(It should be noted that Congress is already doing this to a surprisingly large extent. Daddario's subcommittee has a seven-member research management advisory panel and is working out arrangements for the National Academy of Sciences to provide advice on specific problems. On a long-term basis, the House Science and Astronautics Committee has a 15-member advisory panel that periodically meets with the committee to think aloud and to provide advice on problems of science and government, and the House Select Committee on Government Research, chaired by Rep. Carl Elliott (D–Ala.), has established eight separate advisory panels, comprising 85 persons, to advise on a wide range of issues.)

The Daddario staff study also suggested that Congress could find valuable sources of assistance in the National Academy of Sciences and the newly established National Academy of Engineering, and also through strengthening of the Legislative Reference Service, which, under the Library of Congress, provides research service for the Congress. But on the subject of bringing more scientists into committee staff positions, it cautioned that while persons with "technical backgrounds" were valuable, it was advisable to bear in mind "the desirability that such personnel be familiar with the workings of government and the Congress, and . . . that the bulk of staff work, even for technically oriented committees, requires more application of the social and political sciences than the purely physical ones."

Finally, on the question of whether Congress would like scientists in its ranks, and whether scientists would like to be in the ranks of Congress, the staff report offered these observations:

> Aside from the fact that most top-level scientists and engineers wish to pursue psychologically and financially rewarding careers in their chosen fields, they would not be qualified to work on the (Capitol Hill) if they could not translate specialized subjects into language understandable to laymen and also be able to write reports. The science administrators in government, universities, and industry have these extra qualifications of being able to express opinions by speaking and writing, but they can get much more personal satisfaction and public recognition by working in the places where they are now employed than by accepting anonymous staff positions in Congress.

—D. S. GREENBERG

Battelle: New Contractor's Role at AEC Lab Means Diversification for Hanford, Growth for Institute

By becoming the new operating contractor of the Atomic Energy Commission's Hanford Laboratories at Richland, Washington, Battelle Memorial Institute has taken a giant step down the road of expansion and diversification.

Battelle, a nonprofit research and development organization based in Columbus, Ohio, will administer only the research part of the billion-dollar government atomic energy complex on the Columbia River in southeastern Washington. The laboratory facilities represent a federal investment estimated at $85 million. Industrial contractors will continue to operate the plutonium reactors and chemical processing facilities at the Hanford works.

However the General Electric Company, which has been contractor for the whole Hanford operation for 17 years, will relinquish management of the production as well as the research phases of the Hanford operation as soon as the AEC has found a successor—or, more likely, successors—to GE.

Power from Hanford

General Electric will stay on for a longer period to oversee bringing of the so-called New Production Reactor (NPR) at Hanford into full service. The NPR is designed to produce plutonium but has features that will allow it to be linked to an electricity generating plant which will use the reactor's by-product heat energy. After a long congressional fight, a Hanford steam generator plant was authorized during the Kennedy administration. Both public and private power companies in the Northwest are participating in the project. The plant is expected to be capable of producing 800,000 kilowatts when it is completed late next year.

Battelle will not take over direction of the laboratories from GE until the beginning of the year. Negotiations between the AEC and Battelle on terms of the operating contract are still in progress. The negotiations are based on the Battelle proposal which in May won the nonprofit research organization its selection as contractor. Battelle will operate the labs on a cost-plus-fixed-fee contract, with an estimated annual level of operations, at the outset at least, of $25 million.

General Electric's disengagement at Hanford comes at a time when the government, finding itself with an embarrassment of enriched uranium and plutonium, has ordered the shutdown of four of AEC's 14 plutonium reactors. Three of Hanford's eight reactors will be shut down. Savings from these shutdowns, plus cutbacks in production of enriched uranium at three gaseous diffusion plants, are supposed to amount to $50 million in the current fiscal year and to $70 million in fiscal 1966.

The cutbacks will result in layoffs for about 2000 of the more than 8000 workers at Hanford. The major impact of the reduction in employment will not be felt, however, until early 1965, when the reactors are actually shut down.

Looming unemployment has stimulated rather strenuous efforts in recent months to change what, since the vast Hanford works went up in the desert during World War II, has been essentially a single-employer economy in the so-called tri-city area (Richland, Pasco, and Kennewick). A citizens' committee has been regaling industrial prospects with accounts of an available abundance of technical manpower and cheap power. And Senator Henry M. Jackson (D–Wash.), an influential member of the Joint Committee on Atomic Energy and the Senate Armed Services Committee, has been aiding the cause.

As it now stands, a major fission-products-recovery and isotope-packaging operation will be established at Hanford, where there is a large supply of fission-products wastes now going largely and literally to waste. The AEC hopes that private industry will take over the job, but in case private capital is not available, the AEC has earmarked $9 million for the project. The AEC is also inviting proposals from contractors to handle radiation protection services at the works, and it is hoped that new radiation environmental safety laboratory may be established on this foundation of radiation health protection services. Early this week the AEC announced that a proposal submitted by the United States Testing Company, Inc., of Hoboken, N.J., had been selected as a basis for negotiations on a contract to manage and operate radiation protection services.

The AEC has had a policy of encouraging economic expansion in the areas of its plants and labs and, within the past couple of years, has had diversification studies for its major installations carried out. This, and pres-

sure from both businessmen and officials in the state of Washington and willingness of GE to cooperate in the face of the cutbacks, seems to have combined to open the way for the managerial changes at Hanford.

Only nonprofit research organizations were invited to compete for the contract to operate the research facility after the AEC and GE decided that it would be mutually advantageous to end their relationship at Hanford. A nonprofit would be able to attract research contracts from other industrial clients as well as from government, and to forge closer bonds with nearby universities more easily than a "for-profit" industrial contractor could, thus better serving the cause of expanding technically based industry in the area.

Battelle was chosen, according to the AEC announcement, because the institute "has extensive experience and considerable current activity in the particular scientific and technical disciplines required for the operation of the Hanford Laboratory." It was noted that Battelle was heavily involved in the wartime project which produced the atomic bomb, and that it has since invested its own funds in nuclear research.

Battelle was originally established in Columbus, and the labs there are still the organization's largest, now employing some 2300. But in the mid-1950's Battelle set up European counterpart labs in Frankfurt and Geneva. These separately operated overseas laboratories have grown until the Frankfurt laboratories employ 727 people and the Geneva operation, 381. Research expenditures at the German laboratory last year were over $4 million, and at the Swiss, over $3 million. Battelle has a small marine laboratory in Florida and offices in Washington, Los Angeles, Portland, London, Paris, and now, of course, Richland.

Formative Years

While Battelle has expanded greatly since 1940, it is fair to say that the character of the institution was formed before World War II. Battelle is unusual, incidentally, among the legion of competitors now in the field in having been privately endowed as a research and development organization when there were very few of them around.

Battelle was founded with a bequest from Gordon Battelle, heir to an Ohio iron and steel fortune, who died in 1923 at the age of 40 and left the major part of his estate "for the encouragement of creative research . . . and the making of discoveries and inventions."

In view of the founder's occupational interest in metals research and the fact that the institute's first director was Horace W. Gillett, a distinguished metallurgist, it is not surprising that Battelle research, in the difficult, Depression-ridden early days after its establishment in 1929, focused on materials technology.

Convincing Industry

In 1934 Gillett decided to leave the director's office and return to his laboratory. Clyde Williams took his place and headed the institution for more than 20 years. And Battelle historians agree that Williams not only did much to give Battelle its distinctive attributes as a research organization but also was an effective advocate in convincing industry of the values of industrial research. Under Williams, also, the pattern of research at Battelle broadened, to cover both basic and applied research, first in the physical sciences, then in the life sciences, and finally in the social sciences.

Materials research has remained a Battelle mainstay, however, and a good example of this is the institute's contribution to development work on the intractable "miracle metal" titanium, which has now achieved notoriety as the *sine qua non* for missiles and supersonic aircraft. Battelle did much important work over two decades in physical metallurgy, and especially on alloying and fabricating on titanium, a metal with spectacular strengths and foibles.

The range of Battelle research, however, is suggested by examples cited by Battelle president B. D. Thomas last December in an end-of-the-year letter to the staff.

Alluding to sponsored research in materials and industrial processes, Thomas said, "typical of these was the development of a two-stage process for producing superior quality tungsten shapes, work directed toward a new method for growing synthetic rubies of high optical quality for laser applications, a study aimed at developing synthetic aggregates for highway construction, and further advances in our effort to make hydrostatic extrusion a commercial process for the metal-working industry."

Considerably over half of the Battelle research in the U.S. is sponsored by the federal government—$16.67 million in a total of $28.6 million last year—and much of this is directed to problems relating to space exploration and defense.

Referring to this work in his letter, Thomas wrote, "There were, for example, studies involving simulated space environment to evaluate and develop materials and devices for future space ventures, studies concerned with life-support systems to sustain astronauts, studies to develop and evaluate engineering data needed in the construction of better underground shelters, and work on a multi-fueled, portable electric generator for field use by the military."

Battelle sets considerable store by another kind of research, which is financed neither by the government nor by private industry but by the institute itself. This institute-supported research is concentrated in the "frontier areas" of science. Some current or recent projects in this category which Thomas cited were studies in neutron diffraction of magnetic intermetallic compounds, stacking faults in body-centered cubic transition metals, effects of radiation on dissociated embryonal cells, and work in low-temperature physics, optical lasers, and computer sciences.

This house-supported research is financed in part with income from the original endowment. Gordon Battelle's gift, augmented by a bequest from his mother, who died shortly after he did, amounted to about $3.5 million. The Battelle trustees do not make public figures on present endowment or income, but it is understood that the Battelle investment portfolio is a healthy one. Licenses and patents provide added funds, and other income for Battelle is derived from a copying process which Battelle took over from the inventor, developed further, and then exchanged for an equity position in the company, which became the prodigiously profitable Xerox Corporation.

Institute-supported research often leads to new departures for Battelle. This was the case with Battelle's gravitation into socioeconomic research. The impact of science and technology on society has obvious relevance for the social scientist, and in the 1950's it

became clear that it also had practical significance for industry.

In 1956 Battelle had a single trained economist on its staff working in what was called "research economics." Proceeding on the theory that technological change generates new social and spending patterns and that predictions about trends in these areas would prove of great use in corporate planning, Battelle enlarged the professional staff studying the broad effects of R&D on society and industry until today it numbers about a dozen social scientists at Columbus. The work has been supported primarily with institute funds. Similar studies have been started at Frankfurt and Geneva.

Aiding Corporate Thinking

The result has been the evolution of a new Battelle service called "aids to corporate thinking," scheduled to start this year. Subscribers will receive annual detailed reports on the United States and seven Western European countries. Research until now has concentrated on obtaining data on income, occupation, and education, and the analysis will be broadened to give more complete information on consumer potential and business and political prospects in the countries under study. There would also be scheduled meetings between Battelle researchers and clients, and Battelle obviously hopes that some subscribing companies would wish to negotiate special contracts for work on special subjects.

Socioeconomic research is not the only instance of Battelle's movement away from its earlier concentration on engineering and hard sciences. Work on human-factors research, systems engineering, operations research, and information research are other examples.

With its broadened research base, Battelle has prospered in the postwar years, with research volume for both industrial and government contracts increasing steadily, government-sponsored research building the more rapidly. In 1940, the record shows, Battelle had research contracts totaling $600,000, and all but a minor four-figure sum came from industry. Total research volume at Battelle in 1950 was $6.6 million—$3.4 million in industrial contracts and $3.2 million in government contracts. In 1955 the total was $16.7 million—$8.9 million industrial and $7.8 million government. Last year the total was $28.6 million—$11.9 million industrial and $16.7 government.

The growth in the institute's staff over the years has been accordingly impressive. And the alteration in the makeup of the staff has reflected fundamental changes in American science and technology over the past generation. Scientists are much more in evidence at Battelle than they were in the early days when work at the institute was mainly applied research in engineering. The proportion of staff members with advanced degrees is also much higher.

Organizationally, Battelle has inevitably changed. The original idea of seeking to hire good men, giving them space to work and then leaving them alone as much as possible, remains policy. Autonomy has been extended to the new labs at Frankfurt and Geneva, with the result that the staffs are now reportedly all-European. The same rule of independence is to be applied at Hanford. A new director has been appointed from the Columbus staff and a few aides will accompany him, but no major transfer of staff is expected. Present GE employees in most cases will become Battelle employees. With luck in keeping present contracts and winning new ones, there will be no sizable layoffs among the 1800 employees of the lab, which, incidentally, is to be renamed the Pacific Northwest Laboratories of Battelle Institute.

Changes in the management structure of the institute are also in process. A new director of the Columbus lab was appointed at the first of the year, that job being separated from the presidency in a move to streamline the organization of the institute. To deal with some problems of bigness, two wholly owned subsidiaries have been set up. One is a nonprofit auxiliary to take over the task of developing inventions spawned at the institute and to handle affairs related to licenses and patents. The other is a for-profit tax-paying business that is devoted to development work and manufacturing.

Battelle, a pioneering industrial research laboratory, has become a successful international general research organization which, as its officers like to say, lives by its reputation. With assumption of responsibility at Hanford, Battelle has committed itself to operations on a considerably grander scale, with the opportunities and the risks which that implies.—JOHN WALSH

Consumer Motivation: Handy Handbook Reveals Discovery—"Mystery Surrounds the Cheese"

One difference between the researchers who have put their talents to work in defense industries and those who have undertaken research into consumer motivation for business enterprises is that, unfortunately, the discoveries of the latter are not classified. As one recent public monument to their efforts we have a handy compendium entitled *Handbook of Consumer Motivations* (McGraw-Hill, New York, 1964), in which the "communications expert, whether he is in advertising, sales, marketing, promotion, public relations, teaching or politics," can learn what psychological factors are thought to affect the attitude of the consumer toward his purchases. The handbook was written by Ernest Dichter, a Vienna-born psychologist who holds degrees from the University of Vienna and the Sorbonne, and who is generally credited with having introduced the practice of "depth interviewing" into market research. The book is a collection of findings accumulated by Dichter and his associates in the Institute for Motivational Research, which he heads, during the course of 2500 studies conducted for a variety of commercial and other institutions. The reader must thus be prepared for such casual introductory comments as, "In a psychological report conducted for a mustard company . . . ;" or, "One of the classical studies of motivational research has been conducted in the field of prunes."

If Dichter's main assumption, that "our everyday habits have a much deeper basis than we ordinarily assume," is literally true, it is not surprising that women in supermarkets occasionally have a glazed or stupefied look. If they manage to survive the tangle with the asparagus which, "because of its peculiar shape, easily acquires a phallic significance," they still have to cope with the soft drink, which, "unlike coffee, does not have a psychologically firmly established place in the daily life of most adult Americans," and they must prepare for disappointment when the outrageous demands they make on bread are left unfulfilled. (" . . . most people wanted a bread which satisfied the hidden hunger for sensory satisfactions, indivi-

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