

radiation than has been current. People in the know think that a revision of the slope of the dose-response curve (in this case a straight line) by a factor of two or so may be the outcome. The first word may come from UNSCEAR, which meets next year. But ICRP's critics are not prepared to wait, and are asking that the backwards extrapolation of this still hypothetical curve should be decreed forthwith.

In reality, in the assessment of the effects of small doses, an element of counting angels on the head of a pin is almost unavoidable. It is possible, for example, to argue that exposing a tissue to an acute dose of radiation will have the effect of killing some of its constituent cells, especially those which suffer the greatest dose, with the result that the incidence of malignancy arising from somatic mutations in the remaining cells will be an underestimate of the damage that would be done by small doses. That argues for a backwards extrapolation of the curve relating effect to dose that rises above the straight line through the origin. The notion that it may require two hits on a DNA molecule to cause a significant somatic mutation may or may not lead to the same consequence. These arguments ignore the effects of DNA repair mechanisms in all living cells, about whose efficiency in different circumstances almost nothing is known.

In the long run, harder evidence may come from careful studies of populations occupationally exposed to radiation, workers in nuclear plants for example, but the need for large numbers (and the long timescale of cancer induction) will make this process slow. A well-run study of those exposed at Chernobyl would also eventually be invaluable. Meanwhile, those seeking further information on the two sides in this disjointed argument could do worse than read *Radiation and Health* (eds Russell Jones, R. & Southwood, R., Wiley, Chichester, 1987). Few will be persuaded that the dose-effect relationship at small doses can be determined unambiguously from the data now available, but many will be stimulated to see how hard evidence might be derived.

## Controls

This will not be quickly done. In the nature of the problem of radiation risks at low doses, the numbers must be large and the interpretation for a time uncertain. So much is evident in discussions of the Japanese data now being reclassified. Should the control group be those who happened to live at Hiroshima or Nagasaki, but who were not exposed to significant amounts of radiation? Or should it be the general population of Japan? The first choice offends those who think the evidence already justifies the assumption that radiation effects are greater than simple proportionality would suggest at small doses. The second is plainly wrong, given that both Hiroshima and Nagasaki are (and were) industrial cities.

The determination of the effects of small doses of radiation is a gigantic biological study of the human population. In the long run, the work will be done, and there will be a tangible dose-effect relationship at low doses. It could even prove that the present-day critics are correct in their now-unsubstantiated assertions. (It could just as easily turn out that there is, after all, a threshold, although that seems unlikely on theoretical grounds.) The practical issue is that of whether public administrations should immediately change the rules or wait until more is known. If the radiation exposures of human populations were not still small fractions of the ICRP recommended limits, the case might be different. As things are, the interests of public health would probably be better served by the urgent investigation of a related problem whose importance has come to light only recently — the unexpectedly high concentration of radon in some poorly ventilated modern houses.

Where does all this leave ICRP itself? To respond as its critics ask by promptly tightening the present limits would be as damaging of its reputation and effectiveness as if it caved in to a demand from the nuclear industry that the limits should be

moved in the other direction. It has no choice but to move deliberately. Serious people know that a careful review of the reclassification of the Japanese data must take time, for example. But that is not to say that ICRP should pay no attention to the clamour there has been in the past few months. If it seeks to retain its influence, it had better change its style. For reasons connected with its constitution, but none the less excusable on that account, ICRP is slower than it should be to respond to changing circumstances, and given to behaving as if its recommendations should be regarded as mosaic tablets, to be accepted by all concerned with only the most laconic explanation. It may not have sought the place on the public stage it now occupies, but being there it should learn to act. □

## Private public service

*Britain is learning again that private monopolies can be as unlikeable as nationalized industries.*

LESS than a year ago, the British government seemed to be basking in the knowledge that its schemes for selling public industries to private persons were being so widely imitated elsewhere (in Japan, New Zealand and France, for example) that it could count this imitation as a form of flattery. Now, not unexpectedly, the glow is fading. One of the first and largest industries to be sold to private shareholders, the telephone company called British Telecom, has been through a great barrage of complaint from newspapers complaining that its service is atrocious. The hapless company, saying that it is hampered by the great weight of antiquated electro-mechanical switching gear at its exchanges, appears to agree, promising service of a kind that people know they can reasonably ask for only in 1990 or 1991. The government is in a cleft stick. If it acts tough, and faces British Telecom with the threat of competition on a scale that would force it to be efficient, the value of the privately held shares and of its own holding will no doubt decline sharply, but if it does nothing, the word will get around that selling public companies to private owners is not quite the recipe for prosperity the government has made out.

It will be no bad thing if this little awkwardness gives the government pause. It will no doubt reflect that much of its programme for selling public assets has been successful. Companies such as Amersham International and Rolls-Royce are no doubt in better shape now than when their decisions were monitored (and sometimes made) by civil servants. There is no reason why British Airways, already big and reasonably profitable, should not be allowed in the future to sink or swim in the competition with other carriers by its own efforts. But these are enterprises of a kind which are bound to be made more efficient in an international marketplace in which they are no longer sheltered by government ownership. By contrast, public monopolies, even when faced with limited competition as British Telecom has been (Mercury International is licensed to compete with it, but not to the tune of more than 10 per cent until 1991), have every incentive to make profits, not to provide better service at their shareholders' expense.

Much of this has been clear, in Britain, from the outset of the government's programme. But there is no reason why even the most obdurate of public monopolies should not be sold to the private sector in a way that enhances the incentive to be efficient. Britain owns a number of coal-mines, for example, some of which would be profitable even if the protective barriers of import restrictions were removed. Why not sell them off? More adventurously, why should not the government, which has an ambition to sell the nationalized electricity industry, should begin by selling its power stations singly, not as an integrated network. By British standards, the result would seem an anarchic patchwork of tiny enterprises competing with each other for the business of selling electricity to the distribution network. But is that not what competition is about? □