and the present theory is, that they act upon the soil by improving its texture, or by rendering soluble the parts of it which are insoluble, or by otherwise fitting it to promote the growth of plants; and, that they act immediately on plant itself, by being received into its substance. The process of this action, however, is not fully understood; nevertheless it is well ascertained that certain earths, oxides, and alkalies, combined with acids, pass into the substance of the plant, absorbed it may be, in part, from the atmosphere, but chiefly along with the aqueous portion of the sap from the earth in which the roots are fixed.

Of all mineral substances known to us, lime is that which performs the most important part in improving the soil and promoting the growth of vegetables. It is found in nearly all soils that are capable of sustaining vegetation, and in combination with different acids in nearly all vegetable substances. Lime, in its natural state, is called limestone, and by chemists, the carbonate of lime. As limestone, it is too hard and compact to be diffused in the soil, and even quicklime would be too solid, were it not that through its combination with water and carbonic acid from the atmosphere, it splits and crumbles to powder.

Lime exists in several different states; first, as a carbonate; second, as the hydrate of lime; third as the sulphate of lime, which is the same as the plaster of Paris, or gypsum, and fourth as mail, which is limestone reduced to a powder and mixed with earthy matter. The best earthy materials for mixing with lime, are those which contain a certain proportion of decomposing organic matter; such as the scouring of ditches, the sediments of pools, mud deposited by rivers and tides, and similar substances.

If quicklime were applied immediately to plants, it would be to them like poison, it would burn them up; but when spread on the earth, it rapidly attracts water and carbonic acid from the atmosphere, and it is only when thus modified that it promotes vegetation.

To obtain the greatest benefit from lime, it must be kept as near the surface as possible. The reason is this; its weight and minuteness give it a tendency to sink, and after a few years of cultivation a large portion of it will be found to have gone beyond the depth of its most efficient action. Hence it is advisable to spread it on the ground. after ploughing; then harrow it well in, and allow it to remain in grass as long as good crops can be had. When the lime is settled down below the reach of a common plough, the subsoil plow will prolong its effect by enabling the atmosphere and the roots of plants to penetrate the subsoil likewise.

The quantity of lime applied to soils is various, and is dependent upon the nature of soils, the climate and other circumstances. In warm countries, a smaller quantity need be used than in those which are cold and humid. The stiff clays, for the most part, require a larger proportion of it than the lighter soils, and in case of such soils as contain much undecomposed vegetable matter, as peat, a quantity should be applied sufficient to decompose effectually the inert matter.

On common soils, the first dressing is ordinarily in the neighborhood of an hundred bushels per acre, and then in four or five years, half as much more. On some heavy clays abounding in vegetable mould, there have been applied six hundred bushels to to the acre, with decided beneficial results to the land; yet it is not impossible nor improbable that half that quantity would have answered as well. Lime, as other manures, must be repeated, and the reason may be stated as follows; first, because the crops eat up and carry off a portion of the lime; second, because of its sinking into the subsoil, and thirdly, because the rains are always washing a portion of it out of the land, and carrying it away to brooks and rivers, where it becomes mixed with the mud and decaying vegetables.

Every plant that has been analyzed, with one exception, contains a portion of lime in some form or other, which it must have derived from the soil in which it grew. Wheat in flower, when ripe, the straw, the bran, all yield lime when analyzed; so likewise do barley, oats, vetches and the leaves, the bark and the timber of various trees. Indeed this substance is so universally present in all portions of the vegetable structure, that it may fairly be assumed to be an integral part of all, varying, however, according to the quantity existing in the soil in which plants are cultivated.

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[We thank Mr. Manley for his practical contribution. It has that high value that ever belongs to articles that deal with facts instead of theories. We will ever welcome the labors of his pen to our columns, and feel assured that our subscribers will do likewise.—Ed.]

For the Farmer's Advocate

The Adulteration of Farm Seeds.

The adulteration of Farm Seeds has long been a subject less of suspicion than of actual undisputed fact. Farmers have complained and some have even prosecuted the seedsman from whom they have bought the adulterated article. Scientific men have been employed to ascertain the proportion of the mixture of bad with the good, and have found it to amount to from twenty-five to fifty per cent. Mr. Buckman in his work on science and practice, has exposed the practice of adulteration with a vengeance, and shows that dead rapeseed is a regularly manufactured or rather manipulated article, sold for the express purpose of mixing without detection with turnip seed. Good unmixed seed ought to vegetate with a proportion of 90 as a minimum, and 95 to 100 as the maximum. Mr. Buckman found in ten samples of turnip seed procured from dealers, the range of inefficient seeds was from 48 to 20 per cent., and that the average of the ten samples 68 per cent. came up, and 32 failed. On the other hand, of ten samples of fresh unmixed seeds, the proportions were 92 per cent. grew, and 8 per cent. failed. These two specimens which were selected from several, will give our readers an idea of the difference between good and bad seed.

Hithertoo the seedsmen have maintained a discreet silence on the subject of adulteration, and have left it to conjecture; but within the last season a letter has appeared from a firm, in which they charge the practice of adulteration on the whole body of seedsmen, excluding of course, themselves, and treating the matter as a well known fact that cannot be controverted. This bold assertion has raised the wrath of a good many houses, and they declare that during the time they have been in the trade they have never mixed a sample of seed, or even had any rape or other seeds for that purpose in their warehouses, and that having commenced business on that principle they will never deviate from it.

There is no doubt that in some seasons even unmixed turnip seed will contain a large proportion of abortive seeds, and the same may be said of old seed that has not been carefully kept. But the silence of the trade is decisive on the subject of adulteration, and admits of little doubt or cavil. Indeed Professor Buckman's work contains a circular from a party, offering 000 (i e nought) seed *killed* by an improved method without chemicals, which by their unpleasant smell would lead to detection, and he likewise professes to sell the machinery for the purpose, with which a man can kill ten or twelve quarters of seed per day. This naive production is properly published at full length, but the name is unfortunately omitted.

We cannot abquit farmers themselves of all blame in the matter. They *will purchase cheap seeds*, and will not take the trouble to ascertain whether they are good or bad, or whether the party that vends them is a responsible and reliable person. Seeds can be easily tested by sowing fifty in a flower pot and notice how many vegetate. The fact is, they often sow double the number of seeds that can or are intended to stand, and although the mixing of dead seed may be so carelessly done as to occasion blank places in the field, it is ascribed to other causes than the real one, an undue proportion 000 lighting on these spots. We may add that all seeds of the Brassica tribe are liable to the same species of adulteration, by the 000 seed. Professor Buckman endeavored to procure a sample of this precious article, but the friend who was in the trade did not use it himself and could not obtain it then from any of the others; they were chary respecting it, and although perfectly well known and understood in the trade, they do not care to have it known beyond. There are secrets in all trades, and this system of adulteration was once a secret, but is so no longer. A person in the seed trade applied to a house for the price of turnip seed; they told him it would be according to the proportion of 000 he wished to have in it, which ranged from 20 to 50 per cent. As he wished for *genuine seed*, he justly concluded that after such an avowal he could not trust the trader.

Clover and other seeds of that kind, are adulterated by mixing old with new, and there