

Q. Do you believe there are many insects in this country which are not to be found in the United States, insects which are not described by the United States Entomological Bureau, and for which no remedies have been prescribed?—Undoubtedly there are many. The insects, whose life histories are known, are small in number compared with those which have yet to be investigated. Besides, there is no telling what insect may at some future time become destructive, because as the conditions of the country change, the insects also change their habits to a certain extent. In this connection I may mention that many of the insects which infest our fruit trees, fed in their native state upon our forest trees. For instance, the apple borers, before apples were cultivated here, fed upon the hawthorn and junberry. The potato beetle is probably one of the best examples of this. It was only when the potato was introduced into the section of country where it existed that it became injurious. It then left its native plant, because it found the potato more to its taste, and very soon spread all over America. In the same way there may be insects in Canada which only require certain plants to be introduced into their neighborhood to become obnoxious. When those plants suited to them reach them, they will seize upon them and may perhaps spread all over the country. It is impossible to say, at any particular time, what insect may or may not become injurious.

Mr. PHILLIP LANDRY, M.P. (Montmagny), called and examined.

*By the Chairman:*

Q. Is agricultural chemistry very useful in agriculture, and in what way?—There is no doubt that chemistry is very useful in agriculture, especially in giving analyses of the soil, analyses of plants, and of manures. In this way it shows the farmer what is missing from his soil, and puts him in a position to replace it. In fact, chemistry and geology, of all the different sciences, are the most useful in agriculture. By the aid of these two sciences, you can tell beforehand what may be the composition of the soil. In the soil, I may say, you have organic matters and inorganic matters; and by chemical analysis you find out, in a given soil, what its principal elements are. We know also by analysis what are the chemical elements of the different plants, and what are the elements of the different fertilizers and manures. By the aid of the sciences which tell all this, you can find what plants will succeed in a given soil, and what manure is necessary for a given soil.

Q. What do you understand by the ash elements of the soil?—The ash elements of the soil are the produce of the combustion of different plants. If you take a plant and burn it, you have in the ash that is left the mineral or inorganic elements that constitute the plant. These elements are drawn from the soil. They are mineral elements and will not burn, whereas the organic elements will consume and will form other combinations.

Q. What does the atmosphere supply to the plants during their growth?—The atmosphere supplies the plants with different gases, but not directly. You have in the air nitrogen. This is given to the plants generally in the form of nitrates or nitric acid. The nitrogen is converted into plant food by the electrical influences in the air, chiefly after a storm. After a storm you will find a peculiar odor in the air, due to the presence of ozone. When the lightning crosses the air there is a great quantity of that ozone formed. Under its influence, a combination is made with the nitrogen of the air, and in that state it is furnished to the plants. It may, indeed, be carried down by the row to the roots of the plants, to which it is given. Then, the different plants themselves, by means of their leaves, breathe air, exhaling in the day-time oxygen. In the night-time the operation is reversed. Thus, in the night-time, we find that flowers in a bed-room or chamber are injurious, because then, instead of emitting oxygen, they emit oxide of carbon or carbon.

Q. How many pounds of ash ingredients do plants remove from the ground per acre?—That is rather difficult to say. It depends upon the character of the plant and the nature of the roots. The large roots, like turnips, remove more ingredients from the soil than the clover or the other plants which are used for forage.