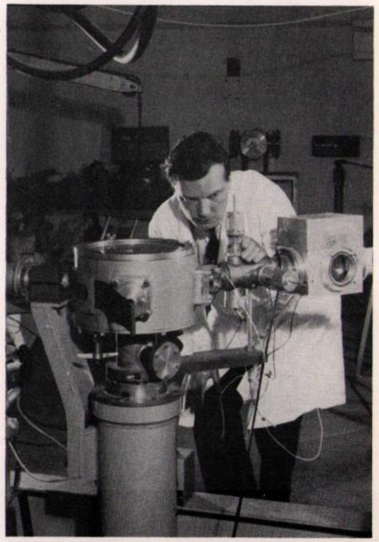
Research

Scientific research is the spearhead of technical advance. Much of the Authority's research is applied to particular reactor systems or radio-isotope techniques.
However, a substantial part—mainly centred in the research establishments at Harwell, Culham and Aldermaston—probes deeply into the nature of things, and its results can be applied over a wide field.
This work seeks to strengthen our understanding of the fundamental nature of atomic nuclei, the properties and behaviour of materials, especially under reactor conditions, and the principles underlying some of the processes in nuclear technology.

In this section, diagrams, photographs and samples illustrate facets of research into radiation damage, ceramic materials, waste disposal, nuclear cross sections and the production of carbon-16.

A spectrograph for detailed study of the properties of atomic nuclei.



Programme of lectures and films

Thursday, 17th October 8.00 p.m.
The Structure of the Atom — Lecturer to be announced.

Friday, 18th October 7.30 p.m.
Film Show — Colour films on atomic energy of interest to the general public.

Monday, 21st October 7.30 p.m.
Radio-isotopes in Industry and Research — Dr. J. L. Putman, U.K.A.E.A. Wantage Research Laboratories.

Tuesday, 22nd October 8.00 p.m.
Film Show — Colour films on atomic energy of interest to the general public.

Wednesday, 23rd October 7.30 p.m.
Film Show — Colour films on atomic energy of interest to the general public.

Thursday, 24th October 8.00 p.m.
The Use of Radio-isotopes in Medicine — R. Oliver, Radiation Protection Officer, University of Oxford.

Friday, 25th October 7.30 p.m.
Power from Nuclear Reactors — U.K.A.E.A. Lecturer from Reactor Group.

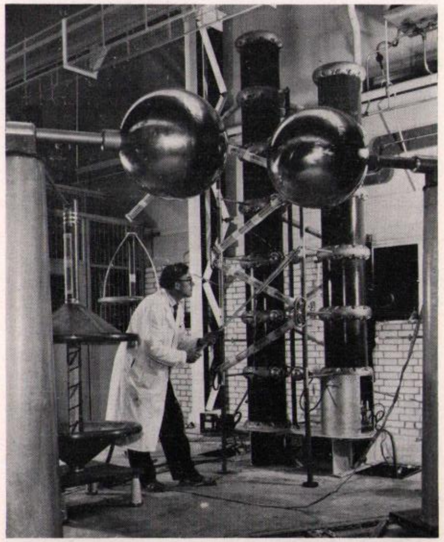
The Lectures and Film Shows will be given in the Oxford College of Technology, Headington.

Admission Free

Films

The exhibition includes a cinema at which the following sound-films in colour will be shown:
Britain's Nuclear Power Programme
Operation Undersea
Nuclear Power Reactors
Dounreay Symposium
Industrial Uses of Radioisotopes
R. and D.—Research and Development
Harwell
Fuel for Nuclear Power
Explaining the Atom
Chemistry for the Nuclear Age

A 500 kV impulse generator for insulation testing at Harwell.



UNITED KINGDOM ATOMIC ENERGY AUTHORITY
in conjunction with
THE NATIONAL PRODUCTIVITY YEAR COMMITTEE, OXFORD

ATOMS AT WORK

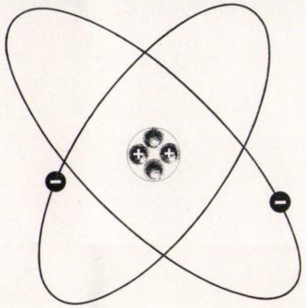
EXHIBITION AT THE
OXFORD COLLEGE OF TECHNOLOGY, HEADINGTON
17TH—26TH OCTOBER 1963
9.15 A.M. TO 7.0 P.M DAILY (CLOSED SUNDAY)

The Exhibition will be opened by the Hon. Christopher Woodhouse, D.S.O., O.B.E., M.P. at 11 a.m. Thursday, 17th October. The Right Worshipful the Lord Mayor of Oxford Alderman A. P. Parker will take the chair at the opening ceremony.

Admission Free

OXFORD COLLEGE OF TECHNOLOGY, HEADINGTON

ATOMS AT WORK



What are atoms?

The exhibition begins with an account, in simple language, of the basic principles of nuclear fission.

You are made of atoms and so is everything around you.
Atoms are very small. The air inside an empty matchbox contains one thousand million million million atoms of oxygen and nitrogen.
Atoms were once thought to be hard solid balls, like marbles. Nowadays an atom is thought of as a solar system—a "sun" in the centre (nucleus) with "planets" revolving round it (electrons).
No one yet knows what exactly are the forces holding the *nucleus* of an atom but they are a **MILLION TIMES AS STRONG** as the forces holding an *atom* together.
By splitting the nucleus of the atom one can turn this energy to practical use in nuclear power reactors. The heat given off in the reactor turns water to steam which drives electrical generators.

This section is illustrated with animated diagrams and film.

Nuclear Power

The fuel for nuclear reactors is **URANIUM**. One ton of uranium produces as much electricity as 10,000 tons of coal.
CALDER HALL (Cumberland) was the first nuclear power station in the world to produce electricity on an industrial scale (1956).
By mid-1963 the completed station, together with the almost identical station at Chapelcross (Dumfriesshire), had supplied over 10 thousand million units of electricity to the national grid.
Operation of these reactors has been so successful that they are providing some 32 per cent. more power than originally expected.
Nuclear power stations based on improvements of the Calder Hall design and built by British industry for the Electricity Authorities are in operation at:

Bradwell (Essex) —	— 300 Megawatts
Berkeley (Gloucestershire)	275 ,,

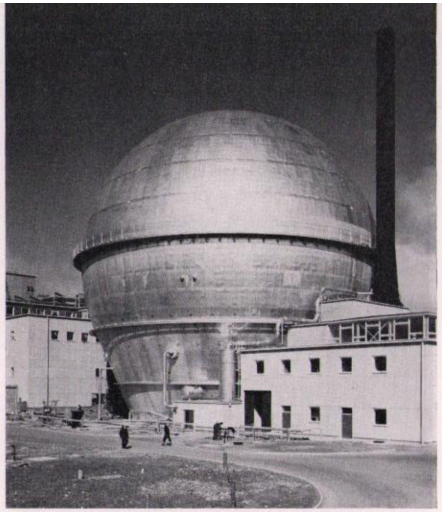
others are being built at:

Hunterston (Ayrshire) —	320 ,,
Hinkley Point (Somerset) —	500 ,,
Trawsfynydd (Merionethshire) —	— 500 ,,
Dungeness (Kent) —	— 550 ,,
Sizewell (Suffolk) —	— 580 ,,
Oldbury (Gloucestershire)—	560 ,,
Wylfa (Anglesey) —	—1,000 ,,

(A *Megawatt* is 1,000 kilowatts. One kilowatt will keep a single-bar electric fire burning.)
The British Government's *Nuclear Power Programme* (June 1960) envisages orders for further nuclear power stations being placed at the rate of roughly one every year. This should give the country about 5,000 Megawatts of nuclear generating capacity by 1968.
The *United Kingdom Atomic Energy Authority* has the task of developing more advanced and efficient types of nuclear power reactors. Research and development is proceeding on the following types which may come into *commercial use* at the dates shown—

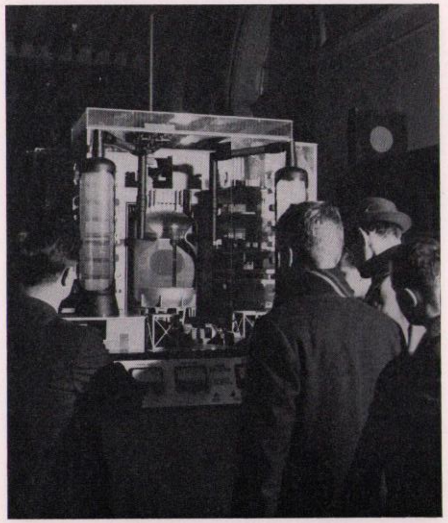
Advanced Gas-Cooled Reactor	late 1960's
High Temperature Gas-Cooled Reactor	early 1970's
Fast Breeder Reactor — —	1970's

This section illustrates the manufacture of uranium fuel for reactors (visitors can see the "Fuel Elements"—uranium bars in their metal cans) and the reactors of the present and the future.
The section also features both a working model of the Advanced Gas-Cooled Reactor operating in conjunction with a tape-recorded explanatory talk, and the Calder Reactor Simulator.



The Advanced Gas-Cooled Reactor at Windscale.

A large working model of *Calder Hall* (with controls similar to those actually used) demonstrates how a power reactor is operated.



Radiosotopes

A radioactive isotope is a material whose atoms are their own "radio station".
Its presence can be detected by "signals" which register on electronic instruments or on photographic film.
Isotopes (which are a by-product of nuclear power) have many uses in medicine, research, agriculture and industry.
In industry, for example, they can be used to check the thickness of paper or steel-plate; to check the contents of packages on a production line; to detect leaks; to make an "X-ray" of welds.
At present they save British industry £4 million a year. Potential savings could be at least £14 million a year.

In this section, the uses of radioisotopes in medicine, research, agriculture and industry are illustrated by working models, diagrams and photographs.

Taking a gamma ray photograph of a longitudinal welded seam in 3" thick steel.