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Published under direction of the Board of Agriculture of Nova Scotia.

VOL. II.

HALIFAX, N. S., MARCH, 1874.

No. 99.

*Ten Copies of this Journal are sent, Postage Prepaid, to the Secretary of every Agricultural Society in the Province, in payment of which a reduced charge of \$4 is deducted annually from each Society's Grant. Societies requiring their Copies addressed separately to individual Members will be charged \$5. Any greater number of Copies to one address may be obtained at the reduced rate of \$40 per hundred. The Annual Subscription for a single Copy is Fifty Cents, payable strictly in advance. The subscription year commences with the March number.*

HALIFAX, 3rd March, 1874.

THE Prize List of the great Provincial Agricultural Exhibition, which is to be held early in October, is now ready for distribution in pamphlet form. Copies may be obtained in Halifax at the Nova Scotia Printing Company's Office, corner of Sackville and Granville Streets, and in the country from the secretary of each county or district society.

All communications on business relating to the exhibition should be addressed to the Secretary, Professor Lawson, Dalhousie College, Halifax,

THE present number of the *Journal* contains some important matter. In the first place we have a list of the new Board of Agriculture, which is considerably reduced in accordance with the provisions of the Amendment of last Session. All the Societies in the Province, except a new one, sixty-three in number, nominated on this occasion, and in every district they selected a member from the old Board. The Government have appointed as Government member, the Hon. Mr. McHaffey, who had long experience on the Board in former years, and the vacancy caused by the lamented death of Mr. Northup, has been filled by the appoint-

ment of Colonel Laurie, in accordance with suggestions made by several of the leading promoters of agricultural improvement in the County.

The abstract of annual returns of societies for 1873 will afford material for thoughtful comparison on the part of the officers and members of societies throughout the Province. Our report of Mr. Beattie's recent sale of Short Horns, horses and sheep is worthy of consideration. It is the best sale that has ever taken place in Canada. Although the animals were not so numerous as the lot usually offered at an importation sale in Halifax by our own Board of Agriculture, yet Mr. Beattie's sale realized thirty thousand dollars. Lady Gunter brought two thousand, Maid of Honour six hundred more than Lady Gunter, whilst Malmesley and Rose of Racine both went above three thousand dollars each. The Clydesdale horse, Donald Dinnie, brought five thousand dollars, and some Cotswolds one hundred and fifty dollars a-piece.

L. L.'s paper on ploughs should be carefully read and acted upon by members of Agricultural Societies. Dr. Reid's Lecture on Agricultural Chemistry is thoroughly practical, and highly suggestive. In Mr. Thomas's letter a subject is brought

up of grave importance, whether we view it in its agricultural, social, or political aspect. But we doubt whether there is much difference of opinion between Mr. Thomas and Colonel Laurie. The Colonel, as a gallant General of Militia, would like to see the Province peopled less sparsely with an industrious class of peasant farmers and their wives and families; Mr. Thomas, as an earnest champion of High Farming, desires improved cultivation and management such as exist in highly civilized countries, where farming is worked with capital and reduced to a scientific system, so as to become a profitable occupation. There is the element of progress in both schemes; one may be better than the other, but perhaps both are best. The subject is deserving of more attention than can be given in this number.

May we hope that the precise details we are publishing respecting the Swedish Dairy System may lead to an increased development of our Nova Scotian cheese factories, improved modes of management and an extension into the butter manufacture? If a steam engine of four horse power will churn five thousand pounds of butter in a day, how many farmers' wives will bless their husbands' hearts for taking a share in a butter factory?

CENTRAL BOARD OF AGRICULTURE, 1874.

Government Member: Hon. R. A. McHEFFEY, Windsor.  
 District No. 1, Halifax County: COLONEL LAURIE, Oakfield.  
 District No. 2, Kings, Annapolis, Digby: JOHN DAKIN, Esq.,  
 Marshalltown, Co. Digby.  
 District No. 3, Lunenburg, Queens, Shelburne, Yarmouth: GEO.  
 S. BROWN, Esq., Yarmouth.  
 District No. 4, Hants, Colchester, Cumberland: ISRAEL LONG-  
 WORTH, Esq., Truro.  
 District No. 5, Pictou, Antigonish, Guysboro': DAVID MATHE-  
 SON, Esq., Pictou.  
 District No. 6, Cape Breton, Richmond, Inverness, Victoria:  
 JOHN ROSS, Esq., M. P. P., Boularderie.

ABSTRACT OF RETURNS OF AGRICULTURAL SOCI-  
 ETIES, AND STATEMENT OF DISTRIBUTION  
 OF LEGISLATIVE GRANT FOR  
 YEAR 1873.

COUNTIES.	Number of Members.	Subscrip'ts attested as paid.	Amount of Grant.	Subscrip'ts to Prov. Exhib.
<i>Annapolis:</i>				
Annapolis Agricul. Society....	83	\$83 00	\$109 21	\$50 00
Eastern Annapolis Ag. Society.	61	61 00	80 26	25 00
Bridgetown "	43	43 00	56 58	20 00
Paradise "	42	42 00	55 26	25 00
Townsh'p of Clements "	75	75 00	98 69	10 00
	304	\$304 00	\$400 00	\$130 00
<i>Antigonish:</i>				
Morristown Agri. Society	50	73 00	146 00	25 00
St. Andrew's "	43	73 50	147 00	0 00
Arisaig "	51	53 00	106 00	20 00
	144	\$199 50	\$399 00	\$45 00
<i>Cape Breton:</i>				
Boularderie Agri. Society	55	55 00	110 00	30 00
Sydney Mines "	52	52 00	104 00	20 00
North Sydney "	47	47 00	94 00	25 00
	154	\$ 54 00	\$308 00	\$75 00
<i>Colchester:</i>				
Onslow Agricultural Society...	196	200 00	190 93	80 00
Shubenacadie "	40	40 00	38 19	30 00
Lower Stewiacke "	44	44 00	42 01	20 00
Tatamagouche "	40	40 00	38 19	12 73
Stirling Township "	45	45 00	42 96	25 00
Brookfield "	50	50 00	47 72	5 00
	415	\$419 00	\$400 00	\$172 73
<i>Cumberland:</i>				
Parrsboro' Agri. Society	100	100 00	106 38	40 00
Malagash "	63	63 00	67 02	15 00
Minudie & Barronsfield A. S.	42	43 00	45 75	20 00
Amherst Ag. Society	50	83 00	88 30	25 00
Wallace "	40	40 00	42 55	20 00
Union Ag. Soc'y of Pugwash..	47	47 00	50 00	25 00
	342	\$376 00	\$400 00	\$145 00
<i>Digby:</i>				
Digby Central Ag. Society	108	116 00	230 85	30 00
Weymouth "	44	44 00	87 56	0 00
Claru "	41	41 00	81 59	10 00
	193	\$201 00	\$400 00	\$40 00
<i>Guysboro':</i>				
Guysboro' Agricul. Society....	41	41 00	82 00	20 50
Milford Haven "	50	50 00	100 00	25 00
Glencelg "	40	40 00	80 00	0 00
	131	\$131 00	\$262 00	\$45 50
<i>Hants:</i>				
Windsor Agri. Society	56	56 00	82 66	50 00
Fonwick " of Noel..	40	40 00	59 04	25 00
Newport "	55	55 00	81 18	30 00
Union " of Hants.	61	61 00	90 04	20 00
Upper Nine Mile River A. S.	59	59 00	87 08	
	271	\$371 00	\$400 00	

<i>Halifax:</i>				
Halifax County Agri. Society..	127	\$127 00	\$240 76	\$200 00
Low. Musquodoboit " ....	43	43 00	81 51	30 00
Upper " " ....	41	41 00	77 73	20 00
	211	\$211 00	\$400 00	\$250 00
<i>Inverness:</i>				
Mahou, &c., Agri. Society ....	44	44 00	88 00	
N. E. Margaree " ....	63	63 00	126 00	8 00
	107	\$107 00	\$214 00	
<i>Kings:</i>				
Union A. S. of E. Cornwallis... 105	105 00	134 62	60 00	
King's County Ag. Society....	48	48 00	61 54	20 00
Central Ag. Society of Kings...	42	84 00	107 69	16 00
West Cornwallis Ag. Society...	75	75 00	96 15	15 00
	270	\$312 00	\$400 00	\$111 00
<i>Lunenburg:</i>				
Malone Bay Ag. Society ....	64	64 00	128 00	20 00
<i>Pictou:</i>				
Pictou Agricultural Society....	101	101 00	124 69	
New Gairloch " ....	77	84 00		51 00
River John " ....	41	41 00	50 62	
Egerton " ....	58	58 00	71 61	10 00
Merigomish " ....	40	40 00	49 38	
	317	\$324 00		
<i>Queen's:</i>				
North Queen's Agri. Society....	40	40 00	80 00	30 00
Kempt " ....	49	53 00	106 00	20 00
M. B. of Brookfield A. S. ....	40	40 00	80 00	20 00
	129	\$133 00	\$266 00	\$70 00
<i>Richmond:</i>				
Richmond Co. Ag. Society ....	42	43 00	86 00	
<i>Shelburne:</i>				
Clyde River Agri. Society ....	40	40 00	80 00	25 00
Barrington " ....	44	44 00	88 00	
Barrington West Passage A. S.	61	61 00	122 00	
	145	\$145 00	\$290 00	
<i>Victoria:</i>				
St. Ann's Agricul. Society ....	50	50 00	100 00	15 00
Middle River " ....	88	88 00	176 00	40 00
	138	\$138 00	\$276 00	\$55 00
<i>Yarmouth:</i>				
Yarmouth County Ag. Society..	156	343 50	250 00	50 00
" Township " ..	53	53 00	106 00	15 00
	209	\$396 50	\$356 00	\$65 00
Total number of members..... 3574				
" Amount of subscriptions.....\$3941 00				
" " of Grants ..... 5699 00				

MR. BEATTIE has favoured us with the following list of prices realized at his sale of thorough-bred stock at Markham, Ont., on 12th February. All the numbers from 1 to 15 inclusive are Short Horn Durhams:—

- No. 1. Lady Gunter, Mr. Murray, Racine, Wis., U. S.....\$2000
- " 2. Lady Knolmer, Mr. Stilson, Wis. U. S..... 725
- " 3. Ruberta, General Merideth and son, Indiana..... 1275
- " 4. Maid of Honour, Mr. Murray, Wis..... 2600
- " 5. Malmsey, Mr. C. C. Parks, Illinois..... 3100
- " 6. Royal Booth, Mr. C. C. Parks, Illinois..... 700
- " 7. Rose of Racine, General Merideth and son, Indiana.... 3420
- " 8. Anna Leslie, Mr. Sumner, Connecticut..... 375
- " 9. 5th Duchess of Springwood, Gen. Merideth & son, Ind . 550
- " 10. Her Highness, Mr. Sumner, Connecticut..... 400
- " 11. Jessie, do do ..... 275
- " 12. Royal Duke, Mr. C. C. Parks, Illinois..... 550
- " 13. Royal George, do do ..... 100
- " 14. Tweedside, do do ..... 225
- " 15. Burnside, D. Brown Canada..... 205
- " 16. Ayrshire Cow, Mr. Peer, Canada..... 120

CLYDE HORSES.

- " 18. Emperor, Blodget & Parks, Illinois..... 1400
  - " 19. Emily May, Mr. Murray, Racine ..... 1200
- Donald Dinnie, put up and sold after a spirited bidding by Canadians and Americans, fell to Mr. Murray, Racine, at..... 5000
- Glencairn, sold privately to a Canadian, Mr. Vardon..... 2000
- SHEEP.—40 imported Cotswold Ewes, averaged over \$82 each, and Rams sold from \$27 to \$150 each.

TRURO, Jan'y. 20th, 1874.

DEAR SIR,—Last Fall the Onslow Agricultural Society held a Ploughing Match soon after their Exhibition at Truro. While the latter was a decided success, nothing more special can be said of the former, than that some good sod-turning was done at it, if by the best plough-men of Onslow, certainly not by the best ploughs in the world, and it is gratifying to know that the lessons of that day, unimportant as they may appear, have already borne fruit, and are going to have a very decided bearing on the future husbandry, not only of Colchester, but of Nova Scotia. I look upon the Onslow ploughing match as one of those trivial circumstances that are always influencing the events of the world. By such a circumstance Mr. Jonas Webb's attention was called to the room for improver\* in the breed of Southdowns during the present generation. His grandfather was a breeder of Norfolk rams, and it was the amusement of the old gentleman at his annual sales to set his grandsons to ride on his tups, holding fast by their huge horns. It was during the races on these sharp-backed animals that Jonas determined, as soon as he was a man, to breed sheep with "better saddles of mutton." And who will say that it was not the great variety of home-made wooden ploughs at the ploughing match that suggested to a leading agriculturist the idea of asking the Onslow Society at its annual meeting to import this Spring, for sale to its members, a few of the best iron ploughs made in Great Britain—an idea I would like every society in the Province to entertain, and which, had the Onslow Society ignored, it would in my opinion have taken a retrograde step in the cause it so energetically endeavors to promote.

The time is fast approaching in the history of this Province, when capital and the soil shall become better acquainted, and Agricultural Societies are not fully cognizant of one of the main objects contemplated in their formation, should they fail to appropriate a portion of their funds occasionally for the purchase of the best farm implements, in whatever part of the world manufactured. It is because English implements are in keeping with the agriculture of that country, which has arrived at a stage of perfection far in advance of the one ours occupies, and which has not been attained by that of any other part of the world, that the Earl of Carlisle, in addressing an agricultural gathering of Yorkshiresmen, was led to remark "I saw on the plains of Troy the clodcrushers of Crowskill, the drills, the horse-hoes of Garrett, and the ploughs of Howard and Ransome." And it is not matter for surprise that on the banks of the Danube, the Schedt, and the Po, of the Mississippi and the Amazon, on the shores of the Baltic and the Black Sea, on the conti-

ment of Australia, or in Flanders, the cradle of modern agriculture, English implements have the same preference as on the plains of Troy. And no good reason can be assigned why the farmers of Nova Scotia, in the matter of testing the superiority of English implements over those manufactured in the Province, should be prevented from following in the agricultural wake of the world.

In this connection permit me to add an extract from an admirable essay on "the progress of English Agriculture," as a fitting sequel to my desultory remarks on ploughs.

"But perhaps nothing illustrates better the change which has come over farming in the last few years than what has taken place with respect to so ancient and familiar an article of husbandry as the plough. Although an implement more than two thousand years old, it is only within the last thirty-two years that it has been reduced to an uniform shape and material. In engravings, to the eye of the casual observer there is now no difference between the ploughs manufactured for the same purpose by every one of the eminent makers; and, in fact, in general construction, they are alike, except where the "twinwrests of Kent and Sussex" are used, although some have a marked superiority in the details and in durability. They are fashioned entirely of iron and steel, of long graceful wave-like form, provided with a pair of wheels of unequal size, and drawn by a chain attached to the body of the plough. Iron screws and levers have replaced wooden wedges. A few seconds are sufficient to attach the share or adjust the coulter. It was quite otherwise in 1840. Out of six ploughs engraved in the *Journal of Agriculture* for that year, two are swing, two have two wheels, two have one wheel each, all are of wood, except the shares and breasts, all are drawn from the extremity of the beam, and the awkward inferiority of their respective shapes is perceptible at a glance. In 1840, Lincoln, Rutland, Bedfordshire, Berks, and almost every other county had its separate plough, and knew little of its form in the rest of the kingdom; the exceptions being among the customers of scientific makers, whose trade was restrained by the cost of conveyance, the want of publicity, and the want of intelligence. Mr. Pusey and Mr. Handley, who contributed articles on the plough to the first volume of the Royal Agricultural Society's Journal, were, as gentlemen farmers, far ahead of their time, but it is evident, from their observations, that they had every thing to learn in the science and practice of agricultural mechanics. Mr. Handley's acuteness led him to conclude that wheel ploughs were of lighter draught, "contrary to the opinions of the writers" whom he had consulted; but Mr. Pusey in his general report on Eng-

lish agriculture, evidently prefers the Scotch swing plough, not aware that the old Bedford wheel plough even in its unimproved state, was a better implement. After mentioning the instances in which the Scotch plough failed, he hesitatingly adds, "It is even doubted whether one wheel might not be advantageously restored." Another report on a trial of different kinds of ploughs in Berkshire showed how general was the ignorance of the simplest principles of mechanical knowledge, for he confesses that he had no idea that there would be any "difference of draught between a smooth share and one covered with tar or paint." These trials, valueless in themselves, were the commencement of investigations by well informed persons under the auspices of Mr. Pusey, and of a series of public competitions, which have placed ploughs constructed on the best principles and in the best manner, within the reach of every parish in England. The improvement is as great as the change from the old musket to the Minie rifle. Skilful manufacturers, each eager to command the market, study, with all the aids of mechanical knowledge and a wide experience, to secure excellence of design, durability of make, and economy of price, while the farmer in his turn has learnt that science is a better constructor than ignorance, and no longer prefers the clumsy efforts of a village artisan. The marvel is in the rapidity with which these changes have been effected, as if some magician of agriculture had waved his wand over our favored island."

Yours, &c.,

I. L.

WINDSOR, Dec. 27th, 1874.

MR. EDITOR,—I cannot refrain from making some remarks on Colonel Laurie's last letter in your journal, as it is so altogether at variance with my views published some time ago in the Journal, on the application of Farm Capital, that I should like to see some discussion on the subject, and also hear something of your opinion, particularly, as the promise you gave to follow me up, and show what had been accomplished in Scotland by these means, led me to believe that at least I was not altogether flying off at a tangent, I only wish to take up one or two points in Colonel Laurie's letter. He says that the farmer owns his own lands here and is not restricted by any conditions of a lease; in answer I would say that any of the old-fashioned and often silly leases, were better than allowing farmers to skin their farms until they became perfect barrens, and, if you read the article that Colonel Laurie quotes from carefully through, you will see that the author does not object to the leases and restrictions made in old times, for he calls them reasonable enough, but he simply com-

plains that they do not apply to the days of high farming. The question of unexhausted improvement is nothing to us, as we don't improve, only exhaust, both tenants and landlords, generally. This question is now being rapidly settled in Great Britain, and no doubt in a few years as little will be feared of this trouble as of the Irish Church story. I am finally convinced that the restrictions put on tenants has been a great blessing to England. Also I say, that a farmer by owning his own farm is generally so cramped for means, that he cannot develop the resources of the soil, the very reason that a farmer in this country requires all his means, is because the restrictions that Colonel Laurie complains of have not been put on; it must be plain to any man that when we read of the glorious crops that were formerly grown in this country, that any man having foresight enough to keep up his balance of fertility, or having been compelled to do so, would reap with our present prices great results. A great deal of sympathy has been shown for Mr. Hope, of Fenton Barns, and no doubt he deserves it, but does it not strike you as strange Mr. Editor that a rich man, as he is reputed to be, would run the risk of being tanned out of his homestead sooner than purchase? No, he knew perfectly well that the money laid up to purchase a farm would be so much capital locked up, the interest of which could not be calculated to a man with his brains; he has reaped the benefit of his labors and courage, and lost it in another way, and any one who has read the papers through will see that no one has been more reticent about his wrongs than Mr. Hope, all he says is something to this effect, that he advises no farmer to invest heavily in another man's land until the law of remuneration for unexhausted improvement is perfected, but I believe he is the last man in the world who would recommend that a good farmer should own his land even if he could, for he knows that the combined interests of landlord, tenant, and laborer is necessary for any great results; this rule applies quite as much to many parts of America as to England, for the reasons above stated, and our cute Yankee friends are beginning to see it clearly. What does the Rev. Mr. Murray mean by his speech in Boston, in his inaugural address before the New England Agricultural Society, by the following remarks. I have to trust to my memory as I have not the papers by me just now, but it was something as follows:—"That the merchants of New England, who accumulated fortunes so easily could never stand by and see farming go down as rapidly as it was then going, that the farmers had not capital enough of themselves and that it is both the duty and interest of merchants to assist them." Are the merchants to give the farmers the full run

of their bankers' accounts simply for patriotism, I fancy not, it means that the system of landlord and tenant must be introduced, which is far more advantageous to the farmers than mortgaging. The landlord has to keep up the buildings, pay insurance, and, should any thing happen, any great changes occur, the farmer is not stuck for ever in one corner of the earth which circumstances may have made distasteful to him. I believe the most prosperous farmer I know is a tenant farmer, and he need not be, as he owns a farm of his own, but prefers renting one, and I believe a great deal of this prosperity could be traced to his being a tenant farmer. It appears to me about as sensible to insist that a farmer should own his farm, as that a young merchant should own his wharf and store. A few more remarks and I have done. I agree pretty much with the writer about growing or rather not growing wheat, and never grew a bushel in my life. As long as the Ontario farmers clear up virgin soils, and exhaust their own by selling wheat, let us buy from them, but I see no reason why any one preferring their own bread should not grow it provided they keep the elements of fertility in the soil, by any means that may be at command; but it appears to me that both theoretically and to a certain extent practically the writer is wrong in his ideas. The whole system of farming in England, and no one would be rash enough to say that she dare give up growing grain, is based on the idea of growing food for the people, and substituting other food for stock, but which contains all the elements which are required to reproduce what has been sold off for human food. For an instance, a ton of cotton cake consumed leaves enough value in the manure to produce four tons of wheat, consequently a farmer, (assuming this to be correct) can afford to sell three tons of wheat without deteriorating his farm; again an illustration which may come more home to us, a ton of grass and a ton of oats only reduce land equally, but in value one is worth \$12.00, the other \$35.00, allowing \$23.00 per ton for the difference in expense of cultivation, which I believe would be very small if done in a systematic way. Many farmers would say, but it is perfectly absurd to tell us that we can get a ton of oats where we can get a ton of hay; there is no doubt that all grain to be well filled requires a larger amount of phosphates than hay does, but I am only speaking of it strictly from a theoretical point of view as another illustration that can be given of the advantage of rented farm, with all the silly unreasoning prejudice there is against what is called scientific farming, which not one in ten who talk about it know whether it can really come under that denomination or not. I have never yet heard one word spoken against the advantages of underdraining, every one

appears to admit that it is exceedingly important, and in fact almost impliatively necessary. Now the writer has drained about fifty acres, from which he enjoys as great advantages as could reasonably be expected, but the capital locked up by owning the farm would have drained and furnished means of cultivating at least five hundred acres. So convinced I am that this is the only way that Nova Scotia can go ahead as a farming community, that I shall endeavor occasionally to bring my views before the public. Before closing this article, which is longer than I first intended it to be, I would like to refer to the question politically, and ask why are the farmers of the Maritime Provinces to be left to fight the battle of farming without any legislative assistance, not as in Ontario, where their path is easier or supposed to be. Will it be the old answer? That Nova Scotia is not a farming country? If so, for gracious sake, as honest consistent men let us do away with Agricultural Societies and Exhibitions, and establish Anti-agricultural Societies instead. As Mr. Longworth remarked, what have we gained by all the political money and energy that have been used? simply a government railway, and the least said about the location of a certain portion of it the better; or is it that we have no money, but surely our credit is good as part of the Dominion, and the security is ample, for no man would be foolish enough to make a farm perfectly dry by government loans simply to see his neighbor step into his shoes. I do not believe that any government can suffer serious loss by these allowances, and the advantage to the country at large would be enormous; at all events every farmer in the Province has a perfect right to ask to be placed on the same footing as the Ontario farmers, unless good reason can be shown that it cannot be done. As to the subject of tile draining, I have been requested to write on this subject, and my advice is constantly required, both by personal application and by letter. I would like to give all the advice I could but the outside questions to be considered, such as getting capital, right of outlet, economy of drainage on a large scale, legislation required in many cases, vested rights, of which there are as many in this country as in England, in spite of Mr. Jenkins, and other difficulties have to be overcome, before any practical results can be obtained, or in fact before any treatise on drainage could be of any great value, and also last, but not least, a tremendous amount of prejudice.

Yours truly,

ALFRED THOMAS.

MR. BLANCHARD'S Ayrshire bull "Monarch," recorded in the January number of the *Journal*, should be numbered CVII., instead of CVIII. as therein stated.

FOR the last ten years we have been trying to stir up our local seedsmen to issue their catalogues in February. Now we are now in March, every farmer, florist and horticulturist looking forward to a Provincial Exhibition, and not a single Halifax Catalogue has reached us, nor do we see a single advertisement of seeds for sale anywhere in the city.

WE have been favoured by Professor A. P. Reid, M.D., L.R.C.S., Edin., with the following notes of a paper on "Agriculture allied to Chemistry," communicated by him some time ago to the Nova Scotian Institute of Natural Science:—

My lord rides through his palace gate,  
My lady swoops along in state,  
The sage thinks long on many a thing,  
And the maiden muses on marrying;  
The minstrel harpeth merrily,  
The sailor plows the foaming sea,  
The huntsman kills the good red deer,  
And the soldier wars without a fear;  
But fall to each, what'er befall,  
The farmer, he must feed them all.

ANON.

In taking up this subject, I do not expect to give anything new, or branch any form of theory, but rather to give a resume of the previous and present ideas that to a great extent rule with those who have paid most attention to the scientific cultivation of the soil.

Previous to the present century these sciences were held to have but few links in common, the authorities in either, with few exceptions, did not trespass their imaginary boundary line. Even Sir Humphrey Davy in his lectures on the "Elements of Agricultural Chemistry," (1802-1812), did but shew that there was a relation between the science of Chemistry and the art of Agriculture.

Strange to say Boussingault, in 1836, after long study, experience and observation, came to the conclusion that the value of manure was to a great extent indicated by the amount of nitrogen and ammonia it contained—a theory that was rudely shaken to the winds by the accomplished Liebig; but it has again asserted itself, and is not likely to be displaced, for experience has proved the security of its foundation and the accuracy of the study and observations of its founder.

In 1840 Liebig propounded a most comprehensive, clear and definite theory of plant nutrition that took the agricultural world by storm and ruled for years, but it vanished, and was even given up by its illustrious founder, long ere his late decease. I will very briefly run over its landmarks, for it had much to do with the extended and accurate observations of the past thirty years.

The old idea, advocated by Sir H. Davy, was that plants derived their gas-

eous nutrition (carbon, hydrogen, nitrogen, and oxygen) from *humus*, a constituent of all productive soils. Boussingault taught that plants obtained these elements both from the air and soil, but could not solely depend on either source for their requirements. That notably the nitrogen and ammonia in the air had to be supplemented by these substances if not existent in the soil.

Liebig taught that the food of the chief mass of the plant (carbon, hydrogen, oxygen, nitrogen) consisted solely of carbonic acid, water and ammonia. That these were altogether obtained from the atmosphere, which was abundantly supplied by the decay of animals and vegetables, their decomposition giving off these substances to the air. That thus is produced much more oxygen than plants can use, and hence this gas so absolutely necessary for the maintenance of life had its supply kept up by plant growth. The decomposition of carbonic acid depositing carbon in the tissue of the plant and giving off oxygen to the air. That the only substances furnished by the soil were the "ash constituents" of the vegetable or the mineral matter it contained. That these alone were all that was necessary to be supplied to the land, as they were all that were taken from it. That manures were only of value in proportion as they contained the mineral or ash constituents of the crops they were intended to nourish.

All of these ideas of Liebig are yet believed to be and are correct, the only error being that they were made too exclusive. Plants do absorb and assimilate carbonic acid, water and ammonia from the air, but they require a portion from the soil as well, and hence manures containing these or equivalents are demanded.

The ashes of the plants or mineral constituents are derived from the soil, in which they must exist in a state capable of being dissolved in water, and there is need for their return in this form to keep up productiveness. In this particular a good soil is an extensive deposit that may be drawn on for many, many years, without showing very marked deterioration. For good husbandry exposing it to the air cause the insoluble salts of silica, potassa, lime, phosphates, &c., to be decomposed, and in addition much ammonia is absorbed from the air and retained, this being a property of all well tilled soils. The other gaseous or aerial constituents, and a large portion of the nitrogen are not so renewed, and hence need the most frequent repletion and must be furnished in the largest percentage by the most profitable manures. In fact we have returned to the previous theory of Boussingault.

The ash of plants contain potassa, soda,

lime, magnesia, iron, phosphoric and sulphuric acids, silica, &c., &c., derived from the soil. Liebig taught "supply these in a soluble form in sufficient quantity and the plant demands nothing more in the way of food; with these it is able to assimilate carbonic acid, water and ammonia from the air, without them it cannot. Liebig's "Mineral Manures" were the natural outcome of such teaching,—much was expected from them, but comparative failure resulted.

Farmers voted scientific agriculture a delusion and returned to the good old way that had been handed down from father to son for ages, and yet they could see that their lands were getting run out though knowing not how to correct their condition.

No country demands more from its soil than Great Britain, and no people are better qualified to reduce theories to a financial basis; hence it is natural that we should look to England for correct practical and as well scientific agriculture. To get the grains of truth out of the mass of chaff abounding in all theories and as well to still farther enlarge the domain of our knowledge, an experimental farm at Rothamstead, England, was carried on for over 20 years (from 1843 to 1864, when reports were given) by Lawes and Gilbert. They gave to the world the most practical and scientific agriculture that had yet obtained, and whose results stand the test of continued experience. Every conceivable theory and experiment was tried and the results given in plain and explicit figures and opinions. To these as I am able to understand them, and as briefly as possible, I would wish to direct your attention.

Continued crops of the same kind without manure and from the same soil exhaust the soluble ash constituents demanded by that plant and as well the organic elements it requires for food and that are present in more or less quantity in all soils.

Rotation of crops is good husbandry, because different plants require different mineral food, and a soil deficient for one plant may have abundance of what is wanted for another. The waste of one crop that decays on the land or is returned as farm yard manure furnishes food for the one that follows, and the tillage, by exposure of the minerals of the soil to the air and sun and rain, promotes their decomposition and consequent solubility, while facilitating its power of absorbing ammonia from the atmosphere. In this way is utilized a portion of the vast reserve of minerals or ash constituent present in all soils, the soluble part of which had been more or less removed by previous cropping.

Regarding the influence of manure, it requires some variation owing to the kind

of crop, and different manures are suitable at different stages of the growth of the same plant. Phosphoric acid, potash and ammonia are largely demanded by all crops, and soils are most rapidly exhausted of these constituents.

Farmyard manure is the most universally applicable, but its supply is very limited in proportion to its demand. It can be aided or even supplemented by the judicious use of substances containing nitrogen, such as guano, sulphate of ammonia, nitrate of soda, rape cake, &c., and those containing phosphoric acid, such as apatite, coprolites, bones or animal matter, superphosphate of lime, mixed phosphates containing lime, magnesia, potash and ammonia, as in "artificial" manures, guano, and those containing potash, as the ashes of plants.

Wheat and cereals demand a very large proportionate amount of ammonia and next of phosphoric acid—silica, lime, etc., being generally present in sufficient quantity. Potash is also largely supplied by most soils.

Turnips and root crops, though having as large a percentage of nitrogen as cereals, have also the marked property of absorbing ammonia from the atmosphere, and thus getting a quantum of nitrogen do not require it so much as manure. It is very serviceable after the plants have attained a vigorous growth, and should be combined with carbonaceous manures and placed not too near the seed as their presence is prejudicial at an early stage though most necessary when approaching maturity for the development of the weight of the bulb. The soluble phosphates are the most demanded by turnips and root crops at an early stage of growth to promote active development, but are not needed as they approach maturity for they do not increase the weight of the bulb.

Phosphates alone used as manure are not successful. The amount of phosphoric acid in the turnip crop is not larger than it is in the wheat crop, yet experience teaches that a direct supply of soluble phosphates is more influential in promoting the growth of the turnip than wheat, and hence they must exercise some important function in its development.

To give an idea of the amount of material obtained by crops from the soil as minerals, and the amount of soluble mineral or ash constituent present, from the air and soil as gaseous or aerial, or as often termed organic constituents, I present a table which I have compiled from those given by Magnus and Lawes and Gilbert,—and as well an analysis of the soil. The quantity of each constituent is given in pounds weight, and they exist of course in combination though spoken

of as in the free state. Straw and grain are included in the analysis.

Per acre of soil one foot deep, soluble in acid—lbs. ....	Average annual Wheat crop 15 bushels, lbs. per acre.....	Wheat 30 bushels per acre—lbs.	Barley, 40 "	Oats, 44 "	Beans, 34 "	Turnips, 10 tons "	Clover, 5000 lbs. per acre.....
7591	3-73	12-73	4-79	1-89	01-3	102	182
5933	23	29	9	6	102	88	171
33794	20	30	12	7	90	83	184
10180	16	31	12	8	90	90	184
17920	29	32	32	11	113	113	280
50468	28	32	60	4	6	77	287
10	28	73	121	32	11	124	4130
10							
4880							
3891							
3513							
3777							
2957							
4130							

In no part of the Dominion are correct ideas of the chemistry of agriculture more needed than in Nova Scotia, where many farms are quite run out. I have seen thousands of acres lying waste in different parts of the province, and on enquiring the cause from those in the vicinity they said the land was spent and not worth the trouble of tillage, though it had at one time been good.

The rotation of crops and manures which obtain in England are not on that account necessary for Nova Scotia, but the principles which dictate and the occasions which demand rotation are precisely the same. The composition of our soils may vary from those of Great Britain, but good tillage and judgment in the selection of appropriate manures for plant food are as necessary for the one as the other.

To assert that Nova Scotian farms want the same manures and crop rotation as Rothamstead would be haphazard, but to say that our farms want as good tillage and as careful experimenting is simply a statement of fact.

The soils of Nova Scotia are extremely varied, and their chemical analyses are not alone sufficient upon which to build a perfect system of agriculture. Because though chemistry may give all the constituents in their natural state of aggregation, it cannot positively state the in-

fluence on each of tillage and exposure to the air with the acquired solubility of its minerals. However it can suggest the most likely experiments to be tried in the way of manures and crops.

A rotation of crops applicable to most soils is the alternating of cereals with roots, vetches and clover, as these possess marked superiority in absorbing ammonia from the atmosphere and as well of assimilating the nitrogen and thus enrich the soil for a grain crop by the products of their decay, while their accompanying tillage has increased the soluble minerals from the vast insoluble reserve that makes up the mass of clay and sand and loam to which we give the general name of soil. Careful and intelligent agricultural experiments by the agricultural societies on the granitic, plaster, and alluvial soils of our province, would before many years bring unwonted fertility to our farms, and the demand for manures, whether phosphatic or ammoniacal could be freely supplied by the resources of our own province.

There is an old and very erroneous saying that "any kind of a man is good enough to make a farmer of," but even limited experience will convince that there is no human calling that can give as good and continuous return for the capital and intelligence invested as the farm. I could not say to Nova Scotian farmers buy a book and immediately set to work on what is wrongly styled scientific farming, for failure would be the probability. But rather study up the best authorities on agriculture and set apart five or even one or two acres upon which to experiment with all varieties of crop and manure that would hold out prospects of success. Thus there would be no fear of incurring any serious loss or disappointment. It takes energy and patience with study both of chemistry and agriculture to make a good experimenter on a plot of one acre, and this method alone when thoroughly and repeatedly worked out can give success on the more extended area of the farm.

Young men designing to enter on an agricultural career would need to devote as much time to education if success is to be assured, as would be needed if they intended adopting the professions so called. For it is an extensive and complicated subject and can give scope to the most accomplished intellect in studying its mysteries.

Chemistry does and will do much for agriculture; it explains the changes taking place in and products resulting from vegetation; it gives, in competent hands, the composition of the active constituents of the soil and suggests the most appropriate additions thereto, or in other words directs EXPERIMENT, the crucial and TRUST-WORTHY TEST.

When the demand becomes sufficiently extensive for commercial success, it will produce the necessary plant food in soluble form from apatite rock, phosphates from the so called *marl* deposits existing in the province, from the bones and animal substances that now go to waste, from ammoniacal gas, liquor sewage, sea weed, and such like, that are mines of wealth to the farmer as well as manufacturer, when the occasion calls forth some of the resources of Chemistry.

We continue our description of the Swedish Dairy Factory system, which was commenced in the January number of the Journal:

The object of the company is to purchase milk at different places situated within the provinces surrounding the Lake "Mälaren," for the making of butter, cheese, and other dairy products, partly on the spots where the milk is delivered from the surrounding farms, and partly at the central dairy at Stockholm. The branch factories are to be established partly near railway stations in daily communication with the central factory, and partly at places from which a daily communication with the capital cannot be reckoned on all the year round, and which latter, on that account, must be so arranged as to be able to carry on a more independent existence.

All these dairy-factories are under one and the same direction, consisting of five shareholders annually elected at the general meeting of the company; the chairman and the managing director must reside in Stockholm or its neighbourhood.

The salary of the chairman amounts to 1,000 Sw. dollars (55*l.*); that of the managing director to 5,000 Sw. dollars (275*l.*); and that of the three other directors to 500 Sw. dollars (27*l.* 10*s.*) each.

The Lord of directors authorizes the purchase of the milk and the manner of employing the same, as also the sale of the manufactured produce. The board appoints and dismisses the assistants and clerks.

The managing director has to effect the purchase of the milk and the selling of the produce, both, however, in conformity with a plan previously drawn up by the board of directors. He alone engages and dismisses workmen and women, both at the central and the branch dairies.

The board of directors meets once a month at least, the chairman exercises a general supervision in the intervals. To other members of the board is committed the superintendence of certain districts according to a division agreed upon between themselves.

Branch dairies at places, which are in daily communication with the capital all the year round, are established by the

board of directors whenever and wheresoever they find it advisable.

The establishment of branch dairies in districts which are deprived of daily communication with the capital requires more direct co-operation between the company and the neighbouring dairy farmers; but such dairies are always established as soon as sufficient means, by subscription for shares, have been obtained at the place, and a guarantee has been given for the delivery of the requisite quantity of milk. The annual profits of the company, after all the expenses and disbursements, as well as salaries, have been paid, and 20 per cent. of the value of the plant has been deducted, are to be disposed of in the following manner:

(a) Six per cent. interest is to be paid to the shareholders on their presenting the coupons of interest.

(b) Of the remainder, one-tenth is to be set apart as a reserve fund, which, in the event of a bad season or other circumstance causing the balance to be so small as not to cover the interest at the rate of six per cent. on the shares, may be employed in supplying the deficiency.

(c) What thereafter remains is to be divided between the directors, the shareholders and the purveyors of the milk in such a manner that the directors receive one-fourth, and the shareholders and milk-purveyors the remaining three-fourths.

(d) The amount falling to the share of the directors is divided in such a manner that the managing director receives one-half, the chairman one-fourth, and the other directors the remaining fourth, to be divided in equal shares among them.

(e) The division of the balance between the shareholders and the purveyors of the milk is made so that those purveyors who have furnished the factories during the whole of the previous year with milk to an amount of not less than 5,000 "kannor" (2,900 gallons), shall, for each 2,500 "kannor" (1,450 gallons) delivered at any dairy of the company, partake in the division equal to one share.

The milk from the different farms that have entered into contracts with the company for the delivery of the produce, is conveyed every morning and evening, immediately after the milking, to the nearest of the sixty stations at present fixed by the company for receiving the milk. It is there poured into tin vessels holding about 14 "kannor" (8 gallons), 20 by 13 inches each, which are placed in water, cooled so as to be from 36 to 40 degrees Fahrenheit, and are left there until the cream has risen.

The skimmed cream is conveyed by railway or steamer (during the winter also on roads) to the central factory, where it is made into butter in five churns worked by a steam engine of 4 horse-

power, by which 5000 pounds of butter can be churned per day.

At some of the branch factories, where at least 500 gallons of milk per day may be obtained, the company intend to try the production of Cheddar cheese, but at present that description of cheese is not made.

The butter is exported; the skim-milk cheese prepared in the Dutch manner, finds a good market at home. With regard to the quality of the butter, the most flattering testimony has lately been received from London factors.

The capital of the company is fixed at 55,000*l.*, but as soon as 8,000*l.* were subscribed—which was done in two days—the company commenced its operations.

The calculation on which the company was formed is abridged as follows:

RECEIPTS.

Supposing that 3 million "kannor" milk (= 1,700,000 gallons) are furnished per year, and that 5½ "kannor" of milk (= 30 gallons) are requisite for the production of 1 pound of butter 545,000 pounds of butter will be obtained, and sold at a price of 85 öre per pound (= 11.3 pence per Swedish pound) which will yield \$463,250

From 3 million "kannor" milk, after deducting the cream and the evaporation, 2¼ million "kannor" of skim-milk are obtained. Of this milk, about 2000 "kannor" per day, making 600,000, "kannor" per year are sold in the capital at an average price of 15 öre per "kanna" (= 3.6 pence per gallon), after deducting the commission, which makes 90,000

Of the remaining 1,900,000 "kannor" of skim-milk, calculating that 2¼ "kannor" of milk are requisite for the production of 1 pound of cheese, 760,000 pounds of cheese are obtained, making at 22 öre per pound (= 3*d.* per pound) 167,000

Of the cream employed in the making of the butter, viz.: 500,000 "kannor," 250,000 "kannor" are left after the churning, making, at 8 öre per "kanna" (about 1*d.* per gallon), at which price this buttermilk is sold in the capital 20,000

Of the milk employed in curdling, 85 per cent. is left in the form of whey; consequently of the above stated 1,900,000 "kannor" of skimmed milk 1,600,000 "kannor" of whey would be obtained. Whey is here generally used as food for swine, considered worth 2 öre per "kanna" (= ½*d.* per gallon), which in this case would be equal to a sum of \$32,000; but in this calculation we have only considered it as equal to the amount that may be required for fuel at the branch factories, and for the covering of unforeseen expenses.

Total receipts (40,713*l.* 15*s.*) \$740,250

EXPENSES.

For the purchase of 3 million "kannor" milk, the price of which is at present 19 öre per "kanna" (= 4½*d.* per gallon) \$570,000

Annatto, salt, spices for the cheese, rennet, barrels, etc. 12,500

Ice for cooling the milk; average price ½ öre per "kanna" milk (= 1-16*d.* per gallon) 3,750

Wood and coal employed at the central factory 1,000

Salary of the directors at the central factory 7,500

clerks in the office 10,000

" 10 mechanics and man-servants 6,000

" 5 traveling controllers 5,000

" 20 dairymaids at the central factory 7,000

Salary of 60 dairymaids at the branch factories	\$15,000
Rent and hire of buildings	10,000
Seven horses at the central factory	5,000
Other costs of carriage and transports	30,000
Amortisation of the expenses of buildings, machinery, etc.	10,000
Sundry expenses, such as writing materials, postage, medical attendance, etc.	2,000
Total expenses (38,238/ 15s.)	\$605,250
Surplus (2,475/)	\$45,000

The attention this enterprise has here called forth, has given rise to proposals for the forming of several similar companies within different parts of this county, to which result perhaps also your very interesting description of the cheese factories in North America, translated by me into Swedish and lately published, has not a little conduced.

THE savoury odour of Christmas Beef still lingers about the *Sun* office at Truro. Here is the latest cut, and a nice one it is:—

We always take pleasure in publishing figures that show decided improvements in our country cattle, when contrasted with those of a breed gradually becoming extinct in our more advanced rural districts, and consider that the credit is due altogether to the Agricultural Societies, organized by the Board of Agriculture, for we have in some instances noticed that in places where the operations of Societies do not extend, the old breeds of cattle abound to the injury of their owners and the detriment of the country in a corresponding degree.

In our issue of the 10th inst., in case of oxen, we gave some weights of old breeds. This week we are glad to hear from a very fine pair of six years old oxen raised by Geo. C. Phillips, Esq., North River, Onslow, from Durham stock owned by the Onslow Agricultural Society. This pair took the first prize given to fat oxen at the Colchester Exhibition, held in Truro, on the second of October last. That day they weighed separately 1770 and 2170 lbs. On the nineteenth of this month they were weighed again, when the figures stood 1900 and 2280 lbs. respectively. The lightest ox is not what is called an extraordinary sized animal, but he is very well built, and very fat, his girth being 7 feet 6 inches. His mate has few competitors of his age in the Province, is not in very high condition, and girths 8 feet. Mr. James A. Leaman, butcher of this town, killed the small one for his customers at Xmas. We do not doubt that it will go well with plum pudding, and recommend all lovers of agricultural progress and commercial enterprise, to secure a roast off it for that day. The dead weight of animal is 1045 lbs.

We hope Mr. Phillips will retain his large ox for the Provincial Exhibition, as we hear a handsome prize will be given to the best of such odd-fellows, and should the animal feed in the meantime like a Kamtschatkan in a New York hotel, we will not be surprized if he takes it, although Nova Scotia is a large country to beat.

The figures we have given about cattle are mainly important as they indicate results. Unless ages and girths are given, weights do not go for much. We therefore hope that

our thrifty farmers who feed cattle will give all the particulars necessary to inform thoughtful readers of the profit and progress made in the business.

In Mr. Phillips case it appears that in 78 days his pair increased 240 lbs. in weight, being rather better than 1 1/2 lbs. a day to each ox, while in case of a pair weighing 1126 lbs. less, owned by Mr. Longworth, the gain was 54 lbs. more in 6 days less, being a little over 2 lbs. a day to each ox. If whatever reason may be assigned for this difference in favor of the small cattle, it must not be taken as an argument on behalf of the old breed, as at nine years of age the Truro pair are, comparatively speaking, light weights, while that of Onslow at six, like unto giants.

AMONG our Canadian Seed Catalogues this season we find a new name,—Chase Brothers & Bowman, Oshawa, Ontario; the Catalogue is nicely got up, with a coloured picture of a thoroughly typical gardener on the cover, and other illustrations. The selection of vegetable and flower seeds appears to be very judicious, and the commercial information is interspersed with excellent remarks on the best modes of culture of the various vegetables, &c. Messrs. C. B. & B. adopt the American system of sending all small orders of seeds free by mail without expense to the purchaser. They are sent in packages of not more than four pounds in weight each. The firm is evidently an enterprising one, for they send a chromo to all who give them a seed order to the extent of five dollars. The subject-title of the chromo is "The Little Florists." It represents a robust country girl with a smaller boy, both laden with flowers, and their unrestrained figures and brown faces lighted up by the bright sunlight, show very well against the blank plastered brick wall. There is the mansion and its flower garden in the distance, and the gardener's cottage half buried in foliage. The ruddy bloom which these two youngsters have got in the garden is sufficient to drive every father and mother into a gardening fit without waiting for the melting of snow or thawing of ground.

MR. VICK, Rochester, has also sent his Catalogue, or "Floral Guide," which is even neater and more valuable than in any former year. The remarks, reaching almost to the capacity of a treatise, on Floral Decorations, Flower Culture, &c., are full of novelty and sound advice. If we can find room we shall give some samples in a future number. But every lover of flowers should send for a Floral Guide, price 25 cents, to James Vick, Rochester, according to advertisement in another column.

JAMES FLEMING, 67 Nassau Street, New York, also sends a very good Catalogue; there do not appear to be many novelties

in seeds in any of the Catalogues this year, but perhaps they are all the better on that account.



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March. C. R. COX.

### NOTICE.

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