

ble the dormant constituents of the soil, and furnishing plants with Carbon from which to build up their tissues. Sulphur and Phosphorus and their compounds were then studied in detail,—the first is an element whose chief relation to agriculture is of the injurious kind, inasmuch as the decay of sulphides in our slate and clay soils produces soluble iron sulphate which poisons the land, often rendering marshes and recently broken up lands barren, especially where the plough has gone too deep into the pan below. Phosphorus on the other hand is the light bearer that has led the way in our modern scientific farming, inasmuch as Phosphate is one of the most valuable materials that can be applied to the soil, being required by the plant, and from the plant transferred in food to the animal in which it goes to form bone, whilst the other inorganic materials taken by the plant from the soil are mostly returned by the animal to the soil again. The constitution of phosphates, the circumstances upon which solubility depends, &c., were entered upon in detail.

The Lectures up to this point formed, as it were, a preliminary course on the principles of Chemistry.

The application of Science to Agriculture was then commenced by a minute description of the soil, with respect to its constituents, mode of formation, and changes to which it is subject. Soils consist essentially of two kinds of material, *sand* and *clay*, the one being the oxide of Silicon, the other a Silicate of Alumina, variously modified by the presence of other bases. Soils are classified into sandy soils, those in which sand predominates, loamy soils, in which there is both sand and clay, clayey soils which consists mostly of clay, and all the intermediate gradations. In some soils Calcium Carbonate (limestone) exists in large quantity, in others vegetable matter predominates, but such are exceptional. The methods of analysing soils, so as to determine their exact character was described and shown, and after the lecture the students commenced work in the laboratory, each having brought a sample of soil for analysis. This preliminary examination extended to the determination of the percentage of clay, sand, organic matter and water present,—these determinations being made by weighing out say 100 grains of soil, drying at 212° in water bath, the loss of weight showing the amount of water; incinerating, by which the organic matter is determined; washing the soil in water thoroughly, the loss by this process indicating the exact amount of clay or typical soil, and the remainder showing the percentage of sand,—stones and gravel that do not pass through a sieve with meshes $\frac{1}{2}$ of an inch, being classified as foreign matter

that does not constitute a part of the soil proper, inasmuch as it takes no part in the chemical changes which the soil undergoes in the processes of cultivation and manuring.

So far the soil is a mere vehicle to enable us to feed the plant. Sand and alumina are not the food which it requires. Accordingly the chemical constitution of the plant was now examined, and the various elements which enter into its composition, pointed out. Those that are derived from the soil are mostly represented in the ash of the plant. The ash then shows what a crop removes from the soil,—the amount of potash, phosphate, soda, lime, and other ingredients, the larger the crop the more is taken out, and these ingredients are taken out by different kinds of crops in very different proportions. The straw of grains requires, for example, a very large supply of Silica, not in the dormant state as sand, but in the active condition as soluble silicate, whilst turnips require an immense quantity of phosphates and alkalis. The suitability of a soil for a certain crop depends upon the amount of soluble materials which it contains. These are necessary in the required proportion for each kind of crop. In the cropping of land nineteen-twentieths of the Potash or Soda withdrawn from the soil are taken by the green crops, by which they are returned to the soil again if these crops are fed on the farm. In selling such crops the farmer is selling the fertility of his soil. Ten tons of potatoes or twenty tons of turnips contain nearly ten times as much potash and soda as fifty bushels of wheat. In potatoes, however, these alkalis may be replaced to some extent by lime.

This subject was followed by a consideration of the conditions necessary for Fertility and of the application of Natural and Artificial Manures.

To the Editor of the Journal of Agriculture.

Onslow, Feb. 5th, 1879.

DEAR SIR,—In view of the Agricultural Exhibition to be held in Halifax in the autumn of this year, I would beg leave to make a few suggestions, which I trust you will not think altogether out of place.

First.—That in judging stock a scale of points should be adopted, particularly in regard to cows, as it is impossible after a cow giving milk for six months to be as high in flesh as one that has dropped her calf, but a few days previous to being exhibited, and I do think that in the past Judges have not given this the consideration they should.

That Judges on Short Horns should not be allowed to pass judgment upon Ayrshires, and *vice versa*.

Seeing that there are now so many herds in competition, would it not be well to divide the money proportionately into three herd prizes, that is to say, first, second and third prizes for herds of each breed.

That a competent person be authorized to wait upon the Judges, and examine cattle as to their ages, as I have frequently observed three year old heifers entered as two year old, and winning first prize in the class of two year old.

Yours,
J. M.

ELLENHOUSE, Feb. 9th, 1878.

DEAR SIR,—The following important questions are put in a December number of the *Country Gentleman*, and answered on the eighth page of the present volume of the same paper, by Dr. Horne, V. S. : 1st. Is it judicious to have a carefully fed and well-grown heifer calve at the age of 21 months, and is her calf as likely to become as valuable at maturity as those born from older parents? 2nd. Do Guernsey Cows, being a third larger than Jerseys, generally give a third more milk and butter of equal excellence? The first question has been decided beyond a peradventure. "I have raised calves from much younger mothers, which have developed into fine large animals." Dr. Horne goes on to say, "I never knew before that Guernseys are a third larger than either of the other Channel Island breeds. The rule is, in all grades of cows, that the short-legged, small, well developed cow gives the most and richest milk."

EDWARD BLANCHARD.

A NEW Society is being organized at Beech Meadows, in Queen's County, where every man in the settlement is a farmer in a way. The community consists of from 150 to 175 families; there are between 300 and 400 cows alone, besides a considerable number of other horned cattle, and about the same number of sheep. Farming operations are conducted in a primitive manner, and there is much room for improvement. A well managed Society, with such a field of usefulness before it, is likely to prove a great benefit to the district. Mr. Charles M. Frith is in correspondence with C. E. Brown, Esq., and the Secretary of the Board, on the subject of the formation of the new Society.

THE Hon. W. Ross, Collector of Customs at Halifax, sends us the following telegram :

OTTAWA, Feb. 3rd, 1879.

To the Collector of Customs, Halifax :

Importation of cattle from United States prohibited, from first instant.

(Signed) J. JOHNSON,
Commissioner of Customs.