

crop on a place perfectly barren before and after the application of lime."

Lime is of great value to pasture land. So great an affinity has it for acids that it will greatly sweeten the herb. Indeed, if lime be spread upon a tuft of grass that has been refused by cattle, it will be found that they will soon detect the greater sweetness, and will eat it close down. When used for this purpose it must be laked, for quick lime would be apt to burn the grass if used in any but very small quantities.

In the "General Report of Scotland" it is remarked that, "In the best cultivated counties, lime is now generally laid on finely pulverized land, while under a fallow or immediately after being sown with turnips. In the latter case the lime is uniformly mild—in the former quick lime, as pernicious (in a certain extent) to vegetation, may be beneficial in destroying weeds, and some experiments have been recorded, showing it to have a very powerful effect upon the fly. Sometimes mild lime is applied in the spring to land, and harrowed in with grass seeds, instead of being covered with a plough; and under this management a minute quantity has produced a striking and permanent improvement in some of the hill pastures of the south-eastern counties. Its effects are yet perceptible, after the lapse of nearly half a century. In some places lime is spread on grass land a year or more before it is brought under the plough, by which the pasture in the first instance, and the cultivated crops subsequently, are found to be greatly benefited. But in whatever manner this powerful stimulant is applied, the soil should never be afterwards exhausted by a succession of grain-bearing crops—a justly exploded practice which has reduced some naturally fertile tracts to a state of almost irredeemable sterility."

It is impossible to lay down any established rule for the regulation of the quantity of lime to be applied to land, for this must greatly vary according as the land is naturally calcareous or not, and also in proportion to the strength of the lime. It may suffice to say that in Great Britain the application, as made by her most eminent agriculturists, varies from thirty bushels to one hundred bushels per acre of slaked lime. Indeed, on some soils, as much as 400 bushels have been used per acre with great advantage.

Lime may be, and often is, used as a top-dressing on wheat, and the results of this proceeding have been various. I consider, however, that the lime will have a better effect, if applied to the land before it is shallow-ploughed the last time, or sown broadcast, and harrowed in with the wheat.

In conclusion, D. G. F. Macdonald says in his excellent "Hints on Farming—

"Lime, it would appear, may be always used with good effect under the following circumstances: 1. Directly upon mossy land, upon laked fallows, and in the spring,

when preparing for turnips. 2. In composts in which the whole of the soluble salts of lime will have a tendency to be converted into gypsum by the action of the air; and consequently the benefits which result from a large application of the same, will be obtained by laying such composts upon the land. 3. It may be safely mixed at once with barnyard or other animal manures, though not in too large quantities. It may also prove a valuable admixture with guano, on which its action would ultimately be to fix, rather than expel, the ammonia. 4. Strewn sparingly over the young turnip plants, it is stated that it prevents the attack of the turnip-fly; and harrowed in when the ground is naked, if the quantity be considerable, slugs and wire-worms disappear from its effects."

Many Canadian agriculturists have experimented with lime. Some have given us results in the CANADA FARMER. Let us have more experiences, and thus ventilate the subject, and give us the bounds within which we may steer, in order that we may improve the fertility of our lands, without exhausting our soil or ruining our crops.

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### Draining Wet Lands

It is to be hoped that our farmers will be brought more and more each year to see for themselves that the proper drainage of their lands, wherever there is a field that retains water on its surface for any length of time, is one of the surest means of adding to the prosperity of the farmer.

We sometimes see a large meadow or field marred by a slash of wet soil through it, caused either by springs in that particular portion, or by the running down upon it and retention of water from springs higher up. This can often be easily remedied by making a good drain through this portion that will lead off the water to some lower level without the necessity of first percolating through and permeating with superabundant moisture, a large portion of the soil near the surface. Draining in this case ought to be resorted to, not so much for the sake of the land affected, as for the convenience of working the entire field, at all times when required, and so improving the entire farm.

There are sometimes to be found portions of land in the farm that are of good strong soil, but flat and cold, even when high up, retaining wet long after other portions of the field are ready for the seed. If such portions could be readily drained they would often prove as productive portions as any others in the field.

There are three modes of draining which may be employed, according to circumstances; namely, subsoiling, furrow draining, and ditch or underdraining.

When a soil is underlaid by a compact impenetrable subsoil, all rainfall and melting

snows will be retained near the surface until in process of time it can become evaporated. This compact subsoil acts like a water-tight floor. By subsoil ploughing we can work through and break up this undercrust, thus giving free egress downwards to the moisture that was previously retained near the surface, to the injury of the land and the plants growing on it. It will also help to prevent the injurious effects of drought in summer, as the breaking up of the hardpan enables the roots of the plants to draw up moisture from below, even when the surface is quite dry.

There is, however, a limit to the amount of usefulness of subsoiling. It has been ascertained in England that when a soil contains forty-three per cent. or more of alumina (clay) subsoil ploughing becomes useless, because, with so large a proportion of clay in the soil, it soon runs together again, and becomes as impervious as ever. In such a case, in the absence of underdraining, furrow draining must be resorted to. This is done by throwing the soil into high narrow ridges, ploughing back furrows, leaving the land so that surface water may readily run off into the furrows on either side before it can be absorbed into the soil. By leading these furrows into a ditch or underdrain, much of the surface water can be carried off the land, and the soil rendered much more workable and more amenable to the influence of the sun and the atmosphere.

Underdraining is, without doubt, the most certain and profitable method of improving all soils that are at all compact; but as few can afford the expense at the present high price of tiles and sufficiently skilled labour to accomplish the work satisfactorily, it is well to use other expedients, even if temporary, rather than continue to neglect the land.

### Manure—Night Soil.

"The neglect of enlightened systems of agriculture precedes the decline and fall of empires. If the substances extracted from the land are not returned to it in the form of manure, the consequences must ultimately be disastrous to those guilty of such neglect. The sewers of ancient Rome have been highly spoken of, but at the same time it must be remembered that the *cloaca maxima* engulphed for centuries matters that would have greatly conduced to the prosperity of the Roman peasant, could he have obtained them. The Tiber became silted up, and when the exhausted fields of Italy failed to produce sufficient quantities of corn for the enormous population of Rome, and of other cities, recourse was had to Sardinia, Sicily and Africa, which also in the course of time became impoverished. The inundations of the Nile keep up the fertility of Egypt. The inhabitants of China and