

OLD WORLD

Is DDT Carcinogenic?

AS Mr William Ruckelshaus, director of the United States Environmental Protection Agency, laid the environmental lobby in America to rest last week by banning most uses of DDT throughout the country, he raised again the old spectre of DDT being carcinogenic.

The argument by now is an old and hoary one, but whatever future research may show, there is no evidence to date that the chemical causes cancer in man, although it is clear that it does accumulate in the fatty tissues of the body, apparently without any harmful effects.

The medical evidence against DDT comes from studies in mice which develop lesions in the liver when fed levels of DDT ranging from 10 to 250 ppm. Work at the International Agency for Cancer Research in Lyons, partly financed by the World Health Organization, is confirming these findings, but they are a far cry from proof of carcinogenicity in man. Only certain strains of mice develop the lesions. Rats treated the same way may produce lesions, although this is not yet clear. The World Health Organization is financing work in Moscow on rats, but studies have not yet proceeded far enough to produce results.

Equally, the value of studying the type of lesions produced in mice has been called into question recently by Grasso and Crampton (*BIBRA Bulletin*, 11, 3; 1972) and by Rowe and Grant (*Intern. J. Cancer*, 6, 133; 1970). Some strains of mice which have been used for testing the carcinogenicity of DDT have a tendency to form lesions of the liver which calls into question the value of studies on mice. Equally the types of lesion found in mice are not comparable with any found in man.

But if the evidence gained from mice remains unconvincing, results from epidemiological tests so far are completely negative.

The World Health Organization has such studies running in Brazil, Israel, the United States and India among other countries, and there is no evidence that the DDT levels found do cause cancer. Studies at DDT manufacturing plants where workers' blood levels can be anything between 50 and 100 times the "normal" levels found, show no evidence of an increased incidence of cancer, and studies over a 14-year period at one of Shell's manufacturing plants where dieldrin—a close relation of DDT—is made, produced equally negative results, although at very high blood levels there were small bio-

chemical changes in humans, insufficient, however, to affect the subject's well-being.

The position seems to be adequately summarized by the 1970 annual report of the International Cancer Agency, published this week, which states that studies of the carcinogenicity of DDT in experimental animals "have shown that, at very high doses, liver tumours are produced in mice. In other studies, the levels of DDT stored in human fat tissues, sampled from different populations, are being measured; although these levels are often very high there is as yet no epidemiological evidence of any modification of the cancer pattern in any of the populations studied".

Clearly DDT cannot yet be given a completely clean bill of health. Possibly the lesions in mice are in fact significant, and equally really long-term epidemiological studies of the sort that the WHO is currently running may yet reveal that DDT has a tendency to

cause cancer over long periods, but to date there is no basis for Ruckelshaus's statement.

Will Britain follow the United States in the ban? In spite of speculation that other developed nations will follow the United States down its pioneering, if possibly unwise road, it seems unlikely that Britain will do so immediately. Mr Ruckelshaus said in London this week that he has had talks with the Department of the Environment on the subject and that he will be sending the British Government the 36-page document on which the EPA based its controversial decision, but the reaction among British scientists in the field is cool. One described the United States action this week as "selfish" in that its decision is likely, whether the United States is willing to admit it or not, to coerce nations that cannot yet afford to manage without DDT to ban the chemical.

There is no doubt that Europe and

SPACE

Onward with Europa

THE ELDO council has now agreed to release a further \$4.8 million for work on the F12 launcher in the Europa II series. This money had been allocated in the 1972 budget but was frozen after the disastrous F11 launch in November 1971.

This decision, taken by the council, seems to prejudge the issue to be debated at the meeting of the ELDO ministers in Brussels on July 11 on whether work should continue on F12. The confidence of the ELDO council that the ministers will approve a continuation of work on Europa II is no doubt based on the report of the causes of the failure of F11, which broke up after 150 seconds of flight.

The abortive launch of F11 was, according to the report presented to the council, the result of a computer failure which was itself caused by a "manifestation of electromagnetic interference aggravated by the fact that digital equipments susceptible to interference and relatively unprotected (the guidance computer and third stage sequencer) had been placed in an unfavourable electrical environment".

In view of this report ELDO has taken action to prevent such occurrences in future—the technical side has been strengthened and, more important, ELDO said last week that "the organization, timescale and finance to guaran-

tee proper reliability of the Europa II vehicle" has been improved.

The ELDO council also made plans for the future launches of Europa satellites. It is planned that after F12, which is now scheduled to be launched between May and November 1973, provided the ministers agree next month, F13 will be launched in late 1973 or early 1974. If it is decided to go ahead with these launches then the cost will be between \$21 and \$26 million. The Symphonie satellites will then be launched by F14 and F15 during 1974, whereas F16 is to be used for ESRO's COS-B satellite.

There are no definite plans for F17 and F18, whose construction has yet to be approved, but the council decided to open negotiations with the Symphonie group and with ESRO for the sale of these satellites.

Another decision which will face the ELDO ministers next month will be the future of the Europa III launcher. This launcher is to be more powerful than Europa II and is designed to put a payload of 750 kg into a geostationary orbit. This launcher is to be a two-stage rocket whose development is estimated to cost \$470 million. One of the features of the launcher, which particularly concerned the ELDO council at its meeting, was the possibility of making the second stage compatible with the space tug.