

Retrospective and Prospective.

Agricultural Thinkers on the Achievements of the Past and the Pathway to Future Success.

1st.—Considering the extension and the general progress of Agriculture, and the advances made in scientific investigation, stock breeding, grain cultivation, horticulture, dairying, etc., what would you regard as the most remarkable achievement or feature of the past century?

2nd.—Having in view present tendencies and methods of farming, improved transportation, the nature of the demand for human foods, and the probable civilization of Asia, what would seem likely to be the chief characteristics of successful farming in the future?

WORKING WITH NATURAL LAW.

1st. The application of scientific knowledge and methods to every department of life and work.

2nd. Fighting it out on the same line: conquering nature by obeying law.

G. M. GRANT, Principal.
Queen's University, Kingston.

TRANSPORTATION AND MIXED FARMING.

1st. I consider that the improved means of transportation by rail and water, with improved farming machinery, are the most remarkable features in the agriculture of the nineteenth century, as by them the farmers have been enabled to increase their output of grain, stock, dairy produce and poultry, and to place them on the markets of the world at the least expense in time and money, and this has enabled us to bring the fertile prairies of Manitoba under cultivation, furnishing homes for thousands of industrious farmers.

2nd. Prospective.—I would place the growing of grains and grasses, along with the judicious breeding of good horses, cattle, sheep, pigs and poultry (commonly called mixed farming), as the chief characteristics in the farming of the future. I place the growing of grasses as the most important item in the rotation of farm crops. I consider the grasses the foundation of successful farming.

Mekiwin, Man. G. S. MCGREGOR.

LESSENING THE WASTE.

1st. I would say that scientific investigation, and the application of its results, is the most remarkable achievement of the past century. We see it in the improved method of tillage, in live stock, dairying, horticulture, and every branch of agricultural industry.

We are simply controlling and manipulating the forces of nature, and it is the scientific knowledge, skill and industry exercised in controlling these forces that makes Canada, at the close of the nineteenth century, stand pre-eminent as an agricultural country.

2nd. So far as the Province of Ontario is concerned, live stock, dairying and horticulture are likely to be the three chief branches of agricultural industry, with a tendency toward more intensive methods producing greater results from smaller areas. Improved transportation facilities will bring the producer and consumer in closer touch, and at the same time extend our markets, and will greatly lessen the waste of products and of energy.

Simcoe Co., Ont. G. C. CASTON.

IMPROVED LIVE STOCK AND INTENSIVE FARMING.

1st. On a retrospect of the agriculture of the past century, I would say that its chief features are:

1st.—The great improvement in the various pure breeds of all kinds of live stock.

2nd.—The introduction of improved machinery used in all the operations of the farm, and without which the immense areas of virgin soil in new countries could not have been brought into cultivation; and

3rd.—In older countries the application, on scientific principles, of artificial manures to the land.

2nd. In view of the rapidly increasing population of the world and the opening up of the semi-civilized nations of the East to the trade and commerce of the West, I would say that the chief characteristic of the agriculture of the coming century will be *intensive farming* i. e., more thorough cultivation of the soil, combined with an increase in the number and improvement in the quality of the live stock kept on the land.

The farmer who plans his methods on these lines, and judiciously and vigorously puts them into operation, will be the successful farmer of the coming century.

Niagara, Man. W. M. WALLACE.

FIXATION OF NITROGEN, CONTROLLING GROWTH AND REPRODUCTION.

I would say that the most important advance in the science of agriculture during the past century has been the discovery of the role which bacteria play in the fixation of free nitrogen.

While there will undoubtedly be many important improvements in the mechanics of agriculture during the coming century, I believe that the advance in this direction will be comparatively small, and that the great steps of progress hereafter are to be made in the direction of a larger control of the forces which govern growth and reproduction, rather than in the extension of mechanical invention.

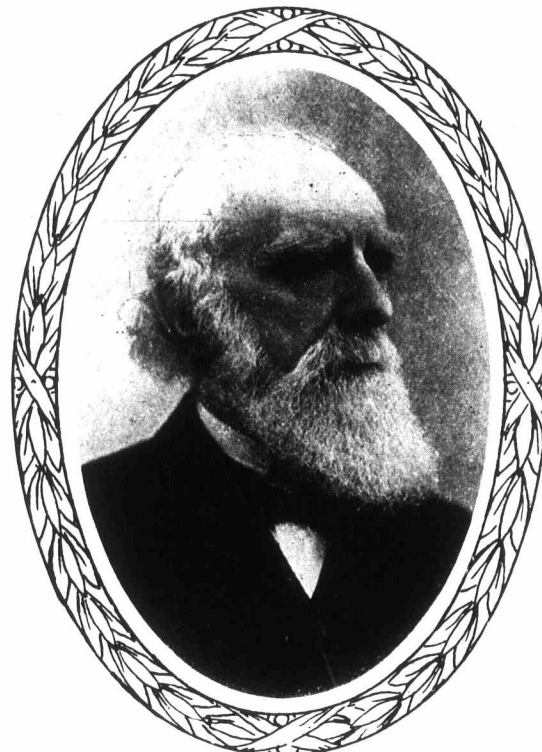
Until the invention of the reaping and threshing machines, brawn was the farmer's chief reliance. With the perfection of farm machinery, mechanical skill became more important than brute strength. Henceforth this skill must be supplemented and directed by that highest faculty of the human intellect—the ability to comprehend, co-ordinate and use invisible and intangible forces of nature, of whose existence, even, our fathers were ignorant.

CHAS. E. THORNE, Director.
Ohio Experiment Station.

APPLICATION OF MECHANICS—SPECIALIZATION AND CONCENTRATION.

I think it is generally conceded that the application of mechanics to agricultural pursuits has done more to advance agriculture than any other one thing during the present century. Take the self-binding harvester, for instance—embodying, as it does, so many well-known mechanical principles. Without it, I venture to say that a sufficient number of laborers could not be obtained to harvest the crops of the world.

As to your second query, I cannot say that I lay claim to prophetic gifts sufficiently to outline the different characteristics of successful farming in the future. No doubt the most successful farmers will be specialists to a large extent. As in manufacturing, those manufacturers have been most successful who have devoted themselves largely to special



LORD STRATHCONA AND MOUNT ROYAL.
(Formerly Sir Donald A. Smith.)

single lines, so I believe it will be with the farmer. The development of corn as a food for man and beast has reached an advanced stage in the United States and is rapidly interesting Canadian farmers, more especially in Ontario. No doubt it will have its influence in future farming operations.

Looking at the question in a broader sense, just how far the principles of concentration and development can be applied to large allied farming interests is a question that will be much discussed in the near future, and it may be that to some extent at least there will be a tendency in this direction, and that farming operations, like other industrial pursuits, will be carried on most successfully in a large way.

Toronto, Canada. W. E. H. MASSEY.

THE MARCH OF PROGRESS.

A new edition of Webster's International Dictionary issued this year has an appendix of 25,000 words and phrases that have come into the English language since 1890, and it is a significant fact that nineteen-twentieths of them are technical or scientific. This discloses, by the language of the people, the rapid and vast advance of science, and in a survey of the passing century one cannot but be struck with the applications of scientific knowledge in human effort. And in common with every other domain, it embraces agriculture.

1st. (a) Of the century's specific achievements in agriculture, I would put in the very front rank the establishment of pure breeds of live stock, which has made breeding a science, created herds, flocks and a new literature, gave competitive exhibitions their life raised feeding, general management and housing to a higher plane, stimulated trade in animals and their products throughout the whole civilized world, and set men thinking everywhere—Improved live stock and successful farming

have gone hand-in-hand. (b) The creation of the Agricultural Press and the establishment of Agricultural Colleges and Experiment Stations are mighty incentives and aids to progress. (c) In Canada, the century's greatest event in agriculture was the opening to cultivation of our illimitable and fertile West.

2nd. (a) The successful farmer of the 20th century must be equipped with knowledge, and must direct his operations in harmony with natural law. (b) He must apply to his business the same principles that bring success in mercantile and manufacturing enterprise.

OBSERVER.

THE TREASURE OF THE TWENTIETH CENTURY.

In answer to your question, I beg to express my hope and belief that the greatest treasure the twentieth century has in store is a new aim of education. Another Renaissance is dawning; words, empty shells and lifeless symbols, will cease to be offered for ideas and realities. The generation that will grow up under the conditions developed by a proper aim of education will feel with Wordsworth—

"My heart leaps up when I behold
A rainbow in the sky,
So was it when my life began,
So is it now I am a man;
So be it when I shall grow old,
Or let me die."

To the properly-educated man the rainbow is not less wonderful than when he first saw it as a child; on the contrary, the deeper his insight into the substances and forces which cause that beautiful phenomenon, the more wonderful and heart-lifting it will become. For him who learns to see them, there are rainbows in the soil, rainbows in the corn, rainbows in the orchard, rainbows in the pasture-field, rainbows in the dairy. As the farmer's mind opens to a more sympathetic and intelligent conception of the objects and forces which serve him, or which he has to obey, the more pride and delight will he take in his noble profession. The farmer, surrounded by his growing crops and herds, is, if he had the training to perceive it, in a more wonderful place than a world's-fair machinery hall. Legitimate agriculture can never promise its followers large store of gold, but more largely than any other industry it can secure them the realization of Agur's prayer. When pursued with an intelligent interest, begotten by the right kind of education, it will confer rewards for body and mind that gold cannot purchase. It will yet be said that life is worth living when it is lived on the farm.

London Normal School. J. DEARNESS.

THE VISION OF A VETERINARIAN.

1st. (a) In connection with animal industries are the more accurate scientific knowledge of the causation of contagious disease in farm animals by bacteriological methods, and the discoveries by Pasteur and Koch of methods of rendering animals immune by injections of antitoxines, and the diagnosis of tuberculosis by the tuberculin test, rendering stock-raising a safe investment for capital. The advancements made in cold storage and rapid transportation, together with the more general appreciation by stock-breeders of purity of blood, certainly constitute very remarkable features of the past century in this connection. (b) As to grain-growing, horticulture and dairying, I would consider the reclaiming of vast areas of land by irrigation in India, Egypt and America, the improvements in agricultural machinery (especially mowers, reapers, manure-spreaders, stacking machines, etc., etc.), improvements in milling machinery, rapid transit on steel rails, and fast ocean steamers fitted up with refrigerators and cold storage, have led to wonderful progress in these industries, and constitute remarkable achievements which have been developed during the century.

2nd. Judging from the present tendencies, I would expect that the farmer of the future would require to take advantage of his opportunities (which are very great) of acquiring scientific knowledge of agricultural chemistry, fertilization, drainage, and irrigation. He must bring his land into the highest possible state of cultivation. He must breed none but animals which will command the maximum price in his market. He must learn how to prepare his animals for sale. Mixed farming will prove to be most profitable, including crop-growing, stock-raising, and dairying. Advantage must be taken of labor-saving machinery and motive power (electricity will play an important part in this), and he, knowing that the present and prospective development of rapid transit will greatly increase his competitors, will not fail to utilize his opportunities to produce the best at a minimum of cost. Agriculture in the future, to be profitable, must be conducted on scientific principles.

DUNCAN MCEACHRAN,
F.R.C.V.S., Edin.; D.V.S., McGill, etc.

HON. MR. LONGLEY DISCUSSES PRODUCTIVE CAPABILITIES.

The most wonderful achievement of the past century, as it would present itself to my mind, would not relate to material progress of the country at all. The entire attention of the world seems at the present time centered upon mere material affairs, and hardly any person can be induced to stop and reflect, even for a moment, upon the development of the spiritual part of mankind. Indeed, it seems to me that the world has about lost faith