by this work are the men and women of mature years. This is all very well in its way. These men appreciate thoroughly what is being done; they recognize the importance and the necessity of this instruction—but is it not beginning at the wrong end? Why should the farming class of this country have to wait until they become men before they learn that there is a science underlying their practice? If it is a good thing to educate a grown man or a grown woman in the principles of agricultural work, it is still more important, as far as practicable, to give the boy and the girl some training in these principles early in life, at the time when these principles are most easily acquired, and when they will be of most permanen. benefit. I, therefore, have no hesitation in answering my first question by saying that agriculture in some form should be taught to the pupils of our schools.

2. When and where should it be taught?

Most persons, I think, are of the opinion that some instruction in agriculture should be given to pupils in rural schools, since they assume that these pupils are to be the future farmers. They are not, in general, of the opinion that the teaching should be given in town and city schools, because the pupils of such schools are likely to move out into professional pursuits, become school teachers, enter mercantile life, or follow some one of the many manufacturing lines of life. They are not quite sure that all pupils in rural schools even should be taught agriculture, as so many are yearly coming from the country to the town to reinforce the struggling city classes with new blood and new physique. Right here I would present a debatable statement. If agriculture can be taught in our schools in a manner such as I will suggest in my next division I am of the opinion that it should be on the course of study for town and city pupils as well as on the course for rural pupils. Perhaps in city and town schools it might be made optional but in rural schools it should be obligatory. The present situation is that with very few exceptions all town and city pupils will remain in city and town pursuits, and the country schools are also being annually drained of the majority of the brightest and most promising. But this, I contend, is not a very promising feature of our country's growth. It may be due in some part to the very nature of our present system. That I shall not here discuss. If we can, by altering or rearranging our system, keep more of the best rural pupils in touch and work with agriculture, and if we can at the same time arouse in some of the town and city pupils a sympathy for agricultural methods and agricultural life, we shall be looking to the best interests of the pupils and of the country as a whole. I am of the opinion that a course of agriculture can be given in town and city schools that will be interesting and beneficial and that will be in harmony with the best educational methods or system. I would put a course in the science of agriculture within the reach of every pupil in all of our schools, and I would therefore begin the work in the public schools, rural and urban alike. In the schools of France, where agricultural education has been most fully taught, instruction in this work begins in the primary schools in the elementary course, with pupils from seven to nine years old, and is followed out through the middle course, nine to eleven years, and the superior course, with pupils from eleven to thirteen years old. It might be best to begin the work here by making agriculture a compulsory subject in the 4th form of our public schools, and from this as a starting point work out in time a system of instruction adapted to our conditions, prefacing it first by a simpler course in the 3rd form, and adding an advanced course to our high school work.

I believe that agriculture can be taught just as well to the public school pupils as are some of the subjects at present on the course, and I believe that the pupils themselves will come to the subject with as much eagerness. I do not care to particularize or to make comparisons, but perhaps you will permit one remark, viz.: if public school pupils can master the subject of physiology, hygiene, and temperance, they are well able to take hold of the subject of agriculture, and I think it can be made more intelligible to them.

3. What can be taught and how should it be taught?

This is the most important of the three questions; it is that upon which the whole argument turns. I think that delay in introducing agriculture into our schools has occurred principally because of the difficulty, in fact, the present impossibility, of introducing into our schools instruction as to how to farm. Our schools could not be equipped for training in the practice of agriculture except at an enormous cost, and our public school teachers could not be expected to teach the young idea how to farm even in the crudest manner. Here is the point—any instruction now given in our schools should deal simply with the *science* of agriculture; the practical application of the scientific principles may be left to the home training and to such specially equipped institutions as our Agricultural College. It is quite possible that in time something may be done for our rural schools as has been done in France and other European countries in the way of adding small gardens and plots wherein some of the lessons of the schoolroom may be applied, and where illustrations may be found in the growing trees and shrubs and the development of seeds sown by the hands of the pupils themselves.

This mistake of confusing the science and the practice of agriculture is quite general, and some of the text-books placed in the hands of young pupils have no little responsibility for continuing the mistake.

I consider the science of agriculture eminently adapted for school instruction, and a future student of natural science could not lay a better foundation for his future work than by first mastering the general principles of the various sciences which together form what we call the science of agriculture. Let us note briefly what it includes.

Agriculture consists mainly in the growth of plants, the feeding of these plants to animals, and the working over of the animal products resulting.

First of all we have the air and the soil. A study of these gives us an introduction to chemistry, geology, and meteorology.

The growth of plants brings in the study of botany, and closely follows an introduction to entomology.

The study of the animals at once calls for some of the simplest principles of zoology, anatomy, and physiology.

Even bacteriology comes in when we study the diseases of plants and animals and the making of cheese and butter.

And so we might sum up by saying that a study of the science of agriculture implies a beginning in the study of all the natural sciences that are afterwards found in our high schools and colleges. The study of the science of agriculture is to a large extent a course in "nature study," and since the illustrations are taken from plants, soils, insects, and animals with which all boys and girls are more or less familiar, the subject may be made to appeal to the everyday observation of the pupils. What should be done, then, is to give the pupils an insight into the first principles of the various sciences, laying stress upon these laws and principles that have an application to the work of agriculture. Let me put it in the form of a few questions.

1. What is the atmosphere, and how does it affect the soil?
2. What are the causes and effects of rain?
3. How is soil originated?
4. What are the principles underlying tillage and drainage?
5. What changes take place in the sprouting of seed?
6. How do plants feed and grow and mature seed?
7. How are new varieties of plants produced?
8. How do animals digest food?
9. What is the life history of a butterfly, a beetle, an aphis, or a honey bee?
10. What are the causes of fermentations in the soil, in the silo, and in milk and cream?

A thousand and one other questions might be put, the answers to which would be given by a knowledge of the first principles of the sciences of chemistry, botany, entomology, geology, physics, physiology, or bacteriology. An acquaintance with such would be useful and interesting to all classes of students, whether coming from the farm or not, and to all classes whether going to the farm or not.

What I am trying to lay before you as my idea of how agriculture might and should be taught in our schools has been more clearly and forcibly put by that master teacher, Huxley, who in addressing a farmers' club in England on this subject spoke as follows:

> There are some general principles which apply to all technical training. The first of these, I think, is that practice is to be learned only by practice. The farmer must be made by thorough farm work. I think I ought be able to give you a a fair account of a bean plant, and of the manner and condition of its growth; but if I were to try to raise a crop of beans your club would probably laugh consumedly at the result. Nevertheless, I believe that practical people would be all the better for the scientific knowledge which does not enable me to grow beans. It would keep you from attempting hopeless experiments, and would enable you to take advantage of the innumerable hints which Dame Nature gives to the people who live in direct contact with things.
>
> And this leads me to the general principle which I think applies to all technical training of all school boys and school girls, and that is that they should be lead from the observation of the commonest facts to general scientific truths. If I were called upon to frame a course of elementary instruction preparatory to agriculture, I am not sure that I would attempt chemistry, or botany, or physiology, or geology as such. It is a method fraught with the danger of spending too much time and attention on abstraction and theories, on words and notions, instead of things. The history of a bean, of a grain of wheat, of a turnip, of a sheep, of a pig, or of a cow, properly treated—with the introduction of the elements of chemistry, physiology and so on as they come in—would give all the elementary science which is needed for the comprehension of the processes of agriculture, in a form easily assimilated by the youthful mind, which loathes anything in the shape of long words and abstract notions, and small blame to it.

I have already mentioned one misconception that has retarded the introduction of agriculture as a permanent part of our school system, viz.: the idea that it was intended to give some instruction in the practice of agriculture, whereas nothing should be attempted but the first principles of the various sciences that are connected with or underlie agriculture, taking up the application of these sciences to agriculture.

Another fault is the attempt on the part of some persons *to try to do too much*. We must not crowd too much on the young mind, or mental dyspepsia will result, followed by a loathing of all forms of mental food. The work when first begun in the public schools should be very simple, very restricted, and should call into activity the open eyes and open ears of the pupils.

Every rain that falls, every tiny stream by the roadside, the shooting of the green blade in the spring, the nodding buttercups, the golden rod, the tall bull thistle, the early dropping apple with its worm hole, the ball of black knot upon the cherry, the jumping grasshopper, and the hundred of nature's children, should attract the attention of our children out of doors, and arouse in them a love that is not born of ignorance but of true knowledge. Nature in the country, in the village, in the town, and, to a limited sense, even in the city, lies before our children as a great unnoticed, unmeaning book. Our children, by their natural sympathy with nature, and by their God given faculties, appeal through us to the great Creator of nature. "Open Thou mine eyes that I may behold wondrous things out of Thy Law."

Another objection that comes up in the minds of some, and that even finds expression, is that agriculture is not on a high enough plane, that there is more dirt than diamonds in it, that there is lacking the æsthetic element. Those who think and speak thus have evidently not given an honest consideration to the subject or are not aware of the marvelous progress of agricultural science in the past fifty years. I have, I think, answered this by saying that the science of agriculture is nothing else than a comprehensive grouping and intermingling of the other sciences that are now studied in our schools and colleges.

I could, had I time, discuss the possibilities of increasing our agricultural wealth by a general dissemination of agricultural information among the rural classes. Our annual agricultural product is now about $250,000,000 in the province of Ontario alone. I could prove even to those of you who are not farmers that this can easily be increased by twenty-five per cent., and a sum added to our annual product that would