ill tendency, is a dangerous fallacy, which at once destroys all religious liberty. . . ." The teacher then goes on to speak for himself: "I have taught the writings of Thomas Jefferson year after year in my courses. . . . I cannot refuse to heed his words in my own life."

The AAUP has sent out 1000 letters urging its 42,000 members to explore job possibilities for the four professors. In making its action a matter of public record, the association hopes to enlist the interest of the millions of Americans who, as alumni of colleges, respect the academic profession.

As to interim financial aid, Fidler stated: "The resources of our recently established Academic Freedom Fund are limited, and we regret that we cannot give financial assistance to every college teacher who loses his post for improper reasons. However, the teachers in Arkansas are victims of a law which strikes at the heart of academic freedom by restraining them from joining organizations of their choice. The AAUP stands ready to give every assistance within its power to the courageous teachers who sacrificed their positions rather than submit to Act 10."

Soviet Technical Journals

A listing of abstracted Russian technical journals currently available by subscription from the Office of Technical Services, U.S. Department of Commerce, has just been published. The listing shows some 100 Soviet technical periodicals abstracted regularly by U.S. government agencies and released to the public through OTS as part of its program of collecting and disseminating translated technical literature.

The periodicals cover such fields of research as areonautics, astronomy and mathematics, chemistry and chemical engineering, civil and electrical engineering, fuel and power, geography and geology, mechanical engineering, mining and metallurgy, physics, and general science and technology. Included are the physics, chemistry, and biology series of *Referativnyy Zhurnal,* the U.S.S.R.'s central abstracting journal.

The new listing supersedes one published in August 1958 at the outset of the OTS translation program. Certain periodicals have been added to the collection during the past year, and others have been dropped because of limited usefulness or for other reasons.

The listing, *English Abstracts of Russian Technical Journals,* is available without charge from OTS, U.S. Department of Commerce, Washington 25, D.C.

Britain Uses New Reactor Crane

An unusual two-shafted crane, known as "Goliath," has been designed especially for nuclear reactor construction tasks. It is in use at Hinkley Point, Somerset, England, where the largest atomic power station so far announced by any country is being built.

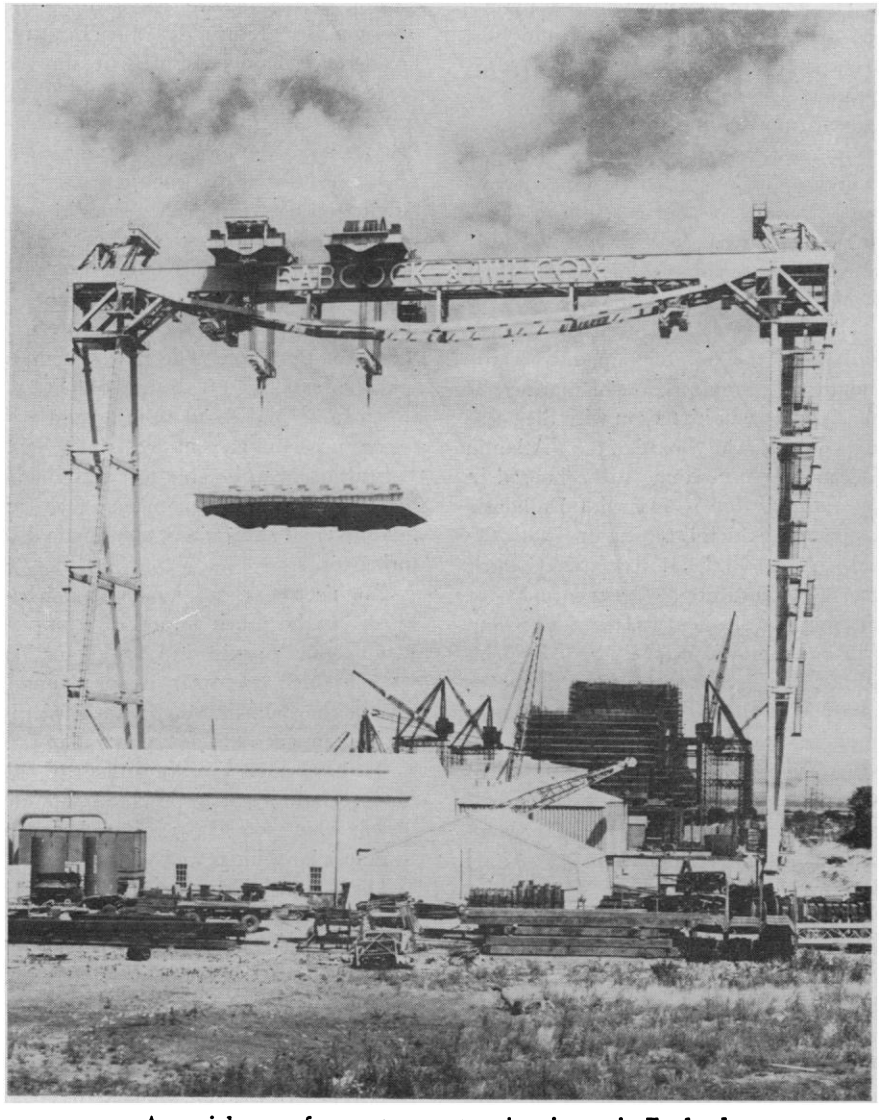
The new facility, which will cost $128 million, is located on a 140-acre site. It is expected to be in operation in 1962 with an output of 500 milliwatts.

The picture shows Goliath raising a temporary weather roof for one of Hinkley Point's two reactors. The new lifting equipment has a capacity of 400 long tons.

AEC Gives Views on Radioactive Waste Disposal at Sea

Following are excerpts from testimony by A. R. Luedecke, general manager of the Atomic Energy Commission, on the National Academy of Sciences–National Research Council report titled "Radioactive Waste Disposal Into Atlantic and Gulf Coastal Waters." The testimony was given on 29 July before the Special Subcommittee on Radiation of the Joint Congressional Committee on Atomic Energy.

The [National Academy of Sciences–National Research Council] report was requested and sponsored by the Bureau of Commercial Fisheries, Office of Naval Research, and the Atomic Energy Commission. The nature of the request was to examine the feasibility of disposing of the low-level wastes closer to shore than the 1000 fathom disposal sites used by AEC. Feasibility was considered primar-



A special crane for reactor construction, in use in England.

ily from the point of view of safety. The study group considered inshore areas as safe for disposing of solid or packaged, low-level wastes up to 250 curies per year of the most biologically significant isotope without causing any adverse effect on man, provided proper precautions are taken in assessing and utilizing the sea disposal sites.

Publication of the NAS–NRC report appears to have led to a misconception that the [Atomic Energy] Commission would approve the suggested sites for immediate use. There is no urgent requirement for inshore disposal sites. The Commission has no intention of designating any such site in the future without first thoroughly investigating, with the assistance of other interested federal and state agencies, the physical and biological conditions of the area, as recommended by the NAS–NRC committee.

If a site were definitely established as suitable for use as a disposal ground without endangering the health and safety, the Commission would not license the commercial use of the site without providing an opportunity for a public hearing on the matter, as required by its rules of practice.

In anticipation of a possible need for a coastal disposal site in the New England area where there is a relatively heavy concentration of industrial, medical, university and other users of radioisotopes, the Commission is making arrangements to conduct field investigations of four Atlantic Ocean areas off the New England coast to determine if a specific site could be designated, when needed, for the safe disposal of small quantities of low level radioactive wastes and to establish the conditions under which such wastes could be deposited at the site. The studies, to begin in September, will be conducted with the assistance of the Coast and Geodetic Survey, the Public Health Service and scientists from the University of Connecticut. The AEC is financing all of this work.

The Commission does not presently contemplate investigating any other suggested Atlantic coastal areas because a need for their use is not foreseen in the near future. The Commission tentatively plans to investigate areas in the Gulf of Mexico sometime next year. None of the suggested Gulf locations has been designated for this study as yet.

Sites Eliminated

After consultation with representatives of the NAS–NRC Committee, local representatives of the United States Fish and Wildlife Service and representatives of the Massachusetts Departments of Public Health and Marine Resources, the AEC has eliminated from its consideration two of the inshore disposal sites in the New England area suggested in the NAS–NRC report because use of these areas might interfere with sport and commercial fishing activities. These sites are: A rocky ledge, known as "Browns Ledge" 10 miles from Sakonnet, Rhode Island, at 41°19′7N and 71°063′W, and a two-mile-diameter site in which unexploded depth charges have been dumped, located 10 miles from Point Judith, Rhode Island, at 41°14′N and 71°25′W.

Two of the four sites to be investigated were specifically suggested by the NAS–NRC Committee in its report. One of these sites is an area two miles in diameter, located in Massachusetts Bay at 42°25.5′N and 70°35′W, which has been used by the Crossroads Marine Disposal Corporation of Boston as a disposal ground for small quantities of low level wates. The company's license has been amended to require that as of August 15, 1959, it carry out its disposal operations in deep waters (1000 fathoms) off the continental shelf, at two locations—one 150 miles southeast of Sandy Hook, New Jersey and the other 200 miles off Cape Cod. The other site is an explosives dumping area, 10 miles by 10 miles, located 45 miles from Sakonnet Point, Rhode Island, at 40°45′N and 70°52′W.

The other two sites were not identified in the NAS–NRC report but were suggested by the NAS–NRC Committee, local representatives of the United States Fish and Wildlife Service and representatives of the Massachusetts Departments of Health and Marine Resources for further investigation. They are near sites included in the NAS–NRC report. One site is a 10-mile by 10-mile area known as No Man's Land. This is an area already restricted and used as a Navy gunnery range. It is approximately 12 miles south of Martha's Vineyard at 41°15′N and 70°43′W. The other is an area reported to be devoid of biological life located approximately 15 miles east of South Wellfleet, Massachusetts, at 42°05′N and 69°46′W.

The Coast and Geodetic Survey will take samples and make measurements to evaluate the dispersing effect of tides and currents and the uptake of radioactivity by clays and silts and by biological systems. The biological sample gathering will be carried out in collaboration with Dr. John S. Rankin, marine biologist of the University of Connecticut. The Water Supply and Water Pollution Control Group of the Public Health Service Robert A. Taft Sanitary Engineering Center at Cincinnati, Ohio, will make measurements of radioactivity in the biological and sediment samples to determine background radiation conditions.

After the field data have been gathered and analyzed the Commission will convene a group of marine scientists to evaluate the results. In the course of the evaluation other Federal and State agencies having an interest in the matter will be consulted.

If one of these inshore disposal sites is approved, periodic monitoring of the site would be carried on in order continuously to assure that the capacity of the site to receive these radioactive materials safely is not exceeded.

Basic Considerations

In evaluating or establishing any waste disposal system, three basic considerations are involved as follows:

1. The specific nature and quantity of the radioactive waste to be disposed of.
2. The characteristics of the receiving environment.
3. Basic radiation protection standards established by the Commission in its regulation, Standards for Protection Against Radiation (10 CFR 20).

The radiation protection standards established by the Commission are based on the best available biological and medical information and on recommendations of the National Committee on Radiation Protection and the International Committee on Radiation Protection. The recommendations of the two committees have been agreed to by various national and international organizations.

The radioactive material involved in AEC sea disposal operations off both the Atlantic and Pacific Coasts is of a relatively low or intermediate level compared with highly radioactive wastes produced at AEC production sites such as Hanford or the National Reactor Testing Station. The wastes disposed at sea contain quantities of radioactivity normally associated with research and development activities rather than production or chemical reprocessing. For example, in terms of radioactivity concentration, the relatively small quantity of liquid wastes finally disposed at sea (after solidification) are less than a curie and generally in the thousandth or millionth of a curie per gallon range, whereas the liquid high-level waste re-

sulting from chemical processing operations at Idaho might have concentrations in the hundreds or thousands of curies per gallon. Thus we have a factor of difference in concentration of the order of tens or hundreds of millions. Also, the total number of gallons (i.e., total quantity of radioactivity) evolving from the two situations is vastly different. As an example, in 1957 the AEC disposed off both coasts of the United States at designated locations 686 55-gallon drums of solidified laboratory waste liquids (this volume includes concrete and other solidifying agents). On the other hand there are about 65 million gallons of high-level wastes in storage at Hanford, Savannah River, and Idaho. We do not propose to dispose of these at sea, even though some oceanographers may indicate that a "dilute and disperse" waste disposal approach may be theoretically possible.

The wastes considered for sea disposal originate in various AEC research and development operations and in research laboratories of hospitals, universities, industrial firms and other places where radioactive isotopes are used for various purposes. The radioactive waste itself usually is in the form of contamination on equipment such as test tubes, bottles, rubber gloves, blotting paper, and rubber tubing. This trash is packaged within concrete in 55-gallon drums or in preformed, reinforced concrete boxes before disposal.

Although experience in other countries has demonstrated the safety and practicality of disposal of bulk radioactive liquids at sea, all radioactive wastes disposed of by the AEC and licensees off both the Pacific and Atlantic Coasts of the United States have been in the solid or packaged form, with two minor exceptions. These exceptions involve millicurie quantities. Most of the waste has been contained in 18-gauge, 55-gallon drums with concrete liners and concrete tops and bottoms for weighing and shielding purposes.

New Legislation Opposed

H.R. 8187 is a bill to impose certain restrictions on the disposal of radioactive material in the Gulf of Mexico. It would prohibit the disposal of any radioactive material in the Gulf of Mexico at a point a) less than 200 miles from the shoreline of any State of the United States; b) where the water is less than 1000 fathoms deep or c) where the waters are used customarily for commercial sports or fishing.

In addition, it would prohibit the disposal of any radioactive material into the Gulf of Mexico unless the material is in a container of "such character and strength that it will remain intact indefinitely, regardless of the depth of the water in which it is deposited." Moreover, if the shipment of radioactive material originated or was assembled in a State bordering on the Gulf of Mexico, disposal in the Gulf would be prohibited unless permission to dispose of the material had been obtained from the State or an authorized official or agency of the State.

Since receiving the request of the Joint Committee for comments on H.R. 8187, we have not had an opportunity to prepare detailed comments on the bill. We should like to say, however, that the Commission would not look favorably on the bill.

The disposal of radioactive material into the seas (including the Gulf of Mexico), involves detailed considerations of many technical factors. These include a) the nature and characteristics of the radioactive materials; b) the oceanographic features of the site proposed for disposal, including the ocean currents and the biological characteristics; c) the nature of the packaging methods; d) other technical factors that may be involved in the particular disposal activity.

We believe that such questions can more appropriately be resolved by quasi-judicial and quasi-legislative procedures, subject to the Administrative Procedures Act, as carried out by the Atomic Energy Commission and other Federal administrative agencies. We believe that it would be undesirable to establish by legislation specific prohibitions which do not take into account the many varying, technical and scientific considerations involved in this complex subject.

News Briefs

Scientists from 18 countries have begun a 2-month training program at Cornell University on uses of atomic energy in agricultural research. The program is sponsored by the U.N. Food and Agriculture Organization and the International Atomic Energy Agency.

* * *

Columbia University and the California Institute of Technology are about to begin construction of a "lunar seismograph." Under contracts from the National Aeronautics and Space Administration, seismological experts from the two institutions plan to develop a "moonquake" detection system to be established on the moon. The seismograph's signals would be monitored at stations on earth. At Columbia the work will be carried out by the Lamont Geological Observatory, Palisades, N.Y.; at C.I.T., by the Seismological Laboratory.

* * *

The August issue of the *Microchemical Journal* introduced a new feature in presenting its first "Annual Progress Number." Published as the third of a year's four issues, each annual progress number will cover advances in microchemistry made during the year. The *Microchemical Journal* was launched in April 1957 under the auspices of the Metropolitan Microchemical Society, New York. It is published by Interscience Publishers.

* * *

An agreement to establish the first joint nuclear research center of the European Atomic Energy Community has been signed by the Euratom Commission and the Italian Government. The center, to be located in Ispra on the shores of Lake Maggiore in northern Italy, will be manned by 1200 scientists from the six Euratom countries by the end of 1962.

* * *

Progress in Atomic Energy, volume 1 of the proceedings of the second United Nations Conference on the Peaceful Uses of Atomic Energy, is now available. The volume, which contains 525 pages, 218 illustrations, and 162 charts and graphs, can be ordered through any bookstore or directly from the United Nations, Sales and Circulation Section, New York, N.Y. (price, $12.50).

* * *

A new major, Mathematics for Teachers, will be offered this fall by the mathematics department at the University of California, Berkeley, to provide training for future high-school teachers of mathematics. Upon completion of the major, students may enter the internship program of the department of education, which consists mainly of a year of intern teaching at full salary, or they may take a fifth year of work in education and earn a teaching credential in the usual way.

Each year a leading professor of mathematics from a California state college will be appointed visiting professor at the Berkeley campus to assist in directing the program. For 1959–1960, the visiting professor will be Roy Dubisch, chairman of the mathematics department at Fresno State College.

The new program is supported in part by a $50,000 grant from the National Science Foundation.