For Argonne, Criticism and a Comeback

University of Chicago takes over as sole contractor at lab whose stock is up despite friction with DOE, barbs from GAO

When Senator Charles Percy (R–Ill.) chose Argonne National Laboratory (ANL) as the site of a 22 March hearing of his Government Operations subcommittee, the announced purpose was to consider the need for long-term energy research in the United States. But the hearing was clearly calculated to forestall a perceived threat that the current Reagan Administration review of federal laboratories would lead to action at the expense of Argonne and the Midwest.

The issue had surfaced the previous October after Argonne director Walter E. Massey wrote an alerting letter to President Hanna Holburn Gray of the University of Chicago, the operating contractor for Argonne. Massey warned Gray that the national labs were under review and there was a rumor abroad in Washington that Argonne might be jettisoned. Word reached the Chicago press via a phantom photocopier and the news rallied the Illinois congressional delegation and led at least indirectly to the show of senatorial solicitude in the Argonne cafeteria.

If Argonne's partisans were feeling defensive, there was cause for concern. Within a year, the lab had figured in two critical reports by the General Accounting Office (GAO), the auditing arm of Congress. The first, in September 1981, took DOE to task over several short-term extensions of the contract with Argonne's dual contractors, Chicago and the Argonne Universities Association (AUA), a consortium of universities. The second GAO study, discussed at a Senate hearing in July, dealt with national laboratories more generally, but singled out Argonne for several unfavorable comments on its procurement, personnel, and property management practices. In addition, Argonne was among the hardest hit of the national labs by reductions in budget and staff imposed by Reagan economies. Argonne's operating budget dropped from about $267 million at its peak in fiscal year 1981 to a projected $212 million for the current year. And staff has been reduced by nearly 1000 from a high of 5100 in 1981.

If Argonne ever was on a putative hit list, however, the crisis appears to be past. The show of political support obviously helped. So have favorable ratings from representatives of the review groups who visited Argonne. Moreover, on 1 October, the University of Chicago took over as sole contractor at Argonne under a revised governance scheme designed to relieve frustrations caused by the old contract. A new management team at the lab is also credited with changes in style and substance in the past 2 years that have helped reverse a slide in ANL's reputation and Argonne director Massey has just been named vice president for research of the university (see box).

The National Labs

The Department of Energy's big, multipurpose national laboratories are in a period of flux, and they are being investigated by the White House Science Council and the Energy Research Advisory Board. An earlier article (*Science*, 8 October, p. 134) examined the change taking place at the Los Alamos National Laboratory. This article looks at Argonne National Laboratory.

Argonne has been in the public eye before. The direct descendant of the Metallurgical Laboratory at Chicago where Enrico Fermi oversaw the chain reaction that initiated the atomic bomb project, ANL was the first of the Manhattan District projects to be formally designated a national laboratory. But unlike the Los Alamos, Livermore, and Sandia laboratories, Argonne has not had the raison d'être of nuclear weapons work and the monopoly status that goes with it. Argonne is arguably the archetype of the nonweapons laboratories. The national labs have all developed their own specialties and styles. At its inception Argonne was given the principal task of fission reactor research and development. This has continued over the years to be the largest single program at ANL. Currently more than a third of lab resources go into the effort that emphasizes work on the fast breeder reactor. Other major programs focus on other energy technologies, on health and environmental research, and on physical research. For the nonweapons labs, including Argonne, changes in national requirements have affected the program mix and often brought scrutiny of the labs' mission. This is certainly the case with the review now in progress.

That mission was hardly questioned when the national laboratories were established after World War II as a legacy of the Manhattan District. There was agreement on the need to develop both military and civil applications of nuclear energy. It was accepted that the labs would be open to outside researchers to perform unclassified fundamental research at facilities too expensive for industry or universities to own. Laboratory locations were picked in part with the idea that they would serve researchers in particular regions.

The hitch was that the labs' mission has been interpreted differently by the major players involved. Federal agencies tended to regard the labs simply as contractors obligated to perform necessary R & D. Congress saw the labs as the first resort when national technological problems arose. More parochially, federal legislators and state and local officials perceived the labs as important employers and sources of business in their bailiwicks and, recently, as touchstones for high-technology industry. Industry has worried that the labs would use their insider position to take an unfair share of government applied R & D contracts. Laboratory staff preferred to do basic research without too much interference from bureaucrats or intrusion by academic scientists. And university scientists have wanted to share the national labs' facilities on terms as agreeable to themselves as possible.

Relations between the labs and the universities, in fact, have been a chronic source of tension. The conflict was generated after World War II by the advent of Big Science, requiring teams of researchers and the use of large and expensive equipment such as only the national labs possessed. Argonne figured centrally in a definitive encounter involving the central symbol of Big Science, a major accelerator. And the incident had a last-

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ing impact on Argonne, with some of the complications only now being unsnarled by the contract change.

The dispute, played out over a decade between the middle 1950's and 1960's, ultimately pitted Argonne against high-energy physicists from the research universities of the region. The falling out occurred during a national competition for a new major accelerator. Argonne scientists had snared a medium-sized machine, the so-called Zero Gradient Synchrotron (ZGS), and were campaigning for the next generation machine. Physicists in the region were ruffled by what they felt was relegation to second-class status in using ZGS. They formed the Midwest Universities Research Association (MURA) and pressed a proposal for their own machine. The details are labyrinthine, but each group saw the other as self aggrandizing. The conflict was described as a contest for access—time on the machine—but the issue was really control.

A decision by President Johnson went against both MURA and Argonne. With ZGS the only major accelerator in the Midwest, circumstances and the AEC persuaded the two sides to patch up their quarrel. MURA withered away and virtually the same member institutions formed AUA in 1965. The arrangement was blessed by the AEC the next year; the Argonne contract was rewritten to include AUA as a partner with Chicago in operating the lab.

Under the contract, AUA was given authority to "formulate, approve, and review" lab policies. But its powers were curiously unbalanced. AUA could fire the lab director or veto his appointment, but only Chicago was given the authority to appoint the director.

The idea had been to give AUA a substantial role in making policy and evaluating basic science programs, but as a management document the contract left much to be desired. The tripartite arrangement, unique among national laboratory contracts, remained in effect through the 1970's although it was given part of the blame for the dissatisfaction that led the AEC and its successor agencies to deny full 5-year extensions of the contract consistently throughout the decade. In 1978, AUA got a new president, Henry V. Bohm. Bohm came in with a clean slate in the sense that he had been totally uninvolved in the old feud. He says that after a couple of years of trying to make the contract work, he decided that it was an "incongruous and unworkable" management instrument. In 1980 he recommended to his board that the present extension of the tripartite contract running to 31 September 1983 be the last and that Argonne should have a single contractor. The AUA board concurred. When the University of Chicago sought to acquire sole contractor role, AUA decided to step aside. The next question was what formula was best for all concerned. This has been the subject of careful negotiation. AUA says that it is satisfied with the prospects and is making a dignified and, especially considering the history of the past, a statesman-like exit.

The main feature of the modified contract that went into effect on 1 October is a new governance mechanism for Argonne. The university's board of trustees is delegating authority to a new board of governors to exercise policy and oversight jurisdiction over the lab. The aim is to recruit knowledgeable board members representing industry and other universities as well as Chicago. Such a board is expected to provide broadly based policy direction for the lab and clearer lines of responsibility and accountability.

Creation of the new post of university vice president for research who would be in charge of laboratory affairs as well as overseeing university research activities was included in the plan primarily to strengthen scientific links between Chicago and Argonne which are said to have languished since the lab's early days.

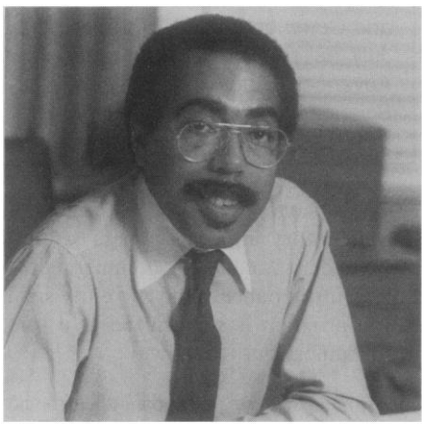
Why did Chicago make its strong bid to be sole contractor for Argonne? Chicago expects to get the same annual management fee of $1.5 million it received in the past so money appears not to be a major inducement. Gray says that the university's long association with Argonne was a factor in the decision. Also, Argonne was seen as "an important national resource and an important regional resource." She said that as a major regional university, Chicago could benefit from closer relations with the lab and "the region more generally could be served."

From the AUA standpoint, the circumstances that made its formal presence in Argonne management necessary have changed. In the 1970's the Midwest got its own big accelerator—Fermilab, which is only 20 miles or so from Argonne but is guided by a national board representing user universities. Argonne's ZGS closed down in 1979, but other machines at ANL of interest to university researchers are operating and rapport between Argonne staff and university users is considerably better than in the unlamented old days.

A case in point is Argonne's Intense Pulsed Neutron Source (IPNS) I, which is an example not only of scientific hospitality but of ingenuity in using hand-me-down equipment. IPNS was constructed rapidly for a cut-rate $9 million by using components built earlier for high-energy physics experimentation, particularly the ZGS. The facility has helped give the United States a boost in neutron scattering research in which the Europeans had seized the initiative (*Science*, 4 September 1981, p. 1097). In the United States interest had been confined largely to a small, rather exclusive, fraternity which had access to certain research reactors. The Argonne machine is attracting the attention of not only academic scientists but also industry researchers interested in studying the effects of radiation on materials. A special drawing card at IPNS is the help from staff in the facility computer room that makes it possible for users to run experiments and analyze data immediately.

A catch is that the budget permits IPNS to run only half the year. Also, a more powerful neutron source is scheduled to go into operation at Los Alamos in the mid-1980's, and Argonne appears to have lost its bid to construct a bigger

Argonne director becomes Chicago vice president



Argonne National Laboratory director Walter E. Massey has been named to the newly created position of vice president for research at the University of Chicago. His appointment is part of organizational changes intended to link the university more closely to the lab as Chicago takes over as sole contractor for Argonne (see story). Massey will continue to oversee Argonne affairs and also act as top administrator for university research. A physicist, Massey was a professor at Brown before assuming the directorship at Argonne 2 years ago. Discussing the appointment, Chicago president Hanna Holburn Gray said Massey had done "a superb job at the laboratory," and was highly regarded at the university.

IPNS II and continue as a main U.S. center in the field. IPNS staff and academic clients fear that the Argonne machine will be phased out before the Los Alamos facility is operating satisfactorily and that there will be a damaging hiatus in research. To bridge the gap, IPNS scientists are said to be offering to share their expertise and experience with their Los Alamos counterparts, a gesture of cooperation of the kind not always common in interlab relations.

The quest for the next machine has always been seen in the labs as a matter of sustaining scientific vitality and, indeed, of self-preservation. Success has depended on anticipating scientific opportunities and convincing headquarters of the competitive worth of the local design. As resources have become tighter, the cost of new equipment has been weighed ever more carefully against its capabilities. Argonne's entry in the current contest for a new accelerator is the 4-billion electron volt "GEM" (GeV Electron Microtron) design featuring a six-sided "hexatron" arrangement with three pairs of magnets to bend the electron beam as it circles repeatedly to reach maximum energy. Descriptions of GEM emphasize low construction costs to be achieved by using existing buildings and target areas and low operating costs made possible by design features claimed to reduce electric power requirements to a tenth of that of a conventional accelerator of the same size.

To maintain a claim on the future, Argonne and other national laboratories have made planning a much more serious activity than in the past. More systematic planning was first imposed by DOE headquarters in the middle 1970's as a way to get a better managerial grip on laboratory operations, but Argonne is typical among the labs in regarding rigorous planning as crucial now for both developmental and basic science programs.

The future role of Argonne as lab planners see it was laid out in a document prepared early this year for DOE's Energy Research Advisory Board, one of the groups scrutinizing the national labs. "The fast breeder reactor program," it says, "is the major program at the laboratory and will remain so until the breeder is ready for commercialization." Further ahead, the currently small fusion program is seen in the lead role. The planners put it this way:

> Fusion technology development has the potential to become a major focus of the Laboratory in the future. Argonne, based on its extensive background in nuclear reactor design and analysis, plans to focus on the engineering and technology aspects of fusion reactors, with emphasis on materials research, system design, components technology, tritium breeding technology, and superconducting magnet technology. Because fusion research involves complex and expensive state-of-the-art technology and because commercial applications are far in the future, it is an appropriate task for the national laboratories.

This is a reminder that the national laboratories are mission-oriented entities expected to produce needed technology. Argonne's basic science activities are justified as necessary to support the lab's technological capacity; they command perhaps a quarter of the budget. Over the years, basic research seems to have attracted a disproportionate share of attention. The MURA dispute, for example, was peripheral to the lab's main program but had a strong impact on laboratory affairs. The fact is that the basic science program has always had a strong effect on the lab's atmosphere and reputation and has been regarded as crucial in attracting and keeping good staff. That is why several favorable evaluations of the science program during the current review of the national labs have helped to take the pressure off.

Despite the good reviews, it would be misleading to suggest that Argonne has no problems. Budget cuts have resulted in the dismantling of many of the programs in nonnuclear energy R & D begun in the 1970's and in the dismissal of nearly 20 percent of Argonne employees.

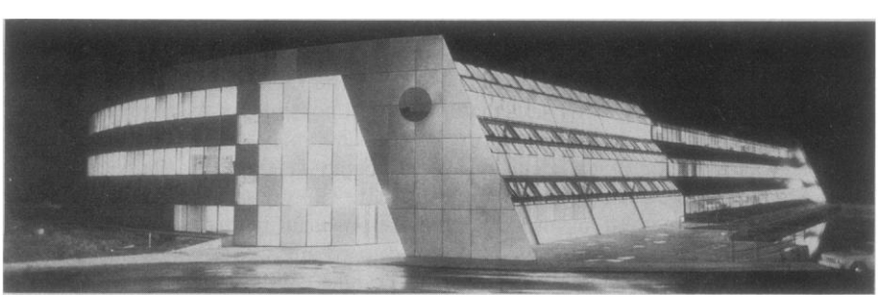
Massey says that the budget cuts were painful. The lab is "adjusting to the priorities of the Administration," and "what we see as a flat R & D budget." Massey says Argonne is becoming "a smaller lab, a more focused lab. We're not planning on big growth, but we think we can be as good a lab at 4000—though 5000 might be better."

Massey bridles a bit at the GAO barbs directed against Argonne for personnel, property, and procurement practices. He notes that no instances of fraud were cited but acknowledges that "some things needed to be changed" in respect to personnel and procurement procedures, and that is being done. He agrees that the more serious criticism was directed against use of personal service contracts. GAO charged that Argonne had chosen to contract for the services of consultants and other temporary employees at costs considerably exceeding that of regular staff. Massey notes that particularly during the days of quick expansion in the 1970's the lab was "asked to do a lot of work on a quick turnaround basis." In some cases manpower ceilings prevented hiring regular staff for the work. Use of consultants for short-term work in many cases was more economical than adding regular staff.

The GAO study was requested by Senator William Roth (R–Del.) chairman of the Senate Committee on Governmental Affairs and its investigations subcommittee. Roth indicated in July that he would ask to have Argonne revisited in coming months to check on how the lab had dealt with GAO criticisms. Sources on his committee say that Roth feels that problems at Argonne involve generic management issues for which DOE and Congress are mainly responsible and which need attention at that level. The groups reviewing the national labs are giving considerable attention to these issues, which will be the focus of a future article.

The criticism seems not to have damaged the general estimate that Argonne has made something of a comeback. Massey is widely accorded part of the credit. Often mentioned are his broad experience and science establishment credentials. He is currently a member of the National Science Board and sits on the AAAS board of directors and the council of the American Physical Society. Previous directors tended to have careers closely tied to the University of Chicago and Argonne. One close observer not on the Argonne staff said Massey's "greatest strength—something

Constance Holden of the News and Comment staff is on leave until July as a fellow of the Center for Advanced Study in the Behavioral Sciences at Stanford, California.



New Argonne administration building

desperately needed—is in external relations. Argonne had a fortress mentality."

There is an extremely unlikely possibility that the Administration could decide that the national labs should follow the AEC into oblivion. Otherwise the omens for Argonne look favorable. A DOE press release on the change in contract says that DOE will extend its contract with Argonne and that its Chicago operations office "will negotiate the expected five year contract."

A DOE veteran knowledgeable about the national labs review says the perception at DOE that Argonne "was quietly going to seed," has changed and that the recent contract action is "tangible evidence of greatly increased confidence in Argonne and Argonne's future" at DOE.

—JOHN WALSH

"Sclerosis" Blamed for Economic Stagnation

Democracies may be choked by the special interest groups they foster, Mancur Olson says

"Economic sclerosis" is the term University of Maryland economist Mancur Olson uses in describing the rigidity that afflicts American enterprise in the latter 20th century. With support from the National Science Foundation (NSF), Olson has written a new book, *The Rise and Decline of Nations*,* that boldly claims to explain how this economic disease grows and why it is likely to attack any democratic society that remains stable and affluent.

His theory, in the words of one NSF staffer familiar with it, is "big-think economics, as opposed to the kind of work we usually sponsor, which is full of equations." The new book has been criticized for its lack of "hard data crunching" or empirical research. Yet it has sparked interest because of its breadth and plausibility.

Olson's theory works as follows. In societies that permit free trade and free organization, coalitions will form around marketable goods and services. Groups of producers, like those who grow wheat or own oil, will organize to protect their assets and, if possible, boost profits by raising prices. Physicians and lawyers do much the same in joining professional societies. Labor unions organize workers to bargain for wages.

In the early stages of this coalition-building process, there are relatively few interest groups, and their memberships are small compared to the society in which they operate. As they develop, they try to impose a variety of specialized rules on the economy that supports them. By law or collusive contract, they make penalties for those who would market the same goods or services outside the group. They also offer selective advantages to those who join and cooperate. Because these groups are small (Olson says they typically include no more than 1 percent of the people in their state), they have no incentive to boost members' welfare by boosting the state's welfare. Instead, they concentrate on promoting their own narrow interests, even at the cost of retarding the general economy. A modest effort at self-aggrandizement may bring great rewards.

As time goes by, tariffs, price supports, monopoly prices, wage guarantees, and business codes grow more numerous. All are intended to channel commerce into areas that benefit the special groups that fought for them. The combined effect is to create obstacles to trade and to prevent innovation. The economy suffers. In the past, nations suffering from this affliction have enjoyed renewed growth after a cataclysm has intervened to wipe out existing trade barriers, or when new territory has been opened for development. Sometimes the power of a domestic group is undercut by low-cost imports, if the imports are not blocked. Rarely has any nation abolished special interest codes voluntarily.

Mancur Olson

Olson's theory has something to say about inflation and business cycles, as well. Inflation may be a common symptom of nations in a sclerotic condition, Olson believes, because it offers a brief measure of relief from economic stagnation. Special interest groups, being run by committee rule, generally maneuver slowly. For this reason, they cannot always adjust their demands upward as rapidly as the nominal value of goods and services increases. This is particularly true if inflation appears suddenly, without warning. Thus inflation may be tolerated because it temporarily devalues the cost of products within the control of special interests. In time, this form of relief fails because the special interests soon catch up and raise their demands in pace with inflation.

In the contrary case, during periods of sudden price decline, the advantage held by interest groups is intensified. Those who operate outside the protection of a group may be forced to lower prices or wages. But the interest groups, again moving slowly, haggle over proposals while the storm rages around them. They may not reduce their demands until a recession has already damaged the economy. After a period of negotiation, they may begin to adjust, but by then investment in new projects will have been cut short, worsening the prospects for recovery. Thus Olson sees a real risk that the inflexibility of special interest groups can lead in bad times to a "vicious downward spiral."

It would be difficult to prove this thesis with numerical data, simply because the volume of information required would be overwhelming. Thus Olson cites several broad historical economic trends as evidence of its validity. His chief example of a democracy that has survived without invasion, revolution, or

**The Rise and Decline of Nations: Economic Growth, Stagflation, and Social Rigidities* (Yale University Press, New Haven, Conn., 1982.)

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