

what happens to the chemicals?

Research workers in many countries are to collaborate in using isotopic tracer and radioactivation techniques to study what happens to pesticides and other chemicals used in agriculture on their way from the field to the dinner-table.

They want to find out how residues of the chemicals may break down into other compounds when crops such as wheat and rice are harvested, stored, processed and cooked.

One of the tasks now being undertaken by a Division operated jointly by the Agency and the Food and Agriculture Organization (FAO) is to co-ordinate and integrate such research. Dr. F.P.W. Winteringham has come to the Agency in Vienna from the FAO in Rome, where he was a pesticide specialist in the Plant Production and Protection Division, to head the section engaged in the work.

Much information has been gathered already about the contamination of food, especially by persistent organo-chlorine pesticides, as a result of work which has been going on since 1961 under a joint FAO-World

Health Organization programme designed to determine in the interests of health and efficient agriculture what chemical residues in food are acceptable to man. The FAO works out the smallest amount of a particular pesticide residue which still permits its effective use, and the WHO determines the safe limits for that residue in food - establishing first what amount is tolerable in food eaten by, say, a rat then dividing that dosage by a safety factor of 100 to set an "Acceptable Daily Intake" for man.

This work depends upon quantitative information which can be gained only by studying the pesticides through all the stages of the eventual food product to which they have been applied — harvesting, weathering, cooking and so on to the final point of human ingestion. The breakdown or reaction products of the pesticide may be more or less toxic to man than in the original form; the toxicologist must therefore have a full picture of the chemical nature of the residue in order to establish safety limits.

The research which is now to be undertaken was foreshadowed by Dr. Winteringham himself in 1949, when he was working at the Pest Infestation Laboratory of the then Department of Scientific and Industrial Research in the United Kingdom (now under the British Agricultural Research Council). Dr. Winteringham broke what he believes to have been then virgin ground, preparing an analogue of the DDT molecule by the substitution of a radioactive isotope of bromine in place of two chlorine atoms, applying it to wheat in the field and tracing it from harvest through the milling and grinding processes. He had the resultant flour baked into bread which was fed to hens and rats. He also ate some himself and traced it through his own body. He was able to show that some of the "tagged" DDT-analogue survived in its original form, while some was excreted as a water soluble metabolite.

The use of certain pesticides is now banned by some authorities and is being examined by others. This follows public reaction to their widespread use, particularly of some persistent organo-chlorine pesticides, and their suspected effects on wildlife and on man. The co-ordinated "tracer" programme will investigate many pesticides, such as insecticides, fungicides and herbicides, and will be a vital aid to the protection of man and his environment.

Dr. Winteringham's section will also continue to watch contamination in the wider sense: by radioactive fallout from nuclear weapons testing, for example, though this is of decreased concern at present after the reduction of such testing in the atmosphere. He and his colleagues will also investigate pollution of the agricultural environment by substances over which there can be no real control without a radical change in the way of life of millions of people — such as motor vehicle exhausts.

Whatever results the research workers turn up, the Agency in conjunction with the FAO and WHO can only show an amber light. The recommendations they make will be passed, as they have been from the FAO-WHO programme, to governments who will have the eventual responsibility of deciding what action to take. Dr. Winteringham feels that on the whole through international collaboration now "there is a very elaborate and conscientiously applied machinery to protect the public. But this machinery depends on good scientific information, and this is where we are trying to help."