

LIMESTONE,

AND OF THE BURNING AND USE OF LIME.

What does limestone consist of?—Limestone consists of lime (*quick-lime*) in combination with carbonic acid.

What name is given to limestone by chemists?—It is called by chemists *carbonate of lime*.

Are there not many varieties of limestone?—Yes. Some soft, such as chalk,—some hard, such as our common limestones,—some of a yellow colour, like the magnesia limestones, which contain magnesia,—some pure white, like the statuary marble,—some black, like the Derbyshire black marble, and so on.

What is marl?—Marl is the same thing as limestone, namely, carbonate of lime, only it is often in the state of a fine powder, and often also mixed with earthy matter.

What is shell sand?—Shell sand or broken sea-shells is also the same thing almost exactly as common limestone.

Can these marls and shell sands be applied with advantage to the land?—Yes. Either as a top-dressing to grass lands, and especially to sour, coarse, and mossy grass,—or they may be ploughed or harrowed in upon arable fields,—and especially they may be applied with advantage and in large quantity to peaty soils.

Can they not be used also in making composts?—Yes. When mixed with earth and vegetable matter, or with animal matter, such as fish refuse, whale blubber, &c.; and even with farm-yard dung they will often produce very good effects.

How would you ascertain the presence of lime in a soil or in a substance supposed to be marl?—By putting a little of it in a glass and pouring upon it either vinegar or weak spirit of salt (muriatic acid.) If any bubbling up (effervescence) appeared, I should say that lime was present.

To what would this bubbling up be owing?—It would be owing to the escape of carbonic acid from the carbonate of lime which the soil or marl contained.

What takes place when limestone (carbonate of lime) is burned in the kiln?—The carbonic acid is driven off from the limestone by the heat, and the lime alone remains.

What is the lime called in this state?—It is called burnt lime, quick-lime, caustic lime, hot lime, lime shells, &c.

What weight of quick-lime or lime-shells is obtained from a ton of limestone?—A ton of limestone yields about 11½ cwts. of quick-lime.

What takes place when water is poured upon quick-lime?—The quick-lime drinks in the water, becomes very hot, swells up, and gradually falls to powder.

What is this pouring of water upon lime, so as to make it fall, usually called?—It is usually called slacking the lime, and the lime is called slaked or slacked lime.

Does the quick-lime increase in weight when

slaked?—Yes. One ton of pure quick-lime becomes 25 cwts. of slaked lime.

Does quick-lime fall to powder of itself when left exposed to the air?—Yes. It absorbs water from the air, and gradually falls to powder.

Does quick-lime drink in (absorb) anything else from the air?—Yes. It gradually drinks in carbonic acid from the air, and returns at length to the state of carbonate.

When it has thus returned to the state of carbonate, is it better for the land than before it was burned?—Yes. It is in the state of a far finer powder than could be got by any other means, and can thus be more thoroughly mixed with the soil.

What is it usually called when it has thus returned to the state of a carbonate?—It is usually called mild lime, to distinguish it from the quick or caustic lime.

Does quick-lime act in a different way upon the land from mild lime?—It acts very much in the same way, but more quickly.

How do they both act?—They act by supplying the lime which all plants require as part of their food,—by combining with acids in the soil, so as to remove the sourness of the land,—and by converting the vegetable matter into the food of plants.

Would you bury lime deep, or would you keep it near the surface?—I would always keep it near the surface, as it has a natural tendency to sink.

To what land would you apply quick-lime rather than mild lime?—I would apply quick-lime to peaty soils, to heavy clay soils, to arable lands which are very sour, and to such as contain a great deal of vegetable matter.

In what state is slaked lime found to produce the best permanent effect on hill pasture?—It is said to produce a better and more lasting effect, when it has become wet—or *dabby*, as it is called—by exposure to the air and rain, than when put on in a dry and newly slaked state.

Will the same quantity of lime produce as great an effect upon wet as upon dry or drained land?—No. The same quantity will produce a greater effect upon drained or naturally dry land, than upon wet land.

What quantity of quick-lime is usually added to arable land in this country?—It is usually added at the rate of 8 or 10 bushels a-year to an imperial acre.

Is it added every year?—No. It is added every *rotation*, or every second rotation, or sometimes only once in the nineteen years.

Would you rather apply the lime in large doses at long intervals, or in small doses at shorter intervals?—If I applied a large dose of lime at the beginning of my lease, I would apply smaller doses at the end of each *rotation*, or at the end of every second rotation, to keep up the quantity of lime in the land.

Why does lime require to be repeated?—Chiefly for three reasons; *first*, because the crops