GAS LIME.

Gas lime is a waste or by-product in the purification of illuminating gas and may frequently be obtained from the city gas works for the cartage. It is quite variable in composition but may be considered for practical purposes as a mixture of slaked lime, carbonate of lime, several sulphides of lime and certain tarry matter. The sulphur compounds present in the fresh gas lime, though imparting an insecticidal value, are distinctly injurious to growing vegetation, and hence the immediate incorporation with the soil of this material as freshly drawn from the works, is not to be advised, excepting in cases where it is used specially for the destruction of certain noxious insects. Exposure to the air, as in small heaps in the field, will, however, in the course of two or three months convert these harmful sulphur compounds into harmless sulphate of lime—a valuable form treated of in this bulletin under the heading of gypsum. The fully exposed material, now essentially carbonate and sulphate of lime, may be spread and harrowed or lightly ploughed under. Thus used it will be found a useful amendment for neutralizing soil acidity and indeed for all the purposes for which ground limestone and land plaster are employed. It has more particularly been used effectively on stiff clays and mucks; on these the application may be say five tons per acre, but on ordinary loams that are not exceedingly acid, the dressing may be in the neighbourhood of two tons per acre.

THE AGRICULTURAL FUNCTIONS OF LIME AND ITS COMPOUNDS.

The chief and outstanding objects of applying lime or carbonate of lime are two: The correction or neutralization of acidity or sourness and the improvement of tilth or mechanical condition of soils. Incidentally, they serve other useful purposes, as will be pointed out in the course of this discussion.

ACIDITY OR SOURNESS.

Acidity or sourness in a soil is a property or quality distinctly detrimental to the thrift of most farm crops; lime and carbonate of lime combine with and neutralize the soil's acids and the excess used renders the soil slightly alkaline, a condition favourable to crop growth. In this way lime and other alkaline lime compounds may restore and enhance fertility.

Wet, low-lying and ill drained soils are especially apt to become sour. Soils consisting essentially of vegetable organic matter, as mucks and peat loams, are usually, though not invariably, sour. Again, strange as it may seem, many light, upland soils are slightly acid, presumably by reason of the washing out and leaching away of their original store of carbonate of lime or its withdrawal by many years of cropping.

In all soils, but more especially in sandy and gravelly loams, there is a tendency for the lime compounds to disappear, partly through removal by crops but more particularly by their solution and passage into strata below the zone occupied by the growing roots. Carbonate of lime is fairly soluble in water containing carbon dioxide — and soil moisture is usually saturated with that gas — and thus the soil's lime is constantly washed downwards and may largely be carried off by the drainage water. This fact explains the presence of carbonate of lime in the waters of our rivers, lakes and wells, and it is in this way that thousands of tons of this valuable constituent of our soils annually find their way to the sea. Once the available lime has disappeared, the tendency will be for the soil to become sour. Some soils, by reason of their origin, are well supplied with carbonate of lime for years of cultivation. Such are almost invariably strong, productive soils and stock fed on their crops are thrifty with plenty of "bone." But there are other soils—especially many clays, silts and mucks—that are poor in lime from the outset and these, under cultivation, become poorer and poorer in this constituent.