

Studies on Green Manure Crops.

Introduction.

The task of the pioneers of a country was associated with land rather than with soil problems; they were primarily engaged, that is, in the search for such country as seemed richest and most fertile, that promised the greatest yields of foodstuffs, and the fertility of which was sufficient to maintain high production for many years.

This stage of land development has now passed. The fertile lands have been heavily cropped, with a natural loss of those elements which characterise fertility; and less fertile lands, less able to withstand exhaustive cropping methods, have been taken up, with the result, that the problem the farmer now has to face, is not with the land, but with the soil.

When a soil has been under cultivation for some time, particularly in grain farming, it will be noticed that it differs markedly in physical condition (especially in the case of a heavy soil) from what it was in its virgin state. It runs together more easily with rain, remains wet or puddled more near the surface, bakes or cracks more readily in drying, and dries harder and more quickly on exposure to wind and hot sun, reducing the period of timely and optimum cultivation or ploughing, and so making it more difficult to get into ^{good} tilth. This is largely due to loss in organic matter or humus in the soil from continued cultivation; this loss takes place much more rapidly in warm, moist districts.

The bad physical condition of the soil is accentuated in heavy soils by the tendency of the clay to go into a very fine colloidal form instead of remaining flocculated. The colloidal form

of clay is so fine that it passes through the finest porcelain filter, which will arrest clay in the ordinary or flocculated condition. It is easy to understand how an increasing content of colloidal clay, which can find its way into the smallest spaces between the soil particles, and the diminishing supply of organic matter or humus will tend to make a soil set more and more firmly. This cementing condition of the soil is observed by many farmers to their cost after working heavy land; green manuring here is an obvious need.