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Biological and Chemical Partners

WHETHER by plan or by chance, the first paper to be presented before the Pesticides Subdivision, Division of Agricultural and Food Chemistry, at next month's ACS meeting in Boston, is a scientific report on Thuricide, a new microbial insecticide. This new "living" insecticide, based on viable spores of the microorganism *Bacillus thuringiensis* Berliner, has recently been given a temporary exemption by FDA for large-scale field testing on food and forage crops.

While the new material is not a chemical in the usual sense, it would be hard to imagine an audience more vitally interested in learning about its physiological and toxicological properties than an organization of chemists and chemical engineers united by a common interest in the production of agricultural commodities and the processing of agricultural products into superior foods for a growing population. Most directly concerned of all among this group, of course, are those who already specialize in pesticide chemistry.

AG AND FOOD has followed with growing interest, during recent years, developments in biological as well as chemical control of agricultural pests. Through news items, interpretive reports, and feature articles, we have presented information on parasites and predators, viruses, bacteria, and other potential factors in biological control; this information has appeared right alongside the latest on "natural" and synthetic chemicals of useful pesticidal activity.

In our view, the two types of materials—biologicals and chemicals—need not be considered antagonists one against the other. In some markets they may be competitors, but in the over-all picture they must be regarded as partners. Both have the same object: the destruction or effective control of insect, disease, or weed pests that lower agricultural productivity and raise growers'—and ultimately food processors' and consumers'—costs. In the long run, it is likely that neither will entirely supplant the other, but that the two types will complement one another for maximum total good.

These opinions have led us in the past to suggest that manufacturers of chemical pesticides would do well to investigate biological pesticides as possible new products which they themselves might profitably manufacture. Many chemical producers, especially those already engaged in fermentation activities, already have the facilities, the technical personnel, and the experience to move fairly directly into this field.

From reports that have come to us in very recent months, we judge that many—perhaps most—of the present leading producers of pesticide chemicals are looking into the field of biological controls, and that some are pushing active research programs in this promising new area.

This is as it should be. We see no reason why pesticides producers should not broaden their lines to offer growers and processors the most effective and economical control possible—whether chemical, biological, or a combination of the two.

A number of entomologists have already concluded that "integrated" control—control based on optimum combinations of biological and chemical materials with improved cultural practices—offers the best hope of keeping ahead of, or at least up with, agricultural pests. If combination is the answer entomologically, why should it not be the answer from the commercial point of view as well?

AG AND FOOD will have more to report on biological insecticides in early future issues.