

plication of dung to the fallows whilst the fermentation is in its earliest stage. In the fermentation of dung, we have important chemical changes taking place amongst the elements which enter into its composition. The great object in fermenting manure is to bring waste matter from the animal body and certain products of vegetable life into such a condition that they can again be useful for the support of vegetation.—This fermentation of the dung may be carried out in two ways: the one will materially diminish its fertilizing powers; but by the other plan the change may be controlled so that the manurial properties may, in a great measure, be preserved, although some slight loss is inevitable. I have estimated, from the analysis given by Dr. Voelcker as the results of an examination of farm-yard manure in its fresh and also in its well-rotted condition, that the ingredients in very superior manure, calculated at their market value, are worth 1s. per ton more when the dung is in a fresh condition, than when it has become thoroughly decayed. This loss is experienced when the manure has been carefully fermented for experimental purposes; but when the decomposition takes place under careless management, when, for instance, the drainage from the manure is not carefully preserved—the waste is far greater, so as materially to affect the finances of the farm. In the application of dung in the early stage of the fermentation, we have this change taking place in the soil under circumstances which ensure us against loss; for we know enough of the power of these retentive soils to be assured that what is entrusted to their custody will be safely retained for promoting vegetable growth.

The best evidence as to the store of fertilizing matter obtained from the soil by tillage, is the fact that some are disposed to rely exclusively on this for their successive crops. Without entering into the merits of this mode of culture, or attempting to define either the limits of fertility thus obtainable, or the economical advantages or disadvantages attendant on such a system we at once recognize the great value of this supply, and the importance of applying all ordinary means for its development. In the use of farm-yard dung, we may materially assist in this decomposition of the soil; for, when the manure is added in a fresh and unfermented state, whilst its decay is taking place in the land it promotes the decomposition of the materials in the soil, and thus renders them available for vegetable growth. In this manner we not only add a certain quantity of manure to the land, but, by applying it so that its decay shall take place in the soil, we gain from the inert and inactive portion of the soil a further contribution of fertilizing matter. This influence would be considerably reduced—I might almost say lost—if the same manure were employed in a well-rotted condition, because it will have passed through its fermentation, in which stage it exerts this influence. This is, therefore, an additional reason for checking

the decomposition of the manure until it has been applied to the fallow land. If there is a sufficient supply of dung free for the fallow and the land is tolerably clean, there can be no objection to its application before the winter ploughing; but neither of these conditions is usual, and hence land intended for fallowing seldom receives any dung before winter. The reasons given above favor the application of the dung as early as the land is ready for it.

When lime and dung are both to be used upon a fallow, care must be taken not to apply them at the same time; otherwise, from their combination on the surface, ammonia will be set free and lost in the atmosphere. But, with due precaution, the two may be employed in the same season, and not only without loss, but with great advantage. The dung may generally be applied in a fresh state, before the second spring ploughing, after which the lime may be spread on the surface, and worked into the soil. The combination of these fertilizers under the surface of the land will, after the tillage, increase the benefit derived from each separately. As the sun has great power at the season of the year when farm-yard manure is commonly spread on the fallow, the labour of the field should be so adjusted that the plough may follow the cart closely enough to bury the dung before it has lost its moisture.

**Fallow Crops.**—The action of manure on these crops is very similar to that on fallows, so that the further consideration of its application resolves itself into a notice of special requirements of each crop.

**Mangel Wurzel** is one of the most valuable roots cultivated upon stiff land. Three modes of applying farm-yard manure are in use:—

1st. That of ridging the land, spreading the dung between the drills, and splitting the ridges in the autumn.

2nd. That of ridging the land in autumn, but delaying the application of manure till spring.

3rd. That of laying on the manure in the autumn, and either covering it by a deep ploughing, or by working it into the soil by the steam-power cultivators.

It may be urged, on behalf of the first method, that as an early sowing of the seed is important, and the difficulties of spring tillage on a retentive soil in a wet season are considerable, nothing should be postponed until the spring except the actual sowing of the seed. On behalf of the second method, we may remark that the many demands on the stock of manure in the autumn, and the convenience of doing the carting to distant fields during the winter frosts, will frequently render its adoption desirable. The advocates of deep cultivation who are fortunate enough to have a grateful subsoil will generally adopt the third method, with perhaps as much eye to the permanent improvement of the soil as the immediate benefit of the root crop. This method has the further advantage of effecting a more equ-