step approach to higher energies. This called for "construction *by*"—though it did not say *at*—the LRL of a 200-Bev machine and later design studies at Brookhaven for a 600- to 1000-Bev machine.

LRL's first choice was a site at Camp Parks, about 35 miles from Berkeley, but the Academy committee expressed some doubt about the geologic stability of the site, and gave its preference to LRL's fallback position, the Sacramento site, some 100 miles from Berkeley. In any case, the decision keeps LRL in the running, and eases some of the mortuary-like gloom which has been noted about the premises.

AEC commissioner Tape told the Joint Committee on Atomic Energy last month that he thinks the AEC will have a final site decision 3 to 6 months after the Academy recommendations are in. Money is in the budget to continue the design studies, but the AEC will have to go before the committee to seek authorization for money to move on to construction. Since Congress is pretty well through the budgetary process and recess dates are being discussed, this means that next January would probably be the earliest date for congressional consideration of the subject.

When the site issue is finally settled, there is the question of the administrative arrangements for running the machine. The only candidate at the moment is University Research Associates, Inc., a 34-university consortium whose organization was initiated by Academy president Frederick Seitz as a sort of ecumenical movement in high-energy physics. It stands ready to run the machine, and is likely to get the job, in the absence of any other candidates.

—D. S. GREENBERG

Pollution: NAS Report Examines Dual Aspect of the Problem

A well-placed governmental trend watcher recently observed that three of the most fashionable problems in Washington these days are the three P's—poverty, population, and pollution.

Pollution, like the poor, has always been with us. But population growth, urbanization, and a more-than-proportional rise in waste-making has produced an increase in pollution now recognized in Washington as a threat to health, an offense to the senses and sensibilities, and a cause for more decisive federal action.

A recent sign of this concern was the appearance of a report titled *Waste Management and Control* from the committee on pollution of the National Academy of Sciences–National Research Council .Genealogically, the report traces back to the early days of the Kennedy Administration, a period characterized by the expenditure of prodigious amounts of nervous energy and the start of more things than could be finished.

In March of 1961 President Kennedy asked the Academy to undertake "an evaluation of the present research on behalf of conservation and development of America's natural resources." By the beginning of 1963, six supporting surveys—on water, minerals, energy, marine resources, environment, and social and economic resources—plus a summary report had been published by the NAS–NRC committee on natural resources. Out of the experience of the committee grew the strong recommendation for a separate study of the problems of pollution, and early in 1964 an Academy committee on pollution undertook the job, with the support of the Department of the Interior and the Public Health Service.

Chairman of the committee is Athelstan Spilhaus, dean of the Institute of Technology at the University of Minnesota and a member of the Academy. He has a reputation as an idea man, and also as a man with an eye for unconventional projects and the energy to undertake them. Spilhaus, for example, was a central figure in the effort which converted the widely admired federal science pavilion at the Seattle fair into a regional science resource. And he is an advocate of "sea grant" institutions on the model of the land grant colleges and universities.

The new pollution report quite clearly bears the signs of having been produced under a strong chairman. Not only did Spilhaus write the foreword and long introduction which precede the appendixes, which make up the bulk of the report, but he is obviously responsible in large part for the approach to the pollution problem which makes the committee's report an unusual one among NAS reports. In addition to scientists and engineers, lawyers and social scientists were involved in study groups to a much greater extent than is usual in such Academy