

EDITORIAL.

Mr. Dearness' Paper on Agricultural Education.

We complete in this number of the *ADVOCATE* a comprehensive and able paper on Agricultural Education, by Mr. John Dearness, Inspector of Public Schools. From a long and intimate acquaintance with the Ontario school system, and a careful study of others, notably when representing Ontario educational interests at the World's Fair, Mr. Dearness is peculiarly well-qualified to handle this subject, and is entitled to rank high as an authority. His paper first gave a review of the rather unsatisfactory record of Agricultural Education in Ontario, then an outline of the famous French system and of what Manitoba is now attempting. He next deals with the philosophy of educational methods, and we must admit, however much we are disposed to plume ourselves on the modern system of education as it prevails in Canada, particularly in Ontario, that this paper is an incisive disclosure of weakness at the very foundation. People complain bitterly of the constantly increasing drift of rural population to cities and towns; but is not our whole school system one of the forces gravitating the youth in that direction? We do well to recognize the basal defect which Mr. Dearness points out, otherwise no rational reform can be looked for. When we consider the fact that in 1893 the grant for the purpose of agricultural education in France had reached about \$700,000, it should open our eyes also to the possibilities of national effort in that direction. We commend to our readers and the educational authorities Mr. Dearness' paper, which we trust will aid in awakening thought and stimulating action upon this most important subject.

Agricultural Education.

[An address delivered before the Ontario Central Farmers' Institute by John Dearness, I. P. S.]
(Continued from page 214.)

Fully accepting the above conclusion, I am not sorry that our attempts to teach agriculture by rote from books has not satisfied either the people or the teachers. Agriculture is a very complex applied science; it is founded on the circle of sciences, the chief of which are meteorology, geology, mineralogy, physics, chemistry, botany, and zoology, including entomology. Every farmer, whether aware of it or not, is an applier to a greater or less extent of every one of these sciences, and something of a machinist, to boot (indeed some add astronomy to the list, for do they not sow their peas and kill their hogs at a certain phase of the moon, and cut Canada thistles at a favorable conjunction of the planets?). The farmer, all his life, must be a practical student of these sciences. How important, then, that the schools should start him with scientific methods of investigation! Nature should be the text book; the teacher should be merely the director and maintainer of the attention. It is true we have object lessons in our schools, but if these, as too often they do, end with cataloguing qualities, the result is chaff and not wheat. The observation faculties are not trained by mere observing, but by reasoning about what is observed. The eye sees the object held before it, but trained scientific observation sees more or less of the history of that object, stretching away back into the past, or attempts to measure its future possibilities. I should rather have my child reach ten scientific conclusions by his own efforts (observations), wisely directed, than to acquire a thousand by remembering *ipse dixit* of teacher or text book. For example: I propounded the question, "Whether is the dew heavier on calm or windy nights?" After three observations, the child said, "On windy nights," giving her reason. Even that result I thought much better than if she had looked in a book and read the opposite statement. I told her to continue watching, and writing each morning what she noticed. The farmer needs to use his eyes and reach correct judgments from his observations; so does everybody else. Hence, Nature study should form an important part of every school's curriculum, from the first to the highest grades. Progress in this kind of education cannot be tested by the ordinary written examinations, upon a set of formal questions prepared for all the schools of a country or a province.

By Nature study I mean that development of mental power and habit which comes with knowledge gained by observation and experiment, and by comparison and relation of causes and effects of phenomena that appeal to the attentive senses, no matter in what field of science, so-called, these phenomena lie.

Gentlemen, do you agree with me that education, by the scientific method, in the sciences that subserve agriculture and domestic economy, and in those parts that serve these arts best and most, is what we need in our schools? Then, inaugurate a propaganda to educate the public to require method as well as matter. The system of written examination in vogue might test how much of a text book in agriculture the children had memorized, but it cannot test how they are being taught to observe scientifically. That was a capital paper by E. A. Powell, in last June 15th-August 15th of the *FARMER'S ADVOCATE*. I hope you all read it. You may remember his argument that readjustment of Public school courses of study will enable us to make farming much more profitable; that the "study of horticulture and biology will aid materially in this direction, but there is quite as much advantage in chemistry and in farm economics. Farming will

pay when it is done understandingly, intelligently, lovingly, with a knowledge of the forces we deal with and the things we handle. At present, the bugs understand us better than we do them. They have little to learn, but that they have learned well." He proceeds to show that "one-half the production of American lands is lost through ill-directed education. Our apple crop is more than half lost, and this is pretty surely true of all other fruits, except, perhaps, small fruit, which cannot be grown at all except with special attention. The plum trees, over large areas of the Northern States, have been cut down, or ought to be, to get rid of the black knot. The cherry trees were also assailed fifty years ago, and gradually eliminated by the same disease. The curculio spoils yearly tens of thousands of bushels of both these fruits. Remedy: more knowledge of entomology and of tree life itself. Give that, and the snap and backbone will be found. The farmer is rarely a lazy man. His trouble is, he does not know his enemies, or how to fight them. He does not know his friends from his foes in the insect world, and is as likely to destroy the former as the latter." He inquires, how can this desirable result be obtained? How can we secure for our rural schools teachers competent to teach geology, chemistry, biology, and physics? He answers his questions thus: "When the demand comes we shall surely have the supply. But let us not make the mistake in supposing these to be more abstruse or difficult studies than geography, arithmetic, and grammar. Rightly taught, these latter are far the most difficult and advanced. They belong only with older pupils. The former sciences are simpler and more fundamental. They deal with everyday questions and things near at hand. Science, as entomology for instance, deals with butterflies and bugs—just what children naturally take to. Science, as botany, deals with flowers, fruits, roots, trees—just what all children like. Science, as geology, deals with the dirt and stones and brook-bed—just what children love. Science, as chemistry, pulls things to pieces and reconstructs; as physics, it plays with sunbeams. This is not at all abstruse. We want just as little as possible to do with books while educating a child."

Develop a strong sentiment in favor of Nature study in the schools and that sentiment will demand competent teachers. The present ruling question, "Who will teach our school the cheapest?" will give way to, "Who will give us the best value for what we can pay?"

Mr. Powell, quoted before, says: "So utterly impossible has it been for myself to secure my children what I call a rational education that I have done what I regret many more do not or cannot do—built a laboratory and employed private tutors. Here they enjoy with a zest drawing, geology, biology, chemistry, mathematics, and music, with, as far as possible, field work. These studies are followed by a general knowledge of life on the globe, as well as the history and science of human language and thought. At this point, geography becomes a rational part of education. The result has been more than satisfactory. They love the land, and the things of the land. I am confident they will never consider land culture inferior to traffic. Their minds are here, because their acquaintances are here. Their souls are with the birds, the plants, the animals, the bugs."

The sentiment I speak of will give us not only trained teachers but the necessary means and appliances for doing the work properly. There must be apparatus and materials; fortunately they are inexpensive. I have spoken of the outfit at \$4, to be furnished each of the Manitoba schools, and they are also to receive a set of colored charts of plants and animals. A compound microscope, as well as a simple one, should be added. Then the school garden, with gardening implements, is almost indispensable; a little plot convenient to the play-ground, but better not a part of it, where germination, growth, fertilization, and even hand-pollination, grafting and budding may be observed and practiced. Could not the agricultural societies give prizes to encourage school-gardening? I see no difficulty in the way, if the competition were limited to townships or inspectorates.

I have said so much against text books that I ought to make it clearly understood that I am not opposed to seeking assistance from books. On the contrary, every school should have a few science reference books. I oppose those lesson books to be placed in the children's hands, liable, almost certain, to be learned by rote. I favor books that are investigation guides. Of the latter, as being the best, I know I have laid on the table Howe's *Systematic Science Teaching*, Jackman's *Nature-Study*, Harlan Ballard's *World of Matter*, Spalding's *Botany*, Boyer's *Biology*, and Colton's *Zoology*. These, and doubtless others I do not know of, should be within every teacher's reach. It is, however, easy to see that a graded series of, say, two or three small books—scientific investigation guides—prepared expressly in the interest of agriculture, would be different from any of the above, although similar in plan to some of those mentioned.

The material for instruction is overwhelmingly abundant; most children start to school with a taste and aptitude for such learning; skillful method on the part of the teacher is the desideratum. "As I write these suggestions (to the teacher) I fully realize the struggle it will cost you to keep silent about all the interesting things there are to be told, but that word 'told' lets out the whole mischief." (Howe's *Systematic Science Teaching*, page 167.)

The following is an outline of a course of study that might be taken up in the Public schools:

First Class.—Observations upon, and conversations about, common objects, such as utensils, articles of food and clothing, etc.; classification, as of houses, fences, books, etc.; sorting metallic articles, seeds, leaves, etc.; observations on weather, skies, seasons, etc.; talks about plants, animals, etc., that can be brought to the school, or that the pupils have experience with.

Second Class.—Observations, of which a daily record is made of direction of wind, cloudiness, rain, snow, dew, hoar frost, etc., and practice in forming judgments upon the observations, as, e. g., answering the questions, "What directions of wind usually bring rain?"; sorting objects, as fibers, minerals, etc.; classifying objects, as tools, plants, animals, on the basis of their uses; observations on the seasons, changes of the moon, position of the sun; elementary systematic instruction, with objects at hand, upon seed, leaf, flower, fruit, etc.

Third Class.—Observations on weather, temperature, changes of the seasons, recorded daily and judgments deduced therefrom; migrations of birds, habits of animals; classification of woods, soils, fruits; comparison of minerals as to qualities, such as hardness, lustre, etc.; plants continued, description, development, and function of organs, relation to soil, moisture, shade, introducing tillage and drainage; elementary systematic study of the organs of animals; simple experiments in physics and chemistry.

Fourth Class.—Meteorological record continued, with notes as opportunity offers on such classes of facts as the effects of frost on soils, buds, etc.; migration of birds, opening of familiar wild flowers, first appearance of familiar insects, such as potato bug, tent caterpillar, grasshoppers, etc.; plants continued, comparison of organs, based on examples, as various forms of roots, stems, leaves, flowers, fruits, seeds, and life history of plants, such as potatoes, wheat, strawberry, apple; talks and practice, if possible, on thinning, pruning, grafting, comparison of animal organs, function, and hygiene; experimental physics and chemistry continued, aiming at teaching the physical properties of matter and simpler chemical facts of air, water, lime, salt, sulphur, etc., soils and manures.

Fifth Class.—Meteorology, farm calendar, recording time of operations, times and effects of unusual cold, heat, drought, winds; observations upon the opening of flowers, setting of fruits and visits of insects; plants, use of key in identifying plants, life histories, observations on injuries from insect and fungal parasites; growth, form, decay of trees; weeds, their means of spreading; entomology, studies (from specimens) of metamorphoses of insects, life histories of insects; physics and chemistry continued, experimentally, with a view to applications to agriculture; visits, by arrangement, to good farms, or to dairies in the neighborhood, to study livestock, farm buildings, laying out fields, or farm or dairy processes.

If France's experience has a lesson for us, results of great importance should be expected of the High schools. If these institutions were to devote as much money and energy to teaching scientific agriculture as they do to the preparation of entrants to the professional and commercial pursuits, they would doubly and trebly repay to the agricultural interests the large grants they now receive from the counties, and they would contribute towards a signal increase of the profit and pleasure of life on the farm.

Inspector Smith, of Wentworth, proposed a scheme to set apart one school in each township, to be equipped at the expense of the township, with an extra teacher, who would give a graduation course specially adapted to farmers' sons. If these classes were established, they should be taught by graduates of the Agricultural College, holding a teacher's certificate.

Elementary science properly begun in the Public school, continued and strongly specialized towards agriculture in the High schools, would increase the attendance of better prepared candidates for our Agricultural College. The present one is admitted on all hands to be doing excellent work. The number of these would have to be increased to meet the demand. This duty would devolve on the Government, also the duty of providing a practical course in the Model and Normal schools, and of sending experts on matter and method to the Teachers' Institutes.

In the paper by Mr. Bryant, first quoted, he argued very cogently that a course in scientific agriculture affords disciplinary training for the mind, it offers scope for aesthetic and ethical training, and it is, above all, utilitarian. If to such a course were added reading, literature and arithmetic, with suitable provision for expression by language, oral and written, drawing, and making in clay and wood—and in the fourth and fifth classes in the Public schools, history and world-geography, with good morals acquired by constant practice and incidental precept, with careful attention to the health and growth of the children throughout, then I think we should have an ideal system of education.

I am addressing the most representative body of farmers in the country. Does it not behoove the Central Farmers' Institute, the Farmers' Parliament, to do more than listen to the reading of the papers on this most important subject? Can you not issue educational bulletins broadcast throughout the land? Would not a committee appointed to consider and draft a scheme, and confer with the Ministers of Education and Agriculture, stimulate efforts towards practical results? I tell you what you know, that the people do not take kindly to innovations that they regard as forced on them from the central authority. Lead the people to demand the improvement, then they will welcome it.

It was the clamor of the Farmers' Institutes that moved the Government of our sturdy neighbor on the north-west to provide a course of agricultural instruction in the Public schools. The people now, I am informed, are receiving it there with enthusiasm. Let us copy the example of Manitoba in this matter; and, although she has the start of us, let us enter into a race with her for best results.

I conclude with a sentence from Farmer Powell's article, that the all-important point is to have in our schools a curriculum of study that will make our children acquainted with the land, and what is on the land: an education that unfolds the nature of soils and the wonders of life in and on the soils; and while bewitching them with the everlasting unfoldings of such studies, makes it possible for them to master their foes and to receive the benefits of insect, bird and plant friend. This done, no other occupation can compare with farming, for its charms and advantages.