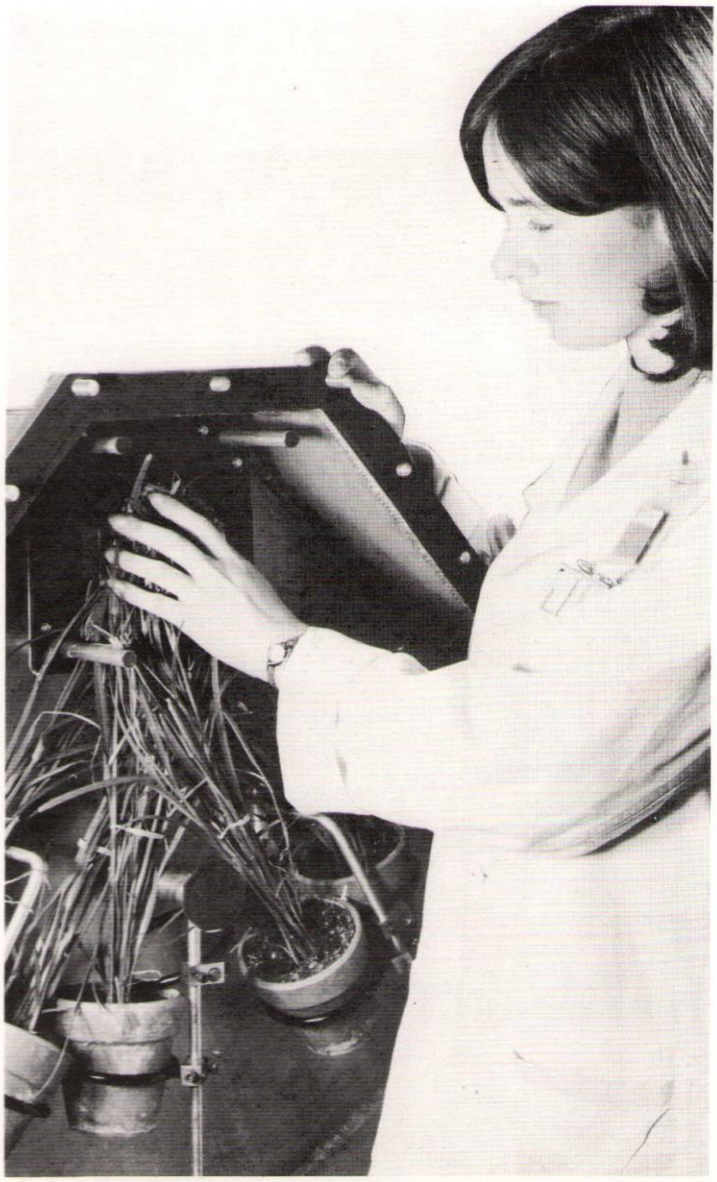
Biomedical research

Charged-particle beams and secondary radiations from accelerators can be used either as probes to examine biological specimens (living or non-living), or as closely controllable sources for investigating in detail the effects of various forms of radiations on living tissues and organisms.



Study of radiation effects

The variety of particles and radiations, and the close control that can be exercised over beam energy and other characteristics, make the Harwell accelerators particularly valuable for studying the biological effects of radiations of all kinds.

Facilities are available for studying the basic mechanisms of energy transfer to irradiated tissue, and the effects of different beams and irradiation conditions on survival and on mutation production.

Tradescantia occidentalis being arranged for irradiation with 1·5 MeV neutrons behind a tissue-equivalent plastic build-up shield, for studying somatic mutations.

Tissue micro-analysis

The fine focus, limited penetration and freedom from unwanted secondary radiations of proton beams allow detailed studies to be made of the micro-distribution of elements in the surfaces of tissues or in very thin sections, with a minimum of damage.

Activation analysis in vivo

Whole-body activation analysis experiments on human volunteers have been carried out at Harwell under strict medical supervision, using secondary neutron-beam irradiation. Total Ca and Na have been measured, using radiation doses amounting to no more than those given in diagnostic X-ray procedures. 'Phantoms' are available for preliminary measurements and setting up, and advanced whole-body counting equipment for measuring induced activity.

For further information, write or telephone:
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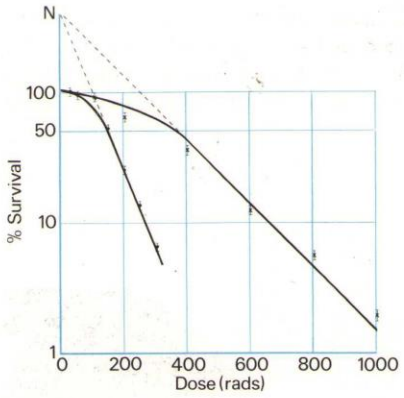
ext. 2506

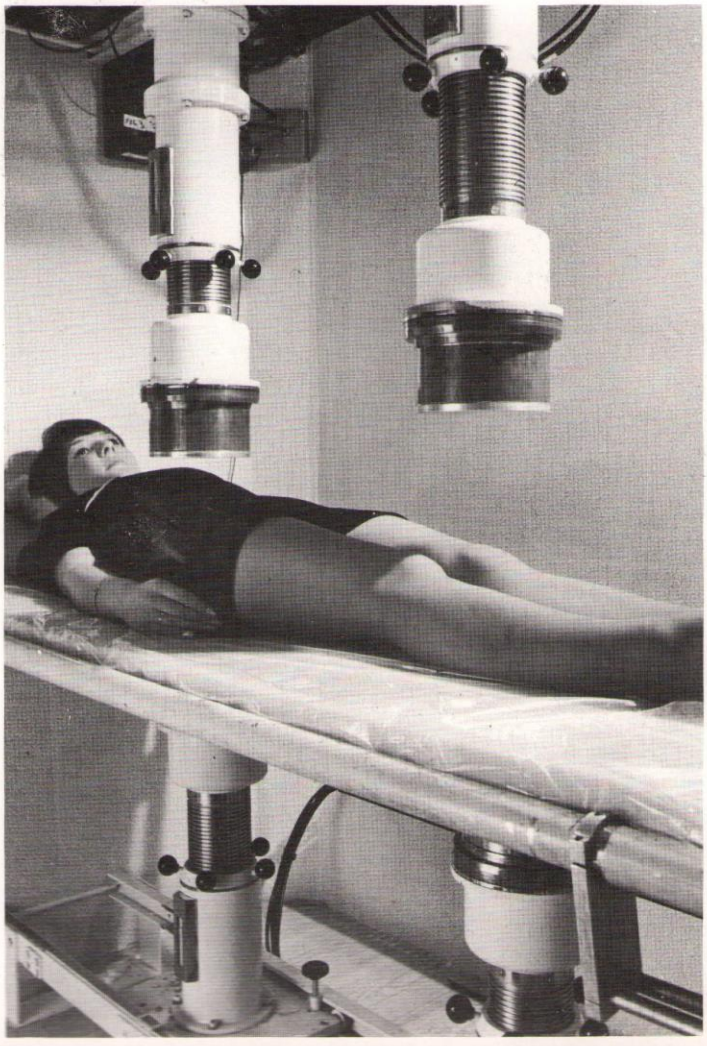
⧓ -^{60}Co-Gamma Radiation: dose rate 100 rads min^{-1}
⧓ -Neutrons from 1·8 Mev Deuterons on thick Beryllium: dose rate 5 rads min^{-1}

Extrapolation number 3·6.
D_o for ^{60}Co-Gamma radiation 180 rads
D_o for Neutron radiation 70 rads



Harwell Design Studio 61/1974

Survival of mammalion cells (Chinese Hamster V79–4) after exposure to neutron and gamma radiation.



The Harwell whole-body monitor.