

public is understandably confused by what seem to be widely conflicting reports of the safety of marihuana use. A report prepared by the National Institute of Mental Health and presented to Congress last week, however, provides a welcome relief from the rhetoric.

An extensive and detailed survey of the scientific literature on the health effects of marihuana, the report makes few definitive statements, and steers well clear of any discussion of the legal status of the drug. Nevertheless, the tenor of the report was best summed up by Dr Bertram S. Brown, director of the National Institute of Mental Health, who said at a press conference last week that the evidence so far indicates that "in a healthy subject taking moderate doses, there seems to be no harmful effects". But Dr Brown was also quick to point out that conclusions about the safety of marihuana are necessarily tentative and much more research into its possible chronic effects is required before sound inferences can be drawn.

The report addresses itself chiefly to a consideration of research results that have been reported during the past year, and it is clear that one of the most important advances has been the development of synthetic forms of the chief active ingredient, delta-9-tetrahydrocannabinol. Research into marihuana use has long been dogged by the difficulty of determining dose rates and the related difficulty of providing comparability in experiments.

Nevertheless, the report has many comforting things to say on the basis of studies so far. As far as acute toxicity is concerned, for example, experience with animals and in man has shown that extremely large doses are required before any dangerously toxic effects are noted. In animal studies, the minimum lethal dose of delta-9-thc that causes death is about 1 g/kg administered orally, and it is not possible to find an LD<sub>50</sub> for these animals. Similarly, in man, there have been extremely few reports of death from an overdose of marihuana and those that have been reported are almost invariably doubtful in some aspects.

Attention has therefore been focused chiefly on the possible chronic effects of long-term marihuana use. Here again, the report seems to suggest that chronic effects, at least with moderate use, are slight. The most common physiological change from smoking marihuana is an increase in pulse rate and a reddening of the eyes, but these effects are relatively short-lived, lasting for only an hour or so after using the drug. The effect on respiratory complaints is often complicated by the fact that marihuana is often mixed with tobacco, but one study among Ameri-

can troops in Germany has found evidence of bronchitis, asthma and throat inflammation which disappeared when use of the drug discontinued. There is little evidence of impaired liver function or circulatory disability that can be pinned down to marihuana use alone, and the report notes that studies of heavy users of hashish in Greece and Jamaica, some of whom had used the drug daily for up to 20 years, provided no real indication of chronic effect. This finding was cited last week by Dr Robert Peterson, who was chiefly responsible for compiling the report, as being particularly surprising to him.

Perhaps the most serious indication of damage from long-term use of marihuana is the recent report of brain atrophy in ten young cannabis smokers. But the report suggests that this finding is inconclusive since most of the subjects were multiple drug users. Some investigators have also doubted that the

radiographic techniques used in the study are suitable for detecting cerebral atrophy. Nevertheless, the report suggests that the importance of the finding clearly merits considerable further study.

As for the possible teratogenicity of marihuana, the report cites two animal studies that have failed to come up with evidence of birth defects, and there is no evidence so far that marihuana use is likely to cause chromosome breakage. Moreover, "the number of clinical reports of birth defects in children of mothers who use cannabis has been very small, especially considering the large number who are believed to have been exposed to the drug". But only a few preliminary studies have been reported and the report cautions that since the teratogenicity of the drug cannot be completely evaluated, its use would be unwise among women during their reproductive years.

#### AGRICULTURAL RESEARCH

## More Aid to Green Revolution

by our Washington Correspondent

THE green revolution has received its first direct support from the World Bank in the shape of grants amounting to \$1.26 million for international agricultural research institutions. The grants, which were awarded earlier this month, are part of some \$15 million that is being made available in 1972 for international research projects by members of the newly-formed Consultative Group on International Agricultural Research.

The World Bank grants mark the first tangible signs of the efforts of the Consultative Group to channel more funds into internationally supported research centres aimed at increasing the quantity and quality of food production in developing countries. Chief beneficiary of the World Bank's entry into agricultural research is the International Wheat and Maize Improvement Centre in Mexico, which is set to receive \$1 million, while the International Potato Centre in Peru has been given \$160,000 to help with projects designed to breed a variety of potato with an enhanced resistance to disease and which can adapt to tropical climates.

Behind the formation of the Consultative Group on International Agricultural Research, and the subsequent awarding of the World Bank's grants, lies the suggestion that although the so-called green revolution has received a good deal of public attention, not to mention a Nobel prize, it has been in danger of running short of funds. In any case, in 1970 it seemed that the growth and size of the five internation-

ally supported agricultural research centres were such that their traditional sources of funding would be inadequate to meet their financial needs. Until then, the research centres were supported chiefly from North America, with the Ford, Rockefeller and Kellogg Foundations, together with the US Agency for International Development, providing the bulk of the finances.

A meeting convened by the United Nations in 1970 to discuss priorities and funding for international agricultural research led indirectly to the setting up of the Consultative Group, whose members include the Ford, Rockefeller and Kellogg Foundations, the FAO, the UN development programme, the World Bank, the twelve donor governments (Belgium, France, Germany, Japan, The Netherlands, Norway, Sweden, Switzerland, the United Kingdom and the United States) and representatives from five developing regions. At a meeting in December last year, the group agreed on a programme of support for the five existing research centres.

The World Bank grant includes a donation of \$100,000 to a fund to set up an International Crops Research Institute for the semi-arid tropics which will probably be based in India, and when the group next meets in the autumn it will decide whether to set up a centre in Africa for the improvement of cattle production. The group is advised by a committee of twelve scientists under the chairmanship of Sir John Crawford, vice-chancellor of the Australian National University.