Bacteriology in Relation to Agriculture

By Prof. D. H. Jones, B.S.A.

WHILST agriculture is the oldest of the practical sciences and has been practised for thousands of years in all countries, bacteriology is the youngest of the sciences, having developed in its entirety during the last fifty years. One well might wonder if there is any close relationship between the two.

Bacteriology has to do with the study of bacteria which are the smallest forms of life known. High power microscopes and considerable special apparatus are necessary for the pursuit of the study. Consequently the science itself will always be a specialist's work. Notwithstanding this, however, the science touches all phases of life and is most vitally connected with agriculture.

PROF. D. H. JONES, B.S.A.

It has been found that the fertility of the soil, the infectious diseases of animals, some of the worst diseases of plants, many of the problems of the dairy, food preservation and danger from the water supply are all most intimately connected with the science of bacteriology as they all depend upon bacterial activities.

The action of the soil bacteria is one of the essential factors in the production of crops. If millions of certain species of bacteria were not present and active in every ounce of cultivated soil, the plant food there present in a crude form would not be available to the growing crops. That is, they could not make use of it even though it be right at their roots. This crude plant food has to be digested before the plants can assimilate it. This digestion is brought about by the activities of certain species of soil bacteria. They act in somewhat the same way that the digestive juices in the mouth, stomach and intestines of man and animals act on the food that is ingested. If the digestive juices are not present in the ailmentary canal, the food cannot be assimilated by the body. If the digestive groups of soil bacteria are not present in the soil and acting properly, then the plant food added to the soil in various ways cannot be used by the growing crops.

In addition to the varieties of digesting bacteria in the soil, there are other varieties present which have an entirely different function to perform. Instead of digesting or breaking down the complex organic substances in the soil, they combine the elements or simple compounds there found which are also unavailable to plants, into forms or conditions in which they are available. Among the most important of these are the nitrifying and nitrogen-fixing varieties of bacteria, the action of which in the soil is to produce nitrates out of atmospheric nitrogen, ammonia and nitrates.

The science of bacteriology has to do with the study of these various types of bacteria, how to encourage their development and beneficial activities, so that their essential work in the soil