

being present, and yet not so productive as where magnesia exists. But the evidence does not stop here, the ashes of the grain of wheat contain from 12.98 to 16.26 per cent of magnesia, according to the analyses of Bichon, Thou, Boussingault, Wills, and Fresenius, the inorganic part of the grain of barley contains of magnesia 10.5 per cent.

But why multiply proofs? The above are sufficient to show, that it is one of the necessary constituents of plants and of fertile soils, and if it does not exist in a soil, common sense tells us that it must be supplied, or that the soil cannot reach its maximum of productiveness. The application of caustic magnesia to a soil, may prove injurious from its caustic properties, since it does not readily imbibe carbonic acid from the atmosphere, and become *mild*, as lime does. From this quality, we should place it in as dense an atmosphere of carbonic acid as possible, by applying it to the surface, and turning it under with some green crops, or by mixing it in compost heaps, before applying it, or by letting it remain on the surface for as long a time as possible, before the land is cropped. On the Black Gum Swamp soils, and on those on the Beaver Dam in Queen Anne's, no injury need be feared from its use immediately before a crop.

On the soils not containing a large quantity of vegetable matter, from twenty to forty bushels of magnesia lime to the acre, is the best quantity. This quantity should be applied every three or four years, until about two hundred bushels shall have been used. The larger the per centage of magnesia in the lime, the smaller the quantity to be used.

POTASH

Is the oxide or rust of a metal called Potassium. This substance is supplied to soils from ashes, the unleached containing very much the larger quantity, from stable manure, from scrapings of the woods, and more especially from the green sand or Jersey marl. The quantity in ashes, as they are usually sold for manure, is very variable. I have found it to vary from five tenths of one per cent, to four and one half per cent. The quantity of Potash necessary to constitute a fertile soil, as I have elsewhere stated, is very small for reasons given elsewhere, I have not been able to give any very definite information in regard to it. It will be in my power, in my next annual report, to speak more particularly of this substance, as well as soda. With regard to both of these substances, I may here state, that upon land where the wheat crop is liable to rust, ashes, particularly the unleached, or common salt, which contains soda, will usually prevent its occurrence. Of common salt, from one to three bushels per acre, sown on the wheat is sufficient, and the proper time for doing this is the early part of April.

Chlorine exists in salt, and can only be economically supplied by applying salt.

The next class of manures are those which especially supply phosphoric acid or phosphates of soils.