several megawatts, at the United Kingdom Atomic Energy Authority's Research Establishment at Winfrith Heath in Dorset. The cost of the five-year programme of research and experiment is estimated at some £13·6 million. £10 million will be provided by the United Kingdom, Euratom (43·40 per cent each), Austria, Denmark, Norway, Sweden and Switzerland. The excess £3·6 million will be borne by the United Kingdom, which will retain ownership of the reactor and installations on conclusion of the *Dragon* project. The agreement inaugurating the project is expected to be signed at the Organization for European Economic Co-operation headquarters in Paris. Previous joint nuclear energy undertakings initiated by the European Nuclear Energy Agency comprise a twelve-country Convention setting up the European Company for the Chemical Processing of Irradiated Fuels (Eurochemie) with plant and laboratories under construction at Mol in Belgium; and a Boiling Heavy Water Reactor at Halden in Norway, in the operation of which five Organization member countries and the Euratom Commission are participating.

New Reactor to be Built at Windscale

A NEW low-power research reactor is to be built at Windscale, which is being expanded as one of the national centres for the development of gas-cooled reactors. The new reactor, to be known as *Hero* (hot experimental reactor of zero power), will cost about £1¼ million and will be built near the advanced gas-cooled reactor (*Agr*), on which work has already started. Its function will be to complement the work of *Agr* by making it possible to carry out measurements at low radiation-levels and to experiment with several alternative arrangements of fuel to obtain the best results. It will be completed early in 1961 and will be operated and studied by physicists of the Research and Development Branch of the United Kingdom Atomic Energy Authority at the Windscale laboratories. *Hero*, which will generate a few kilowatts of heat, will consist initially of a graphite structure 19 ft. in diameter and 19 ft. high, but an important feature is that it will be possible to dismantle it and rebuild it in a variety of ways. The graphite core will be contained in a steel vessel connected to a pipe circuit with pumps and heaters so that it can be operated at high temperature in carbon dioxide. It will, in fact, be the reverse of *Agr*, since the carbon dioxide gas will supply heat to the core instead of removing heat from it. The fuel will consist (as in *Agr*) of clusters of rods of uranium oxide sealed into beryllium cans, arranged in channels in the graphite in a regular lattice.

Advanced Gas-cooled Reactor Power Stations

IT is expected that from about 1965 onwards the reactors for nuclear power stations in Britain will be based on *Agr*, using uranium oxide fuel and beryllium instead of magnesium cans. This will permit higher operating temperatures and heat ratings and consequently will lead to greater efficiencies than can be achieved in the reactors now being built for the electricity authorities. The levels of radiation inside the reactors will be considerably higher. Two broad categories of problems are raised by these more severe conditions: those of reactor physics and those of reactor materials. The most important material problem is to develop fuel elements which can withstand high burn-up under the exacting conditions of high temperature and high flux, and the main purpose of the *Agr* prototype is to test various types of fuel at high power for prolonged periods (100,000 kW. of heat). It is essentially a fuel-element development reactor. The reactor-physics problems concern the behaviour of neutrons within the reactor. The high radiation-levels necessary in *Agr* for fuel testing and power production prevent the physicist from gaining access to the parts of the reactor which need most careful study. Sensitive techniques, however, are available with which it will be possible to carry out the necessary measurements at low radiation-levels in *Hero*. In addition, there are the problems of the kinetics and stability of highly rated reactors. *Agr* fuel is intended to remain in the reactor for a long time, building up very substantial amounts of plutonium. The reactivity of such a system is strongly dependent both on the fuel and moderator temperatures and on the isotopic content of the fuel, and careful study is therefore needed of the stability and control of such reactors.

Conservation Corps for Young Volunteers

ONE important purpose of the Council for Nature is to assist in the conservation of areas important to naturalists and country-lovers. The Council for Nature has embarked on a new venture and has started to organize a Conservation Corps for young volunteers. The volunteers will combine a holiday of manual work on a site needing attention with study of the natural history of the area under expert guidance. This scheme will achieve two ends: the education of young people in the principles of nature conservation, thus establishing a pool of future leaders for further studies in natural history; and the restoration and preservation of areas of special interest for future generations. This plan will require expenditure over the next five years of £25,000, and towards this the Carnegie United Kingdom Trust is making a provisional grant of £9,000 to be spread over the first three years. The response from other sources, particularly the larger industrial firms, has been encouraging and the Council is confident that the project will develop in its entirety. The Council has appointed as organizer of the Conservation Corps Brig. E. F. E. Armstrong, a retired officer of the Royal Engineers. His last Army appointment was concerned with the selection of young men and women for regular commissions, and since leaving the Army he has been warden at the Loughborough College of Technology. He has had considerable experience in the Boy Scout movement and Toc H and is also a keen naturalist.

Regiomontanus's Astrolabe at the National Maritime Museum

THE National Maritime Museum has recently placed on exhibition a small brass astrolabe made in 1462 by Johannes Muller, of Königsberg, known to posterity by his Latin name, Regiomontanus. This astrolabe was the first scientific instrument he made—it was a gift to his patron, Cardinal Bessarion, who had brought the young scholar to Rome from Nuremberg and given him access to his fine manuscripts on classical Greek astronomy. Later, Regiomontanus returned to Nuremberg and erected there an observatory, a press for printing scientific books and a workshop for making scientific instruments. It is this activity, spreading out from his centre, that