3. The quantity of lime adequate to the first purpose, that of giving, per se, food to the plant—is very small. I have repeatedly examined soils with as little as one-tenth of one per cent. of lime, capable of producing ten barrels of Indian corn (maize) to the acre.

The minerals most generally present, which require the presence of quick lime for their degradation, and for their solubility, are mica, (isinglass,) felspar and hornblende—they are those which are present in all granite soils. The red sub-soil clays, so abundant in many parts of our state, are formed from those rocks, and to them, when unproductive, quick or water slaked lime will always be beneficial.

The agency of lime in decomposing vegetable matter, is also, not an unimportant function, Some limestones contain small quantities of sulphate of lime, (gypsum,) and phosphate of lime, (bone-earth,) and also potash. The value of a limesone is materially increased to a soil not containing felspar, mica or hornblendes, when it contains mica as one of its constituents, as these soils are most generally deficient in potash, which these minerals supply.

Lime existing in shells and limestones, naturally, in the form of carbonate, is deprived of its carbonic acid, by being burnt in kilns. When exposed to the atmosphere it again receives its carbonic acid, and thus becomes *air-slaked*, and crumbles into fine powder.—When water is added to quick lime it generates a large quantity of heat, unites to a definite quantity of water, and becomes *water-slaked*, still retaining, however, some of its caustic properties. These are entirely destroyed when it is air slaked.

The limestones of our state vary very much in their constituents, even when of the same formation, and lying very close to each other.

There will be seen from what has been said above, that many limestones are Dolomites—that is, composed of a large quantity of magnesia.

Magnesia, like lime, is the oxyd or rust of a metal, called magnesium, which never exists in its pure state. Magnesia exists as carbonate---that is, as air-slaked magnesia, in rocks, and when exposed to a sufficient degree of heat, in kilns, loses its carbonic acid, and then becomes quick, caustic, or what it is most usually called, *calcined* magnesia. This, on exposure to the air, absorbs carbonic acid from it, and becomes again *mild*, or carbonate of magnesia: it however does this very slowly, and remains caustic a much longer time than lime. It also unites to water, in definite proportions, but not with the same intensity of action as lime, and gives out but little heat, in consequence of the slowness with which the union is formed between it and water.

In Dolomites, or magnesian limestones, the proportions of lime and magnesia are very variable, as "isomorphous substances crys-