largely manufactured and sold for such purpose. Liebig holds that it acts by giving the plants the power of condensing and absorbing the nitrogen by means of its surface exposed to the air

Phosphates.

These are present in considerable quantity in all our most nutritious plants. This substance forms the chief part of what is sold as bone manure, and is the ingredient which gives to that manure its value, for it is not, as was formerly held, dependent on the amount of nitrogenized matter for its fertilizing effect. A soil which is destitute of this material is totally unfit for producing grain, peas or beans.

Common Salt

can hardly be said to constitute a vegetable food, but still it is of service in assisting the decomposition of vegetable and animal fibre, and would therefore assist in the assimilation of green crops when turned under It is possible perhaps that its property of attracting moisture from the air may also be of value

Vegetable Manure.

Under this head we include perhaps the most valuable means of enriching light soil. All green succulent plants contain saccharine and mucilaginous matter, with woody fibre, and readily ferment They should therefore, if intended for manure, be used as soon as possible after death. Hence the grand principle of turning in green crops They must not, however, be ploughed under too deep, lest fermentation be prevented by compression and exclusion of air. As was mentioned above, such crops should be turned under when in flower, or at the commencement of flowering, for it is then that they contain the largest quantity of easily soluble matter.

What crop is most suitable for the purpose mentioned above? It has been found that clover possesses the valuable property of withstanding a dry soil, and in consequence will succeed where cereals would fail. It also reaches perfection at a height which permits it to be turned in, and in consequence possesses a great advantage. As to the proper variety, the common red succeeds perhaps as well as any; for we must look chiefly to the amount of material likely to be produced. The roots of clover also possess a peculiar advantage in the manner in which they bind the soil together, thus increasing its firmness and affording a basis for successive crops of more exhaustive character By giving the soil a fibrous consistency it increases its retentive powers with respect to moisture. The reader has only to visit the neighborhood of Paris and Brantford to see what a fertile district has been made out of what was formerly, in a great many places, an expanse of soil so light as to be shifted by rain storms and carried into hollows and ditches. We have frequently seen hills of corn left bare in such cases, where now an artificial soil has been formed which supports fine fields of wheat, peas and oats. This has been accomplished by means of the above agencies, but more especially by the latter practice of turning in timothy and clover.

Lastly, we must not omit to mention a most important

Mechanical Means

of improving sandy soil. This consists in the use of the roller. Without this implement no farmer can successfully till a light farm. Compactness is one of the qualities which is deficient in such a farm, and in consequence the moisture escapes too rapidly from the soil, and the seed is not sufficiently protected by the firm envelopment of earth necessary to its successful germination. The use of the roller supplies this quality, and moreover gives to the ground a greater capability to resist the wearing action of violent rains

By putting these principles into practice, the farmer may expect to make a farm, otherwise worthless, fertile and profitable; but he must not forget that as he every year takes away a large portion of materials from his land in the shape of different crops, so must he yearly pay the land back its due interest, namely, the manure, or otherwise in a short time it will yield neither principal nor interest; and he will find it reduced to the condition of the farms in the Southern States, where the great object has been to get everything possible out of the land with the least possible outlay, and the consequence has been, in one word, *poverty*. C M SMITH, M. P.

Owen Sound, Aug. 19, 1873.

Concentrated Manures for Wheat.

Farmers in the older settled States are becoming convinced of the necessity of sowing with wheat in the fall, some fine, quick-acting fertilizer, in order to give it such a start that it will become deeply rooted to endure the freezings and thawings of winter and spring. Our winters are becoming harder, or, at least more unfavorable for fall-sown grain, either because there is less snow, or the winds, in consequence of the destruction of forests, blow it off the fields, leaving them exposed to the action of the weather. In order to preserve the wheat under such circumstances it should be well rooted and have a good growth of top.

It is impossible for ordinary farmers to make enough barn-yard manure to cover their cultivated fields, or even their wheat crop should they make that a leading crop, and if they could, it will not, in dry seasons, yield up its fertilizing properties soon enough to be available for the autumn growth of wheat. It then becomes a question of the highest interest, is there any economical substance for barn-yard manure procurable, that will answer the desired end? We believe that it is generally admitted, both by chemists and practical men, that those manures which are the richest in available *nitrogen* are the most promptly, and the most powerfully. There are various kinds of special manures offered to the farmer which are more or less valuable if honestly made.

Peruvian Guano.—A pure article of this fertilizer is undoubtedly valuable to sow with wheat to give it a rapid start, and as it is rich both in ammonia (a compound of nitrogen and hydrogen) and phosphate of lime, it furnishes two important ingredients of wheat. But the amount of genuine Peruvian guano that finds its way to Western New York is small and expensive. We are not certain, if the pure article could be obtained for four to five cents a pound, that it would not pay to drill in with wheat, some 200 pounds to the acre.

Bone-Dust, when genuine, is generally made thus: —The animals dying in a city are collected, the skulls of slaughtered animals are obtained from slaughter-houses, and the bones from which the meat has been cut for Bologna sausages are gathered, and boiled a long time until the flesh will readily cleave from the bones. The mass is then sorted over, and the harder bones picked out for manufacturing into buttons, knife-handles, &c. The next softer class are burned in tight vessels to make boneblack, or animal charcoal to be used in sugar refining. The small, broken pieces, and softer bones, together with the flesh, hair, &c. (substances rich in nitrogen) are dried and ground, forming the bone-dust of commerce. The nitrogenous portions of the bone-dust are rapidly digested by the soil, and assimilated by the growing plant, while the phosphate of lime is much more slowly appropriated. Where this bone-dust is ground sufficiently fine to pass the drill and is *honestly* made, we believe it is an excellent fertilizer to sow with wheat.

Super-phosphate of Lime is sold in two forms; the raw bone, and the burnt bone. The raw bone is bone-dust treated to sulphuric acid, which unites with a portion of the lime of the bones, hastening their decomposition, and leaving an excess of phosphoric acid available to the nutrition of plants. Burnt bone, superphosphate is made of the refuse bone-black, or bone charcoal of sugar refineries, digested in sulphuric acid. This is destitute of nitrogen (that gas having been driven off in burning the bones), and is in consequence much less valuable than the raw bone There are many manufactories of these fertilizers through the country of more or less reliability That extensive frauds are perpetrated in adulterating the pure superphosphate there is no doubt. The fact has led farmers to distrust all commercial fertilizers, and prevented that general use of them, which would greatly increase the profits of farming were they what they ought to be.—*Rural Home*.

The Philosophy of Vegetation.

The following is the substance of an essay read by Dr, A. A. Pratt, of Washington University:

"Each seed, bud or young plant is an individual living being. As it passes through its periods of youth, maturity and reproduction, it must be fed and nourished, to sustain its development. Some of the essential conditions of perfect development are beyond our control, such as the composition of the air and life, the history and physiology of the plants which are subject to the fixed and immutable laws of the Creator. Others can be modified and controlled by us; such as the porosity, wetness, dryness or composition of the soil; also the seed and the season and manner of cultivation and harvesting. It is to these latter only that the agriculturist can, with advantage, devote his attention.

All plants receive their nourishment or food through two channels, First—Through their leaves, from the atmosphere. Second—Through their roots, from the soil in which they grow. In general terms the leaves absorb all the carbon (in the form of carbonic acid gas) that is found in the plant, also part of the ammonia, but very little, if any, water. On the other hand, the roots absorb all other elements, of which are lime, magnesia, potash, soda, chlorine, sulphur (sulphuric acid,) phosphorus (phosphoric acid,) silicic acid, (sand,) oxide of iron, alumina, nitric acid ammonia, and a few others in very minute quantities. It is evident, from the conditions of the case, that we cannot modify or improve on nature, by attempting to feed the plant through its leaves. For this nature has abundantly provided. But the channel or medium of the roots is entirely under our control. From 9-10 to 99-000 of the bulk and weight of plants come originally from the carbonic acid of the air, and from the water of the soil, Both these go off as gases when the plant is burned. The ash or mineral matter left came only from the soil. The ash of wheat (grain) is only two per cent. of the original perfectly dry."

Of wheat straw	5 per cent.
Of clover hay	6 per cent.
Of rice	½ of 1 per cent.
Of corn (grain)	1½ per cent.

And still this very small proportion of mineral matter is absolutely essential to the growth of the plant You may sprout grain floating on the surface of pure water, in a glass, or in a bed of pure sand, but it cannot thrive or grow. But, if you add to the water (or sand) all the elements of the ash as given above, it will rapidly revive, flourish, and arrive at maturity in the usual season. If a single important element, however, is omitted, such as magnesia, potash, sulphuric or phosphoric acid, the plant is unable, to mature and reproduce itself. This has been proved.

In general terms, then, any application made to the soil, with a view of increasing the yield of the crop, may be considered a fertilizer.—*N. Y. Times.*

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