Is the chemical herbicide 2,4,5-T responsible for birth defects and alterations of behaviour? Australian health authorities say that there are no grounds for preventing its use. But in other countries, including parts of the US, it has been banned on the basis of scientific reports. The 2,4,5-T issue raises questions about how scientific information should be assessed, and about the relation of scientific research to political decision-making. Is there really a case against 2,4,5-T and, if so, then why have our health officials been so reluctant to acknowledge and act on it?

The Case Against 2,4,5-T

2,4,5-T contains dioxin, one of the most highly toxic substances known to organic chemistry. We have already seen effects of dioxin poisoning. In July, 1976, leakage from a factory near Seveso, Italy, which produced hexachlorophene (a powerful antiseptic cleaning agent) resulted in the release of about 650 grams of dioxin. This settled in an urban area southeast of the factory and affected a population of several thousand people. The immediate effects were acute skin lesions, especially in children; myasthenia, a weakness characterised by extreme muscular fatigue; and an increase in the incidence of miscarriage and birth deformities. The full effects of this accident will not be known for many years.

Seveso is the most publicised of accidents involving dioxin, but there have been others. Steven Rose in *New Scientist* mentions reports of hushed-up accidents involving 2,4,5-T production and dioxin contamination in factories in Britain, Europe and the US. I have found reports of dioxin contamination from accidents in Florida and Missouri, involving 150 grams and 5 kilograms of dioxin respectively.

A mixture of 2,4,5-T and 2,4-D formed the basis of the defoliant Agent Orange, used by the US government in the massive crop and forest destruction program in Viet Nam. Its use was poorly controlled, with a rate of application many times the recommended usage and an estimated dioxin content of 50 parts per million (some 500 times the upper limit now allowed). There is no doubt that this defoliant caused harm to the people of Viet Nam, as well as to some US and Australian servicemen. Vietnamese authorities have reported an increase in miscarriages, birth deformities and liver cancer in areas affected by the aerial spraying. These increases have not been found in areas which escaped direct spraying.

The US government failed to acknowledge the reports of the Vietnamese. However, veterans of the Viet Nam war have filed some 500 claims against Dow Chemicals for damages to health incurred through exposure to the defoliant. In Australia, at least 40 ex-servicemen have been informed of a possible four-year delay in the processing of their claims — apparently to allow a survey of scientific data, even though the case against Agent Orange is well established.

The toxicity of dioxin clearly poses a threat to workers in plants producing 2,4,5-T and to people living near such factories. However, chemical companies claim that with modern manufacturing methods, they can maintain dioxin levels at less than 0.1 parts per million, and that at such low levels 2,4,5-T poses no threat to human health.

It has long been known that fetal abnormalities and an increased incidence of fetal mortality occur when laboratory animals are exposed to 2,4,5-T. However, the
research prior to the 1970s was frequently criticised as inadequate; because the population samples were too small, the doses of 2,4,5-T very large, and because the levels of dioxin and other impurities tended to vary. The evidence could be dismissed as not representing the hazards actually faced by the use of 2,4,5-T in the environment. Failure to examine the effects at low doses led to the misconception that 2,4,5-T was indeed harmful only at high doses.

More recent evidence has established that 2,4,5-T, in low doses, does cause birth deformities in animals. In addition, Swedish researchers in 1975 reported that 2,4,5-T affects the behaviour of rats when given in a single low dose to the mother at a critical stage of pregnancy. This has important implications for the 2,4,5-T issue, for it suggests that the behaviour and learning of animals and humans may be affected at doses lower than those that cause physical deformities. 2,4,5-T may be exerting a more subtle and insidious effect on creatures exposed to it.

Much of the evidence against 2,4,5-T is based on correlations between its use and increase in birth deformities and cancers of certain kinds. For instance, a doctor in Yarram, Victoria, revealed a disproportionately high incidence of deformities in children born to women living in an area known to have been sprayed with 2,4,5-T. But an inquiry initiated by the State government failed to find a statistically significant link between 2,4,5-T and increased birth deformities.

However, on March 1, 1979 the US Environmental Protection Agency placed a ban on the use of 2,4,5-T on the basis of evidence relating a seasonal increase in the rate of miscarriage in the women of the Alsea Basin, Oregon, to the aerial spraying of 2,4,5-T. Dow Chemicals, however, won an appeal against the deregistration of the herbicide, which, they objected, came on the “eve of the spraying season”.

Australian health authorities, having failed to act on evidence accumulating in Australia and New Zealand, were somewhat
shaken by the EPA's move. The Victorian Minister for Health, Mr. Houghton, strongly advised against the use of 2,4,5-T in built-up areas because of the evidence from Oregon. A few suburban city councils acted to prevent its use in their municipalities.

However, the National Health and Medical Research Council (NHMRC) advised the Federal government against further restriction on the use of 2,4,5-T, claiming that the restrictions in the US were based on evidence which is inconclusive because it does not establish that 2,4,5-T caused the birth deformities and miscarriages.

As the scientists responsible for collating the Oregon data admit, the study is correlative, and as such, cannot prove that 2,4,5-T is the causative factor involved in the increased incidence of miscarriages. This is a limitation that scientific research into this field simply cannot escape. The alternative — of deliberately administering 2,4,5-T to pregnant women — is obviously unthinkable. There is causative evidence from animal experiments that 2,4,5-T is harmful; there is statistically significant correlative evidence. What more does the NHMRC require?

The Politics of 2,4,5-T

In the face of the evidence now accumulating, the NHMRC have continued to reaffirm their stand that there is no evidence to link 2,4,5-T with birth defects. According to them, the cluster of birth defects which have occurred in certain areas are simply inexplicable. They do admit that workers involved in the production of 2,4,5-T may be at risk. But no scheme to monitor the health of workers producing 2,4,5-T exists in Australia. The scheme used by Dow Chemicals in the US was abandoned when positive effects began to show up.

No-one who examines the 2,4,5-T issue can avoid becoming aware of the political power of those who manufacture and promote the use of herbicides, particularly Dow Chemicals, the American company which is responsible for making and distributing most of the chemical herbicides used in the Western world. This use of power extends to the suppression of scientific evidence. Reports have come to light in the US of a "mafia"-type operation set up to suppress experimental results unfavourable to the pesticide and herbicide industries. It appears that scientists who have 'detrimental' information find that they cannot get a hearing from the government, that they are sometimes threatened with the loss of their grants or even their academic positions. Could this sort of thing be happening in Australia?

Dr Barbara Field of Sydney University claims that the NHMRC tried to prevent her from publishing the results of her study of the effects of 2,4,5-T — that she was asked to withdraw a paper submitted to the international medical journal Lancet. Her report, linking the national sales of 2,4,5-T with increased incidence of spina bifida and other neural tube defects, is not nearly as convincing as the Oregon study. Nevertheless, whether this paper was worthy of publication was not for the NHMRC to decide. The action of the NHMRC amounts to an attempt to suppress results of scientific research and as such the implications reach far beyond the 2,4,5-T issue.

Can the stand of the NHMRC be justified? There is substantial and growing evidence against 2,4,5-T. But this evidence is inconclusive and is likely to remain so. What causes harm to laboratory animals may not be harmful to humans. The miscarriages and birth defects in Yarram and Oregon may have been caused by something else. It is possible to doubt that 2,4,5-T causes harm to people. But even if our health officials don't accept the evidence against 2,4,5-T, they have no right to assume that this substance is harmless. The decision to ban or not to ban is inevitably political. By making the decision in the way they did, these officials are tacitly supporting the practices of those who manufacture and promote this chemical.

From the point of view of the public, it would be more rational to assume that a substance is guilty until good evidence is found for its innocence. If this principle were followed, 2,4,5-T would be banned, and so would many other chemicals now in use. But this is only likely to happen when people bring political pressure to bear on those who pretend that their decisions are justified by scientific evidence.