do than to supply the requisite amount of silicious materials, phosphoric acid, &c., in order to effect this object. Probably, however, up to the present time these ingredients cannot be obtained sufficiently cheap to carry out this system; but if agriculturists were upon the watch for these compounds, there is little doubt that eventually a cheap supply of them may be rendered available, and the same land be cropped with grain crops every year in succession, without impoverishing the soil. Phosphoric acid can be supplied by bone-dust; but this is too expensive for common use. It is, however, fortunate for agriculturists that fossil supplies of this phosphate of lime occur in immense quantities in various parts, embedded in the soil to the depth of several inches, and occasionally to the depth of one or two feet. This "coprolite," as it is termed, (or excrement of animals that have long ceased to exist) contains from 80 to 90 per cent. of pure phosphate of lime. Now comes the question of supplying silicious materials to the soil—a matter which is engaging the attention both of agriculturists and of chemists at the present time. If we supply the requisite quantity of manure to a given space of land to crop it yearly with wheat, after two or three years the straw fails in strength, and the least wind beats it down, the straw not being sufficiently strong to bear the ears upon it. How are we to get rid of this difficulty? Simply by the application of these silicious materials, which are not requisite for the formation of nutritive matter, but are required to give strength to the stalk by which to elevate the grain to the atmosphere that it may ripen. It is important that we should be able to supply these silicious materials in the cheapest form. Bunson has discovered that in volcanic regions there are extensive layers of lava, known under the name of pelagonite, which contains silica in large quantities, and in such a state that it readily becomes soluble by the action of the atmosphere, and capable of being conveyed to the plants by rain water. All our soils contain a sufficiency of silicious matter, but being in an insoluble form it can only be reduced to a soluble condition by the action of air and moisture through a long series of years. This pelagonite yields silica in a comparatively short space of time, and might be imported for that purpose.

There is also another plan I would propose for adoption in places where it could be carried out to advantage—that is, the heating of silicious substances with quick lime. The chemist knows that when silicious substances are to be brought into solution, they must be heated with alkalies or alkaline earth. Now this is precisely the operation we have to apply to the silicious materials which constitute 40 to 50, and in some cases 60 to 80 per cent. of our soils, to bring them into solution, and into a condition in which they are capable of being assimilated by plants. If we take these silicious materials—namely, gravel on the coasts, and flints in the south of England—and mix them in alternate layers with coal and chalk or limestone, and ignite the whole mixture, we convert the chalk into quick lime, and heat the flints to redness. If we then turn upon the mass a stream of cold water, so as to cool it very rapidly, we slake the lime, convert it into hydrate of lime, and reduce the flints or silicious stones into an almost impalpable powder; at any rate we disintegrate them to a very great extent, and bring a large surface of them into contact with the lime; and the consequence is, we obtain a large quantity of silicate of lime, which furnishes silica in a soluble form to the plants upon the soil to which it is applied. A few months ago, one of my students tried this experiment on a small scale in my laboratory with successful results. There can be no doubt that where corn or other grain crops are liable to heavy rains or rough winds, the application of such manures would be of the very greatest advantage. There are many other points which we might mention illustrative of the advantages which agriculture may derive from the application of chemistry; but as the time is already so far advanced, and as I am sure that many of the agriculturists before me will have questions to ask in reference to the application of manures to particular soils, or on other matters, I will content myself with the few observations I have already made, and conclude by assuring you that I shall be very glad, so far as I am able, to answer any inquiries that may be put to me on these subjects, or on other subjects relating to the application of chemistry to agriculture.

Consumption of Bread.—Estimating that there are 24 millions of bread-consumers in Great Britain and Ireland, (leaving out the four millions of potatoe-eaters,) and allowing each person one and a half loaves per week, it is 36 millions of loaves. Admitting that each quarter of wheat makes 136 loaves of bread it requires 168,656 quarters of wheat per week. To this add 10 per cent for flour used in other articles, and it gives 291,521 qrs. as the weekly consumption of wheat, or 15,367,092 qrs annually. London and suburbs, with its two millions of a population, consume three million loaves weekly, and with flour, require 24,626 qrs. of wheat. A quarter of wheat will give 50lbs of flour per bushel, of the quality which makes best seconds bread, 400lbs altogether; and that quantity of flour will make 134 quartern loaves. A quartern of wheat, ground into flour, and taking out only the rough bran, say about 5lbs to the bush., will yield 58lbs. per bushel of such flour, and that will make 141 loaves the quarter. A quartern of wheat ground down into rough meal without taking any bran, will give 62 or 63lbs of meal, and that will make about 166 loaves of healthy good brown bread.