

hazards. In areas where insecticides are used, these chemicals protect our health as in mosquito and fly control, decrease discomfort and annoyance and increase the efficiency of agricultural production.

Seventy-five per cent of all insecticides are applied on two per cent of the total land area of the United States. This is primarily

AGRICULTURE

More Chemicals Needed

► **CHEMICALS** will be more in demand, more used and more necessary than ever as American agriculture progresses.

This is the prediction of veteran entomologist and research director, Dr. A. M. Boyce, dean of the College of Agriculture, University of California, Riverside.

"A million species of insects and mites have competed with man for his food and fiber since he first emerged as an intelligent being," Dr. Boyce said.

During the last two decades probably the biggest single development has been organophosphorus and organochlorine insecticides. Farmers have controlled insects and mites to a degree that 20 years ago would have seemed almost impossible. Without these compounds many crops could not be produced economically, he said.

Farmers will increasingly rely on chemicals not only for pest control but for a variety of new uses.

Insects, attacking our farms and forests, cause losses estimated at from \$10 billion to \$15 billion a year, but ultimately new chemicals will reduce a very large part of these losses, Dr. Boyce believes.

To meet these needs, the pesticide industry, now producing compounds with an annual value of \$300 million, will have to raise its output tenfold in the next 20 years, Dr. Boyce predicted.

In the last 20 years alone, pesticide output increased sevenfold. The 50 basic chemicals available 20 years ago have increased to 250.

What are the new prospects in pesticide chemicals?

"Industry's rapid progress in producing systemic insecticides has resulted in hundreds of compounds with systemic activity," said Dr. Boyce. "These are making possible the first practical control of plant virus infection carried by insects. Systemics applied to the rootbed at planting time or as a side dressing to mature plants kill the feeding insect before it can infect inner tissues with the virus."

Systemics also protect animals from pests such as lice, ticks, flies and grubs.

Grubs alone cause yearly damage of \$100 million in the United States. Among the compounds for controlling grubs, Co-Ral, Ruelene and Ronnel are the principal ones used. Healthier animals and better animal products are resulting from this application of the systemic principle.

"Analogous to the entomologist's use of systemics is their use by plant pathologists in controlling plant diseases by chemotherapy. One newly proposed form of protection is to model a chemical after naturally occurring substances that enable plants to resist

cotton, fruit and nut, and vegetable land and urban areas.

There are still many millions of acres today in which fish, birds and other wildlife may live without ever coming in contact with insecticides.

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disease. Other compounds might change the metabolism of the host plant to make it inhospitable to a disease," said Dr. Boyce.

Weed control will be another area with great development potential. "Chemical mowers" that desiccate controlled areas offer great promise. Many new herbicides are coming into use now, and more than 50 million acres of farmland are chemically treated for weed control each year.

Defoliation, rodenticide, growth regulation, synthetic nutrition, fungicide—these are the jobs that chemicals will increasingly perform in the future, in addition to today's chores as insecticides, acaricides, nematocides and herbicides.

For example, synthetic vitamins are used in many animal rations, synthetic fats are produced from petroleum and the sulfur-containing amino acid, methionine, is valuable in poultry nutrition.

"In the years to come expanding world population will make such a demand on natural foods that synthetic foods may become the largest of all the agri-chemical industries," Dr. Boyce states. "Certainly we need not fear this increasing dependence on chemicals."

The United States has more information on food additives and pesticide chemicals than any other country. Industry and Government have spent many millions of dollars and years of work accumulating the data needed to make sure chemicals are used safely.

"Chemicals have provided us with the world's safest, most nutritious and best food at reasonable prices. If we want to maintain our present standard of living we must continue and increase the use of chemicals in agriculture," Dr. Boyce concluded.

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GENERAL SCIENCE

Help to Farmers Instead Of Atom Study Urged

► **EDUCATE** farmers not nuclear scientists, the developing nations were advised by Sir William Kershaw Slater, of the United Nations Department of Scientific and Industrial Research, London, in a University of Chicago lecture.

Nuclear science has become a status symbol in some less advanced countries, whereas what they really need is men trained and willing to solve agricultural problems and go out into the fields to instruct farmers how to raise production, Sir William said.

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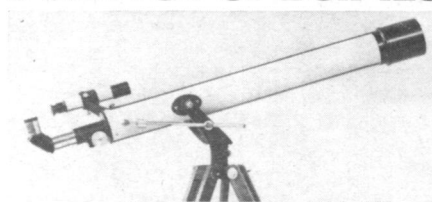
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