

## OLD WORLD

### ENVIRONMENT

## Decay of Strontium-90

THE amount of radioactivity in the environment continues to decrease as it has done every year since 1963 according to three separate reports published in the past few weeks.

*Radioactive Fallout in Air and Rain* (HMSO, £0.40), a report by R. S. Cambray, E. M. R. Fisher, W. L. Brooks and D. H. Peirson of the Health Physics and Medical Division at the Atomic Energy Research Establishment at Harwell, shows that there has been little change in the deposition of the radionuclides caesium-137 and strontium-90 on the surface of the Earth since 1966. The Harwell team estimates that 0.21 megacuries of strontium-90 were deposited in all during 1970—some 20 per cent less than in 1969. This rate of deposition is, however, one tenth of that in the peak year of 1963. The cumulative deposition of  $^{90}\text{Sr}$  since 1963 has increased from 6.90 megacuries to 12.37 megacuries, a total that has been substantially constant since 1966. This apparent inconsistency arises because the injection of new radioactive debris into the stratosphere from Chinese and French nuclear explosions—of which there have been three since 1970—has balanced deposition from it and the deposition of radioactive nuclei on the Earth's surface has made up for the decay of radionuclides already deposited. The Harwell team estimates that the Chinese explosion of October 1970 contributed 60 per cent of the long-lived activity in the air over Britain in the summer of 1971.

A complementary report to the Harwell document has been produced by N. T. Mitchell of the Fisheries Radiobiological Laboratory at Lowestoft on *Radioactivity in Surface and Coastal Waters of the British Isles, 1970*. The laboratory from which this report originates monitors the radioactive waste discharged from industrial and other sites. The report shows that all sites under surveillance discharged only a small proportion of their maximum allowed quota. Discharges from Winfrith, which is principally engaged on the development of new reactor systems, totalled only 4 per cent of its annual quota of 30,000 curies, whereas the nuclear power station at Trawsfynydd emitted 60 curies of tritium during 1970, well below the set limit of 2,000 curies. The atomic energy establishments at Harwell and Aldermaston did discharge a greater percentage of their allowed limits.

Of particular interest in the report are the estimates given of public radiation exposure from liquid radioactive waste during 1970. All the Central

Electricity Generating Board's establishments emitted less than 0.1 per cent of the dose limit set by the International Commission on Radiological Protection. The United Kingdom Atomic Energy Authority establishments also had a good record but the emissions from Windscale, in certain cases, were more of a hazard than the emissions from other sites. The estimated dose, for example, to a person who ate 160 g of laverbread every day during 1970 amounted to 5 per cent of the recommended dose limit—this estimate is based on the fact that a great deal of the seaweed used to manufacture laverbread comes from the Cumberland coast. Mitchell also estimates that the solitary person who supervises the salmon fishing operation in an estuary near Windscale was exposed to a dose of 12 per cent of the allowed maximum. This results from an accumulation of radioactive nuclei in the silt of the estuary and the fisherman is irradiated chiefly by gamma rays.

One of the most perplexing results in the report is the way in which over the past four years an increasing amount of  $^{110m}\text{Ag}$  has been found in oysters near Bradwell power station in Essex. During 1970, the silver content was for the first time greater than that of  $^{65}\text{Zn}$  which has decreased in recent years. The presence of the silver contaminant was first observed four years ago but according to Dr Mitchell the level has remained steady since the summer of 1970. In spite of this increase and the greater toxicity of silver, there has not been a significant increase in the human radiation dose from eating oysters. From a survey of the consumption of oysters it is concluded that an individual is only subjected to 0.1 per cent of the maximum permissible dose from this source.

The third report, on the *Assay of Strontium-90 in Human Bone in the United Kingdom* (HMSO, £0.185) for 1969, is produced by the Medical Research Council. The decrease of radioactive strontium in the atmosphere

since 1963 is reflected in the decreased amount found in the bones of babies and young children. The report shows, however, that there are regional variations and that there is considerably more radioactive strontium found in the bones of children in Glasgow than in children from elsewhere as a result of the greater rainfall in the district. The statistics show that in the 5–19 year old group, the mean  $^{90}\text{Sr}$  value in 1969 was 1.8 picocurie  $\text{g}^{-1}$  calcium whereas the corresponding value for Glasgow was 3.9 picocurie  $\text{g}^{-1}$  calcium. Both these values are less than they were in 1968 and the downward trend is seen in all age groups.

### EDUCATION

## Counting the Cost

THE total public expenditure in England and Wales on education in 1969/70 was £1,979 million compared with £760 million in 1959/60. Local education authorities spent £1,705 million, of which 46 per cent was accounted for by teachers' salaries. And 79 per cent of the spending by the central government (£274 million) was channelled to universities through the University Grants Committee (*Statistics of Education, 5*, HMSO, 1971; £1.37).

During the 1960s the annual increase of expenditure on schools and further adult education increased at a fairly uniform rate of about 8.5 per cent and 12.5 per cent a year. The growth of spending on the training of teachers and on the universities, however, decreased during the decade; average annual increases were 24.3 and 22.0 per cent in the first five years, and 16.6 and 8.3 per cent respectively between 1965 and 1970. The total number of students undergoing teacher training in colleges of education in 1969–70 was 108,000 (4.5 per cent more than in the previous year) but the number of day students increased by 13 per cent to 41,200, indicating a continuing trend for greater numbers of mature students to enter the teaching profession.

Apart from awards for teacher training, local authorities spent an average of £325 a head on fees and maintenance for 251,500 students holding full value awards for courses in universities and at further education establishments. Although the proportion of 18 and 19-year-olds taking up awards from public funds for higher or further education continues to increase—it was 23.1 per cent in 1970 compared with 12.9 per cent in 1963—there is a considerable disparity between different parts of the country. In the London borough of Newham, for example, 25 per thousand of the age group took up local authority awards at universities during 1970 whereas in Solihull the corresponding figure was 185.

## Knighthoods for Scientists

In the New Year Honours List, Sir Peter Medawar was made a Companion of Honour for his services to medical research. Professor Colin Buchanan, Imperial College, University of London, Professor Fred Hoyle, University of Cambridge, and Professor George Porter, Royal Institution, were made Knights Bachelors. Professor Alan Hodgkin, President of the Royal Society, was made a Knight Commander of the British Empire.