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THE

NOVA SCOTIAN

JOURNAL OF AGRICULTURE

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

Omnium rerum, ex quibus aliquid adquiritur, nihil est agriculturâ melius, nihil uberius, nihil homine libero dignius.—Cicero: de Officiis, lib. I, cap. 42.

VOL. IV. **HALIFAX, N. S., DECEMBER, 1883.** **No. 40.**

NORTHERN LIMIT OF WILD GRAPE VINE.

BY PROFESSOR LAWSON.

Read to the N. S. Institute of Natural Science, 14th January, 1884.

I lately received a letter of enquiry from Professor Blytt in reference to the Northern Limit of the Grape Vine as bearing upon the early discovery of America by Norwegian sailors. As the range of our wild grapes had not been made a special subject of enquiry by botanists, and as these plants wherever they occur, are so conspicuous as to attract the attention of persons who might overlook other plants, I requested publication of a note, for the purpose of eliciting information, in the Halifax *Morning Chronicle*, *Morning Herald*, and *Acadian Recorder*. This brought some facts which will be found in the following correspondence. It is now published in the hope that additional facts may be obtained. It is not improbable that the range of Grape Vines along the Atlantic Coast region was more extensive before the country was settled than it is now, when the best lands are cleared and the country pastured by cattle. Any information on this point from old records or reliable tradition would be of special interest.

AMERICAN SPECIES OF VITIS.

The proper Grape Vine (*Vitis vinifera*) is believed to have been originally a native of the hilly region on the southern shores of the Caspian Sea, and of the Persian province of Ghilan; but it has been cultivated by man from the earliest times of which we have record, and has thus been extensively distributed over the world. It was not known, however, on the American Continent before settlers from Europe had brought it with them. Nevertheless early voyagers speak of finding Wild Grapes on landing on the American shores These so-called Wild Grapes are vines very distinct in character from the old world Grape Vine, but they nevertheless consist of species of the same genus *Vitis*, several of which bear, even in the wild state, clusters of well-flavoured grapes, whilst the fruit of other kinds is acid or mawkish.

V. bipinnata, which extends through Virginia to Georgia and west to Arkansas, has a globose depressed berry, size of a pea, blackish when ripe.

V. indivisa grows in the swamps of the Southern States west to Louisiana and Arkansas, bearing a very small usually one-seeded berry.

V. æstivalis the Summer Grape, grows from Connecticut to Florida and west to Arkansas, ripening its blue, pleasantly flavoured berries in October.

V. vulpina, or Fox Grape of the South, grows in Virginia, Florida and intervening States.

V. incisa is a Prairie plant confined apparently to Texas and Arkansas, and has black shining berries the size of a small pea.

V. cordifolia and *V. riparia* which are more northern in their range, have acid fruit, which sweetens after having been touched by frost, hence they are called Winter Grapes to distinguish them from *V. æstivalis*, the fruit of which becomes sweet as it ripens in the sun.

One of the best known species is *V. Labrusca* which has very large leaves, and is familiar to us in its garden forms as the Isabella, Catawba and several other well-known American grapes. Varieties of this species are distinguished by the hariness or woolly character of the very large leaf, and comparatively large berries.

CANADIAN SPECIES.

Only three species of *Vitis* extend into Canada, viz: *Labrusca*, *cordifolia* and *riparia*.

V. Labrusca, leaves (thick 4-7 inches) broadly cordate angular, more or less lobed, the sinuses obtuse or rounded, the under surface tomentose, berries, large globose.

V. cordifolia; leaves (thin, 3-6 in.) cordate acuminate, toothed, smooth (except on the vines), berries small.

V. riparia; leaves (thin 4-6 inches) more or less deeply divided into three lobes and incisely toothed; smooth, except on the petioles, veins and margins, which are pubescent; berries small.

V. LABRUSCA, *Linn.* Canada, Pursh. Torrey and Gray.

Near the Falls of Niagara, *Provancher*, Extends south to Georgia and west to Arkansas and Texas.

Torrey speaks of the fruit of the wild plant as having a strong disagreeable flavour, whilst when cultivated "it is as pleasant as any of the varieties of *Vitis vinifera.*" In Hooker's Flora (published so long ago as 1833) it is remarked that "two sorts are much esteemed at New York, and known under the name of "Bland's-grape" and the "Isabella-grape."

V. CORDIFOLIA, (*V. vulpina*, of Hook.); Shores of Lake Ontario west from Kingston; several places on the banks of the St. Lawrence, as at Thousand Islands, Brockville, La Chine, etc. Extends south through the United States to Florida and west to Arkansas.

"*V. cordifolia* or *riparia*, grows on the evidence of collections made on my former journeys, as far north as the south end of Lake Winnipeg, on the 50th parallel. I did not observe it on my late voyage, in which, indeed, I had very little leisure to search for plants; and if it actually grows in so high a latitude, it does not produce edible fruit so as to attract the attention of the residents, who could give me no information respecting it It is common in Wisconsin and Minnesota, with *V. esticalis.*" —Sir J. Richardson, Arctic Jour., II., p. 287.

V. RIPARIA, Michx, Canada, Mr. Cleghorn, Mrs. Percivall. Lake Huron, Dr. Todd, extending to the south end of Lake Winnipeg, in lat 50 degrees N., (Hook. H. B. A.)

Nicolet, P. Q., and Maldon, Ont., *Dr. P. W. Maclagan.* Belleville, common, especially along streams, *J. Macoun.* L'isle-aux-Coudres, Provancher. Some of the localities may belong to *V. cordifolia.* Extends through the United States south to Virginia and west to Arkansas.

Christiania, Norway,
5th July, 1883.

DEAR SIR,—My friend, Mr. J. Storm, professor of history at our university, wishes to know how far north on your coasts the wild species of Vitis (Vitis vulpina, labrusca, &c.,) grow. I cannot make it out for him with the books at my disposal, so I am obliged to turn to you and trouble you with the matter. You would oblige me and my friend very much if you would be kind to let me know the northern limit of the species above mentioned in your coast districts. America was discovered some 1000 years ago by Norwegian sailors, who found wild grapes at the shores and named the country after them "Vineland," which means the country of wine.

With much respect, yours,
A. BLYTT,
Professor of Botany at the University.

The Honorable Judge Ritchie informs me that when a boy he frequently gathered wild grapes between Annapolis Royal and Bear River, and that he has no doubt he could still find the place where the vines grow.

Professor Macdonald informs me that our esteemed President, Robert Morrow, Esq., before leaving for the south stated that he had seen a Wild Grape vine growing in a garden at Stellarton in Pictou County, and was told that it had been brought from the neighbouring woods. Some years later, at a distance of several miles further up the East River, he found the Grape growing wild.

MY DEAR PROFESSOR LAWSON,—In relation to your enquiry respecting Wild Grapes, I have a recollection of past days that may suggest to you a quarter in which that enquiry may be successfully prosecuted.

Many years ago I lent to the late Judge Haliburton (Sam Slick) an interesting book that I in vain have often endeavoured to recover. Reclamation of it is hopeless now! The author was a *Netherlander* of intelligence, who particularly mentioned an indigenous grape seen and *noted by him, of which the locality was the neighbourhood of Annapolis.*

Perhaps it might be worth your while to direct the proposed enquiry to some old inhabitant of the old French capital.

Yours ever truly,
L. M. WILKINS.

Windsor, 9th Dec., 1883.

My recollection of the book and the fact referred to is distinct, and you may regard it as reliable. The book was found by me among those of the Thomas family, by some of whom it was brought from Marshfield, Mass.—the ante-Revolution seat of that family—about the close of the last century.

The discovery of the author would, therefore, antedate the beginning of this century. L. M. W.

There is little doubt, I think, that a copy of the book in question is slumbering on the shelf of some Boston library. The author was not a mere traveller, but came to America on some mission for his Government.

I add a circumstance that may serve to identify:—The Book—probably on authority of a redman—indicated *phonetically* Niagara thus:—"Nee-a-gaw-raw."

L. M. W.

Windsor, Dec. 11th, 1883.

Bridgewater, 11th Dec. 1883.

DEAR SIR,—A young Norwegian Captain just left here for Spain, told me some of their professors were to visit our land, as he put it, in search of marks made by their countrymen long since, and a few days after I noticed in the papers that you had been consulted on the matter. My object is to let you know that there is a large rock sitting on three legs of stone, at the height of about 18 inches, which I believe was put up by those old explorers. It sits on Indian Point near the County line, between this and Queen's County. I met it when a child and have taken great interest in it. I have frequently visited it as it puzzled me, till of late years. Should you meet those people, if you think well of it, they may easily drive to it now, but not when I used to steer my boat to where it sits. Its plainly seen from entrance of the port. Locality, Indian Point, Port Midway Harbour, Queen's County.

Respectfully yours,
E. D. DAVISON, SR.

See article on Oak Canoe in *Scientific American*, Dec. 8th. I have a stone axe by which one could make quite a job at big work.

Just received a note from a friend informing me of his having three pieces of stone relics, and I have quite a number all from the Port Midway river, whilst nothing of the sort can I find about the LaHave River, but have two iron axes found in old graves, one having been buried at Went-hill's Lake where bones and axes were wrapped in birch-bark.

There is an old burying ground and koche for dried salmon, &c., I expect.

E. D. D.

Halifax, N. S., Dec. 8th, 1883.

DEAR SIR,—In answer to your question about "Wild Grapes," a small sized wild grape grows in abundance on some of the islands in the St. John river, about seven miles above Fredericton, N. B. I have drank the wine made from them and it is very good.

Any more information I can give will only be to happy to do so, and remain

Sincerely,
ALEX. IRVINE KARNEY,
International Hotel, City.

In a subsequent letter Mr. Karney observes that Mr. Michael Mitchell, Scotch Settlement, York Co., New Brunswick, is owner of the island where the grapes grow.

Liverpool N. S., Dec. 10th, 1883.

DEAR SIR,—There is a grape vine said to be a wild one growing on the farm of a Mr. Hall on the other side of Allen's Creek, close to the town of Annapolis.

I have seen it and was told it was a wild one, but it may be a degenerate vine planted by the French. Seeing your letter in the *Chronicle* of the 8th inst., I thought well to mention this one. I am

very intimately acquainted with the province of Nova Scotia, but do not know of any other wild vine.

Yours, &c.,
MAX D. MAJOR.

"Saint John Globe,"
Editor's Room,
Saint John, N. B.,
Dec. 10th, 1883.

DEAR SIR,—Wild grapes are not uncommon along the St. John river.

At Fredericton I know of several vines in gardens, which were transplanted from the woods, and some of which have seeded themselves.

Yours,
JOHN ELLIS.

Annapolis Royal, Dec. 10th, 1883.

DEAR DOCTOR,—Answering your enquiries in the newspapers, I beg to inform you I have always known a wild grape vine within a mile or more of this town. In a deep ravine, whose steep sides prevented culture, it flourished. It was surrounded by cultivated fields, cultivated no doubt by the French, before Nicholson's capture, a mile or more from the steep hills, now as then covered by the forest primeval.

It was very luxuriant, and, though I do not recollect eating the grapes, yet its flowers and half ripened branches I well remember. It was an object of curiosity to me especially as proving the exactness of old LesCarbot, our most exact and homliest historian. *Without knowing* I thought it the little Fox Grape so luxuriant on the warm south side of New England and which as a boy I knew so well—very thick skin, and very tart flavor. I have no doubt it still exists, but the snow would cover it now. I hear of many other vines about here, but this is the only one I have personally seen. If you want more knowledge let me know and next spring I could send you a specimen.
B. GILPIN.

St John, N. B. 10th Dec. 1883.

MY DEAR SIR,—I notice your communication in Saturdays *Chronicle* regarding the "Wild Grape" and its Northern Limit. Some years ago I was puzzled over the statement in Demont's account of the discovery of the St. John River that they noticed (in June 1604 or 5) grapes growing in profusion on its shores. For some time I was under the impression that they had mistaken some other vine for the grape. But I found afterwards that in fact the wild grape does grow in several places on the River St. John. On the sandy points along its south-westerly bank at Westfield, in Kings County,—luxuriantly on some islands near Oak Point known as "Caton's Island,"—a little further up and beyond this on the Islands at Oromocto and Prince William. Curiously enough I have always heard of it on the south-westerly shore of the River or the Islands, never in a wild state on the northerly or easterly bank, nor can I discover it on the Kennebecasis tributary where I have searched for it, as I have a summer residence at Lakeside near Hampton, where I am collecting these wild vines from Westfield, Greenwich, etc., with a view to amusing myself testing them as stocks on which to bud or graft some of the hardier, improved varieties.

I am Dear Sir, yours faithfully,
W. M. JARVIS.

Fredericton, N. B., Dec. 29, 1883.

MY DEAR DR. LAWSON,—I am in receipt of your note referring to the distribution of the wild grape in New Brunswick, but regret to say that I have but little information to give upon the subject. I have gathered the fruit in some of the valleys near Fredericton, as at the Falls of the Nashwaaksis, and it is quite common on the intervales and islands of the St. John River above this place, but I have never made any special notes regarding its occurrence. I think it likely that Mr. Matthew may be able to tell you something more about it, especially in the southern counties.

I am, Sir, &c.,
L. W. BAILEY.

To the Editor of the Morning Chronicle:

SIR,—In regard to Prof. Lawson's enquiry about localities where the wild grape vine is found on the Atlantic coast of this part of America, I would beg to state that I have studied the botany of Prince Edward Island carefully for years and have never seen anything of this plant here.

There is apt to be great incorrectness in the reports of unskilled observers on plants. Some species of our wild brambles which have a climbing habit, as *Rubus occidentalis* might be mistaken for *Vitis*.

Yours,
FRANCIS BAIN.
North River, P. E. I.

The information so far obtained shows that the present most northerly points of the Wild Grape (Vitis cordifolia, or its near ally V. riparia) are the following:—

Annapolis Royal, Co. Annapolis.
West River, Co. Pictou.
St John River, New Brunswick.
Isle aux Coudres, St. Lawrence River.

AT the sale of Hereford cattle by Hon. M. H. COCHRANE, of Canada, at Chicago, Nov. 23d, 19 head made an average of $579.47—total, $11,010. Mr. C. also sold 24 Aberdeen Polls, averaging $444.58, and 2 Galloways for $330 and $235 respectively.

MANURE CONSTITUENTS IN FOOD.

I am quite prepared to see you hold up your hands in incredulous astonishment, my friends, when you read this present article. In fact, nothing but ocular evidence could have persuaded me, I who am speaking to you, that, in certain cases 95 % of the most valuable constituents of the food must be sought for, not in the flesh, fat, bones, etc., of the feeding animal, but in its manure.

For the same weight of dry food, the sheep produces nearly twice as much manure as the pig, while the ox produces even more manure than the sheep. You will observe that the food given to the pig, consisting as it usually does, in practice as well as in Lawes' experiments, of meal of different sorts, is much more digestible than the food given to oxen and sheep, a large part of which is made up of hay; and you will also observe that the quantity of dry manure (litter excluded) produced a week per hundred pounds of live weight, was nearly the same whether the animal eating the provender was ox, sheep, or pig: the greater consumption of food by the pig accounts for this.

We have also seen, when speaking of the valuable constituents of manure, that the nitrogenous matters and the ash are the only parts worth preserving—the bulky parts, the straw etc., are useful as mechanical distributers, as attractors and retainers of heat from the sun-rays. If the live weight of an animal remains unchanged, and there is no production of weight, all the ash and the nitrogen contained in the food will be voided in the dung; and, of course, the reverse is equally true; if the bodily weight is increasing, or milk is being produced, the amount of ash constituents and nitrogen in the manure will be less than that contained in the food in direct proportion to the quantity of those substances which has been converted into animal produce.

Some of the albumenoids (nitrogenous) and ash constituents are left undigested during the passage of the food through the alimentary canal; these are voided in the solid dung. The digested part of these constituents; passing of course into the blood, becomes animal increase if the animal is giving milk or increasing in weight; and what remains is separated from the blood by the kidneys, and is discharged in the urine.

We saw, when considering what became of the food eaten by the three varieties of animals concerned in the Rothamsted experiments, that of every hundred of albumenoids (in barley meal consumed by a pig) twenty-one will be voided in solid dung, and seventy-nine pass into the blood. Now, if a pig con-

sume five hundred pounds of barley-meal, containing about fifty-three pounds of albumenoids, it will increase in weight about 109 lbs., which animal increase will be found to contain about 78 pounds of albumenoids. Whence it follows that for every hundred pounds of albumenoids consumed, 14.7 are stored up as carcase, 21 appear in the solid dung, and 64.3 as urea, etc., in the urine. In the same way, deducting the ash constituents stored up in the animal from those originally present in the food, we get at the quantity pre-ent in the manure. And to make this the clearer by a concrete statement —for these abstract calculations are always troublesome to my mind, which is not half as well trained as it ought to be —you may study the following table:

NITROGEN STORED UP AND VOIDED FOR 100 CONSUMED.

	Stored up as increase.	Voided as solid dung.	Voided in urine.	In total manure.
Oxen	3 9	22 0	73 5	96 1
Sheep	4 3	16 7	79 0	95 7
Pigs	14 7	21 0	64 3	85 3

ASH CONSTITUENTS STORED UP AND VOIDED FOR 100 CONSUMED.

	Stored up as increase.	In total manure.
Oxen	2 3	99 7
Sheep	3 8	96 2
Pigs	4 5	85 5

How very small is the amount of nitrogen and ash stored up in the fattening animal! It seems, at first sight almost incredible. More than 95 % of the ash, in each of the three cases, finds its way into the dung, and with oxen and sheep, more than 95 % of the nitrogen too! The pig converts a larger amount into carcase; but no great things after all.

Again look at the urine. From three to four times as much nitrogen in it as in the solid dung! This proportion depends entirely on the food, however: in the case of an animal fed on hay, the nitrogen will be found to be a little in excess in the solid dung; on straw, the excess will be still greater; but if cake, corn, and roots be given, the urine will contain a large excess of nitrogen over the solid excreta From this, as cake, in fact feeding stuffs of a high class in general contain large quantities of nitrogen, we may conclude that if the food be nitrogenous and easily digested, the nitrogen in the urine will greatly preponderate; if, on the other hand, the food be poor in nitrogen and hard to digest, the nitrogen in the solid, may exceed that in the liquid, dejections.

Lime, magnesia, and phosphoric acid are chiefly found in the ash constituents of the solid dung—in the urine nearly all the potash. Where, as in Lawes' experiments, sheep were fed on hay, 95 % of the lime, 70 % of the magnesia, and 83 % of the phosphoric acid, contained in the food, were found in the solid dung, but only 3 % of the potash.

The next table gives a good idea of the general composition of the solid and liquid dejections. The sheep were eating meadow-hay; the oxen, clover-hay and oat-straw, with about eight pounds of beans (horse-beans, not haricot-beans) per day.

PERCENTAGE COMPOSITION OF SOLID AND LIQUID EXCREMENT. SHEEP FED ON HAY.

	Solid excrement.		Urine.	
	Fresh.	Dry.	Fresh.	Dry.
Water	66 2	....	85 7	....
Organic matter	30 3	89 6	8 7	61 0
Ash	3 5	10 4	5 6	39 0
Nitrogen	0 7	2 0	1 4	9 6

OXEN WITH NITROGENOUS DIET.

	Solid excrement.		Urine.	
	Fresh.	Dry.	Fresh.	Dry.
Water	80 3	....	94 1	....
Organic matter	12 3	89 7	3 7	63 0
Ash	1 4	10 3	2 2	37 0
Nitrogen	0 3	1 9	1 2	20 6

See how much less water the solid and liquid excreta of the sheep contain than those of the ox; they are of course more valuable—that is why, in the South of England, we value a folding of sheep at $18 an acre!

How rich, too, the urine is, both in nitrogen and ash. We find that in the more highly-fed oxen the dry matter of the urine contains more than 20 % of nitrogen.

The next table, and the last, I suppose, that I shall trouble you with, is given to show the average amount of nitrogen, and of phosphoric acid and potash, the only two ash constituents worth bothering ourselves about, contained in ordinary cattle-foods. In reading it, you will please to bear in mind what I have repeated more than once: nitrogen is the most costly of all plant-foods as well as of all cattle-foods; phosphoric acid and potash being present in manure, our cultivated plants can, on an ordinary farm, find their other ash-constituents in the soil, and even potash may be neglected, as far as purchased manure goes, if cattle are decently well fed. It comes to this: what is wanted on a fairly well managed farm is *nitrogen* and *phosphoric acid*.

Oilcakes, you see, yield the best manure; they are rich in nitrogen and phosphoric acid, and contain no small amount of potash. (1)

(1) A feeding bullock, in England, often has 14 lbs., of linseed cake a day, for five and six months at a stretch; the beasts are not expected to pay—the manure makes the profit on the grain crop.

MANURIAL CONSTITUENTS IN 1000 PARTS OF ORDINARY FOODS.

	Dry matter.	Nitrogen.	Potash.	Phosphoric acid.
Cotton cake (decorticated)	900	60 0	15 0?	21 2
Rape cake	900	48 6	13 2	24 0
Linseed cake	880	45 0	14 7	19 6
Cotton cake (undecorticated)	895	29 9	20 1	29 9
Linseed	905	30 0	12 8	15 4
Palm-kernel meal (English)	930	25 0	5 5	12 2
Beans	885	41 0	12 0	11 0
Peas	857	36 0	9 8	8 8
Malt Dust	905	33 0	19 5	17 2
Bran	865	22 0	14 8	32 3
Oats	870	20 6	4 6	6 2
Wheat	850	18 8	5 4	8 0
Barley	860	17 0	4 9	7 3
Maize	880	16 6	3 6	6 1
Clover hay	840	19 7	19 8	5 6
Meadow hay	857	15 5	16 8	3 8
Bean straw	840	10 0	25 9	4 1
Wheat straw	857	4 8	5 8	2 6
Barley straw	850	5 0	9 7	2 0
Oat straw	830	5 0	10 4	2 5
Potatoes	250	3 4	5 6	1 8
Mangels	115	1 9	3 9	0 7
Swedes	107	2 4	2 0	0 6
Carrots	142	1 6	3 2	1 0
Turnips	83	1 8	2 9	0 6

Beans and pease, malt-dust and bran, come next: malt-dust is terribly neglected here—I could hardly give it away at my brewery at Chambly.

A queer thing, and one that will surprise many: clover-hay yields a richer manure than barley, oats, or wheat, but meadow-hay stands below the cereals in this function.

Dung from animals eating potatoes is richer than dung from root fed animals.

Straw is, as we all know, the worst manure-yielding food, but it is worth while to notice how far superior in all points bean-haulm is to the straw of the cereals, as is pease-haulm in a minor degree.

ARTHUR RICE JENNER FUST.

In Illustrated Journal of Agriculture.

FROM a quotation in the *Gardeners' Monthly*, the *American Agriculturist* appears to doubt whether *Kalmia angustifolia* is poisonous to sheep. It is not often poisonous to "sheep," for the simple reason that they do not eat enough of it; but it is often poisonous to early *lambs*, as these nibble the leaves in early spring time, and it does not require much to kill them.

THE DOMINION EXHIBITION OF 1883.

This exhibition has been the only one we have ever attended worthy the name of Dominion Exhibition. It has been a grand success, and the inhabitants of St. John deserve great credit for the enterprise, generosity and spirit evinced in setting such a pattern for others to follow. St. John has not the population, the wealth, or the amount of Government patronage that some of our western cities can command, but she has shown an example worthy of being copied by some of the owners of riches in the west; for instance, a wealthy merchant, Mr. Manchester (of Messrs. Manchester, Robertson & Allison), of St. John, N. B., being desirous of improving the butter products of the country, had at his own expense, engaged Prof. J. F. Sheldon, of the Agricultural College of Salisbury, England, one of the leading dairy authorities in England, to come to this Exhibition and give an exhibit of the latest appliances in butter making now in use in Britain, and to give addresses and instruction on the subject in Canada. A large space of the horticultural buildings was fitted up for the display of the utensils and for a lecture room, and as this had been well advertised, it drew a large concourse of farmers and their wives daily to see the appliances and hear the addresses, great interest being evinced in this department. Mr. Sheldon is a very pleasant speaker, and has awakened a great deal of thought upon this important branch of our industries, especially among those who have not had an opportunity of seeing the new process or reading about it. The cans for the different methods of setting milk were on exhibition and explained. The perpendicular and horizontal barrel churns were exhibited. The butter was churned in the perpendicular churn and was made up before the gaze of the spectators. The principal feature shown was the working of the butter in the globular state, and manipulating it by means of paddles instead of using the hand. The Laval centrifugal machine was exhibited in motion, but owing to some slight defects in the motive power, it did not separate the cream from the milk when we were there, and we watched it closely every day we attended the Exhibition. We do not consider the churning or the manipulating of the butter as shown at this Exhibition to be equal to what we have witnessed at the Kinkton Creamery, in the county of Perth, which was described in this journal two years ago, or at Montreal, as described this year. In another part of the Exhibition there was the Danish Centrifugal machine in operation, which separates the cream from the milk in an efficient manner. It was exhibited by Prof. Barre, of Montreal, and Mr. W. H. Lynch, of Danville, P. Q. It was a much superior and more complete implement than the one exhibited by Prof. Sheldon, but the cost is much greater. Mr. Barre has been employed by the Quebec Government to give instruction in butter making in that Province, where they have already five creameries using the centrifugal machine for separating the cream from butter. The principles have been previously explained in this journal. Mr. Lynch was at the Exhibition. We believe he is preparing a publication on the butter question under the auspices of the Ontario Government.

There was a very good and large display of live stock of excellent quality. The stock on an average was not in as high condition as is generally to be seen at our large western exhibitions, although a considerable quantity exhibited showed that liberal feeding had not been neglected. The Government Stock Farms of Prince Edward Island and New Brunswick strongly contested for the honors against each other; both carried off a large number of prizes, much to the chagrin and disappointment of the practical farmers who had brought their stock to the Exhibition. Loud and grievous were the complaints about this. It is a debatable question whether the Government stock of the different Provinces should compete for prizes at Exhibitions; also whether the Government sales of stock are checking private enterprise. The stock exhibited by the two Government Farms did credit to the feeders, but they would not have carried off so many prizes had some of our best Ontario breeders exhibited. But the latter would not take their stock so far; in fact, some of our best breeders do not exhibit at our Ontario Provincial Exhibition, although they hold stock that could not be excelled at any of the exhibitions.

At this Exhibition a few Polled Norfolk cattle were shown, the only cattle of that breed we have seen in Canada. There was exhibited one Holstein bull, a much larger and finer animal than any of that class that has been shown in Ontario. There were working oxen exhibited that would have taken the prize in Ontario; but what surprised us most was the large numbers of Jerseys—some remarkably fine animals, too; for instance, there was a large, solid colored Jersey cow, having good points, good pedigree, and a body well formed, straight back, wide brisket, showing a strong constitution; she was in milk and her milk veins were very prominent—in fact, she was the largest and best developed Jersey cow we have ever seen, such as a judge of a Shorthorn, Hereford or Galloway would not have looked at twice before giving her first prize. But the judges of Jerseys do not look so much to the symmetrical points of an animal, or the beef-making qualities, as they do to the escutcheon and yield of milk; the quality and quantity of milk are the crowning points in their estimation. Many a noted milker is but a very inferior looking animal in the eyes of the butcher. This remarkably fine cow deserves attention, as we saw some of her stock, and faultless animals they appear to be, and we know that the appearance of an animal must have some weight among many Jersey breeders. We hope to refer to this stock again, as it is our opinion that some German fanciers will aim for size, form and docility, and an animal that tends to fatten is generally docile. We do not meet any of our Ontario stock men at this Exhibition, and only one or two from Quebec. W. H. Rodden, of Plantaganet, took some Ayrshires and was successful both in the prize ring and in sales.

Implements were shown by agents, but many of the leading manufacturers were unrepresented. We believe that fully one-half the implements on the ground were shown by Messrs. Johnston, of St. John. There is an opening for some of our western manufacturers to effect sales in the Maritime Provinces, which would be of advantage not only to themselves, but to the farmers in those Provinces. The Machinery Hall was interesting, and the manufacturers of cotton and silk goods were better represented than at any of the western exhibitions.

In addition to being the Dominion Exhibition, it was called the Centennial Exhibition, as it is 100 years since the founding of St. John.

The display of grain was much better than we expected: in fact we thought it superior to the exhibit at our principal western fairs this year. In some vegetables and roots they excelled our exhibitions, more particularly was this noticeable in potatoes, and the display of apples from Nova Scotia was such as would rival, and, perhaps, surpass any State or Province on this continent. We are not aware whether British Columbia contributed anything. Ontario was very poorly represented and Quebec not much better; but Manitoba had a varied and magnificent display, by far the finest we have ever seen from that Province, both the quantity and quality being excellent, and very nicely arranged, reflecting great credit on the collectors and the arrangement. The grapes, grain, roots, the soil and the vegetation of Manitoba were viewed with intense

interest by the thousands that visited the exhibition, for many would not credit there could be such a fine display made. This and many other parts of the exhibit deserve more extended notice.

On our return, between Campbellton and Riviere du Loup, in the Province of Quebec, we noticed that the fields of grain were principally cut and lying in small bundles ready to be tied into sheaves. In some fields we saw several men, women and children reaping the grain with reaping hooks; some of the reapers reap on their knees. Some of the grain was still green; it consisted of oats and wheat principally. This was on the 8th of October. The crops in the Maritime Provinces had been secured, and ours in the west had been in our barns a month ago.—*From the Farmer's Advocate.*

THE POTATO CROP.

[The following paper in last month's *Chambers' Journal* is stated by the *North British Agriculturist* to be from the pen of an experienced agriculturist in the west of Scotland.]

It is to the grower rather than to the consumer that the fact of violent fluctuations in the value of potatoes chiefly appeals. The total expenses in the case of potatoes sent from such districts as Yorkshire or from Scotland to the metropolis are probably not over-estimated at from 30s. to 40s. per ton. When, therefore, the price to the retailer in the London market is £6, the amount reaching the farmer will be about £4 per ton. Should the price in the metropolitan market, however, fall to 75s., the farmer will find his return reduced from 80s to 35s. per ton, thus showing that a relief of 37 per cent., to the consumer implies a reduction to the farmer of 56 per cent., in the value of his crop. It has even happened, in the case of potatoes sent for sale to some distance, that the selling price has been entirely swallowed up by the inevitable charges.

The great fluctuation in the value of potatoes as a farmers' crop is, of course, owing to the extreme uncertainty of its soundness and weight per acre one year with another. In this way the supply in any one season may be much short of the demand, or may greatly exceed it. It is, however, an unwarrantable inference to judge that the year of a plentiful and sound crop is necessarily the most profitable one for the grower. This may be illustrated by reference to the crops of the two past years. The crop of 1881 was unprecedently large and sound. On fairly well-managed farms it was 8 to 10 ton per acre of "dressed" potatoes. The following year on the same farms, the "marketable ware," owing to disease, did not probably exceed 4 to 5 ton per acre. The price per ton for crop 1881 was, however, a good deal less than half of what has been realized for the produce of last year. The comparison may be shown thus:—1882, 5 ton per acre at 80*s.*, £20; 1881, 10 ton per acre at 30*s.*, £15; total, £5. Thus, a considerable difference in favor of the season of a meagre and diseased crop is brought out. And this is not all the advantage; for in 1881 there would be greater expense to the farmer in handling and carting the bigger crop, as well as a greater drain upon the soil's fertility.

With the information at our disposal through Government returns and otherwise, it is not possible to state exactly what is an annual average supply of potatoes for the purpose of human food. We know the acreage grown, and we may, with tolerable accuracy, estimate the average return of sound roots per acre; but it is always uncertain how much of the crop may be used in cattle feeding or sent to the starch manufactory In such a year as the present, we are perhaps safe in assuming that an exceedingly small proportion of the sound roots will be used otherwise than as human food. Judging from the prices during the past winter, it may with confidence be said that the supply from crop 1882 was not equal to the demand. On the other hand, a great deal less than the crop of 1881 is all that could be disposed of at a price which would be remunerative to the grower. Of crop 1881, it is reckoned that about 1,000,000 ton were exported, chiefly to America; besides this a great quantity was consumed by cattle; and still the surplus was too large to allow the price to rise to a remunerative figure, except in the case of farms near the large centres of population, where cost of carriage was small. The British demand for this article of diet may, therefore, be said to be somewhere between the quantity grown in 1881 and that grown in 1882. The total acreage of potatoes in the United Kingdom in these years may be stated roundly as 1,333,000. If the marketable roots of 1881 averaged 8 ton per acre, the crop of that year would be nearly 11,000,000 ton. Deducting 1,000,000 ton probably exported, and another 1,000,000 ton consumed by cattle, we have 9,000,000 ton as the quantity of sound potatoes available for human food of crop 1881. But from this we must deduct seed for the following year. We reckon this at only 500,000 ton of marketable roots; the quantity would not be enough for seed purposes; but it must be remembered that a considerable breadth is always seeded by 'seconds" (small potatoes), which are unfit for the market for food purposes. Making these deductions, we reckon the quantity of crop 1881 used for human food to have been 8,500,000 ton. This, then, may be considered the maximum quantity which the population of the kingdom care to use, even when potatoes are at the cheapest—when they can be had at the price of cattle food.

Crop 1882, including Ireland, where disease was very prevalent, is probably not under-estimated at 3 ton per acre of sound, marketable roots, or a total weight of 4,000,000 ton. Deducting, as before, 500,000 ton for seed, and reckoning all the rest to be used for human food, we find the quantity to be 3,500,000 ton of sound roots as the food supply from crop 1882.

From the experience, then, of the past two years, it would appear that 8,500,000 ton is too large a supply for our wants—more than will be remunerative to the grower; and 3,500,000 ton is so small an allowance that the London price is raised much above the intrinsic value of the article, as compared with other staple food products. With wheat at £11 to £12 per ton, potatoes are too dear at from £7 to £8 per ton, judged of by their value as human nutriments. Probably, we are not far from the truth in reckoning 5,000,000 ton to be the measure of the nation's annual demand. For this quantity, a fair price might be obtained by the grower.

We have not taken imports of potatoes into account in the above calculation. We find, however, that, during the past twelve years, there have been annual importations, varying from 38,000 ton in 1870—which is the smallest quantity—to nearly 500,000 ton in 1880, which is the largest importation during the period mentioned. It is probably safe to reckon that three-fourths of our imported potatoes are early varieties, and are used in this country between June and September, before the main portion of our own crop is ready for use. This being the case, the foreign competition in this product of our agriculture is seen to be of extremely little account.

It has not yet been found profitable to raise potatoes as food for stock. The average cost of producing 10 ton of potatoes would be sufficient to grow double the amount of turnips; and the latter is preferable, as costing less for labor and manure, and being more cheaply stored. It is not in cattle feeding that farmers can hope for a profitable outlet for the potato crop, when it happens to be superabundant. The value of the potato crop as a preparation for the growth of wheat yearly diminishes, as the growing of wheat is found to be itself unprofitable.

What is meantime wanted in the interest of the farmers is the means of annually growing just such a weight of potatoes as will be sufficient for consumption on our tables. To arrive at this, two things are requisite—first, a means of

stemming the ravages of the potato disease; and second, a constant supply of new varieties. This latter is the only way yet discovered of securing a full crop in adverse seasons. Were these two objects attained a great national benefit would be the result. The number of acres devoted to this crop, for instance, might be greatly reduced. Instead of having 1,300,000 acres planted, to insure the raising of an adequate supply for our requirements, it would be found that the requisite quantity (5,000,000 ton) could be grown on about 1,000,000 acres. This would represent a saving in seed alone of about £750,000. And it is a very moderate estimate to reckon the labor, manure, and rent of the 300,000 acres set free for other purposes at £10 per acre, or £3,000,000 annually.

When there is a lack of potatoes, the tendency is towards a greatly increased scarcity as the season advances. There are three reasons for this. The seed demand being generally about the same from year to year, the quantity required in spring for this purpose is a larger percentage of the available stock in a season of scarcity. Second, potatoes are of inferior keeping quality if touched by disease when still growing; and consequently a large percentage apparently sound in autumn become tainted during the winter.

Another result to be obtained by the discovery of a cure for potato disease, would be the better quality of the roots, from their being grown only on land well suited in every respect for their cultivation. At present the uncertainty of the crop, while it restricts the acreage on suitable soils, tends also to increase it in districts where other crops could be grown to better advantage. The great risk of failure makes the farmer of really suitable soil for the growth of potatoes cautious in determining the number of acres which he will devote to this crop. On the other hand the chance of the considerable profits sometimes made from the crop, induces the occupier of land not well suited by its own nature or its proximity to easy means of conveyance, to risk the cultivation of this precarious root, when he would be more profitably employed in growing turnips.

Sir John Lawes, the English Farmer-Baronet, gives the results of a Hunt for Nitrogen in the *Country Gentleman* of 10th January. One of the earliest facts arrived at during the Rothamsted experiments—40 years ago—was that the yield of wheat under mineral manures could be largely increased by an application of Ammonia; another, that the quantity of nitrogen in the manure could never be accounted for in the increased crop. Failing to find an explanation in the giving off of Ammonia in the plant, or in the assumption that the seasons had not been sufficiently favourable for the crop to use all the manure applied, Sir John began to look into the drainage water. He remarks as follows:—

"Finding that the winter drainage was rich in nitric acid in proportion to the quantity of ammonia applied in the autumn to the wheat, we very naturally set to work to stop this waste by applying these salts of ammonia in the spring. On one experiment the autumn application was continued. We have, therefore, two experiments in which the mineral manures are the same, but not sown at the same time. The wheat on both is sown the same day, but the same quantity of ammonia is sown, on one at the end of October and on the other in March. The crop of wheat grown by the autumn sown ammonia is less than that sown in the spring; but the difference is not so great as might be expected. The amount of nitric acid which passes through the autumn sown ammonia drains is very large, and, as nearly as we can estimate it, makes up with that taken up in the crop nearly the whole applied.

"For instance, in the year 1880-81 57 pounds of nitrogen was applied in the autumn. It was estimated that 57 pounds passed away as drainage, while the increased crop contained 26 pounds. While there was plenty of rain to wash the spring sown ammonia into the soil and subsoil, there was not sufficient to cause the drain to run until the wheat was cut and carried. In October the drain ran, and toward the end of the month samples of the soil were taken on each experiment, in several places, to the depth of 27 inches, and the nitric acid was determined. The excess in the soil where the ammonia was spring-sown over that which received the ammonia in the autumn was not more than 11 pounds per acre. It is evident, therefore, that while we are able to account approximately for the whole of the nitrogen in the autumn-sown ammonia, there is a considerable quantity in that which is spring-sown which does not appear as nitrogen in the crop or as nitric acid in the drainage water or soil. What then has become of it? Has it been destroyed? We know that nitrates when in contact with organic substances are reduced to ammonia, or even to nitrogen gas, if oxygen is absent. Has a portion of the ammonia entered into combination with the soil as such, and not been converted into nitric acid, or has the nitric acid got below the drain pipes? Although there was no drainage, it is quite possible that water might descend below 27 inches without the drain running.

These suggestions by no means exhaust the probabilities of what might occur. It is evident, however, that even in regard to the action of ammonia upon one crop only, the hunt is in full vigor, and the quarry likely to baffle our pursuit for many a long day. I have brought forward these results because they have an important bearing upon the application of these costly substances. Whether it will pay a United States farmer to use nitrogen, as salts of ammonia, or nitrate of soda, is a question upon which I do not venture to offer an opinion. When they are used, I would point out that with the much hotter and drier weather in the States, there is some danger of salts of ammonia failing to act upon the growing crop, if sown late in the spring. Under these circumstances, nitrate of soda would be a profitable substance to apply.

"It should be understood that several operations have to take place before a salt of ammonia assumes the form of nitrate of lime. The sulphate has to leave the ammonia and combine with with lime; the ammonia becomes what is called "fixed" in the soil, and then it has to combine with oxygen and lime. A moist soil is required for these operations, and it would almost appear from our experiments as if an early spring application, although attended with more risk of loss by drainage, might be advisable. I was recently consulted by some farmers who were not satisfied by the increase of the late sown barley, to which salts of ammonia had been applied, and I advised them to apply the manure at the end of February, even when they did now sow the barley before April. If the crop had been corn or mangolds, which grow throughout the summer and autumn, I should have advised the application to take place when the seed was sown, but barley is a very short lived crop, and requires its food to be ready for use."

POTATOES AND POTATOES.

Recent issues of the London *Gardeners' Chronicle* contain notices of two plants that may prove of considerable and substantial interest to Nova Scotian farmers. The first is a New Species of Potato, *Solanum Ohrondii* found on the Island of Gorith in the mouth of the Rio de la Plata. The plant has been successfully cultivated at Brest and at Montreuil near Paris. It is perfectly hardy there and grows continuously, producing two crops in the year. It spreads like couch grass or artichokes, and M. Blanchard has found it impossible to root it out. The tubers are not larger than hazel nuts, but under cultivation they show a tendency to increase in size. The flavour is rather strong. The tubers of our now common potato, *Solanum tuberosum*, were probably

no better than those of the new comer when first grown in Europe.

The second novelty is, if possible, even more interesting and promising. It is a SWEET POTATO grown in New Zealand, whose climate resembles that of England more than any other British colony. The New Zealand sweet potato is called "Kumara." The early voyagers spoke very highly of it, but it is only now successfully introduced to England, after ten years anxious endeavour on the part of Sir Joseph Hooker. This plant has been the staff of life of the Maories from prehistoric times The published figure shows it to resemble an Ashleaved Kidney potato in shape and size. In suitable seasons and soils its yield is very plentiful. About forty varieties are known.

THE custom of offering prizes to young men for proficiency in Scientific training for agriculture, is gaining ground both in Europe and America. The way was first shown by the Highland and Agricultural Society of Scotland. The County Councils of Ontario are now taking it up. It is not unworthy of the attention of our own Board of Agriculture and the Agricultural Committee of the House of Assembly. It might be well to consider whether a portion of the funds of Agricultural Societies could not be made good use of in this way. We have not time to wait for a full blown Agricultural College, and we fear a mere Agricultural Professorship or Lectureship in an Academic Institution would not draw the proper class. A few prizes offered for competition by examination would stimulate the young men all over the country to avail themselves of the scientific instruction now given at all our colleges.

At a meeting of the County Council of Simcoe, held at Barrie, Nov. 16, the Standing Committee on Finance reported as follows:—

That they view with hearty approval the effort now being made by the Agricultural and Arts Association of Ontario to encourage farmers' sons and others interested in agriculture to pursue a course of reading upon subjects pertaining to practical agriculture, and trust the effort will be appreciated. For the purpose of increasing the interest of the farming community in this scheme, your committee recommend that five cash prizes be given by the county to the candidates who secure the highest number of marks at the examination to be held in July, 1884, of the value in the aggregate of $100, viz., $30, $25, $20, $15, $10, upon the following conditions:—1st. The candidates must be under the age of 25 years. 2nd. They must produce a certificate from the Reeve of the municipality where they reside that they have been *bona fide* residents of the county of Simcoe for at least one year previous to the date of examination. A copy of this report to be sent by the clerk to the secretary of the Association at Toronto, and the prizes shall be paid upon the order of the examiners at Toronto through the secretary. (Signed), GEORGE P. MCKAY, Chairman.

PROF. PETERMANN has tried Dried Blood in comparison with doses of Nitrate of Soda containing approximately equal quantities of Nitrogen, and finds the value of Dried Blood to be less than that of Sodium Nitrate, both when used alone and applied conjointly with phosphoric acid and potash. The sources of Nitrogen appear to hold the following positions in respect to their efficacy:—

1. Sodium Nitrate. 2. Dried Blood. 3. Dissolved Wool. 4. Crude Wool. 5. Ground Leather. A. Nantier finds that Superphosphate and Precipitated Phosphate are most efficacious in increasing the yield of Potatoes. Upon Beets the action of Precipitated Phosphate was, in every respect, more beneficial than that of Superphosphate. Maize seemed to derive the greatest benefit from farm-yard manure.—*Biedermann's Central Blatt.*

Graham Bread and the wheat meal of the Bread Reform League are now coming in for their share of criticism. Dr. Max Rubner finds that the bran left in flour is not assimilated in the human system, and thinks it better to feed the bran to farm animals capable of digesting it than to waste it in overloading the digestive apparatus of human beings.

HOW to carry TENDER ROSES over the winter in Nova Scotia is a problem that has not yet been solved. The following is the New York plan, as given by C. E. Parnell, in the *Gardeners' Monthly:*

In order to protect tender roses properly during the winter season, they should be pegged down to the ground as close as possible, and covered up with six or eight inches of leaves or rough litter, over this place some evergreen branches, in order to prevent the leaves from being blown away. This covering should not be applied too early, not until hard freezing weather sets in, say from December 1st to 8th. In this latitude it is soon enough, for if the covering is applied sooner the shoots may be smothered and destroyed by decay, a certain result of too early covering. In the spring this covering must be gradually removed, a portion about the middle or end of March, and the remainder about the 10th of April, according to the season. If the roses are well established and are strong healthy plants, they will survive the winter, and more satisfactory results will be obtained by this method than by taking the plants up and potting them.

THE most extensive cattle-feeder of Illinois, Mr. Gillet, says it takes an immense capital to carry steers until three years old, before being properly fitted for the shambles; and for one, he has now done with it. He will dispose of his present three-year-olds this fall, and never rear another lot this age. Hereafter he intends to keep his calves fat as they grow up. He will induce them to eat oats and grass before weaning, so that they cannot fall away in flesh when taken from suckling the cows. He will continue the oats and hay in winter until they can digest corn well, and then give them plenty of that. By this system of feeding he can bring his high grade Short Horn Steers up to 1,600 pounds at twenty to twenty-eight months old. Young cattle take on flesh and fatten much faster previous to attaining the age of two years than at any subsequent period. In consequence of this there is considerable profit in pushing them up with plenty of feed thus far, rather than allow less feeding, and keep them on till three years old. Beeves of 1,200 to 1,500 pounds weight are now preferred, both in the American and English markets, to those older, for their meat is found to be more tender, juicy and savory than that of older and heavier cattle. —*A. B. Allen in New York Tribune.*

Printed at the Office of the *Nova Scotia Printing Company*, corner of Sackville and Granville Streets, Halifax, N. S.