AGRICULTURAL.

[From the New England Farmer.]

FALL PLOUGHING.

It is commonly best for cultivators to plough most of their land, which they propose to plant the next season, in autumn. The advantages of fall ploughing are, 1st. It saves time and labor in the following spring, when farmers are generally pressed by the indispensable avocations of the season, and their cattle are comparatively faint. 2d. Land which is ploughed in autumn will be more exposed to the action of the frost, than that which is suffered to remain unploughed, and frost will pulverize soil more effectually than it can be accomplished by artificial means. 3d. *Ploughing lands late in* the fall, is of service by exposing insects and their eggs and larvæ to be destroyed by frost. If, however, the land is light and sandy, it is best not to plough it till spring, as it will become less porous and more retentive of moisture if permitted to remain without being stirred previous to the setting in of winter.

Much has been said on the depth of ploughing. We believe, however, that no general rules, not liable to very many exceptions, can be given on this subject. The depth of ploughing should be regulated by the staple of the soil, the nature of the intended crop, &c. If the soil is thin, it will be expedient to commence its culture with shoal ploughing. If the plough turns up too much at a time of the barren soil immediately beneath the upper stratum, the succeeding crop will be of little value. The owner of such soil should endeavor to render it deeper by degrees, according to the manure he may be able to apply to it. A shallow soil is not only deficient in consequence of its furnishing but little pasture for the roots of plants, but it is liable to be so much scorched as to be incapable of producing and vegetation.

Land should generally be broken up from the sward with a deeper furrow than will be required in subsequent culture. Harrowing and shallow ploughing will then answer through a course of crops. If the soil is light and porous, the furrow should be turned over as flat as possible. If it be a stiff loam, or mixed with clay, it may be well to lap the furrow slices a little one upon the other, so as to permit the air and frost to pervade the hollows or interstices between the under and the furrow slices.

Although there are sundry advantages in fall ploughing, still, *in some cases it is best to wait* till spring. An excellent practical and scientific farmer, in Lexington, Ms., gives the following directions on this subject:

"If it be intended to sow or plant sward land in the spring, the ploughing should be at as short an interval before putting in the seed, as possible. The greater the growth of the roots and tops of grasses at the time of ploughing, the more perfect will be the fermentation, and the sward, by its increased toughness, will be less broken by the plough and harrow. The roller, loaded as heavily as may be conveniently drawn by one yoke of oxen, should follow the plough as soon as may be convenient; this will smooth any unevenness of surface. Set the furrow slices close together, and thereby prevent their being torn up by the harrow, and also prevent the escape of the gases that are thrown out by fermentation. Every farmer who has three acres of ground to till, should have a roller. One made in two parts is much preferable to that made in the usual way. After rolling, harrow with a light harrow—the more the better provided the sod be not disturbed. The compost should then be spread on, and the ground again harrowed, when it will be ready to receive the seed, either potatoes, or grain with or without grass seed.

SCIENTIFIC GARDENING.

GARDEN CHEMISTRY—CONTINUED.

Potass.—When wood or any garden plant is burned to ashes, these are found to consist of a considerable portion of the substance termed potash, which was discovered by Sir H. Davy to consist of a metal termed potassium combined with oxygen and water. Different sorts of plants, however vary very much in the quantity of potass which they contain; aspen and boxwood, for instance, containing only sixty or eighty pounds in every thousand pounds weight, while sun-flowers, fumitory, and wormwood contain from three hundred and fifty to seven hundred and fifty pounds in every thousand. Sea weeds and plants growing close by the sea shore, instead of potass yield soda, when they are burnt to ashes.

It may be taken as a general rule, that herbs yield four or five times, and shrubs two or three times, as much impure potass as trees; while the leaves produce more than the branches and the branches more than the trunk; and plants, when green and fresh, yield more than when they have been previously dried.

The process by which this is ascertained is not difficult and consists in weighing the plant before burning; in passing the washings through blotting paper; and in evaporating them to dryness. The dry substance then obtained will be tolerably pure potass.

The potass is introduced into the system of a plant in the same way as carbon, by being first combined with humic acid, forming humate of potass, and then dissolved, in water.

Lime.—Like potass, lime has been proved to be composed of a metallic substance termed calcium, united with oxygen.

When thus composed, without the addition of other substances, it is usually called quicklime; when united with carbonic acid it forms chalk, limestone, marl, and marble; and when united with sulphuric acid, it forms gypsum, or plaster of Paris.

In the process of burning vegetables, lime is found in their ashes, but never, I believe, in such quantities as potass, and consequently it is of less use to supply soils with it artificially on this account, but on account of its uniting with humic acid in form of a humate, and of the compound thus formed being readily dissolved in water, it becomes highly useful.

If quicklime, either fresh burnt or slacked, be mixed with moist vegetable substances, however hard and fibrous, it soon destroys their texture and forms a mixture, the greater part of which can be dissolved in water, thus rendering what was previously useless, fit for the food of plants.

On the other hand, it is injurious to mix quick lime with vegetable substances already soluble in water, or with any sort of dung, or other animal manure, lest it should take up too much humic acid.

Lime, however, is more seldom used in gardens than in farms, and this is so far judicious, that garden soil would often, as appears from what has just been said, be thereby injured rather than benefited.

Sugar and Gluten.—There are few plants that do not contain sugar, which chemists have shown to be composed of about three parts carbon, four parts oxygen, and eight parts of hydrogen.

It would follow, therefore, that it is not necessary for it to be introduced into the soil in the state of sugar, the constituents being always more or less contained in the water, and most probably combined into sugar after entering the system of a plant. This applies also to starch, which is composed on the same principles, and may indeed be converted into sugar, as was lately discovered: and gluten differs only in containing nitrogen, in addition to the carbon, oxygen, and hydrogen.

In a word, all substances of this kind, which *can be discovered in the soil, or in the water* diffused throughout it, may be resolved into water, carbon, and nitrogen; and hence it is of less consequence for our present purpose to notice separately every compound that might be enumerated.

Recapitulation, and Proof from the Sap.—It hence appears that the chief food of plants is carbonic acid gas, atmospheric air, and the humates of potass and lime mixed with water, and presented to the spongelets or suckers at the the tips of the root fibres, to be thence carried into the interior of the plants. The examination of the sap, as it rises from the root into the *inner bark of a tree, confirms the truth of these* statements.

This sap is usually found to be a clear fluid, of a pleasant taste, readily fermenting, and, in that case, giving out, at first carbonic acid gas, *and afterwards some azote. The chief portion* of sap is water, and it only differs from the moisture of the soil by acquiring in its passage upwards a portion of thicker fluid, which probably acts a part similar to the saliva of animals, mixed with the food in chewing, or to the digestive fluid in the animal stomach. By means of this, the sap becomes thicker the higher it rises. M. Biot, of the French Institute, is at present, (1833,) engaged in experiments which bid fair to elucidate this important subject. His tests of the substances contained in the sap are made by the polarisation of light.

Besides tangible substances, there are other *important principles, which, if they do not serve* as food, are as useful, by way of stimulants, as salt is to us, and, as chemical agents for digesting the food of plants, are quite indispensable; I refer to Light and Heat, to which Electricity may be subjoined.

Light.—It is common with gardeners to expose their tender frame plants gradually to the open air, by taking off the lights from day to *day, for the purpose,* it is said, of rendering them hardy. Few of those, it is probable, who do so, are aware of the principal agent which renders the plant more hardy, and which, if I mistake not, is cold or fresh air. This, there *can be no doubt, assists in the process, and* is indispensable to its perfection; but there can be as little doubt, that light is the main agent, as a few facts and a little reflection will prove.

The process of blanching sallads depends chiefly on *depriving the plant of light, by earthing* up a portion of the stem, as practised with celery; by tying up the tops of the leaves, as is done with lettuce; or by covering them with inverted pots, as is done with sea kale. In all these cases, the plants are crisp, watery, and tender, compared with others not thus treated but similar in all other circumstances, which are stringy and tough in their fibres, less juicy, and therefore hardy. No exposure to cold or fresh air would produce this toughness and hardiness if the plants were kept in the dark; and no absence of cold and fresh air would produce blanching, if a strong light were admitted.

Complete blanching is only produced by complete exclusion of the light; but its partial exclusion causes plants to be pale and sickly, and as in the shade of thick woods or plants in a stove or green house accidentally placed so *as to be shaded by others.* In all such cases, plants are popularly said to be *drawn*, that is, they endeavour to push their branches as much as possible into the light, and being from deficiency thereof proportionably feeble, they *increase in length without at the same* time acquiring strength. A potatoe in a dark cellar will in this way send out shoots of some yards in length, but not much thicker than a writing quill. It is on this account that the glass