matics, metallurgy and ceramics, and engineering. A second kind of organization, projects, crosses divisional lines; these projects are organized to attack large problems that require a massive effort on the part of a multidisciplinary team. The project-division structure of ORNL fits well with the role of basic research at the Laboratory, with about 25% of the research classified as "basic." However, because this basic research is performed in the environment of a laboratory dedicated to large national purposes, it usually acquires a general relevance that often is missing in basic research conducted in institutions whose sole purpose is basic research.

The Oak Ridge National Laboratory's contractor, Union Carbide Corporation, operates three other installations for the Atomic Energy Commission, two of which are in Oak Ridge, and the third in Paducah, Kentucky. ORNL derives many advantages from the single contractor operation. By the use of common functions such as purchasing, accounting, and legal staff, many economies are realized. Both personnel and work may be moved with relative ease between installations. Many ORNL successes, such as the liquid centrifuge and the High Flux Isotopes Reactor, are due in considerable measure to support received from the other installations in Oak Ridge.

MAJOR PROJECTS AT ORNL

Thermal breeding

We have long believed that our most important objective is attainment of an inexhaustible, cheap source of energy. The ORNL approach to abundant energy by means of the thermal breeder may be traced back to 1944 when studies of an aqueous homogeneous reactor were carried out. Two small experimental homogeneous reactors were operated during the period 1952–1960. The more significant step, however, was taken in 1949 when the Laboratory became involved in development of the nuclear powered aircraft. In the course of this investigation, a vast amount of knowledge of molten fluoride fuel systems was accumulated, and the work culminated with the operation of the Aircraft Reactor Experiment in 1954. Since that time, study of molten fluoride systems as fuels and molten salt breeder reactors has continued, and the great promise of the concept has now been proved in the Molten Salt Reactor Experiment.

Although the Laboratory's major power reactor effort is devoted to the molten salt concept, a program aimed at thorium utilization in general is also carried out.

Transuranium element development

The Laboratory has been interested in the transuranium elements since its inception, with development of processes for purifying plutonium providing a vein of continuity. The program reached a milestone in 1965 when the High Flux Isotopes Reactor, the world's highest flux research reactor, became critical. The HFIR ultimately will produce 1 gram of californium-252 per year, as well as other interesting elements of both higher and lower atomic number, for use in the national heavy element research program. Other parts of the transuranium element complex are the Transuranium Processing Facility, where targets containing heavy elements to be irradiated in the HFIR are made. Following irradiation in the HFIR, the targets are returned to the Transuranium Processing Facility for separation of the transuranium elements. Because study of the heavy elements requires special facilities, a Transuranium Research Laboratory was constructed. Up to one-half of the staff may be composed of visiting scientists from other parts of the United States and the world.

Water and food

The economics of nuclear power are such that very large reactors are relatively less expensive than small ones. This introduces the possibility of vast agro-industrial complexes. Such a complex might employ a 10,000 MWe reactor to produce inexpensive water and electricity. The electricity would be used to make agricultural chemicals and other products, and the excess reactor heat would be used for evaporating sea water. The water and agricultural chemicals from one such complex would then be used by methods of intensive agriculture to provide food for millions of people. We are currently making economic studies of big reactors, and research is being carried out on improved evaporators. A recent summer study was devoted to the agro-industrial complex itself.