

The Debit Side.

WHAT AGRICULTURE OWES TO SCIENCE.

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We never weary of magnifying the importance of agriculture. Its influence in the world's economy is wholly beneficent. The hard-earned profits of the farmer impoverish no one else; nay, more, when the farmer prospers, the rest of the world prospers with him. Whatever praise agriculture has received, it deserves it all, with interest. But while so much may be placed to the credit of agriculture, there is also a debit side which is frequently overlooked, and the object of this paper is to place on record a few of the many debts which the various branches of agriculture owe to occupations with which they apparently have little in common. No attempt will be made to make anything like a full list, but only a few will be enumerated by way of examples.

The study of the influence of centrifugal force upon substances of different specific gravity apparently has little to do with agriculture, yet such knowledge, combined with a knowledge of the component parts of milk, resulted in the manufacture of the cream separator, which has practically revolutionized dairying.

The man with the microscope, studying bacteriology, who talks learnedly of "cultures" and uses scientific terms of appalling length, seems to be very remote indeed from "the man with the hoe"; yet it was such men who discovered that certain bacteria are associated with the roots of leguminous plants, such as clover, peas and beans, and that through the action of these bacteria, leguminous plants are able to avail themselves of the nitrogen of the air. Thus the bacteriologist has shown the farmer the importance of these crops, since they gather nitrogen which is not available to other crops, and tend to increase the supply of this valuable fertilizer in the soil. The same men have studied the influence of bacteria upon milk, butter and cheese, and to them the dairy industry is directly indebted for much of the progress it has recently made. There is a much closer relation between the bacteriologist and agriculturist than many farmers suppose.

Then, the chemist has studied the composition of animal bodies and animal foods, and as a result we have learned much regarding the best use of stock foods and how to combine them for the best results. Besides this, he has studied the composition of plants and soils, the requirements of different crops, and many other matters which have been instrumental in enabling the farmer to plan a satisfactory and rational rotation of crops. Yet while we make use of the knowledge obtained from the chemist, we forget what long years of labor were necessary to obtain it, while many a farmer looks upon the work of the chemist as entirely useless.

Then there is the physicist puddling among soils and water in a most incomprehensible manner. "How foolish!" we say, and so pass on. But all we have learned of the best methods of conserving soil moisture we owe to him, and who can estimate the increase in the farmers' profits derived directly from his labors?

The clover midge threatened to destroy one of the farmer's most valuable allies in maintaining soil fertility; but to-day the clover midge has largely lost its terrors owing to changed methods in growing clover seed. Instead of cutting the first crop for hay, the first crop was pastured until about June 20th, and then allowed to produce seed. Who hit upon this plan? Was it merely a lucky guess? By no means. The entomologist patiently studied the insect and discovered that it produced two broods each season. The first brood developed in the first crop of clover, and the insects of this brood laid eggs in the second crop to attack the clover seed. By pasturing the first crop, no shelter is provided for the first brood, and the clover seed matures earlier than under the old method, thus making conditions as unfavorable as possible for the midge. The whole plan, therefore, depends upon a knowledge of the life-history of the insect, and for this knowledge we are indebted to the entomologist. A number of years ago the orange groves of California were threatened with destruction by an insect known as the "cottony-cushion scale." Prof. Riley, the noted entomologist, took hold of the matter. The scale had come from Australia, and experts were sent to Australia, at his suggestion, to investigate. What a fool's errand this must have seemed to many; and when these experts began sending from Australia a species of little beetle, commonly known as ladybird beetles, we can fancy what disgust would fill the souls of those who hold the study of entomology in contempt. But these beetles were imported because it was discovered they lived upon the cottony-cushion scale, and it was not long before the scale was checked and the orange groves were saved, with all the millions in money which they represented. Then, again, do we ever reflect why we apply one kind of insecticide for one insect and a different kind for another insect, and why we apply insecticides at certain seasons in order to be effective? There was no guesswork about these discoveries; they all arose from the careful study by entomologists of the habits of different insects. Thus we know that Paris green is useless against insects which suck the juices of plants, and kerosene emulsion would be wasted if applied for insects which eat the leaves or other parts of plants. How can we estimate the magnitude of the debt we owe the entomologist?

Neither has the botanist been behind in useful work for agriculture. The whole system of origi-

nating and improving varieties of plants is based upon the information collected by the botanist. To the botanist, also, belongs the credit of explaining the mysteries in connection with fungous diseases of plants, and of rendering effective treatment possible in many cases.

But to go into these matters fully would require a whole volume. We cannot stop to enumerate the discoveries of men engaged more directly in agricultural research, such as Lawes and Gilbert, in England, and many others in the different countries of the world. The work of investigation is slow, and frequently the methods employed are beyond the comprehension of those in whose interests the work is performed. An attempt has been made to show the relation of a few leading sciences to agriculture by giving as briefly as possible one or two examples to show something of the nature of the debt we owe to science. Thus, while we hope that we may always have a good conceit of ourselves, let us not be unmindful of the debit side of our account, nor fail to give honor where honor is due.

Deschenes.

AN OTTAWA VALLEY FARM.

On the Quebec side of the Ottawa River, 5 miles from the capital, conveniently reached by means of the Ottawa & Aylmer Electric Railway, is the beautifully-located, fertile and well-kept dairy and stock farm of Messrs. R. & W. Conroy, whose post-office address is Deschenes Mills, where they are largely interested in manufactures. The farm, which is under the careful and competent superintendence of Mr. Gilmour Woodburn, comprises 300 acres of strong clay loam, inclining to sandy loam in parts, and produces heavy crops of hay, oats, corn and roots. Three hundred tons of hay were saved this year, an average of 2½ tons per acre for first crop clover, and 1½ tons of second crop, mainly timothy. Two silos with a combined capacity of 600 tons of corn ensilage were nearly filled, and a generous supply of roots were stored, making a liberal provision for the winter keep of the stock on the farm, which is principally dairy cattle, the leading feature of the farm being a cream and butter business, for which the equipment is very complete. The fine barn, with dimensions of 50x120 feet, has basement stable accommodation for tying up 96 head of cattle, and is lighted by electricity from the water and steam power plant at the mills near by, which also operates the machinery in the dairy building.

From 50 to 70 cows, Jerseys and grades, are kept at various seasons of the year, cream being sold in summer in the city, and buttermaking the specialty in winter, for which a complete creamery outfit is provided, with all modern improvements. The lines of pure bred stock maintained are Clydesdale horses (of which a few excellent brood mares and fillies are in stock), Jersey cattle, and Tamworth swine.

THE JERSEY HERD.

The foundation for a herd of registered Jerseys was well laid last year by the purchase from the noted herd of Miller & Sibley, of Pennsylvania, of a richly-bred bull and a trio of typical females, from which an exceedingly useful herd is being built up, which has already made its mark in the showing, winning eight first prizes, including the herd prize, at the Ottawa Exhibition this year, the first time they have been shown. The bull, Ida's Rioter of St. Lambert 27th 47570, is a 2-year-old son of the famous Ida's Rioter of St. Lambert, one of the most richly bred of the breed and the sire of a long list of tested cows having registered records of butter production averaging high up in the twenties weekly. He is a model bull of the breed, and bears the stamp of his worthy sire in his lordly bearing, the depth of his body, and the richness of his skin secretions, for the latter of which virtues he is doubly indebted to his parents, his dam, Becky of Pogis 63069, by Major Appel Pogis, having a butter record of 17 lbs. 15½ ozs. in a week. Among the females a striking figure is the grand old matron, Dilwa 30515, with a record of 15 lbs. 10 ozs., by Jersey Express 5771, and out of Wilda 21205, a magnificent model of a dairy cow in conformation, milk vein and udder development, and evident capacity for work, her bright eye, deeply-dished face, fine withers, exceeding depth of ribs, and long, level quarters, combined with a velvet skin and rich secretions, indicating a high order of usefulness in the dairy and as a breeder, the latter feature being realized to a charm in her sweet little daughter of a few months now in the herd, one of the most completely promising calves we have come across during many moons. Sired by the present stock bull, so richly bred, and with Dilwa for her dam, she has started in life with an endowment of constitution, conformation and quality which, with judicious training, should carry her to the pinnacle of fame long before she reaches the mature age her mother has attained. Heiress of Prospect 116423, a 4-year-old daughter of Major Appel Pogis, and having for her dam the rich Ribbon's Gift 77375, with a record of 18 lbs. 1 oz., butter in a week, 46½ lbs. milk in a day, and 9,974 lbs. in a year, is a dairy cow of high degree, with a capacious udder, a breezy look, and combining many indications of usefulness at the pail and in the churn. A number of other pure-bred Jersey cows, prominent among which is the 5-year-old Flora Katie, a deep milking dame, having given 7,000 lbs. in 8 months, and 11½ lbs. of butter in a week, bred from standard families and combining the blood of many of the best-known families, are included in the herd and show evidences of usefulness in a large measure, while a trio of excellent

young bulls bred direct from the imported stock, and held for sale, have all the dairy characteristics of their progenitors in profusion, and would make creditable heads for first-class herds.

The production of pork works in well with a dairy business, the separated milk and the buttermilk making the best of food for the young pigs, and the Deschenes farm is well equipped for this branch of husbandry, the large and well-arranged new pigery, 30x100 feet, being provided with all conveniences for heating, cooking, killing and cleaning, as well as for the breeding and care of the herd of registered Tamworths maintained on the farm, which is well up to the standard of the best, having won the first prize at Ottawa Exhibition in 1888, and embracing among a lot of useful sows the typical aged Amber Trip, second prize at Ottawa, by Ranger, bred at the Ontario Agricultural College, dam imp. Middleton Mimulus, and her almost faultless full sister, Aylmer's Maid, a yearling, winner of third prize at Ottawa; while Gilmour's Choice, a sow under a year, which won first at Ottawa Exhibition, sired by Dominion King and having Middleton May for her mother, is one of the most perfect of her kind. The boar, Samson, now in his 2-year-old form, and head of the harem, is an animal of strong breed character and ideal bacon type. With such foundation stock, it is not surprising that the young things descended from them are of the proper stamp; and with the facilities for developing them found on the Deschenes farm, there is every reason to expect a steady advance in the quality of the stock produced.

A Week's Allowance.

The following extract from the diary of a Scotch shepherd some forty years ago will strike our readers as curious. It is explained that the whiskey of that time was less than half the price in later years:

Monday.—A half gill to wash awa' the effects o' a dry sermon, 1½d. Midday—A gill to wet my lips for dog whistlin', being out after the sheep, 3d. For gatherin' wi' the neebors, twa gills, 6d. Mair dog whistlin', a gill, 3d.	1 14
Tuesday.—A wet mornin'. A gill, 3d. (there being some holes in my plaid). Dog whistlin' through the day, twa gills, 6d. Consolin' wi' Jock Macdonald over the loss of his wife, four gills, 1s.	1 9
Wednesday.—Market day. Forgatherin's, sax gills, 1s. 6d. Dog whistlin', twa gills, 6d. Gills wi' folks I hae nae mind o' whatever, 1s. Gill wi' the man that sang "Auld Lang-syne," 3d.	3 3
Thursday.—A gill to try to mind whaur I peeled ma knuckles in a poleetical argument, 3d. Introducing Jock Macdonald to a likely lass to mak' his second wife, twa gills, 6d. Sunday dog whistlin', twa gills, 6d.	1 3
Friday.—Among the sheep, fortifying myself for Jock Macdonald's wife's funeral in the afternoon, twa gills, 6d. Another on the road tae keep myself fra greetin' for the pair body, 3d. Dog whistlin', 3d. The funeral, sax gills, 1s. 6d.	2 6
Saturday.—Too keep the mist oot o' my plaid, the holes no being mendit, gill, 3d. Glein' in the banns for Jock Macdonald's marriage, fower gills, 1s. Dog whistlin' and forgatherin's, three gills, 9d.	2 0
Sunday.—The Sawbath day. A we drap to clear ma throat for cryin' on ma dog, a gill, 3d. Another at Luckie's when the bells are ringin', 3d. Some brandy, so as no to tak' in the smell o' whiskey into the Lord's House, 6d. A drap to digest the sermon, twa gills, 6d.	1 6
Total	13 44

The Salaries of Potentates.

The Czar has an income of \$1,000 per hour, the Sultan \$850, the Emperor of Austria \$500, the Kaiser \$450, the King of Italy \$330, Queen Victoria the same, the French President \$250, the King of the Belgians \$85, and the President of the United States \$75.00 per hour.

Farming in the Transvaal.

From two books ("South Africa To-day" and "On Veldt and Farm") recently published, we glean the following:—

"On first looking at the plentiful foliage in Johannesburg—seven-year-old trees often 40 feet in height—and on seeing evidence of the rapidity of growth of various kinds of vegetable produce, one is tempted to believe that the agricultural products of the country may be as brilliant as the mineral. But the experiences of those who have tried farming have not hitherto been very encouraging. Trees certainly grow well because there is plenty of water under the soil, and because their roots can readily penetrate to a great depth. But the soil where these surprising results in tree-growing have been obtained is not really rich, and has little staying power unless manure be applied. And agriculture has many natural obstacles to contend with. Hailstorms of unexampled severity occur every three years or so, beating down the crops and destroying the fruit. Locusts frequently eat up the crops and the leaves of the fruit trees. It is said that wheat cannot be grown in summer because the rain falls in that season and causes rust, and in winter there is all sun and no rain, so that to grow wheat irrigation must be resorted to."

"Although localities are to be met with where cattle will answer, and though sheep will thrive pretty generally, it would be altogether untrue to represent the Transvaal as a cattle country. The scarcity of grazing forces the Boers to 'trek' through a large portion of the year in search of pasture. These men are known as 'trek Boers.' The habit is not distasteful to them; the tendency to 'trek' is inherent."