at exposure" and (2) the tests provided conclusive rejection of a recent (Hanford based) model for cancer induction by small doses of ionising radiations.³

Meanwhile Sorahan had discovered that the mortality experience of the luminiser cohort was internally inconsistent and suggested that this might be due to unrecognised selection effects.⁴ Therefore, it only remained for us to point out that the Hanford model "is a source of risk estimates whose standard errors are large because they were of necessity based on a relatively small number of Hanford deaths."⁵

In reply Dr Baverstock has shown that there is genuine incompatibility between the Hanford model and the luminiser cohort. In so doing, however, he has shown other problems that strongly support the Sorahan hypothesis. For example, the luminiser based estimate of the doubling dose for gamma radiation (13·0 to 14·0 Gy) is not only far larger than the Hanford based estimate (0·15 Gy) but is three times as large as the A bomb based estimate (3·0 to 4·0 Gy) which is the main stay of ICRP recommendations for radiation workers.

For this reason we have carried out a Mantel-Haenszel analysis of the luminiser data—similar to the Hutchinson et al. analysis of Hanford data.⁶ According to this test of dose related effects there is not only no evidence of any radiogenic breast cancers there is actually a deficit of these cases at high dose levels compared with other cancer and non-cancer deaths. There would, therefore, appear to be genuine flaws in the luminiser cohort which prevent any valid comparisons with the Hanford cohort.

References

Book reviews


Control of environmental hazards and monitoring to confirm that control measures are working is a central aspect of the World Health Organisation's environmental health programme. It is hoped that countries involved in the programme will eventually formulate and develop national policies for health protection. The guidelines are intended as a source of practical information on the design and conduct of genetic study on populations exposed or suspected of being exposed to mutagens. The report contains the collective views of an international group of experts. As they are guidelines they do not include comprehensive protocols for studies; however, attention is directed to important details that must be included as well as the limitations of the methods. The guidelines encompass methods that are practicable at present for studying somatic and germinal genetic effects in human populations.

Increases in the frequency of somatic effects may contribute to an increase in the frequency of, for example, cancer, whereas increases in germinal effects are likely to contribute to inherited defects in the offspring. The general principles for detecting these effects are the same for all countries and comparability can be achieved through standardisation of the procedures. Certain general principles influence the design of studies for genetic effects: there should be a means of identifying the exposed population which should have a similar unexposed group; there should be some knowledge of the perceived mutagen and where possible some separation into different exposure levels and a means of observing the time course of the exposure; when long term follow up is concerned attention should be paid to the identification of individuals so that starting and end point data will be unambiguously matched; confounding variables such as smoking, radioactivity, etc, must be taken into account. In relation to somatic effects the report describes how to detect chromosome damage, sister chromatid exchange, and gene mutations in human peripheral lymphocytes. The chromosome methods are now well established but the gene mutation methods less so. Some of the findings described—for instance, sex differences and age effects—have been challenged by recent work on sister chromatid exchanges. The methods for detecting germinal effects are used less commonly than those for
somatic mutations. These include the detection of chromosomal abnormalities resulting in fetal deaths and indicator phenotypes such as Downs syndrome. Gene mutations can be detected by biochemical approaches such as one or two dimensional electrophoresis and also by determining sentinel phenotypes such as haemophiliacs or patients with muscular dystrophy.

The book is a useful, well referenced report for those currently using such methods and those wishing to gain more information. It is to be updated as more knowledge and experience is gained and it is recommended reading for those interested in monitoring for environmental health.

DIANA ANDERSON

Toxicity and safe handling of rubber chemicals. (Pp 345, £70.00.) Birmingham: British Rubber Manufacturers Association, 1983.

The British Rubber Manufacturers Association Code of Practice has a clearly stated purpose “to secure the health and safety of people at work in the rubber industry.” The code has been produced for, and largely by, the British rubber industry but this is the second edition and experience of the first edition was that rubber industries in other countries found a great deal in it of value to them.

For people outside the rubber industry it is most important as an illustration of what can be done when trades unions and suppliers as well as managements and occupational health specialists get together to do something for the benefit of the industry in which they are all engaged.

The publication has three parts. Part 1, after a useful short section in which there are notes on toxicity and on occupational exposure limits, defines the categorisation used in the second part and sets out the association’s recommendations for good practice in handling rubber chemicals.

The meat is in the second section which comprises data sheets on each of 181 chemicals used in the industry. The collaborative approach of an enterprise of this nature should ensure internal consistency, particularly in the notes on the hazard of each material and of the precaution needed in handling and the way to deal with accidents. Especially helpful to the industry must be the recommendations of occupational exposure limits for chemicals not listed elsewhere that the association health committee has put forward.

The third part is a detailed and comprehensive definition of the occupational hygiene procedures followed in the industry.

It would be possible to quarrel with the statement made in the first part that the code defines recommended working procedures. It does not go into the detail implied in such a claim, not surprisingly given the great variety of enterprises in the rubber industry. What it does is to state clearly the principles that must be the basis of good working procedures. There is also a statement that only personnel fully conversant with the code of practice should handle or transport rubber chemicals, although it is clear from the recommendation on training that what is really meant is that those responsible for these activities should be familiar with the code and ensure that its principles guide the procedures used.

These really are small points, more a demonstration that the reviewer did have a good look at the publication before putting pen to paper than anything else. This is a publication that anyone with managerial responsibility or concern about occupational health in the rubber industry will need to have readily to hand. It has cost a lot in time and effort which the industry obviously thinks is worth while. Others may be encouraged to consider whether there is scope for some similar cooperative venture in their own industries.

JOHN GREEN

Notice

Recent advances in occupational cancer, San Francisco, 5–6 December 1986.

This meeting will be held at the Cathedral Hill Hotel and will cost $200 for physicians and $140 for allied health professionals. Category 1 AMA physician and industrial hygiene credit, number of hours to be announced. For further details contact Postgraduate Programs, Department of Medicine, 505 Parnassus, M979, University of California, San Francisco, CA 94143-0120.