also a veteran of the Washington science scene. Then comes a 21-member board of trustees, about evenly divided between scientists and administrators, which is chaired by Henry D. Smyth, of Princeton, a distinguished elder statesman of science.

The striking, but not surprising, thing about URA is not that it exists (since, if it didn't, something like it would have to be established to build and run the 200-Bev accelerator) but that it has worked so well to bottle up the strong feelings that were generated throughout the physics community by the competition for the 200-Bev machine.

It is not improbable that the decision to build the machine in Illinois constituted a death warrant for high-energy physics at the Lawrence Radiation Laboratory (LRL) at Berkeley, which conceived and designed the machine, with the expectation that it would be built nearby. LRL people have wept copiously over the political tricks of fate that led to their machine being put in a national sweepstakes, but in their appearance before the committee last week they were statesmanlike and dignified. LRL director Edwin M. McMillan and Edward Lofgren, the chief of the design group for the machine, said that a good machine, built as quickly as possible, was their chief interest, and they would cooperate in every way possible to achieve this.

At the outset of the hearings, AEC chairman Glenn T. Seaborg emphatically stated that "there was no political interference in our choice of the Weston site. . . . The President left the choice of the site entirely up to the Atomic Energy Commission." Just why the President chose to behave in such fashion is not clear, but the fact is that in a city well populated with industrious cynics, no one has yet been able to find a political speck on the site selection.

Testifying before the full committee, on 7 February, Senator Javits of New York explained why disinterested analysis inexorably leads to the conclusion that the machine should be located at the Brookhaven National Laboratory, on Long Island. He got very little response. Last week the hearings resumed under the auspices of the JCAE's subcommittee on research and development, chaired by Mel Price, of Illinois. He was not inclined to explore the issue of whether the accelerator should be built in Illinois.

The only matter that stirred up any feeling was that of the civil rights situation in and around Weston. Clarence Mitchell, director of the Washington bureau of the NAACP, said, "If the AEC had set out to find a site where colored employes, scientists, and visitors would be most likely to encounter discrimination in housing, Weston could clearly qualify for that dubious honor." If consideration is confined to the six finalists in the site selection, there is no doubt that Mitchell is right. The 35 communities surrounding the site area, he said, all follow discriminatory housing practices; two of them considered and "quietly buried" open-occupancy ordinances; and, when Governor Kerner issued an executive order on housing, following the legislature's failure to pass "fair housing" legislation, real estate interests blocked it with an injunction.

Seaborg immediately responded that "a satisfactory solution to the human rights problem is more important than this accelerator." He agreed that the civil rights situation in the Weston area was not satisfactory, and pledged, "The Commission means to have an affirmative action program on non-discrimination and equal employment opportunity every step of the way."

Representative John N. Erlenborn, a Republican whose district includes Weston, offered a clarification of the situation in his area. He conceded that some real estate men from DuPage County, where Weston is located, had sought the injunction against the Governor's housing order. "There is a reason for this," he pointed out; "DuPage County realtors have been among the leaders, both in the state and in the nation, in the real estate business. It is natural that these leaders would have been among those challenging this executive order. It affects their business and their livelihood."

Erlenborn pointed out to the committee that, "in the years before the Civil War, opponents of Negro slavery operated an illegal device known as the Underground Railway. Its stations were places where escaped slaves could find refuge as they made their way to Canada. One of these stations was in Wheaton, the county seat of DuPage County."

And he also noted that "West Chicago, the nearest town to Weston, houses a considerable number of people of Latin American descent, and I don't think this minority can claim to be the victims of police brutality. For the chief of police is Joe Buenrostro."

Senator John O. Pastore (D–R.I.), chairman of the Joint Committee, said, "I don't think we ought to put a nickel in that accelerator at Weston if a Negro Ph.D. is going to be denied the right to go in there."

"Or a janitor?" asked Edward Rutledge of the National Committee Against Discrimination in Housing.

"Or a janitor," said Pastore.

Last week Weston passed a "fair housing" ordinance, but civil rights leaders said it was "window dressing," and renewed their appeals to the Joint Committee.—D. S. GREENBERG

NATO: A North Atlantic Technology Organization?

Paris. Science in the North Atlantic Treaty Organization could until very recently be likened to a silent partner with a small share of the business. Now it appears that the role of science and technology will grow bigger and more conspicuous.

The withdrawal of France from NATO—a more selective withdrawal than is generally realized—has left the alliance with a number of military and communications problems. And the impending move of NATO headquarters from Paris to Brussels gives an appearance of retreat which hasn't helped morale. But NATO's fundamental problem is that of adjustment to conditions in Europe far different from those which caused the alliance to be formed, nearly 20 years ago.

The necessity of changing NATO to meet changed circumstances, particularly the altered relations between NATO countries and the Warsaw Pact nations, was a dominant theme at the most recent NATO ministerial meeting, in December. British Foreign Minister George Brown emphasized, in a sonorous phrase, that the purpose of NATO is defense, deterrence, *and* detente. And while this seems to be wanting it both ways, he apparently caught the sense of the meeting.

On a different tack, the Belgian

Foreign Minister, Pierre Harmel, called for a serious restudy of the objectives of the alliance—political and economic as well as military—and said that attention should be given to finding ways to enhance the "partnership" between the two sides of the Atlantic. Observers think Harmel hopes that such a study would give new impetus to moves toward political unity in Europe, which have been flagging in recent years.

Another kind of partnership—scientific and technical cooperation between Europe and the United States—however, was a main theme of the meeting. Much of the discussion centered around a proposal which Italian Foreign Minister Amintore Fanfani advanced in October and which is said to have received serious attention from the United States and British governments. The Fanfani plan, which is yet to be spelled out in detail, calls for a 10-year program of joint projects aimed at improving European performance in industrial technology. The NATO council adopted a resolution calling for a study of the Italian proposal and a report, presumably with recommendations for action, at the spring ministerial meeting.

The Fanfani plan has been interpreted by some as a ploy designed to burnish NATO's image and to deter France from straying too far from the alliance. The French have, as a matter of fact, taken the position that, while the idea is a good one, the suitable institution through which to pursue it is the Organization for Economic Cooperation and Development (OECD), which was intended for this sort of endeavor in the first place and has the virtue of including in its membership such non-NATO nations as Sweden and Switzerland.

To imagine that the Fanfani proposal had no political motivations would be as naive as to expect that whatever concrete steps are finally taken toward scientific and technical cooperation will not require political implementation. At this point, in respect to NATO, it is probably most relevant to consider what the organization has to offer as an agency for technological cooperation.

In terms of support of operational programs in the categories of science and technology, as distinct from purely educational or advisory programs, NATO has been more active than other intergovernmental organizations. Much of this activity is directly related to NATO's military mission, but a civil science program of respectable dimensions has also developed, in which, rather surprisingly, contacts between East and West have already been made.

Neither the military nor the civil science side of NATO has been much publicized, perhaps simply because of the stress placed on the military and the political character of the organization. But from the early days of the alliance, emphasis on science has grown steadily out of the recognition that it was necessary both to solve technical problems on a joint basis and to raise the level of technical competence of some member nations.

Demands for military technology imposed themselves earliest. A practical need of the alliance for an integrated air defense system led, by the mid-1950's, to establishment of a technical center devoted to development of the plans and technology for such a system. At the outset the costs of the center were borne by the United States, and, on America's insistence, the center was established under the administration of a civilian, nonprofit institution. The Dutch RVO-TNO agency for applied research was chosen, and the center was located at The Hague. NATO countries took over the financing in 1960. The center's concerns broadened considerably beyond the original problems of air defense, and in 1963 it was redesignated the SHAPE (Supreme Headquarters Allied Powers Europe) Technical Center. STC, as the center is called, has a concentration of competence in communications, operations research, and systems research. Its total staff is about 350, about 100 of them professionals.

The antisubmarine warfare center at La Spezia, Italy, with a staff of 100, is smaller than STC but is, in rough terms, its naval counterpart. The mission of the center at La Spezia is to provide technical advice and assistance on antisubmarine warfare to SACLANT (Supreme Allied Commander Atlantic) and the nations participating, which number eight now that France has withdrawn. Sonar research is the center's specialty, and the chartered merchant ship which is the center's oceanographic vessel is specially modified for underwater sound research. More general oceanographic interests are also followed at La Spezia, and, with the traditionally liberal naval attitude toward research prevailing, about 30 percent of the research is unclassified.

NATO's quest for expert scientific and technical advice is exemplified in the Advisory Group for Aeronautical Research and Development (AGARD), established in the early 1950's on the recommendation of Theodore von Karman, who was then chairman of the U.S. Air Force Scientific Advisory Board. The functions of AGARD are to organize the interchange of information and, perhaps more important, to provide a vehicle for mobilization of the leading talent in aerospace science and technology in the NATO countries. A permanent AGARD technical and administrative staff has been headquartered in Paris, and the committee operates through a board of national delegates and a substructure of technical panels and committees.

While the machinery for advancing military technology was developed fairly early in NATO's existence, the desirability of promoting scientific cooperation of a more general character was also recognized from the start. It was not, however, until the launching of the first Sputnik, which resulted in the launching of so much else in Western science and education, that NATO's civil science program was firmly established. A full-time science adviser to the NATO secretary general was appointed, and a Science Committee was created, responsible for advising the NATO council (NATO's policy-making body). On the Science Committee each country is represented by a scientist who may represent his country's views or speak personally if his specific competence as a scientist is relevant.

This NATO science office administers a civil science program with an annual budget of something over $4 million. More than half the budget, some $2.6 million, goes into a fellowship program. Most of the fellowship holders are at the postdoctoral stage, and the purpose of the program seems to be to benefit both the individuals and their countries by providing opportunities for the young scientists to work in laboratories where very-high-quality work in their fields is being done. About 1000 fellowships a year are awarded. Most are 1-year grants; some are renewed for a second year. About half the grants are in physics and chemistry; the other half are distributed more widely—in biology, in engineering, and in fields where special needs may be noted, such as agriculture. In practice, the flow of fellowship holders is primarily to northern Europe and North America. Preferential treatment

(Continued on page 988)

in the number of fellowships awarded is given to less scientifically developed member nations. The United States, for example, contributes nearly a quarter of the budget which supports the program, but Americans get perhaps an eighth of the fellowships. The French will continue to participate in the fellowship program but, in terms of percentages, they will contribute more than they receive from the fellowships.

The civil science program regarded as the most successful one is the Advanced Study Institutes Program. These are summer sessions which resemble the Gordon Research Conferences in organization. Usually, a pleasant but fairly isolated spot is picked for the discussion of a specialized topic by a highly selected group of research scientists.

Some $730,000 is the current annual budget figure for the institutes, and NATO officials estimate that, over the 8 years of the life of the program, some 20,000 scientists have participated. The sessions are devoted to straight basic science. Up to 10 percent of the participants may be from non-NATO countries; in fact, up to 3 percent can come from what were called, in a phrase that seems to be going out of fashion, Iron Curtain countries.

The other major item in the civil science budget is about $750,000 this year, for a research grant program. The grants range in size from small ones, to provide equipment or materials, to relatively large ones of up to $100,000 or so. In general, NATO research grants seem to be given either to encourage governments with small science budgets to support their researchers or to help underwrite programs of collaborative research where international support is needed—as, for example, in oceanography or meteorology.

In terms of a direct contribution to European technology, NATO's newest undertaking represents perhaps its most daring departure. Within the last year NATO has become a major participant in the financing of an institute for fluid dynamics research, named for von Karman and located in Brussels. The institute has no direct tie with the university in Brussels but has developed close associations. Established in 1956 with U.S. encouragement and aid, the institute will now be essentially a training center in aerodynamics research for postgraduate students from NATO countries.

Another potential stimulus for European technology is a NATO communications satellite program now being negotiated, which boils down to a cooperative agreement between the United States and NATO. Participation in a communications satellite program has been favored for some years within NATO, but initiative came from the United States in the form of specific proposals last September. There were three main points: (i) NATO would participate in an existing American military communications satellite system by building ground terminals; (ii) the U.S. would launch satellites for NATO in 1968; and (iii) NATO countries would in the future cooperate in U.S. projects.

The first point, which is in a sense a first phase, has been agreed to. The other parts of the proposal are still under consideration. The total bill for ground stations, satellite launching, and so forth, would amount to about $40 million. Since NATO would in a sense be paying only hardware costs and would not be saddled with R & D costs, this could be interpreted as a bargain. On the other hand, it can be argued that NATO participation in an American program will not do much for European industry, since the equipment, except for some components for ground stations, will be essentially Made in U.S.A.

The offer to include NATO nations in work on future projects clearly was addressed to this objection. A separate offer has been made by the U.S. to NATO member nations to participate, on a country-to-country basis, in a Defense Department project to develop small mobile terminals which might be used in a "tactical" system in conjunction with satellites. The Europeans are being offered a share in the research, which should produce a fair yield of technological fallout at a cost which would not be forbiddingly high.

The September offer seems, in fact, to have been pressed by the U.S. ambassador to NATO, Harlan Cleveland, to get NATO involved in an important, technologically advanced program in the interests of cooperation as well as of communications. Intergovernmental decisions are not easily arrived at, in NATO or anywhere else, and when both money and national interests are involved, it may be as difficult to agree on a scientific program as on a weapons system. The communications satellite proposal seemed to be generally attractive and to carry a minimum of potential conflict. In such decisions, however, questions of financing and of technological advantage are ingredients of very high viscosity, and NATO history yields plenty of intimations of what Europe faces in a search for a technological concordat with the United States.

NATO may well be passing through a climacteric which will result in significant changes in its structure and even in its mission. But it seems unlikely that the alliance will be demilitarized and transformed into a North Atlantic Technological Organization. The technology gap, however, has become a sizable political issue in Europe, and the search is on for institutional forms suitable for attacking the problems involved. The OECD at this stage seems to lead most lists of candidates for the task, and OECD in fact has a demonstrated capacity for the kind of survey and analysis work which is badly needed to "map the gap." Whether OECD could or should later turn itself into an operational agency is another question.

A technological Marshall Plan of the sort some have suggested seems to be an impractical concept. The underdeveloped nations would certainly have first call on any American effort on that scale. And besides, American industry would doubtless view a latter-day Marshall Plan for Europe as suicidal altruism.

Obviously, more of what is being done now in the way of scientific and educational interchange will help, and the internationalization of industry will also tend to equalize technology, although Europeans will no doubt continue to resent what they see as the conversion of their industries to branch-office of American corporations.

Ultimately the technology gap reduces to a multitude of country-by-country, industry-by-industry, almost company-by-company problems. At this level are encountered the tangle of difficulties with patents and licensing agreements, investment, labor practices, and—perhaps most of all—management which have to be dealt with if the technology gap is to be closed.

There is obviously no panacea in the economic pharmacopoeia for the technology gap. But NATO is an example of an organization with a modest store of relevant experience which shouldn't be ignored. —JOHN WALSH