

ing the lime and earth was suggested from spreading the refuse of lime and sand gathered from about buildings, and laid upon the fields, the effect of which I observed, was more immediate than any equal quantity of clean lime, although the mixture of lime and earth was equally so: the succeeding rains carrying the fertilizing principle of the lime, as from a sieve, into the soil below, completely dividing it, and rendering that which was before too compact and cold for the roots of the grass and grain to live in, both warm and open: when immediately the whole soil, which before felt hard under the foot, became so elastic that persons of observation, by walking over the field even in the night, distinctly told how far the lime and earth compost extended: the color of the soil was likewise changed into that of chocolate: now these effects seemed to prove that any thing which would separate the particles of the soil and admit the air, would render these cold and heavy clays warm and fertile, the free intercourse of air carrying off the acid, &c.; and to meet this idea, ploughing in the fall was adopted and found successful. As an experiment, one half a field, six years ago, was ploughed in the Autumn, the other half in the Spring; but that part which was ploughed in the Spring has never yet brought grain or grass equal to the other. Spreading manure in the Autumn from the compost heap, has also been attended with universal success, both upon grain and grass; the salts of the manure being carried into the soil by the rains upon the breaking up frost, which had in some measure prepared the soil to receive it. Vegetable substances have also been covered with earth, and when well rotted, the compost has been used with the same success as stable manure; and so long as they operate in separating the soil and promoting the access of the air, they fertilize and change the color of the mould.

W. YOUNG.

CULTIVATION AND MANAGEMENT OF FLAX.

WEEDING.—Weed the flax as soon as it is a few inches high, and can readily be distinguished from the weeds. One great cause of the superiority of the foreign flax arises from the pains taken to weed it; the crop is sure to pay for all the expense incurred. This is done abroad by women and children, who, with coarse cloth round their knees, creep along on all fours. This injures the young plant less than walking over it. They work, also facing the wind; so that the plants, laid flat by their pressure on them, may be blown up again, or assisted to regain the upright position. This fact proves what minute attention is paid to every circumstance which can possibly affect the crop. The tender plant, pressed one way soon recovers; but, when twisted or flattened in different directions, that seldom occurs.

PULLING AND RIPPING.—To judge of the time of pulling, the best criterion is, when about two-thirds of the stalk is observed to turn yellow, and lose its leaves; but the fibre is in the best state before the seed is quite ripe: and, if the quality of the fibre alone be the object of the farmer, the flax should be pulled without waiting for the seed to fully ripen. The seed, however, is valuable for the oil it contains, or for feeding, and forms an important object in the value of the crop, as it will produce from 4l. to 7l. per Irish acre. These advantages are to be balanced and determined by the grower himself, and some judgment is required to ascertain the *exact time* when the greatest value from the crop may be secured; for there is great variety of opinion on this point. In Belgium, the early pulling is reckoned to yield the finer flax; while, in Holland, it is thought that, though it may appear finer, it is weaker, and greatly deficient in weight, when returned from the scutchers and the hacklers. When any of the crop is lying, it should be pulled as soon as possible, and kept by itself: the long, middling; and short, being tied up separately. This is particularly attended to on the Continent,

and must be a great means of enhancing the value to the spinner, and, consequently, to the grower, who will be amply paid for the extra trouble. When the flax is pulled, it is laid on the ground, in handfuls, heaped in small parcels, each handful crossing its fellow, and left to dry for a day or two. It is then tied up in sheaves or bundles (each of which would about fill the two hands); carried off the field, for ripping, or rippled on the spot, and then taken away to the steeping pools. The Courtrai system of stoking the flax, as soon as pulled (without being bound) is well adapted to this country. The handfuls are set upright each resting against the other, the root ends spread out, and tops joining like the letter A, forming stooks of about 8 feet long, and a short strap keeping the ends firm. In this way, it will resist rain, "wind" well, and dry fast. In eight or ten days it may be bound up in small bundles, and carried to ripple and steep; or it may be stacked in the field, or put into a barn; the seed to be taken off at leisure in winter; the flax to be steeped the following May. This is a system strongly to be recommended for this country, where the convenience of parties will admit. For steeping and grassing the best season of the year is thus ensured—a time of comparative leisure, when the time is not called off to the harvesting of other important crops. The flax is said also greatly to improve by keeping over even for two or four years.—*Belfast Mercantile Register.*

DR. MURRAY'S LECTURE ON CHEMISTRY.

The fact of plants which are growing in the dark giving off carbon and absorbing oxygen, gives rise to a particular process called blanching, which is used in order to render the plant tender; this is done by accumulating the oxygen in the plant; when the plant is brought into the broad light of day, the usual change taken place. Besides these there are occasionally other elastic fluids evolved from plants; these are ascertained to be chlorine, ammonia, and nitrogen gas; these are evolved by the plants, when the soil in which the plants grow contain much of the substances that have those elements in them. The leaf of the plant is an expansion of the bark; it consists of two layers of vessels, covered by a thin membrane on both sides, which are filled with an immense number of pores, and from these the exhalations proceed; those on the under side of the leaf are the absorbents; this may not be the case in all instances, but it is generally found to be so. The inner bark conveys the substances absorbed by the leaf to the root of the plant; and by means of the inner bark, the stem is enlarged by deposition of annual layers; in the bark of the root further changes take place, there being then an absence of light; these changes are observable from the fact that substances are frequently found in the root that are not to be found in the bark of the leaf or the stem—a number of medicinal substances for instance. Having considered the structure of plants Dr. Murray proceeded to notice the course of the sap, the vital or circulating fluid. If the trunk of a plant be cut off from the roots, and these plunged into a coloured solution, the coloured liquid will ascend and tinge the surface of the plant, and it will continue to ascend till it colours the leaf, the bark remaining untinged; it then begins to return down the stem and colours that portion of the stem down which it passes. It may be asked how does the water ascend in the stem? Various causes have been assigned for it, such as capillary attraction, that is, the attraction which minute vessels are supposed to have for fluids, in drawing them above their level; this action is shown by small tubes; if we take a portion of coloured solution, and place in it tubes of various sizes, the water rises in the tubes in proportion to their width; when we apply this to the vessels of plants, which are so very minute, it is possible that the sap may rise by capillary attraction; but it is known that if the top be cut off a plant when full of sap, the sap will continue to flow from the top in large quantities, sometimes for days together; these facts are irreconcilable with the theory of capillary attraction; to obviate this difficulty it was supposed that the stem underwent an alternate contraction and expansion, but this explanation is by no means satisfactory. Another has been given, called *endosmosis* and *exosmosis*: if we take a wide tube, cover the end of it with a piece of bladder, introduce