4. As the vegetable matter (humus) furnished by farmyard manure decays in the soil, substances are formed which have considerable influence upon the insoluble compounds of plant food contained by the soil, tending to make them soluble and fit for plant food. Humus makes clayey soils more open in texture, thus admitting air more freely; and air also has an influence in making insoluble plant food available besides being, in itself, absolutely essential to the growth of plant roots.

5. It is believed by some very good authorities that farmyard manure also adds to the soil certain organisms (bacteria) which exert a very beneficial influence in making plant food available.

III. SOLID AND LIQUID EXCREMENTS.

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Farmyard manure is composed of the solid and liquid excrements of animals, and usually contains in addition some anbstance which has been used for bedding, such as straw, sawdust, etc. When food enters an animal's stomach, a portion of it is digested and its constituents used to form bone, muscle, blood, fat, milk, horn, wool, hair, or other part or product of the animal body. In addition, a part of the digested portion of the food is used to renew those tissues of the animal body which are constantly wearing out, for the wearing out process is very rapid and necessitates a regular supply of food to furnish building material for new structures in place of the old. Therefore, in the animal body there are two classes of waste material which must be got rid of, namely, the undigested portion of the food, and the waste or refuse material from the worn out structures. The undigested food is excreted in the form of solid excrement, though the solid excrement also contains other waste products in addition. The waste matter from worn out structures is excreted in various ways, but most of those substances which are of value to the farmer are removed in the liquid excrement or urine.

Composition of liquid and solid excrements. Any figures relating to the composition of animal excrements can be only approximate, because so many influences affect the composition of excrements that it is impossible to give exact percentages. Since the solid excrement contains the undigested portion of the food, it follows that it will contain all the undigested nitrogen, phosphoric acid, potash, and other constituents of the food. The liquid excrement, on the other hand, contains a large part of the worn out material of the animal body; and the main fertilizing constituents which it contains are nitrogen and potash with occasionally a little phosphoric acid. Now, the animal body is built up from the digested portion of the animal's food ; and, since the nitrogen and potash in the liquid excrement once formed a part of the animal body, it follows that the nitrogen and potash in the liquid excrement originally came from the digested portion of the food. Thus, the solid excrement contains (along with some other substances) the undigested portion of the food, while the liquid excrement con-tains part of the digested portion of the food. From these facts it will be seen that the more indigestible the food, the greater will be the proportion of its constituents which appear in the sc lid excrement; and the more digestible the food the greater will be the proportion of its constituents which appear in the liquid excrement. There is, therefore, no definite or fixed relation between the composition of the liquid and solid excrements of any class of animals; but while that is the case, the study of the results of a large number of analyses will be helpful i Beal, an



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