The balloon carries the rocket through the denser air, in which the high speed of about 17,000 miles an hour necessary to attain a height of three to four thousand miles would otherwise give rise to enormous drag forces. These would seriously reduce the altitude and produce such intense kinetic heating that the rocket would almost certainly be destroyed during the ascent. This application of the balloon has already been well illustrated by the American 'Rockoon' programme. The technique is not without its problems, however, because launching a fragile balloon carrying a rocket assembly weighing nearly a ton is a difficult task. Moreover, having ascended through the denser air, conventional stabilizing fins can no longer be relied upon to overcome the effects of rocket jet malalignment and keep the rocket pointing in the right direction. The comparative simplicity and cheapness of the design give promise of further useful measurements on cosmic rays, ion density, magnetic effects and other physical phenomena.

PLUTO : Materials Testing Reactor at Harwell

PLUTO, the latest materials testing reactor at the Atomic Energy Research Establishment, Harwell, which went into operation on October 25, was designed and built to provide the intense neutron fluxes which are now required to help advance the Authority's reactor research programme. In PLUTO the behaviour of materials and components for advanced power reactor systems will be examined under operational conditions created in experimental assemblies, or 'loops', built into tubes or 'holes' which pass within the intense radiation zone near the core of the testing reactor. At full power, PLUTO will generate a peak neutron flux of 10^{14} neutrons/cm.^{2}/sec. at a heat output of 10 mW. The reactor uses highly enriched uranium as a fuel, and heavy water as both coolant and moderator. It is similar in design to the DIDO materials testing reactor, which was formally opened at Harwell in November 1956, but there are fewer 'holes' into the core of PLUTO, since these are primarily designed for large testing 'loops'. A second reactor (DMTR—Dounreay materials testing reactor) is under construction at Dounreay.

Construction of PLUTO

The core of PLUTO comprises a cylindrical array of twenty-six vertical boxes, each made up into a composite fuel element from ten curved uranium–aluminium alloy plates. The reactor is controlled by moving seven cadmium-sheathed 'signal arms' into the core between the fuel elements. The circulating heavy water, which is forced upwards through the fuel element assembly for cooling, is contained in an aluminium tank surrounding the core. This core tank is in turn surrounded by a graphite reflector sealed into a helium-filled steel tank and by the concrete biological shield. The heavy water is pumped through the core tank from a circuit outside the reactor : the heat generated by the system is transferred to a secondary coolant, ordinary water, in a heat exchanger in the heavy water circuit. The secondary coolant dissipates the generated heat to the atmosphere in cooling towers outside the reactor building. The whole of the reactor area is enclosed in an airtight shell with controlled entrances so that any accidental release of radioactivity can readily be confined. Eighteen tubes are mounted inside the reactor itself to serve as experimental holes : for example, four of them pass horizontally through the reactor close to the reactor core. These holes will be used for holding large-scale engineering loop systems in which fuel, canning materials, coolants, moderators and constructional materials will be tested under specific design conditions. PLUTO will also be used for producing cobalt-60 at high activity levels for hospital and industrial use. The reactor and its associated plant and buildings were designed and constructed by an Atomic Energy Research Establishment team in association with the Ministry of Works and Messrs. Head Wrightson Processes, Ltd.

The Atomic Energy Establishment at Windscale

Replying to questions in the House of Commons on October 29 regarding the accident at the Atomic Energy Establishment at Windscale on October 10, the Prime Minister said that the Authority received the report of the committee of inquiry, under Sir William Penney's chairmanship, on October 28, and that he would make a further and full statement early in the next session when this report had been assessed. He was also asking the Medical Research Council to give an independent view on the information collected, so far as it affects public health. Mr. Macmillan said that, with his approval, the Authority has decided that such an inquiry could best be conducted by a committee of eminent scientists with experience of nuclear energy who are unconnected with the industrial group of the Atomic Energy Authority, but at this stage he could conceive of no man with Sir William Penney's knowledge who was not directly concerned with this part of the work. The object would be to get the most rapid report by the most competent investigators ; but he agreed to consider the possibility of a further inquiry under a scientific but more independent chairman, and also the possibility of publishing the report. He emphasized the Government's concern to maintain the unique reputation of British scientists in this field throughout the world.

Monitoring Radioactive Fall-out

In a written answer in the House of Commons on October 29, the Prime Minister said that the United Kingdom Atomic Energy Authority exchanges information with the United States Atomic Energy Commission on the measurement of fall-out from nuclear weapon tests, and some of this information may be passed on to other interested government organizations in the United States. Regular measurements of strontium are taken at various places in the United Kingdom, including some in the Welsh mountains, and the evaluation of the results proceeds continuously. The Atomic Energy Authority has prepared several reports on the subject, the latest, "Radiostrontium in Soil, Grass, Milk and Bone in the United Kingdom", being dated August of this year. In an oral reply to further questions on October 31, the Prime Minister said that last summer the Agricultural Research Council accepted responsibility for monitoring soil, herbage, farm animals, and milk and other foodstuffs, while the Atomic Energy Authority will remain responsible for monitoring air and rain-water and for determining the radioactivity present in samples of human bone. The Joint Committee of the Agricultural and Medical Research Councils and the Development Commission on Bio-