

enhanced by the addition of about half its weight of superphosphate. This should be mixed with the manure as it is collected from the roosts from time to time. This prevents the volatilization of any ammonia which would otherwise be liberated continuously from the manure. To improve the mechanical state of the final product it is advisable to intimately mix it with about one-third its weight of sawdust or peat. Such a mixture when sold as a garden manure should command a good price, and give good results where used with discrimination by vegetable-growers. For field-crops and fruit it should be used with extreme moderation, as, owing to the high availability of the nitrogen, it may unduly stimulate growth and produce a rank, weak plant which will be subject to attacks of disease organisms."

HUMUS.

Humus is an absolute necessity. Where even a moderate supply of stable or farmyard manure is available its judicious use will be sufficient for the purpose. Considerable quantities of waste vegetable matter in gardens can also be used. This, however, will not be sufficient, and, failing stable or farmyard manure, green crops must be grown for turning in. Nor are fertilizers alone sufficient; soil may be well supplied with these, yet in the absence of humus may be comparatively sterile.

SOIL-REQUIREMENTS.

It is a comparatively easy matter to state the chief requirements of various plants: it is a quite different thing to say what should be applied to any particular soil to obtain the desired result. Soils vary so greatly that it is impossible to lay down a rule that will apply to all alike. Nor does analysis of the soil help much, for this has been found to be very misleading. There are forces at work in the soil which analysis does not reveal, and, though it shows what is in the soil, analysis does not in all cases indicate whether or not the various elements are in a form available to the roots of plants. Scientists throughout the world now agree that soil-analysis by itself is of comparatively little use; experimental work must be done in each case before the best results can be secured. A knowledge of the chief requirements of plants and the effect of the various fertilizers is useful and important, because it teaches the direction in which we should move, what to avoid, and what to use. Within these limits the cultivator must judge by results as to what additions or omissions are required.

AMOUNTS OF FERTILIZERS TO USE.

Assuming that fertilizers are being used without organic manure a maximum and minimum may be stated with fair certainty as follows, the quantities being per acre: Superphosphate, maximum about 10 cwt., minimum 3 cwt.; bonedust (not all available the first year), maximum 12 cwt., minimum 4 cwt.; blood-and-bone, maximum 12 cwt., minimum 4 cwt.; sulphate or muriate of potash, maximum 2 cwt., minimum 1 cwt.; nitrate of soda (to be applied only to growing plants and in one or more applications according to judgment), 1½ cwt. to 2 cwt.; sulphate of ammonia, 3 cwt. (equal to 1 oz. per square yard). This latter form of nitrogen is suitable for use for crops that are stated to require a minimum amount of nitrogen.