

contributed to our fund of actual wisdom and how slightly it has promoted agricultural science, its present condition will best answer. There was ever hidden one of the main causes on which the influence of lime depended, viz: the precise composition and character of the soil. The necessity of this was fully conceded by the attempts given to show its composition in general terms. The adaptation of lime to stiff clays and light clays, to clayey loams and loamy clays, to sandy loams and loamy sands, to stiff and light sands, are all so many attempts to give the nature of the soil; all so many concessions to the principle that its exact character should be known, since if a slight knowledge of it be of any utility, a more extended and special acquaintance with it will be of proportionably greater benefit. It will be remembered that I defined manures to be those substances absent or deficient in the soil which afforded nutriment to plants, either by their own material or which by their action on the soil would cause its dormant materials to assume a form capable of being used by plants. Lime performs both of these functions. It enters largely into the composition of all plants used by men and animals; it breaks down and disintegrates the particles of soil and causes them to assume a form capable of being used by plants; and furthermore, by its action on organic matter, it destroys its combinations and gives its material to plants. It will thus be seen that it has a wide range of operations. Some limestone contains also the elements of bones, with a little gypsum, in their composition, whilst others have a very large proportion of another necessary substance to plants, which is magnesia. The phosphate and sulphate of lime, though existing in some limestones, yet generally are in such small quantities as not to affect their agricultural value—limestone being valuable in proportion to the quantity of lime or magnesia which it contains. As this is a standard article of manure, and very extensively used, I here insert what I stated in my last report to your honorable body, with the addition of other analyses made since that time, it being my intention to make analyses of all the limestones which may be sold and used in this State for agricultural purposes:

Lime, as used in agriculture, is obtained either from limestones, oyster shells, Indian shell banks, or marl. In all of these different substances it exists naturally in the state of carbonate. Limestone is subjected in kilns properly prepared, to a degree of heat sufficient to expel their carbonic acid, and becomes quick lime, (oxide of calcium,) On exposure to the atmosphere, it absorbs from it carbonic acid, and returns into the same chemical condition as it existed in the limestone. On the addition of water to quick lime, heat is evolved, and not a mere mixture, but a chemical union takes place between the water and the lime, and a hydrate of lime is formed, or in common language, it becomes *water-*