support the expenses of governments; but, in our humble judgment, to carry out honestly the principle of free-trade with perfect justice towards all interests in the British Empire, will be a more difficult matter to accomplish than most persons are aware of. A complicated system has grown with our growth, and strengthened with our strength, that it will be difficult to abrogate altogether, without producing much confusion. There is one fact certain, that Canadian agriculturists, if unable to sell their products at remunerating prices for the English market, will have to encourage customers for a home market, by manufacturing what they may require, instead of importing them.

LECTURE ON THE CHEMICAL COMPOSITION AND NATURE OF MANURES.

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On Monday, 27th April, a general meeting of the Members of the Tring Agricultural Association was held at the Harcourt Arms, adjoining the Tring Station, for the purpose of auditing the accounts for the past year, and arranging the premiums to be offered for competition at the ensuing annual meeting.

After this business the members sat down to an excellent dinner. J. A. Gordon, Esq., the president of the Society, took the chair on the occasion.

In the evening Mr. J. C. Nesbit delivered a highly interesting lecture to the Society, "On the Chemical Composition and nature of manures." The cloth having been drawn, and Mr. Nesbit having arranged his apparatus, he proceeded as follows:—

Gentlemen: I have great pleasure in appearing before you this evening for the purpose of attempting to explain to you, as far as this can be done in one lecture a few of the facts and most interesting portions of chemistry which relate to the science of agriculture. Upon a subject of so much importance and of so widely extended a nature, it is not to be expected that I can, in a single lecture, do more than take a cursory view of the matter: but I will endeavour to seize upon the most prominent parts of my subject now, and perhaps on some future occasion I may have the honour of entering upon more minute and extended explanations. Chemistry is a science which teaches us how to detect different kinds of matter: all matter has certain common properties, such as weight, extension, &c. But, for all that, there are different kinds of matter. You know that iron differs from gold, gold from silver, and so on: all these are elementary kinds of matter. Now, chemists have discovered about sixty bodies which differ totally and wholly from each other, which have properties quite distinct, and can easily be detected; and which can, if necessary be separated, and handed round to be looked at. But although there are as many as sixty of these different bodies, and some of them are very scarce, and only to be found in certain localities, and others are very plentiful, and to be found almost every where, there are not more than twelve or fourteen with which the farmer has any thing to do, or which need to be considered in reference to the science and practice of agriculture. Out of the whole earth, I say that there are not more than ten or twelve chemical bodies with which the farmer has to do. Now the farmer soon knows the differences and distinction between any twelve or fourteen cows or bullocks, and I don't see any reason why he should not as readily comprehend and know the nature of those chemical bodies and their separate characteristics, as he does those of cows or bullocks *(Hear, hear.)* These twelve or fourteen chemical bodies go to make up all that is grown upon the farm, whether it be wheat, oats, barley, mangel-wurtzel, turnips or whatever else it may be, some of them are derived from the land, and others are obtained from the atmosphere: and you will perhaps be surprised to hear that by far the greater portion is derived from the latter. Of all the substances which you cultivate on your farms, about nine-tenths are derived from the air, and only one-tenth, or in some cases one twentieth, from the land. Now, I shall be able to prove this perfectly to your satisfaction. The matters in the air from which these organic substances are derived are, oxygen, hydrogen, nitrogen, and carbon or charcoal. These may appear to some of you hard and stubborn names, but by frequent repetition, and a little more familiarity with them, you will find that they are just as easy to be understood, as the words plough, harrow, or the name of any other farming implement. The first of these of which I shall treat is oxygen, which is a very singular kind of body and possesses a very powerful attraction for all other elements. It is this which rusts iron when left out in the open air: the rust which you see under these circumstances is nothing but the result of the action of oxygen upon that metal; and when you melt lead, you find it covered with what appears a kind of dross which is nothing more than the result of the action of oxygen on the surface of the hot metal. It is, indeed one of the most powerfully acting bodies with which we are acquainted. One-fifth part of the air we breathe is composed of oxygen; in every five bushels of air there is one of oxygen. Water likewise contains a great quantity of oxygen; for instance, in every nine tons of water you have eight tons of oxygen. All the earths—clay, sand, lime, and marl—contain from one-third, to one half of this oxygen. This very powerful substance exists in the air as a gas: in water as a liquid in combination with hydrogen; and in earth as a solid. From the generality of earths it is not separated; from water it is; and from the air also. Now I will endeavour to prepare a little of this oxygen: it can be prepared in various ways. I will take a substance called chlorate of potash a compound of potassium, chlorine, and oxygen. The mixture when heated will give out its oxygen. And I shall then be able to test its presence. It has a very powerful affinity for all combustible bodies. It is this that allows the candles before me to burn; deprive them of it and it would at once be destinguished. The light is produced by the union of the oxygen of the air, and the tallow or wax upon the hot wick. Deprive the air of its oxygen, and you will have no light, no heat. Now I shall heat this chlorate of potash in this tube; and when it has undergone fusion at a "red heat" an effervescence will take place, and oxygen will be given off. Now this oxygen is that which consumes all your vegetables; it consumes the coal in the fire, and the coke under the steam boiler; and when you make a mixen with straw, dung, &c., in your farm yards, it is this gas which causes it to diminish in bulk, and the combinations to fly off to help to produce vegetables all over the world;—as well in the wilds and deserts of Arabia, as in your own neighbourhood, or any other parts of England. The gas is now given off from the chlorate of potash in the tube. I will ignite a small