

Unknown agent

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Childhood Cancer and Nuclear Installations. Edited by Valerie Beral, Eve Roman and Martin Bobrow. *BMJ*: 1993. Pp. 453. £27.95, \$54.

THE gaudy but eye-catching cover of this book presumably shows the iridescent flow of waste from a symbolic nuclear installation. The title in shocking pink carries the unequivocal message *Childhood Cancer and Nuclear Installations*. It is dedicated to the late Martin Gardner whose work fanned the flames of controversy surrounding the "Seascale affair". It chronicles the events that began in 1983 with a programme by Yorkshire Television called *Windscale: The Nuclear Laundry*, which identified an apparent cluster of childhood leukaemias in the village of Seascale, which is on the coast close to the nuclear reprocessing plant at Windscale, subsequently renamed Sellafield. The television crew had gone to Sellafield itself to look into the possibility that the health of workers may have been affected, but their attention was drawn to what seemed to them an excessive number of leukaemias in local children. This report prompted a government inquiry, chaired by Sir Douglas Black, which concluded that there was indeed a higher incidence of leukaemia in Seascale. This spawned numerous investigations and discussions that have occupied epidemiologists and medical statisticians in Britain for a decade.

The book includes reprints of studies conducted in the United Kingdom, including Gardner's original papers, which are reproduced in full, as well as extracts from government reports and summaries of investigations conducted elsewhere in the world.

The introduction by the editors, Valerie Beral, Eve Roman and Martin Bobrow, is a useful and excellent summary of the unfolding story of the epidemiological evidence. Indeed, without it, it would be difficult for the uninitiated to make sense of the conflicting results of the studies that follow. If it has a weakness, it is the lack of an adequate summary of the objections raised to the Gardner hypothesis on genetic and radiobiological grounds, and the magnitude of the disparity involved.

With the appropriate boundary conditions (and they are a little bizarre) the Gardner papers showed an excess of 4 or 5 cases of leukaemia in Seascale, to the south of Sellafield, although there is no excess to the north, where most radiation workers live, or to the west in the path of the prevailing wind.

When Gardner's papers first appeared he interpreted the excess as an environmental problem — specifically the result

of radioactive emissions to the general population — resulting in the exposure of the children who subsequently developed cancer. It soon became apparent that the radiation doses to the children were much too low to account for the excess incidence. Later, the explanation of the excess was changed to an occupational problem, because the affected children had been fathered by workers at Sellafield who received substantial doses before

this lengthy court case, this book must seem somewhat unbalanced, with a surfeit of epidemiology but little science. To be fair, the book does include the papers that describe an alternative explanation, put forward by Leo Kinlen, and supported by Sir Richard Doll, to the effect that the leukaemias were due to an infective agent resulting from the influx of large numbers of people into previously remote areas of Cumbria. Leukaemia clusters similar to that noted at Seascale have been observed in sites proposed for a nuclear facility, but where the reactor was never activated, and also in remote areas developed for oil installations. This observation supports the idea that the Seascale excess, if it is not simply a statistical aberration, is due to some unidentified factor, but is not associated with radiation,

IMAGE
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REASONS

Too close for comfort? — Houses near the Sellafield nuclear reactor.

conception. The study was regarded as well conducted and statistically sound, but many scientists found its conclusions hard to accept, especially when follow-up studies in other countries failed to provide any evidence to confirm Gardner's conclusions.

It is interesting and pertinent that this book has appeared soon after the decision in the landmark case in the English High Court in October 1993 that ruled against the families of two of the affected children. They had claimed that the children's leukaemia and lymphoma had been caused by pre-conceptional irradiation of the fathers while working at Sellafield. It is significant that the defence in the case involved not only the epidemiology but also much cellular and molecular radiobiology, in the light of which it appears that the Gardner hypothesis is untenable.

For those who followed the evidence in

The intended readership of this book is unclear. It cannot be meant for epidemiologists because there can be few who have escaped exposure to Gardner's papers. It cannot be for the mythical 'man-in-the-street' who (although perhaps attracted by the cover and title) would be lost in odds ratios and statistical significance. I hope it is not intended for general scientists (who are not specialists) because it is a limited selection of epidemiological papers with little basic science perspective. Who then is it for?

Prospective readers may be attracted by the eye-catching cover or by the striking title but after reading the contents they may feel, as did Macbeth, that "it is a tale full of sound and fury, signifying nothing". □

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