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NOVA SCOTIAN
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CONTENTS:

The Field and Farm Yard.

WEATHER AND CROPS.

Halifax, 7th August, 1866.

The season has been a trying one for the patience of the farmer. The weather has been well suited upon the whole for the growth of most farm crops, yet both seeding and harvesting times have, so far, been unfavorable, and much disappointment, delay and waste of time have been the result.

At the opening of spring in April, the season was a few days later than last year. During May the weather continued changeable, cold, dull and wet, and there was no great improvement till the middle of June. Thus the season fell later and later, and there was but very little opportunity of putting in spring crops. The comparatively cold, wet weather, by which the whole of the spring was characterized, came to an end, as we have said, in June, and the third and fourth weeks of that month fully made up, by clear skies and high temperatures, for the previous want of warmth. The soil became completely dessicated, hot winds prevailed, and the grass fields began to shoot out premature heads and to show a stinted growth. The closing days of June brought heavy rains, the grass fields resumed their aspect of verdure, and all our crops have been making luxuriant growth.

During July the weather continued changeable, a few days of warm, dry weather, alternating with dull foggy days, and heavy rain showers; and August, so far as it has gone, gives the same kind of weather, so unsuitable at this season of the year.

THE HAY CROP.

So far as we have heard from correspondents throughout the country, the hay crop is very fair this year,—heavy indeed in the marshes, and although it looked thin at first on dry uplands, it has been gaining by a luxuriant second growth.—But the weather has not been favorable for hay harvest. Haying commenced in Halifax county about the middle of July, later than usual, and although we have had pleasant warm weather since then, yet what with alternating fogs, showers, and gleams of sunshine, we have not had much really continuous clear hay weather. There will no doubt be some hay badly saved this season. In Pictou county losses are already reported. The marshes and meadows were in many places flooded by the copious rains early in July, more so than they have been at that season for many years, and the wind and sand carried down by the freshet settled upon the grass; subsequent rains have washed off the dirt pretty well, but still much of the marsh hay will be dusty. The weather being so wet in the central counties of the Province, it is feared that in Cape Breton island there will be much difficulty in getting in the hay in good condition this season.

Really good well-saved hay will bring a high price.

GRAIN CROPS.

Grain crops have done well, and may be expected to give a large yield both in straw and grain. Probably smaller quantities of oats were sown than usual, and much was sown late in the season, but the copious rains have proved favorable to this crop, as well as to barley and wheat, where the latter has not been broken down.

GREEN CROPS.

Potatoes show luxuriant tops everywhere, and will give a good yield, provided we have warm weather to dry the soil and ripen the tubers; but should the season continue wet for some weeks longer the potato crop will, no doubt, prove a failure. The plants are growing

so luxuriantly that heat and drought are now required to ward off the much-dreaded "disease." No more suitable season could have been had for turnips. Wherever they were sown in time, and the land well prepared, they are doing well. The turnip is very apt to fail in this country, for some reason that is not very obvious, unless, indeed, it be poor cultivation or want of manure. Were our farmers to adopt the custom, now universal in Scotland, of invariably sowing their turnips with either bone-dust or guano, we should hear of fewer failures in the turnip fields, and see more turnip-fed cattle.

FRUIT.

Early in the season the APPLE ORCHARDS seemed to be setting very well with fruit, but the changeable weather had an injurious effect in causing much of it to wither away, and afterwards some to drop. The trees, however, are growing vigorously; we have never seen old apple trees make such luxuriant growths of young wood as they have this season. CHERRIES are reported everywhere as scarce; but the trees, like apple trees, are shooting out in long growths of young wood. The unfavourable weather immediately after blossoming time spoilt our crops of currants and raspberries, in some places; but in favourable localities there has been a fair, and indeed abundant, yield. Strawberries in heavy soils did remarkably well.

THE GARDENS.

Garden vegetables have grown with great luxuriance this summer, and although rather later than usual, are giving abundant crops. Slugs thrive too well, and gave much trouble by eating off small plants newly set out, such as cabbages, lettuces, &c. In the flower garden, plants require at this season to be well tied up, as otherwise the rains and winds make sad havoc among them.

THE GOVERNMENT STOCK FARM.

Our readers are aware that during last session, the Legislature made provision for the establishment, by the Board of Agriculture, of a Farm for the rearing of pure stock. Some time ago advertisements were inserted in the newspapers requesting offers of suitable farms. The number of farms offered was considerable. A deputation from the Board visited such of them as were likely to suit, and after full enquiry and consideration it was decided to purchase Mr. Snide's farm, which is conveniently situated at Shubenacadie, and is thus readily accessible by Rail. The matter is thus referred to in the *Express*:—

"We understand that the Hon. Mr. McFarlane, chairman of the Provincial Board of Agriculture, has purchased for the Province a farm at Shubenacadie, consisting of 350 acres, a hundred of which are under cultivation. This property, we learn, has been selected for a stock farm, and the Government intends taking possession of it at once. The necessary buildings for the housing of stock, &c., will be erected at once, and the farm stocked with the best description of cattle that can be obtained. This we consider a move in the right direction, and we have no doubt that a further improvement will be made by adding to it, as there is sufficient land, a model farm, an institution that is very much required in this Province, and a project recommended in this paper a few months ago. The price paid for the farm is, we understand, $7,000."

PROPOSED IMPORTATION OF HORSES, CATTLE AND SHEEP.

Much disappointment was caused this season by the non-arrival of a number of bulls from Canada, for the purchase of which arrangements had been made by the Board of Agriculture. It was found that in spring time the prices of such animals were so high, and the opportunities of speedy transit so uncertain that the Board had to forego the purchase for the season.

In order to meet the great demand for full-bred stock throughout the Province, the Board has determined to import a number of bulls of Devon, Durham, and Ayrshire and other improved breeds this fall. These animals will probably be kept on the Provincial Stock Farm over winter and sold in Halifax in the spring before rising of the Legislature, in order that societies throughout the country may, through their representatives or otherwise, have opportunities of purchasing at the proper season when the animals are required.

It is intended likewise to obtain a number of rams of those large Leicester and Cotswold breeds that have already given so much satisfaction in the Province.—The rams will probably be sold in Halifax in October.

The Board has further made arrangements for obtaining from England, if it can be advantageously done, a few heavy draught horses. These will form a valuable addition to the blood horses and mares which now form the provincial stud, and will enable the Board to meet the wants of the various counties more fully than it has been possible to do during the present season.

BONE DUST, SUPERPHOSPHATE AND CHEMICAL MANURE COMPANY.

Agriculturists throughout the Province will be happy to hear that a Joint Stock Company (limited), is being formed for the manufacture of Bone Dust and other Artificial Fertilizers, required for the successful cultivation of the soil. The capital stock of the company, amounting to $8000, consists of 80 shares of $100 each,—50 per cent. paid up. A reasonable annual return may be expected from the capital invested, and by careful management the stock may in time improve greatly in value as the demand for the manufactured articles increases and the works are extended.—The following are among the gentlemen who have already taken stock, viz:—Hon. Alex. Macfarlane, Hon. R. A. McHeffey, William Cunard, Esq., Joseph J. Northup, Esq, H. Yeomans, Esq., Hon. W. A. Henry, Hon. J. W. Ritchie.

The company is being organized under the sanction of the Central Board of Agriculture, and, so soon as 50 per cent. of the capital has been paid up, will be entitled to receive the Bonus of $600 offered by the Board to encourage the erection of a Bone Mill in the Province.

When the requisite amount of capital has been subscribed, a meeting of the stockholders will be called for the purpose of organizing the company and appointing directors. A person of much experience in the management of such works is prepared to offer his services as manager.

BOARD OF AGRICULTURE.

NOTICE TO THE SECRETARIES, OFFICERS, AND MEMBERS OF AGRICULTURAL SOCIETIES.

All Societies desiring to participate in the government grant for 1866 are required to send in to the Secretary of the Board, not later than 1st SEPTEMBER, 1866, a certificate of payment of the annual subscriptions for the year, *duly certified by the oath of the Secretary of the Society*, with relative list of paying members, all in terms of the Act.

Societies neglecting to comply, must necessarily be excluded from participation in the grant for the year.

By order of the Board of Agriculture.

GEORGE LAWSON,
Secretary.

[The above notice was printed in the January number of the *Journal*, and again in the April number. Lest it has escaped the notice of the officers of some society ignorant of the regulations of the Board, we reprint it again. Much delay in the distribution of monies to societies was caused last year by the necessary returns

not being sent in in time. We hope there will be no excuses this year on the score of ignorance or otherwise, as the Board must necessarily deal strictly with dilatory societies, in justice to punctual ones.]

ON THE USE OF BONES IN AGRICULTURE.

FIRST ARTICLE.

The peopling of the world by two classes of antagonistic organisms—plants and animals—is one of the most beautiful arrangements in nature, and gives rise to some of the most important phenomena with which the philosopher has to deal. The distributions of plants and of animals over the globe follow nearly the same law; it is only in rare and exceptional cases where they are not associated together, for they not only both depend upon similar conditions of soil and climate, but they insensibly minister to each others wants. The animal in every breath exhales a gas—carbonic acid—not only unsuitable for being again taken into the lungs, but highly poisonous, so that the very act of life vitiates the atmosphere and tends to extinguish all animal life; the plant, animate but insensate thing, is ready with its thousand mouths on each of its thousand leaves to inhale the vitiated air, abstract the carbon for the building up of its own wooden frame work, and give back the (to it useless) oxygen to purify the atmosphere and render it wholesome to the animal creation. Could anything be more beautiful than this? each playing its harmonious part on the stage of organic life, so as to serve its own and its neighbour's ends.

When it is considered, says Liebig, that every constituent of the body of man and animals is derived from plants, and that not a single element is generated by the vital principle, it is evident that all the inorganic constituents of the animal organism must be regarded, in some respect or other, as manure. "During life the inorganic components of plants which are not required by the animal system, are disengaged from the organism in the form of excrements. After death the nitrogen and carbon pass into the atmosphere as ammonia and carbonic acid, the products of their putrefaction, and at last nothing remains except the phosphate of lime and other salts in their bones. Now this earthy residue of the putrefaction of animals must be considered, in a rational system of agriculture, as a powerful manure for plants, because that which has been abstracted from a soil for a series of years must be restored to it, if the land is to be kept in a permanent condition of fertility."* In practical agriculture the necessity of returning to the soil what is taken from it, and more, is fully recognized; and as farm produce is chiefly converted one way or other, into animal food, the matters are usually returned in the form of animal excreta or animal remains. The former, consisting of the matter not assimilated by the animal, is of course greatly inferior as plant-food to the latter, which consists of the substances actually acquired by animals from the plants eaten as food. The powerful nature of animal manures is known to every farmer. All animal substances may be turned to good account, hair, woolen rags, &c.; and the luxuriance of a potato or a turnip plant growing beside an old shoe, or a vine flourishing over a stray bone are familiar examples of the striking effects of this class of substances. The florist, in the culture of his geraniums, can find *no* substance more highly suitable for encouraging them to rapid growth than the parings of horses' hoofs.

These facts indicate in some measure the reason why bones, fossil and recent, and in many forms, have become of such extensive utility as manurial agents.—Bone forms the principal waste substance in animals whose flesh is used as food, and is that whose decomposition goes on most slowly; and it is thus conveniently obtainable in sufficient quantities to return to the soil the elements which were taken therefrom for its construction. "It is forty or fifty years," says Dr. Johnston, "since bones began to be introduced in large quantities into Britain from the Continent, and especially from the north of Europe. They have since been constantly growing in repute as a manure, and large tracts of our high lands have been almost dependent upon them for the means of profitable cultivation. The vast importations of guano have scarcely checked the demand for them, and there is no question, I think, that their use will hereafter receive a very large development."

Bones vary in chemical composition in different animals, at different ages of the same animal, and according to the part of the body from which they are taken. They consist of two, organic and inorganic, parts; when bones are burned, the gelatine or animal matter (which forms the organic part) disappears,—the ash consisting of white *bone earth*, which is the inorganic part alone remaining. Much discussion has taken place as to whether the organic part of bones gave them value as a manure, or whether it was not entirely by their inorganic parts that they acted; but it may now be fairly assumed that both have a share in the manurial action. The following table is given by Agassiz and Gould as indicating the chemical constitution of the inorganic constituents of bone in the four classes of animals:—

ANALYSES OF BONES.

	Hawk. (Bird.)	Man. (Mammal)	Tortoise. (Reptile.)	Cod. (Fish.)
Phos. of Lime with a trace of Fluate	64.39	59.63	52.66	57.29
Carbonate of Lime...	7 03	7.33	12.53	4.90
Phos. of Magnesia .	0.94	1.32	0.82	2.40
Sulphate and Carbon. of Soda, & Chloride of Sodium	0 92	0.69	0.90	1.10
Glutin and *Chondrin.*	25.73	29.70	31.75	32.31
Oil	0.99	1.33	1.34	2.00
	100.	100.	100.	100.

The following composition of the inorganic parts of the bones of the cow is given by Johnston as representing very nearly that of the bones which are usually applied to the land:—

Organic Animal matter (gelatine)....	33¼
Phosphate of Lime.....	55¼
Phosphate of Magnesia.....	3
Carbonate of Lime.....	3¼
Soda and Common Salt.....	3¼
Chloride of Calcium	1
	100

There is a striking analogy in composition between bones and guano, which is, for other reasons, interesting to the practical man, but is especially important in connection with the object of the present paper. The following table exhibits the composition of bones compared with the average composition of good guano, supposing both in the dry state. Bones, as they are applied to the land, contain about 18 per cent. of water, Ichaboe guano from 20 to 25 per cent.:

	Bones.	Guano.
Organic Animal Matter.....	33	56
Phos. of Lime and Magnesia.	59	26
Carbonate of Lime.....	4	6
Salts of Soda.....	4	10
Salts of Potash.....	trace	trace
Silicious Matter.....		2
	100	100

"If we compare these two columns, we see that bones and guano contain essentially the same things. There is an organic part in both; both contain a large per centage of phosphates; and there are salts of soda and a trace of potash in both. But they differ in the proportions in which these several constituents are present. Thus—

"*a* The organic matter is in larger proportion in the guano. It is to be observed, however, that this organic matter is in the guano in a very decomposed state. It consists of salts, (oxalates, carbonates, &c.) of ammonia mixed with dark-coloured matter, (humic acid,) and water of crystalliation. In the Ichaboe guano, the ammonia rarely exceeds six or eight per cent. of the whole weight. But this proportion of ammonia we have seen that the gelatine of the bones will produce when it undergoes complete decomposition. On the whole, therefore, I am inclined to think that the organic matter in a cwt. of bones is nearly of equal value

* Liebig, Organic Chemistry, pp. 174-5.

to vegetation with that in a cwt. of Ichaboe guano. Those who are doubtful upon this point may easily supply any supposed deficiency in the former, by the addition of a few pounds of sulphate of ammonia.

"*b* The proportion of the phosphates in bones is twice as great as in the Ichaboe guano. In this respect, therefore, bones are decidedly the more valuable.

"*c* The soda salts are generally in somewhat larger quantity in guano.—They consist chiefly of common salt, mixed, in the case of guano, with a variable proportion of sulphate of soda. If any stress be laid upon this difference, it is easy to remove it, by adding to the bones a few pounds of sulphate of soda, which can be bought at a very moderate cost."

From this comparison between bones and Ichaboe guano, Johnston thinks that we are entitled to infer—

(1.) That what can be said of the value and permanent effect of the one manure may almost of equal truth be said of the other.

(2.) That we can fully supply the place of the one by the use of the other; and, what is more important to our present purpose,

(3.) *That, weight for weight, bones ought to go farther than Ichaboe guano in fertilizing the land.*

In following up this subject the writer quoted, puts these questions:—If this latter inference be true, why do bones not produce in all cases an equal effect with guano? Why are 8 or 10 cwt. of bones required to raise an average crop of turnips, while 4 or 5 cwt. of guano will fully serve the same purpose? The answers to those questions are—(1.) That while guano is in the form of a fine powder, bones are often applied either in form of a coarse powder or in large pieces, and are thus unsuitable for giving immediate action; also (2.) The chemical *condition* of the organic matter is different in the two substances, being in guano in a great measure in a soluble state.

The gelatine or organic part of bones consists, according to Johnson, of

Carbon	50.37
Hydrogen	6.33
Nitrogen	7.55
Oxygen	25.35
	100.

And is thus identical in composition with horn, and with isinglass, and nearly so with hair, wool, and skin, containing nearly 18 per cent., or one-sixth of its whole weight of nitrogen. The last-mentioned fact is sufficient to suggest the utility of this gelatine as a manure, and it has been in fact found in practice to be a valuable manurial agent when employed in the form of waste size obtained from the calico manufactories of Manchester. This proves that the beneficial action of bones as a manure depends to a certain extent upon their organic, as well as their inorganic constituents. These details we give as an explanatory reply to the question often put, Are burnt bones as valuable as fresh ones? It will be seen that unburnt bones are the more perfect manure, since they contain nitrogenous matter as well as phosphates.

Mr. Watson of Keilor, was one of the first agriculturists to draw attention to the importance of bones as a manure, and his highly successful experiments detailed in the first volume of the "Quarterly Journal of Agriculture" (1828), have been fully borne out by the experience of succeeding years. Their remarkable effects in inducing a luxuriant growth of turnips were well shown; and doubts having been raised whether the succeeding crops of oats and barley were in any degree benefitted by the small quantity of bones used in growing a crop of turnips, he confidently stated that on his farms, both the quantity and quality of his barley particularly were improved, and the grass for the first year was a fortnight earlier in its growth than after other manures. In the crop of 1825 the bone manure was a great blessing to the breeders and feeders of cattle in Scotland, and in some instances saved the industrious tenant from ruin. The severe drought even of that season did not prevent a crop of turnips with bones, while all other manures failed; and it was thus the means of bringing through that disastrous winter herds of cattle which must have otherwised perished for want of fodder.

BLIGHTS AND DISEASES OF PLANTS.

When animals die putrefaction ensues, and their bodies become more or less quickly decomposed. The same is the case with plants. Their bodies are no sooner dead, than they begin to undergo the putrefactive process, and to resolve themselves into their chemical constituents; they in great measure pass away into a gaseous form. Now this decomposition in dead animals and plants is usually attended by the presence of certain living organisms; some of the low forms of animal or of plant life, such as the common blue mould with which we are all familiar as occuring on decaying substances, although we do not all know it to be itself a peculiar form of vegetable existence. Now some of these minute and lowly organised plants and animals often make their appearance in the tissues of the bodies of living animals and plants of the higher forms, especially while these are labouring under disease—seeming Vulture-like to await the anticipated dissolution. In certain diseases, in fact, there are certain of these organisms constantly present, so much so indeed that the presence of the parasitical organism is regarded as a diagnostic mark of the disease. These facts show that in discussing the *diseases of plants*, we ought always to devote special attention to those fungoid parasitical growths which in plants are so conspicuous, as they are no doubt in many instances connected with plant-diseases; these in fact arising much more frequently in this way than the diseases of animals.

According to Schleiden, the condition of a plant as an object of cultivation and its disposition to disease are perfectly identical. Both are alterations of chemical action in the plant, produced through the conditions under which it grows.—All our cultivated plants, with very few exceptions, may be regarded as diseased; that is, as deviations from the normal process of formation of the species, and it is only the egotism of man which thinks otherwise of them, in as much as he finds his profit in these diseases as in the artificial enlargement of the liver in the Strasburgh goose. The greater part, indeed, if not all the peculiar internal diseases to which plants as well as men are subject, arise from an improper, deficient, or more frequently too abundant nourishment. In order, however, not to deviate too widely from the common mode of speech, Schleiden distinguishes that condition of cultivated plants in which they deviate from the normal form which they exhibit when wild, in consequence of too abundant nourishment as a general inward tendency to disease.

This tendency, however, becomes specific when they belong naturally to a very light or sandy soil, as oats or potatoes, and are now cultivated on heavy ground, or if, in consequence of the plan of cultivation which was once universal, they are grown in the first year in which the land is manured as wheat, rye, potatoes; or finally, if the climate in which they are cultivated, deviates greatly from their natural place of growth as is the case in wheat, maize and potatoes. Under these circumstances, very slight prejudicial influences are requisite, as for instance wet, cold, or extreme heat at an improper time, to cause the appearance of disease.

The only point which man has in his power is the avoidance of unsuitable soil and site in the cultivation of a plant, which will, however, be exercised by every intelligent agriculturist. Climate is beyond our power, and we cannot increase the general disposition to disease without at the same time hazarding the total loss of any particular species. The outer appearances of the diseases of vegetables are well known, and their specification belongs to the pathology of plants. The inward phenomena, as far as they have at present been examined, possess something general, which deserves a place here since it points decidedly to the fact

that the general tendency to disease is due to the influence of artificial culture.

As the physiology of plants turns on the investigation of the life of a single cell, if it is to be worked out with any degree of success, so also in pathological researches we must direct our attention exclusively to the alterations which the individual cells exhibit. In every living cell the substances proper to it are arranged on one simple plan. The wall of the cell is formed of firm, perfectly insoluble cellulose, which, after it has been penetrated with this or that matter, and has in consequence lost its purity, is in a condition to exhibit different appearances on the application of re-agents, but abstractedly always the same, and that a non-nitrogenous substance remains, in which, along with carbon, hydrogen and oxygen are present in the proportions in which they constitute water. This cell-wall is lined within by a coat of greater or less thickness, either yellowish or free from colour, consisting of a semi-fluid, somewhat coagulated, gelatinoso-granular substance, which is formed of a proteinous matter rich in nitrogen, and called by H. v. Mohl the primordial sac. Finally, the inner cavity of the cell contains a highly mixed fluid, the medium of whose fluidity is water, in which a few nitrogenous, proteinous compounds are present, together with many which are non-nitrogenous, as gum, sugar, pectin, &c., soluable salts, and in a fixed form starch, inulin and crystals.

The relation of the greatest consequence as regards the life of the cells seems to be that of the nitrogenous lining to the other substances, especially the non-nitrogenous, and the vigorous health of the cells depends entirely on the normal condition of the stratum. When the cell is old and begins to perish (as for instance in the wood cells), this coat gradually disappears, or is so closely united with the cell-wall that it becomes inseparable, while at the same time it penetrates it in a soluble state, and thus by degrees the original reaction on the cellulose is perfectly masked by the constantly increasing re-action on the proteinous combinations.

If we now examine the first deviations from normal phenomena which are exhibited in the occurrence of internal diseases, as for instance in smut (*Uredo segetum*), in decay, as in the stems of Cacti, juicy fruits, &c., or in the potato murrain, we find in every case that the nitrogenous lining of the cell first becomes discoloured, assumes a darker tint, a firmer consistence, a more evident granulation, and that it begins at the same time to percolate and saturate the cell-wall, so that it ceases to exhibit its pure reaction on the cellulose. These phenomena are so general that we may well suppose that all inward diseases of plants actually derive their origin from an abnormal condition of this coat, and inasmuch as the peculiar power of the chemical process in the cells is apparently concentrated there, its depravation first calls into existence the symptoms of disease which are perceptible at a later period in the other portions of the cells. The comparative luxuriance of plants depends upon the inorganic matters presented to them in the soil.

The proportional rarity of phospates in most geological formations, and also in the soils which are wholly or principally formed from them, is well known; on the contrary, they are accumulated in soils principally formed of decomposed vegetable matter after being slowly collected by the plants. Animal excrements are very rich in these salts, and therefore manured fields, and especially gardens, contains a greater proportion than is normally present in plants, or can be consumed by them. But the influence which inorganic substances in the soil exercise on vegetation depends upon their being generally present. For since plants have not the power of choosing their own nutriment, and since the proportions in which soluble substances present themselves for absorption can be altered by endosmose within very narrow limits, it is equally important that the substances which are requisite for plants should be contained in the soil in something like the proper proportions, since the plants are otherwise compelled to receive matters in greater quantities than is agreeable to their normal structure, and in consequence inevitable anomalies take place in their vital action.

The sum of what has been said may be stated thus:—The more phosphates are relatively increased in any soil in consequence of its mode of formation or cultivation, the more will the plants which it sustains have a tendency to deviate from their original type, to form sub-species and varieties, and finally to be attacked and destroyed by internal disease.

THIRD REPORT OF THE CATTLE PLAGUE COMMISSIONERS.

Symptoms and Course of the Disease.

We were anxious to ascertain, in the first place, what are the earliest signs which can be relied on as indicating the existence of the disease. As to this point, the inquiries set on foot in this country, first by Professor Gamgee and then by Dr. Sanderson, establish this fact, that a rise of temperature precedes any other symptom. Within a period ranging from 36 to 48 hours after an animal has taken the cattle plague by inoculation the natural temperature rises from 102° Fahr., or a little above, to 104°, or even 105½°. This occurs at a time when the animal appears to be in no way ill. It follows therefore that the length of the inoculative period, that is, of the time when the disease is hatching in the body, is less than was supposed. The disease can be detected at least two days earlier than has been hitherto believed, and the duration assigned to the incubative period must be reduced by that time.

This discovery has practical importance. It may and ought to lead to an earlier separation of sick from sound animals, and may also render it possible to shorten the period of quarantine.

Two days after the perceptible rise of temperature has begun, the next sign occurs, namely, a peculiar condition of, or eruption on, the lining membrane of the mouth. It resembles at first sight the appearance in the foot-and-mouth disease, but can readily be distinguished from it by a practised eye. Dr. Sanderson has found it in every case (80 in all) seen by him, and in every instance he has been able to recognise the disease from this sign alone. It has been stated, however, that in rare instances it has been absent. Almost simultaneously there occurs a very distinctive appearance on the mucous membrane of the vagina. It appears that one or other of these signs is very rarely absent; so that when they are taken in connection with the elevation of temperature, the diagnosis of the disease can be made with certainty.

On the day following the appearance of the eruption, or about 72 hours after the first elevation of the temperature, the animal may be observed to be a little ill, to have less appetite than usual, and to ruminate irregularly. Even at this time, however, the pulse may be unaltered.—On the following day, the fourth from the first rise of the temperature, the animal for the first time shows marked symptoms of illness, and this period, which may be 110 hours after the real commencement, is usually considered by superficial observers as the beginning of the disease.

The seriousness of this oversight is obvious, not only on account of the great importance of the earliest possible separation and isolation, but in regard to treatment. The very earliest recognition of the disease is essential, if a remedy is to be discovered, for it is within the first four days that any remedy is most likely to be efficacious.

After the fourth day is over the constitution is thoroughly invaded. Then ensue the urgent symptoms—the drooping head, the hanging ears, the distressed look, the failing pulse, the oppressed breathing, the discharge from the eyes, nose, and mouth, the eruption of the skin, the fœtid breath, and the other well-known signs of the disease.

During the sixth day there occurs a great diminution of the contractile force of the heart and voluntary muscles, the

pulse becomes very feeble and thready, the respiratory movements are modified, and the animal sometimes shows such weakness in the limbs that it has even been thought that some special paralytic affection of the spinal nerves must exist. The temperature now rapidly falls, and signs of a great diminution in the normal chemical changes in the body appear.

Death usually occurs on the following or seventh day from the first perceptible elevation of temperature.

Although this is given as the typical course of the disease, there are great deviations from it, as some animals live a longer, many a shorter time, and the severity and sequence of the symptoms vary considerably.

The causes leading to these symptoms, or, in other words, the reasons why these alterations from health occur, may be thus stated. A peculiar agent causes first of all a morbid state of the blood. Coincident with the first elevation of temperature, and, of course, long before there is the least outward appearance of ill-health, the blood of an animal which has taken the cattle plague contains an agent which can produce the plague in another animal. In other words, the earliest fact which can be made out after infection is, that the blood contains the poison of the disease, so that serum obtained from it will give the disease by inoculation.

This fact, ascertained by Dr. Sanderson, is the most important pathological discovery yet made in the cattle plague. It is pregnant with consequences in medical doctrine, for though the existence of a similar fact has been long suspected in several human diseases it has never been proved in any. So material, indeed, is it, that we must dwell on it for a moment. The poison contained in a minute portion of the mucous discharge from the eyes and mouth of an animal ill with cattle plague, if placed in the blood of a healthy animal, increases so fast that in less than 48 hours, perhaps in a far shorter time, the whole mass of blood, weighing many pounds, is infected, and every small particle of that blood contains enough poison to give the disease to another animal.—This at once accounts for the rapid spread of the cattle plague. The agent is multiplied to a large amount in a very short space of time. How soon after the poison is put into the blood the animal becomes capable of giving the disease by natural infection to other animals, is not determined; possibly not until those parts of the body which can give off products to the air become impregnated with the poison. At what time the blood and the textures cease to be able to give the disease, is also not determined; nor, when the poison mixed with mucus or with serum is exposed to the air, can a definite time be named when its energy is destroyed.*

As far as we can judge, the elevation of temperature, or (to use the usual medical term) the fever, begins when the poison has infected the whole mass of blood, *i. e.*, within from about 40 to 60 hours after its first entrance into the system.—At the same time the chemical changes in the body are augmented, and one of the ultimate products of disintegrated tissue, urea, is, according to Dr. Marcet, largely increased in amount. Soon afterwards (the time cannot be stated with precision), the blood is otherwise altered, the amount of fibrine is largely increased, the amount of water is lessened, and possibly the physical condition of the albumen may be altered, if we may judge from the change which Dr. Marcet observes in the diffusibility of the albumen of the muscles. According to Dr. Beale, the proportion of soluble substances is also largely increased.

The next phenomenon which can be observed is an alteration in the circulation. Almost everywhere, but more especially on the mucous surfaces and on the skin, there occur on the third or fourth day local congestions varying in size and intensity. In many places obstructions occur, and coagulations of blood in the capillaries: and in some cases the blood becomes quite stagnant.

A great increase of granular matter is found to take place both within and outside of the vessels of the affected parts. The capillary vessels themselves are greatly enlarged, and the spaces between lessened or even obliterated. At the same time a considerable nutritive alteration goes on in the mucous membrane and skin, which leads to very rapid and imperfect growth of many of the cellular elements, and this is followed by a rapid disintegration and detachment in the form of discharges. As that portion of the mucous membrane which is most essential for the digestion of the food is most affected, the appetite soon fails, rumination ceases, and large accumulations of undigested fodder are met with in the first stomach. In many cases the villi of the small intestine are so destroyed, that even if food were taken it would scarcely be absorbed in sufficient quantity to maintain life, and hence the rapid exhaustion, failure of the heart's action, depression of the animal heat, and general sinking of the powers. In some cases, when the process is more superficial, the membrane recovers its former structure, and that rapidly, and it is curious to find that one affected may be healing while another is just beginning to suffer.

When, as sometimes happens, the mucous membrane most affected by the congestion is that of the lungs, the phenomena are not less severe; indeed, the disease is sometimes even more quickly fatal. A slight cough is soon followed by accelerated breathing, which rapidly increases; and not unfrequently the difficulty becomes so great that some of the air vesicles are broken, and the air passes into the cellular tissue between the lobules, and from this it reaches even the subcutaneous textures of the back. This is believed by Dr. Bristowe and Dr. Sanderson to be the cause of the emphysema which they fully describe.

Reviewing this train of symptoms, it appears that the amount of fever, that is, the extent of the rise of temperature, does not constitute the danger of the disease; in some of Dr. Sanderson's cases the temperature was higher in beasts which recovered than in others which died. The true measure of the danger should rather, it seems, be sought in the changes in the nutrition of the digestive or respiratory mucous membranes, or in the failure in muscular contractility.—This latter condition is itself probably in part a consequence of the former, though whether it is entirely so we are not prepared to say.

Whatever may be the cause of these very general congestions and nutritive alterations, the remarkable fact obtains that poison is present in the discharges from the mucous membrane, and hence at this period the beast is most highly infectious. The matter runs down the hide to the floor or woodwork, and when dry may be carried as dust in the air, and infect other beasts when received on the absorbing surfaces of the eye, nose, mouth, lungs or stomach.

* When carefully protected the mucous discharges have occasionally retained their power of giving the disease by inoculation for no less a time than seven months, according to Professor Jessen of Dorpat. Ravitsch also has kept the poison for seven months.

JULY MEETING OF THE FRUIT GROWERS.

The following certificates were awarded at the Exhibition of the Fruit Growers' Association, held at Wolfville on the 11th inst.:—

CHERRIES.

1st Class Certificate—Dr. Hamilton for four varieties.

2nd Class Certificate—Geo. V. Rand.

3rd Class Certificate—Richard Starr.

STRAWBERRIES.

1st Class Certificate—Dr. Hamilton for three varieties.

2nd Class Certificate—Geo. V. Rand for seven varieties.

3rd Class Certificate—Isaac Shaw for two varieties.

LAST YEAR'S APPLES.

1st Class Certificate—Robt. W. Starr for six sorts.

2nd Class Certificate—Richard Starr, Nonpareils.

3rd Class Certificate—Dr. Hamilton, Nonpareils.—*Colonist.*

Communications.

CULTIVATION OF STRAWBERRIES.

[We have much pleasure in publishing the following communication from Mr. John Johnston, the intelligent gardener to Fr. Ellershausen, Esq., of Ellershouse, and hope to receive a continuation of contributions to the Journal.—Ed.]

As the season for making fresh plantations of strawberries is rapidly approaching, a few words concerning their cultivation might not be out of place at this time. First of all the soil should be a deep rich mellow loam, heavily manured, and either dug or trenched to the depth of two or three feet, as strawberries will, under favourable circumstances, send their roots down as far as three feet the first season. Strong, well rooted young plants should be selected, the runners cut away, and then carefully lift them with a trowel, plant in rows two feet apart and eighteen inches between the plants in the rows, tread the soil firmly round each plant as you proceed. The third week in August I prefer for planting, as then the plants have full time to get thoroughly established, and have their crowns (or buds) well ripened before the severe weather sets in. All that they require after planting is to keep them clear of weeds, and cut away any runners which they may put out till frost sets in, when a good layer of short manure is to be put in between the rows and round the plants, with an additional covering of spruce branches over all. In the spring, towards the end of March or beginning of April, take off the covering gradually so as not to let them get checked with the hard frosts at night and strong sun during the day. When the weather gets fine, rake the litter off that was put on in the fall and give them a dressing of good fresh rotten manure, dig it carefully in between the rows with the points of a digging fork. All decayed leaves should be removed from them; and all that has to be done then till the colouring of the fruit begins is to keep them clear of runners and weeds. When the fruit begins to colour good clean straw or short grass is to be put in between the rows and round the plants to prevent the fruit getting soiled. Some people use tiles made for the purpose, but I prefer straw, as the strong heat of the sun on the tiles ripens the one side of the fruit before the other. The same routine should be followed after the fruit is gathered as when they were first planted. By following the above directions the fruit will be far superior the second year, and the third they will be at their best, when they should be dug down and a fresh plantation made, as they always degenerate more or less after the third year. A good plan is to have three successions, to dig down three years old plants, and supply their place with young ones. Single rows of lettuce may be planted between the strawberries the first year, but after that they are better left to themselves.—I prefer rows to the bed system of planting, as the plants can be better attended to and at the same time produce larger and finer flavoured fruit.

I subjoin a list of the best for general use:—Black Prince, very early, great bearer, good flavour; Keen's Seedling, a well known first class variety; Agriculturist, a splendid new American variety; Oscar, a fine, large, good flavoured variety; British Queen, one of the oldest, excellent flavour; Grove End Scarlet, a good variety for preserving.

John Johnston,
Gardener to F. Ellershausen, Esq.,
Ellershouse Station, Hants Co.

Arts and Manufactures.

BLASTING OIL—NITRO-GLYCERINE.

We have in "Alta California," a dozen columns of ample details of the inquest in the lamentable nitro-glycerine case of San Francisco, and accounts of the funerals of some of the principal persons killed. The explosion took place on 16th April. A box of "merchandise," without any indication of its dangerous contents had been received at San Francisco from France by way of New York and Panama. On arrival it was found by the Express Co. to be leaking. Some of the express officers proceeded to examine it, and the concussion caused by the use of a hammer or other instrument in opening, gave rise to the explosion which killed and destroyed everybody and everything within reach, men, horses, trucks, buildings, &c.

At Aspinwall on 3rd April, a similar explosion took place on board the steamer *European*, causing the total destruction of the ship, and the loss of the lives of her captain and the majority of her officers and crew, as well as of several persons resident in Aspinwall, besides doing an immense amount of damage to property on shore.

An explosion occurred some months previously at New York.

"Nobel, the German chemist, when the idea first flashed on his mind of the combination of nitric acid and glycerine, for purposes of explosion, little dreamed that the infernal compound was so soon to cause such terrible destruction of life and property at points thousands of miles from his laboratory. Here, in San Francisco, we have scarcely recovered from the effects of the awful calamity of Monday last before news is flashed over the wires of another explosion of the same mixture at Aspinwall, by which fifty-one lives were lost, a ship and wharf destroyed, and damage done to the amount of a million of dollars.

"This nitro-glycerine is the most fearful, and, according to sad experience so far, the most unmanageable explosive agent which has ever been discovered.—It is to gun cotton what gun cotton was to gunpowder. It is impossible to form even an approximate idea of its tremendous power. If a single box was sufficient to shake the whole centre of this city like an earthquake, how tremendous must have been the crash at Aspinwall? Its force seems altogether to be too great for human control.

"One fact, however, connected with it is established beyond question—that it ought not to be transported, by land or sea, on any public conveyance. If the ingredients cannot be shipped separately, and then mixed at the point where it is to be employed, its use will have to be abandoned altogether. To place nitro-glycerine in wooden boxes, on board steamer, rail car, or stage coach, with the fearful results of the past few weeks before us, is to commit the most atrocious crime of which man is capable. Under such circumstances, the only course which can be pursued is that suggested by the Chamber of Commerce of this city. Congress is the only body that can grapple with the subject. It has, under the Constitution, "the power to regulate commerce." It is beyond question that unless the most stringent penalties are prescribed, nitro-glycerine will continue to be shipped to this State, under one guise or another.—The resolutions of the Chamber, asking the immediate passage of a law making it felony to ship the compound, were telegraphed on Thursday to Washington, and it is to be hoped that speedy action will be taken upon them."

Miscellaneous.

ACADIAN BOTANY.

PART II.

IRIS VERSICOLOR, LINNÆUS.—COMMON BLUE AMERICAN FLAG (FLEUR DE LIS).

Natural Order: IRIDACEÆ.

A herbaceous perennial plant, with thick root-stock, stout angled stem, and sword-shaped leaves. Flower showy; perianth of three large outer divisions (sepals), and three much smaller inner dones (petals); stamens three; stigmas three, petal-like. Flowers chiefly blue, variegated and veined with white, purple, &c. Flowers in June.

Iris versicolor, Linnæus. Persoon's Synopsis Plantarum, vol. i. page 52.—Gray's Manual, 2ed, page 459.

The common blue flag of the American continent is abundant in swamps and low grounds throughout Nova Scotia, New Brunswick, Upper and Lower Canada, and the northern United States. We have specimens from Labrador, collected by Rev. D. Sutherland, where it is no doubt equally common.

NUPHAR ADVENA AITON.—THE POND LILY.

Natural Order: NYMPHEACEÆ.

An aquatic herb, with long thick root-stock, creeping in the mud; leaves floating (in shallows emersed), long-stalked, oval oblong, cordately cleft at the base, margins entire. Flowers yellow, composed of usually six sepals, the outer ones smaller than the others; true petals, small, narrow and thick, (resembling stamens in form); anthers longer than their filaments. Flowers during the summer months.

Nuphar advena, Aiton. Hooker's Flora Boreali-Americana, vol. i., page 33.—Torrey & Gray's North American Flora, vol i., p. 58. Gray's Manual, ed. 2d, p. 23.

Nymphæa advena, Persoon's Synopsis Plantarum, vol. ii., p. 63.

The pond lily is a great ornament of the shallow lakes, ponds, creeks, and canals of Nova Scotia, where the water is stagnant and the bottom muddy. It is equally common in the other Maritime Provinces, and in the creeks and lagunes of Upper Canada. It resembles the yellow water lily of England *(Nymphæa lutea)*, which has been attributed to this continent, but, if found, is probably limited to extreme northern regions.

KALMIA ANGUSTIFOLIA, LINNÆUS. LAMB KILL, SHEEP LAUREL OR LAMB POISON.

Natural Order: ERICACEÆ.

This is a large, stouter shrub than *K. glauca*, and of more compact habit; the leaves are palish underneath, but not white, narrowly oblong, obtuse, stalked, more or less deflexed when old; flowers numerous, in corymbs around the stem, with leaves above and below. Flowers very showy, of a purplish or rosy lilac colour, appearing in June; sometimes there is a second flowering in autumn.

Kalmia angustifolia, Linnæus. Persoon's Synopsis Plantarum, vol. i., p. 477.—Gray's Manual, p. 255.

This British American shrub is very common indeed along the Atlantic shores, but becomes much scarcer as we travel inland. On the hills around Halifax, and in many other parts of Nova Scotia, it is extremely abundant. Lambs are very often poisoned with it, but usually recover when care is taken to give an emetic; under the influence of this poison animals seem to suffer great pain.

KALMIA GLAUCA, AITON. GLAUCOUS-LEAVED KALMIA OR PALE LAUREL.

Natural Order: ERICACEÆ.

A low, straggling, wiry, evergreen shrub; branchlets two-edged; leaves (evergreen) opposite, almost sessile, oblong, with revolute margins, giving them a narrow, more or less linear, appearance, dark green and shining above, glaucous-white beneath. Flowers rather large and showy, comparatively few, on slender stalks, in terminal corymbs, purplish lilac. There is a variety *(rosmarinifolia)* with narrower leaves. Flowers in July.—The gamopetalous corolla has in this, as in other species of the genus, a circle of depressions in which the anthers are curiously pent up till the elongation of the elastic filaments disengages them with a jerk so as to shed the pollen upon the stigma.

Kalmia glauca, Aiton. Persoon's Synopsis Plantarum, vol. i., p. 477. Gray's Manual, ed. 2, p. 256.

This species is pretty generally, but rather sparingly, diffused throughout the Maritime Provinces, from Nova Scotia to Labrador; it becomes still scarcer farther inland, where it grows only in bogs or swamps and on the mountains, and chiefly of the narrow-leaved variety.

TO CORRESPONDENTS.

DEVON BULL.—Any one having for sale a pure Devon Bull may hear of a purchaser, by applying by letter, stating price, age, &c., to the Secretary of the Agricultural Board.

Persons desirous of obtaining copies of last Annual Report of the Board of Agriculture, will please send their addresses to the Secretary of the Board.

FOR SALE.—A pure bred ALDERNEY BULL. He is from Mr. Harvey's Bull and the Hon. E. Collins' best English Cow. He is now three years old, very handsome and perfectly quiet. Lowest price $60.

THE PRINCESS HELENA'S BRIDAL BOUQUET was composed of orange blossom, myrtle, choice orchids, gardenias, stephanotis, &c., and was most elegantly trimmed with real Homiton lace to match the dress. The myrtle was sent from Osborne from the plant which furnished sprigs for the bridal bouquet of H. R. H. the Crown Princess of Prussia. There should have been a lady's slipper or moccasin flower.

LILIUM AURATUM.—Of this magnificent new Japan Lily, several instances have been noticed of its showing partially double flowers, in the English gardens.

TO CORRESPONDENTS.

Literary Communications are to be addressed to Dr. Lawson, Secretary of the Board of Agriculture, Dalhousie College, Halifax. All lists of subscribers and remittances of subscriptions are to be sent to Messrs. A. & W. McKinlay, Publishers, Granville Street, Halifax.

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