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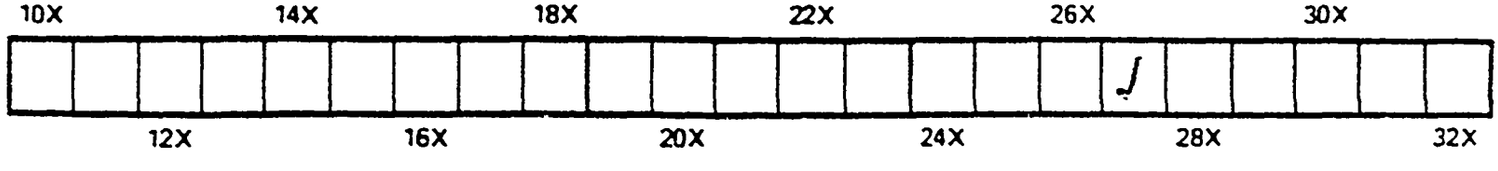

THE

NOVA SCOTIAN

JOURNAL OF AGRICULTURE

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

VOL. I. *HALIFAX, N. S., JUNE, 1867.* *No. 28.*

CONTENTS:

EDITORIAL NOTES.

Halifax, 9th June, 1867.

The weather has been cold and backward for spring work on the farms, but we have now had a few warm sunny days, and the grass in fields and pastures is making very rapid growth. There is promise of an abundant yield of fruit, but much depends upon the weather of the next week or so whilst the fruit is setting. Spring wheat is doing remarkably well.

The Finance Committee is now at work in the city obtaining subscriptions towards the proposed Provincial Industrial Exhibition of 1868. The various Agricultural Societies throughout the Province are holding meetings for the purpose of devising in what ways they can best promote the object, and the Board of Agriculture intends to meet about the third week in June to determine what can be done in regard to the issue of a Prize List for Cattle, Grains, &c., that require a year's previous preparation.

Several so-called "Sulphur Showers" have fallen during the last week or two, chiefly in the Western counties of Nova Scotia. We hope to find room next month for an ample explanation of this phenomenon.

The subject of Dairy Management is one of great importance at the present time. In every country that has any pretension to intelligence among its farmers, the various modes of Milk management and Cheese and Butter making are being keenly discussed and experimented upon. In previous numbers of the *Journal*, we published details of the Dunlop and Annapolis systems of cheese-making, and entered fully into the chemistry of milk. This month we reprint Prof. Wilson's account of the improved Danish Dairy System, and likewise present our readers with a communication from a correspondent, in which the Cheddar system of cheese-making is described.

Mr. Saunders speaks highly of Lucerne, and we hope some of our pains-taking farmers will give it a trial. It is a favorite food for race-horses in England.

We publish the third and concluding article on the Vegetable Cell, respecting which there have been several enquiries.

The Reports of Agricultural Societies will be printed as rapidly as we can find room for them.

The Third Annual Report of the Board of Agriculture, with relative statements of the condition of Societies, crops of the past season, and other documents, will be printed in a separate form in the course of a few days. Copies will be sent to the Secretaries of all the Agricultural Societies for distribution among the members. Secretaries not receiving their copies will please communicate with the Secretary of the Board of Agriculture.

DANISH DAIRY MANAGEMENT.

EQUIVALENTS OF DANISH WEIGHTS AND MEASURES REFERRED TO.

Square mile is nearly	=	22.	sq. miles (Eng.)
Tonde (metrical)	=	3.8272	bushels "
" (superficial)	=	1.363	acre "
Foot (fod)	=	1.0298	foot "
Inch	=	1.0298	inch "
Pound	=	1.1024	"
Pot (thid)	=	1.1758	quart "
Rigs-daler (96 skillings)	=	2.243	shillings "
Rigs-daler per Tonde-land	=	1.6456	shil. pr. acr. "

In regard to the quality of their dairy stock generally, I think that in all probability it would be improved by a judicious introduction of some of our blood—Shorthorn,—Ayrshire,—or Jersey. In the management of all their leading dairies

the old arbitrary "rule of thumb," which still holds sway over too many of ours, has entirely disappeared, and a philosophic treatment, based on sound scientific principles, is the rule and not the exception. The experiments quoted testify to its advantages. The dairy now, instead of, as of yore, being the abode of ignorance and often too of superstition, is the centre of an enlightened and regular manufacture, where certainty replaces chance, and where the waywardness of the dairymaid is checked and controlled by the daily account she has to give of the produce committed to her, while her skill and attention are encouraged by the registered returns. When Mr. Friis showed me his "Dairy Register Sheet," I expressed my fears that any such attempt to introduce such an elaborate system of analysis into the dairy farms of this country would have a very serious mental effect upon our dairymaids, which would at once stop our proceedings. He replied that on first showing it to his own head dairymaid she burst into tears, and continued in a very distressed state of mind for a full week afterwards. As she regained her composure, a few figures were seen chalked on the board; these rapidly increased, until they reached the last column, when she acknowledged freely the value of the daily details, which testified to her own skill while recording her dairy returns, and declared that she would never take the management of any other dairy unless she had the comfort and protection of a similar arrangement. From that day the success of Messr. Friis and Segelcke's "Dairy Register" was assured, and it is now finding its way into all the best dairies of the country. In our ordinary manufacturing establishments, even where there are none of those elements of disturbance which always exist more or less where primary organic substances are manipulated, as in butter and cheese making, such analyses of results are sought for and valued. Would it not be well, then, for us to introduce them (in modified form, perhaps suited to our different requirements) into our own dairies, where too commonly practices are quite independent of principles, where figures are eschewed, and the "reign of law" all but unknown.

The farm establishments of the larger proprietors form quite little colonies in themselves. The dwelling-house is necessarily of capacious size, and is replete with every comfort and convenience, while the same roof shelters not only the master and his family, but also his numerous dairy and farm dependants. The single men live in the house, the married have cottages at the homestead, and in most cases have certain daily rations of food allowed to them. Those who live in the house have meat four days in the week, and about 1lb. of butter and 1 lb. of cheese per week each. Beer is given at the rate of about 150 gallons per head per annum. The annual cost per head depends mainly upon the house-keeper, and ranges generally between 100 and 120 r. d. per annum. In addition to their keep, they receive from 60 to 70 r. d. for their labour. The head dairymaids live in the house, and receive from 120 to 150 r. d. a year; they are allowed also to take one or more pupils, according to the size of the dairy, with each of whom they receive a fee of 20 r. d. which is paid by the Royal Agricultural Society. These pupils superintend the milking, and take part in all the dairy manipulations. The milking, cleaning, and general labour of the dairy is done by a staff of women helpers, at the rate of one for each 20 cows in milk. The cows are kept for the six winter months in the byres, and for the rest of the year (May to October) in the field. The general practice is to picket them singly over the field, shifting them from three to six times each a day, as the keep may render necessary, and leading them to water twice or thrice a day. On some farms, as at Ourupgaard, they are kept picketed until September, and then allowed to run loose; but very rarely indeed is the practice which I saw at Gjeddesdals followed, of allowing them to wander over the pastures and graze at will; and yet that would appear the more rational treatment, as a forced exposure to the sun and blasts of a variable climate without shelter or the means of protection from insect annoyances, must more or less affect an animal's comfort, if not its health, and thus disturb its natural secretions. In either case, whether picketed or loose, they are always attended by the herdsman, who has the entire charge of them.

The cows are milked for about 10 months after calving; the milking takes place twice a-day, at about 4.30 A.M. and 4.30 P.M. The calves are sold as soon as dropped, at an average price of 2 r. d. each; a few of the best bred being retained to keep up the stock. In the winter, the milk is allowed to stand from 24 to 26 hours, it is then skimmed, and the butter made from the cream. In the summer, the milk is churned fresh, and always gives a better return both in regard to quantity and flavor of butter than when made from cream. It is usually tubbed at from 18 to 24 hours after it is made. Cheese is made from both the skimmed and the churned milk, the refuse portions being conveyed to the hog pens. It is generally made twice a day in summer, and once in winter; and in winter, both the cheese and the butter are colored with anatto. The cream or milk for churning is generally set at 56° to 57° Fahrenheit in summer, and at 61° to 62° Fahrenheit in winter; the increase in temperature during the operation is about 4° in summer, and from 2° to 3° in the winter.

The quality as well as the quantity of the milk is a matter of consideration to the farmer. In Mr. Tesdorpf's returns is shown the practical bearing of the latter in the classification of the cows according to their respective yields. The tabulated returns of the Lillerup and Ourupgaard dairies during a continuous period of 26 months, show the variation in the quality of the milk at different periods of the year, and also the proportion of milk required for each pound of butter produced.

Until within the last few years, the dairy management in Denmark was much the same as it existed a century ago. The whole subject, however, in its theoretic as well as practical bearings, has recently been submitted to the test of experimental inquiry, which has rescued it to a great extent from the darkness and uncertainty attending its operations. Foremost in this good service were Mr. Friis and Mr. Sedgelcke—the former testing and proving practically at Lillerup the value of the principles laid down and explained by his friend and fellow worker. Thanks to these enlightened men, the thermometer has now the post of honour assigned to it in the dairy, for the dairy farmer knows well the important bearing it has upon his breeches pocket. In a pamphlet recently published by Mr. Segelcke,* on the Theory and Practice of Dairy Husbandry, it is shown that—

1. The quantity of butter obtained by churning is dependent on the temperatures used.
2. The temperature that gives the best result, differs according to the quality of the cream (more or less old).
3. At any temperature, higher or lower, the proportion of butter obtained is diminished.
4. A considerable percentage of butter, which otherwise might be obtained, is lost when the churning is not so regulated. This loss may often be very large, as a difference of only 2° F. may result in a loss equal to 4 per cent, whereas where the thermometer is not regularly used, the temperatures frequently vary to the extent of several degrees.

The quality is also directly affected by the temperature at which the cream or milk is set, and its increase during the operation of churning.

(To be continued.)

PRINCIPLES OF VEGETABLE ANATOMY AND PHYSIOLOGY AS APPLIED TO AGRICULTURE.

THIRD ARTICLE.

THE VEGETABLE CELL.—(*continued*).—THE STARCH GRANULE—CELL CONTENTS—CELL DEVELOPMENT.

Starch may be said to occur in the tissues of all plants, except Fungi, at some stage of their existence. It is one of the nutritive or assimilable products of plants, being stored up in their cells for future nutrition; and it is thus subject to various changes during the life of the plant, often becoming converted either into sugar or cellulose, or some of the numerous unassimilable secretions. "That the latter takes place very frequently is rendered probable by the discovery that caoutchouc and gutta percha can be artificially manufactured from starch," (Lankester), whilst the conversion of starch into gum is a familiar phenomenon. Schleiden states that starch is gradually dissolved in the full grown potato, so that after three months there is scarcely a trace of it to be met with in the vegetable, even where it is in a perfectly sound condition.

The utility of starch as a nutritive substance is seen in the germination of our cereal grains; these consist for the most part of starch and gluten, which form the materials required for the growth of the young plant. These are insoluble in water, but as germination proceeds, they undergo chemical change, the gluten being converted, among other products, into the soluble substance called diastase: this diastase acting upon the starch, converts it into soluble grape sugar, a process which is taken advantage of by the brewer and distiller. The same change may indeed be brought about by the action of dilute sulphuric acid, which is extensively employed on the continent of Europe to convert starch into sugar; but the manufacture is illegal in Britain.

The great abundance of starch in many succulent roots and seeds give to these their nutritive value—so that many agricultural crops depend upon the production of this substance. Our cereal grains, potato, leguminous crops, as well as Indian corn, and the rice and other grains of warmer climes, owe their value in a great measure to this substance; but it is chiefly from other plants that the pure starches known in commerce are obtained. Thus arrow-root is derived from Maranta arrundinacea; many species of Canna supply toules-mois; Sago is obtained from Sagus and Meteroxylon, and Tapico from the Cassava plant. The presence of starch in the bark of birch and pine trees explains to us why these become a source of human food in those inhospitable regions where the low ebb of the conditions necessary for the development of more agreeable edible plants compels man to have recourse to the most unpalatable fare. In the same countries the "Iceland moss" and other Lichens are prized as articles of food, their nutritive value depending upon the presence of lichenin, a form of starch peculiar to them. Inuline, another starchy matter is obtained from the roots of Dahlias, Dandelions and Elecampane.

Although the starch granules are shut up in the cells of the plant, they are easily disengaged for commercial purposes. This is accomplished by bruising and rupturing the tissues, and soaking them in water so as to free the starch granules. Thus potato starch is obtained by rasping down the potatoes into a large vessel. The comminuted tissue is stirred in water, and when left at rest the cellulose immediately falls to the bottom; but the starch still floats in the water, and is thus poured off into another vessel. In this it is allowed to stand for a few hours, when the starch finally settles to the bottom, and is easily collected. Even diseased potatoes which are quite unfit for food, yield starch, as it is the cell wall that first decays, leaving the starch granules comparatively unaffected for a time. Starch may be obtained from wheat flour by putting it in a cloth and kneading it in water; the granules will thus be freed from the tissue of the grain (previously broken up by grinding) and will pass through the cloth into the water. Starch is not soluble in cold water, but being in the form of microscopically minute corpuscles, is readily diffusible thro' it.

While the forms of the starch granule are exceedingly various, they are often so characteristic as to afford the means of determining the plant to which they belong, at least so far as regards its genus or family. This fact, originally noticed by Fritsche, has been subsequently applied to the purposes of commerce with much success. In the determination of the numerous and varied adulterations of flour, bread, and some other common farinaceous articles of food, it has, in Dr. Hassall's hands, proved a valuable instrument; and in the histological examination of drugs I have found the starch granule a useful guide. In some cases the histological characters of commercial substances are so decided as to enable any one acquainted with the use of the microscope to determine at once whether they are pure or adulterated; but the adulteration of flours and starches are often so complicated as to require a very careful previous study of the characters of the numerous kinds of starch which enter into the composition of articles of food. This kind of knowledge is not to be derived from books, but from actual examination of authentic specimens, and in many cases by tracing the development of substances in the living plant. A definite and systematic method of observation must be pursued. Fortunately in the case of Starch, the characters presented in the form and structure of the granules are sufficiently definite to enable an intelligible classification to be formed. In the following attempt to present a tabular view of the characteristics of the different kinds of starch, I have chiefly followed Schleiden. It must be kept in view that the size and form of the granules are in most cases variable, so that whilst the following descriptions give characteristic marks which will be seen in most of the granules, these may be absent in many of them:—

I.—AMORPHOUS STARCH.

1. Sarsaparilla, rhizome of Carex arenaria and seeds of Cardamomum minus.

II.—GRANULES SIMPLE.

(Not united into masses.)

1. *Roundish or oval.*

A. Hilum apparently wanting.

2. Granules small, nearly spherical, very common in parenchymatous cells, along with other cell contents, often associated with, or invested by chlorophyll; in carrots and some other esculent and medicinal roots.
3. Large, irregular, knobby, truncated multiangular. In Saxifraga, granulata, Ranunculus Ficaria.

B. Hilum small, roundish.

a. Perceptibly lamellated.

4. Granules large, rough deformed. Cycadaceæ, (pith).
5. Granules ovate. Potato.
6. Granules Mussellike (Lilium, Fritillaria), or almost triangular (Tulip). Liliaceæ.

b. Obscurely, or not at all lamellated.

7. Rounded off poleydric granules. Zea Mays or Indian Corn.
8. Sharp edged, poleydric, very small granules. Rice.

C. Granules with an elongated central cavity, or hilum.

9. Granules roundish or oval, generally showing a starlike cleft in the inner layers. Pea, Kidney Bean, &c., also Horse Chestnut (pear shaped).

D. Granules perfectly hollow, cup-like.

10. In Iris florentina, &c.

2. *Granules flatly-compressed lenticular.*

11. The *larger* granules without hilum or concentric rings. Wheat.
12. Most of the larger granules with a longitudinal furrow, many of them distinctly ridged (Hassal). Barley.
13. With a radiated torn up cavity or hilum. Rye.

3. *Perfectly flat discs.*

14. In Zingiberaceæ, Lindl.

4. *Elongated Corpuscles* (with elongated central cavity).

15. In milk-sap of European and some tropical Euphorbiaceæ.

5. *Perfectly irregular bodies.*

16. In milk-sap of many tropical Euphorbiaceæ.

III.—GRANULES COMPOUND.

(United in masses.)

1.—*The individual granules without hilum or cavity.*

17. In roots of Marantaceæ, Aponogeton, Bryonia, Sarsaparilla (bark or *root*).

2.—*Component granules nearly of equal size, each having a distinct hilum or central cavity.*

A. Granules from 2 to 4 in each group.

18. Central cavity small and roundish. Jatropha Manihot, Carolinea princeps, Batatas edulis.

19. Central cavity large and star-like. Colchicum.

20 Component granules quite hollow, cup shaped. Anathorum Ivaranensæ.

B. Granules more numerous.

21. Granules in irregular groups of 2 to 12. Arum maculation.

22. A large number (30) loosely rolled together. Bernhardia dichotoma (stem), &c.

2.—*Smaller granules arranged around a central one.*

23. Sagus Rumphii (pith) &c.

It has been pointed out by Cruger that the ferns present a clouded, indistinctly laminated, irregular form of starch-granule; all the Cyperaceæ, a compressed granule, with a large hollow nucleus, &c., but although peculiarities thus pervade certain families, exceptions exist, "the Arodeæ exhibiting every variety of form except the compressed," while even in the same plant various forms pass into one another, rendering it impossible to tell to which category the plant belongs.

Gum is one of the forms through which vegetable matter passes in being applied to the purposes of plant life; it exists in the cell sap, and is often exuded from the surface of trees.

Sugar in like manner, occurs in solution in the cell sap, and, both in the form of "cane" and "grape sugar," is an important substance in economic botany. The sugar cane, beet, carrots, parsnip and sugar maple, yield the former, while the latter is obtained from the juice of many fruits.

In addition to the above substances, (starch, gum, sugar) consisting of carbon, oxygen, and hydrogen, which are convertible into each other, and are important products as regards the growth and nourishment of plants, there are others which contain also nitrogen, hence they are called azotised; they are essential in the process of vegetation.

Oily, fatty and resinous matters are often contained in the cells of plants, as well as in inter-cellular cavities, and organs of secretion. Thus, a section of the rind of orange shows the oil-receptacles in the form of large cavities, and in many plants, such as Rubiaceæ, we have special glands for the secretion of various substances. The turpentine canals in the bark of pines are merely inter-cellular cavities whose real structure and development are not well known. Wax is in some cases an important vegetable product. We have also crystals in cells, those of an acicular form being composed of phosphate of lime, while crystals of oxalate of lime in an octohedral form occur in cacti and other plants.

Parenchyma cells (of which the leaves, &c., of plants are mostly formed) being usually quite colourless in their membrane, whence comes the green colour of plants? it is due to the prevalence, *in* the cells, of minute green granules (usually of a globular form); these are termed Chlorophyll, and are shown in considerable numbers in the cells of Cladophora and other confervoid growths. It is a fatty or wax-like substance, and is often associated with starch, and sometimes indeed invests granules of that substance. The changes which it undergoes according to its state of oxidition, give rise to the varied autumnal tints of leaves. Flowers owe their colour to colouring matters which exist in some in the form of definite globules, and in others diffused in the cell sap.

All plants, however complicated their after structure, originate from a single cell. From this cell is evolved by the process of cell-development, all the future structure of the plant, its cells and vessels, and matter produced in and by them. We trace all the phenomena of plant life back to the elementary cell, the basis of all vital action. The farmer, the forester, and the gardener, must all view the vegetable cell as the workshop in which the products of their labour are prepared. It is the cell which absorbs from surrounding soil and air the lifeless materials out of which the plant structure is reared; it is the cell which elaborates these materials, converts them into organic form, and endows them with life; it is the cell which stores up those substances required for the plant's future nutrition, and which it is the purpose of Agriculture to turn to the supply of man's wants; it is the cell which is the storehouse of those substances, while the structures of this tiny storehouse itself are available for the like purpose. Cells and cell-contents form the choicest fruits of the orchard, and the gayest hues of flowers, while a modification of them constitutes timber. The whole phenomena of vegetation are performed in and by the cell; every question in physiology, reverts to this elementary body as the basis and parent of the whole structure. The plant begins as a cell; its whole phenomena are the development of cell by cell from this original cell, and the secondary phenomena of which these cells are capable; and even those plants which are most gigantic in dimensions, and most elaborate in anatomical structure consist only of a mass of simple cells and of cells more or less compounded in the form of those elongated tissues which botanists call vessels. In the study of the plant's life, therefore, the cell must be viewed as the theatre of our observations; in it are enacted all the stages of its life. The physiological conditions of the cell are those of the plant also.

It is desirable to keep in view, however, that the applications of Botany to Agriculture are not limited to its physiological department—a view which has been propounded by Schleiden, who, in discussing the relations of this science to Agriculture and Pharmacy, states that "in all these cases it is the physiology of plants which is alone of use (!) A knowledge of the systematic arrangements of plants is only of importance to the botanist, for all others, it is a pastime, if not a waste of time." The application of Sytematic Botany to Agriculture and Pharmacy are rather more productive in England than they appear to be in the romantic valley of Jena!

Communications.

CHEDDAR SYSTEM OF CHEESE MAKING.

To Professor Lawson, Editor of the Journal of Agriculture.

Sir,—Having read with interest in some of the previous numbers of your Journal, several articles on the manufacture of cheese, wherein you gave an account of the Dunlop and Annapolis system of making, and being desirous of bringing under the notice of your readers the Cheddar mode of manufacture, I will, if you allow me through the medium of your columns, give a detailed account of the process, as written by a practical man in Ayrshire, Scotland, who has several large dairies where cheese are made in conformity to the following rules, which he has printed and hung up on the walls of the cheese rooms as a guide, and which must be carried out to the letter by his dairymaids.

Immediately after the morning milking, the evening and morning milk are put together into the tub. The temperature of the whole is brought to 80°, by heating a small quantity of the evening milk. After the rennet is added, an hour is requisite for coagulation and the curd is partially broken and allowed to subside a few minutes in order that a small quantity of whey may be drawn off to be heated. The whey is put into a tin vessel and placed in a tin boiler to be heated in hot water.

The curd is then most carefully and

minutely broken; this may be done either with a shovel breaker or revolvers in the tub. When the curd is completely broken, as much of the heated whey is mixed with it as suffices to raise it to 80°; the temperature at which the rennet was added. Nothing more is done to it for another hour: and then a few pails-full of whey are drawn off and heated to a higher temperature than before, the curd is then as minutely broken as before and after this is carefully done, an assistant pours several pails-full of the heated whey into the mass. During the pouring in of the whey the stirring with the breakers is actively continued in order to mix the whole regular, and not allow any portion of the curd to become over heated. The temperature at this time is raised to 100° as ascertained by the thermometer: and the stirring is continued a considerable time until the minutely broken pieces of curd acquire a certain degree of consistency. The curd is left half-an-hour to subside.

At the expiration of the half-hour the curd has settled to the bottom of the tub.

Drawing off the whey is the next operation. To facilitate this part of the work, the tub is made with a convex bottom, and the curd is cut from the sides of the tub and placed on the elevated centre.

It is carefully heaped up, and then left for fully half-an-hour with no other pressure than its own weight. After this interval it is cut across in large slices, turned over once on the centre of the tub and left in a heap as before for half-an-hour. The whey drips away towards the sides of the tub, and runs off at the spigot; and no pressure being applied it continues to come away comparatively pure.

After undergoing these simple and easy manipulations, and lying untouched during the intervals that have been mentioned, the curd is ripe for the application of pressure, but great care is taken not to put it into the vat to be pressed at too high a temperature. If the heat be above 60° and it usually is higher at this time, the curd is broken a little by the hand and thrown upon a lead cooler until it is brought down to the desired temperature. It is then put into vats and subjected to a moderate pressure for fully half an hour.

The next process is to take the curds from the vats, break them finally by putting them through a simple curd mill, mix them with salt and make up into cheeses. A pound of refined salt is sufficient for half-a-cwt. of curd.

Next morning the cheese is reversed in the vat and a calico cloth put upon it to give it a smooth surface; and the following morning another fine cotton cloth is put upon it. The third morning it is laid upon the shelf. The cheese of Monday is thus laid out on Thursday morning: which gives three days to the process from the time when the rennet is added to the milk until the cheese is finally turned out of the vat.

During at least two of these three days the pressure is continued for consolidating rather than for drying the cheese. When the cheese are taken from the press they are each laced into a peice of canvass, called a filter; this is done for the purpose of preserving the shape.

A temperature of from 55° to 60° is regarded as the best for ripening Cheddar cheese.

I, am respectfully, yours,
AYRSHIRE.

HANTS, May 30, 1867.

To the Editor of the Journal of Agriculture.

LUCERNE.

MEDICAGO SATIVA.—PURPLE MEDICK.—LA LUZERNE CULTIVE OU SEOIN DE BOURDOGNE.

The cultivation of Lucerne is of unknown antiquity in Italy, Spain and France; it is also largely cultivated in Asia, Peru, the Canadas, and United States. In Britain it is a favorite as an early plant for yielding fodder before the red clover, and its cultivation is attended with great success. This climate is generally considered as too cold for the growth of Lucerne, but I consider the failures which have taken place may be more justly attributed to an improper choice of soil and cultivation than to any other cause. The soils most congenial are those of a light and dry nature. It will thrive well although exposed to the direct influence of the sea breeze, and will be fit for cutting a fortnight earlier than rye grass or red clover. Provided the subsoil is dry, it is not indispensible that the surface be very light, but undrained lands, which have a very damp subsoil, or of a very tenacious nature, are unfit for its cultivation.

Various modes have been employed in its cultivation, but that which is decidedly the best is to sow it in drills eight or ten inches apart, and well manuring, keeping it free from weeds, and thinning so as to leave the plants stand about three inches apart. If proper attention be paid to the young plants, they yield considerable the first season, but it is the second before they arrive at full maturity. They will continue to produce fine crops for eight or ten years, provided they receive a good top dressing of stable manure, (which will be a great protection to the plants) in the late autumn, and kept free from couch grass and other bad weeds.

The quantity of seed required per acre is 15 lbs. if sown in drills, and 20 lbs. if sown broadcast.

Although the purple medick (which is decidedly the best) is in general cultivation, there are many other varieties—three of which I have seen cultivated in France, viz.:—Medicago sativa, vas rustica, Intermediate Lucerne, La Luzerne rustique of the French,—Medicago falcata, Yellow Lucerne, La Luzerne faucille, fr,—Medicago Lupulina, Black Medick, Luzerne Lupuline. There are many other varieties more or less worthy of cultivation, but these are the only four, in my opinion, worthy of cultivation; many of the others are bitter and cattle are found to reject them.

ALFRED SAUNDERS, *Seedsman.*
168 *Argyle Street, Halifax.*

INFLUENCE OF THE STOCK UPON THE GRAFT.

There are things in Fruit Culture that have not been more than dreamt of in Vegetable Physiology. In a recent number of the *Journal of Agriculture* attention was called, by one of our correspondents, to a singular apple freak, which was described as follows:—

"On a tree bearing Pound Sweet apples growing in the garden of C. C. Hamilton, M. D., in Cornwallis, three apples formed and grew on a small twig the size of a goose quill and eight inches long. Two of these apples had all the characteristics of the Pound Sweet, in colour, size, shape, and other peculiarities; while the middle one was smaller, perfectly russeted, and different in shape, more ribbed at the blossom end, and having a shorter stem. The twig with its three apples was exhibited at Somerset, and recently the fruit was tested by the Council of the Fruit Growers' Association, when it was found that the apples differed also in their qualities. The two apples appearing to be Pound Sweets had all their true characteristics, whereas the middle one, which was russeted, was smaller, less fine in flesh, with a finer oily grain, inclined to wilt, and with a yellow cast of flesh. When tasted, the flavor seemed somewhat different, being by some considered slightly acid.

"Nothing was done to bring about this singular phenomenon; and the fact of the three apples growing upon the same twig, and differing as they did, was not known to the proprietor until about the first of October.

"It is for fruit growers to speculate upon this subject, and assign if they can, the true cause of this singular "apple freak;" there is not a tree bearing russeted apple within ten rods of where these apples grew."

We reprint the above because we think the matter is one of practical importance as well as of scientific interest. No Fruit Grower has vouchsafed a reply to the appeal made, and we shall therefore offer a few remarks on the subject, and notice one or two kindred facts.

In a paper read by Isaac Anderson Henry, Esq., President, to the Botanical Society of Edinburgh, 14th March, 1867, attention is specially called to the subject of the Influence of the Stock upon the Graft. In the *Gardener's Magazine*, vol. xiv., p. 430, it is stated that a *male* plant of the *Carica Papaya*, (a dioecious plant) bore *female* flowers at the extremity of its racemes, in consequence of having, two years before, been inarched upon a *female* stock of the same species, the part which bore female flowers having been produced subsequently to the act of grafting. Mr. Anderson Henry, of whom we have a lively personal recollection as one of the most scientific horticulturists in Scotland, goes on to observe:—

"The familiar case, of the *Cytisus purpurascens* or *Adami*, a hybrid between the common laburnum and *Cytisus purpurens*, affords another striking instance of the influence of the stock on the scion. For when grafted, as it generally is, on the more vigorous laburnum, shoots sometimes of a mixed character, partaking of both stock and scion, and sometimes of the laburnum pure and simple with its proper foliage and flowers, spring out from the branches of the *C. purpurascens*.

I have just read of the *Cytisus purpurascens*, or *Cytisus Adami* and stating, as I have done, on the authority of a notice given of it in Lindley and Moore's "Treasure of Botany," of its being a *hybrid*, I have this morning read another account of its origin in *The Farmer* of yesterday, where, reporting the proceedings of the last meeting of the Royal Horticultural Society, it is stated—"Mr. Lee, Cliveden, Bristol, sent most remarkably dissimilar examples of apples from the same branch of a tree of orange Pearmain, which was a fertile subject of comment at the meeting. The tree was the true variety, and the other samples were of a russetty cast, instead of the bright crimson colouring common to the original. Rev. Mr. Berkeley instanced *Cytisus Adami* as a sport of a similar character, which is believed to have been produced by grafting *Cytisus purpurens* on the laburnum, and by some accident one cell of the stock and one of the graft having each become divided, and then united together, the result had been a plant partaking of the nature of both. Mr. Berkeley suggested that it would be most interesting to know the stock upon which the orange Pearmain had been worked." Whatever be its origin, the facts I have stated, and which probably many of us have seen with our own eyes, of the same tree producing three kinds of flowers, and two, if not three, different kinds of leaves, there can be no doubt of these having resulted from the operation of grafting. The two kinds of fruit, too, of the Pearmain seem to have arisen from the same cause. And it would seem, also, that many of the sports we see and hear of in roses, in changing colour, and betaking themselves to a climbing habit, are due to the same cause."

The *Gardener's Chronicle and Agricultural Gazette*, of 20th April, quotes at length our account of Dr. Hamilton's apple freak, and goes on to remark that Mr. Anderson Henry's case of a male Carica, after being inarched on a female plant, producing female flowers at the extremity of the clusters of male blossoms, is not conclusive evidence that the grafting had anything to do with it. But suppose we set that case aside, the others cannot be so disposed of. It is obvious that in certain cases, rare though they be, the stock does exercise an obvious influence upon the graft. This much being ascertained, the real point to be determined is, how is this influence to be accounted for. The prevailing notion appears to be that such sports are produced by certain cells of the stock and of the graft having become divided, and reunited as graft-cells. This hypothesis supposes that such a union-cell will have the power of originating half and half cells like itself. We doubt very much whether a half cell, or a cell whose membrane has been ruptured, has any farther power of development. In the ordinary process of union between a graft and a stock, it is seen that this union is brought about not by the union of half cells to half cells, but by the cohesion of one cell to another, which results from the passage of sap from the one to the other through their membranes, and the consequent formation in actual contact of new cells and of intercellular substance Several years ago, we had an opportunity of examining carefully under the microscope, the grafted portions of a large number of Coniferæ that had died in the Edinburgh nurseries and gardens, and as the disc-bearing wood-cells of these plants are remarkably characteristic, and differ widely in different species, they afforded excellent material for such an investigation. In every case the wood cells of the graft and stock were clearly defined and did not commingle to any great extent. Yet where there is a cavity under the bark of the scion, the wood cells of the stock will run up to fill it, and *vice versa*. In apple grafting, the spongy surface of the scion accommodating itself in its increase to the space allowed it in the cleft of the stock shows this very well, even to the naked eye. Now it is not at all improbable that the young wood of the stock may sometimes run up in a more or less perfect cylinder surrounding the young wood of the graft, or a few fibres may run up in this manner and become mixed with the newly formed wood of the graft. A few wood cells straying in this way from the stock might in time reach even the topmost branches, and would be apt to give out here and there a bud which would present not the foliage and flowers and fruit of the graft, but of the stock. After carefully considering the whole subject in view of all the facts that are known, we offer this explanation as the one least liable to objection, and which seems to be more in accordance with the known facts of vegetable physiology than some others that have been brought forward. The subject is one of interest, and we should be glad to see it intelligently discussed.

PROVINCIAL AGRICULTURAL, AND INDUSTRIAL EXHIBITION.

The Secretary of the Board of Agriculture has addressed a Circular to the Secretary of every Agricultural Society in the Province, directing attention to the arrangements that are now in progress for holding a Provincial Agricultural Exhibition in or near the City of Halifax in the Autumn of next year, 1868. The Legislature has voted the sum of $6000 towards defraying the necessary expenses. A Local Finance Committee has been organized in Halifax for the purpose of obtaining subscriptions from the citizens, and the Board of Agriculture is prepared to give all the aid in its power. It is confidently anticipated that every Agricultural Society in the Province will cordially co-operate in the scheme, and afford substantial assistance, by stimulating its members to prepare articles for exhibition, and by setting aside a portion of its funds for prizes or otherwise. The Presidents and Officers of all the Agricultural Societies of Nova Scotia have been appointed Members of the General Committee for carrying out the Exhibition.

In order that intending Exhibitors may have ample time for preparation, it is proposed to issue early this summer, the List of Prizes offered for competition. But before the Prize List can be prepared, it is necessary to ascertain what amount of funds will be available.

Secretaries are requested to take the earliest opportunity to bring this matter under the notice of the Directors of their respective Societies, with a view of ascertaining definitely what sum each Society will be prepared to vote, either from its funds or from the subscriptions of members and others who are interested in agricultural pursuits. The money will not be required till next year, and may be retained out of the Society's Annual Grant for 1867 or 1868, if so desired.

A Reply to the Circular is required on or before 20th June.

Reports of Agri. Societies.

EAST RIVER, PICTOU.

The Annual Meeting of the Egerton Agricultural Society, was held according to the precept of the Board of Agriculture on the *first* Tuesday of December.

The office bearers for the ensuing year were then appointed.

The committe have to report that an exhibition was held in October, and prizes awarded to live stock, grain, fruit, roots, and domestic manufacture.

Owing to circumstances there was not the usual interest taken in agriculture this year, consequently some departments were inferior to what they were in former years.

The show of cattle was rather small, but a few good animals were exhibted; sheep would compare favourably with any we have seen.

Some of the grain was superior, oats rather light this year, fruit was smaller than usual, roots were more than an average, butter and cheese were the best ever exhibited, while the domestic manufactures would do credit to any agricultural district.

The society also held a ploughing match, on the first day of November. The contest was spirited and the work done creditable, leaving no room to doubt but the money was spent to good purpose.

The Treasurer's account will show the manner in which our funds were disposed of:

1866.	EXPENDITURE.	
Oct.	To disbursements of prizes	$65 87½
	Plowing Match	10.00
	Publishing Exhibition list, &c...	5.00
	Expenses of Exhibition	3.00
	Postage and Stationery	0 67½
	Secretary's fee	6.00
		$89.15
1865.	RECEIPTS.	
Dec. 5.	By balance	$12.41
1866.		
Aug. 15.	Members' subscriptions	40 00
Dec.	Provincial Grant	52.00
		$104.41

Leaving a balance of $15.26 in favour of the Society.

DANIEL FALCONER, *Sec'y.*

A NEW SOCIETY IN YARMOUTH.—THE PUBNICO AGRICULTURAL SOCIETY.

We have received a communication from Stephen M. D'Entremont, Esq., with the particulars of a Society just formed at Pubnico. Fifty-five members have entered, each paying one dollar of annual subscription. The officers are as follows:—*President*, John C. Anderson; *Vice-Presdt.*, Jeremiah Murphy; *Treasurer*, William D'Entremont; *Secretary*, Stephen M. D'Entremont.

Miscellaneous.

THE IRISH MULE DRIVER.

I went away once to the wars for a frisk,
Attach'd to the big baggage train, sure,
But what with the toil and starvation and risk,
Faith, I'll not go campaignin' again, sure;
Up hill, and down dale I was dhrivin' of mules
From the top of the morning till night, sir;
Oh! such throuble to take, surely kings must be fools,
When the journey but ends in a fight, sir.

For aatin' and dhrinkin' and sleepin' enough,
'Tis myself that I always found partial;
But these things were scarce, while the fightin' was tough,
From the Private up to the Field Marshal.
'Twas only the docthors I found did contrive
In the best of condition to be, sir;
High and low, right and left, 'twas the word be alive,
The minit we saw an M. D., sir.

M. D. was the signal for clearing the road,
When the baggage got stuck in some by-way;
M. D. had the best of good quarters allow'd,
And carried all things in his high way;
While others were starving, M. D. had his feed,
While others were thirsty, he drank full.
"Oh," says I, "sure if Providence only decreed
To make me an M. D., I'd be thankful!"

The war being done, we were bid to embark,
The ships full as ever they'd hould, faith:
I made on my thrunk, in big letters, a mark,
And strutted aboord then quite bowld, faith,
The letters I put on my box was M. D.,
The minit the skipper espied it,
An coorse, the best cabin for you, sir, says he;
I nodded, and never denied it.

We sail'd in the night and 'twas all right and tight,
While darkness and silence surrounded;
But in daylight, with spaakin', while breakfast was makin',
I fear'd that I might be confounded.
Some officers looked at me, sour as a lime,
With suspicion, or somethin' akin to it,
But I never open'd my mouth all the time,
Unless 'twas to put something into it.

With the best of good living and jolly good berth,
The days pass'd away to my liking;
I ate, drank, and smoked, like a lord of the earth,
Throughout every bell that was striking;
With a book in my hand I would nod when they spake,
As if study, with me, was the main thrick,
So, at last, through the ship it was pass'd, as a joke,
That the M. D. was rather eccenthrick.

But, as bad luck would have it, a fayver broke out,
And they call'd upon me for to cure it;
"In fayver," says I, "there is always great doubt,
And the life of men—who can insure it?
I'll give up to nane in the dhrivin' of mules,
And they'er obstinate bastes, to be sure, sirs,
But I can't dhrive a fayver,—so don't be such fools
As be axin' o' me for a cure, sirs!"

"Why, an't you a docthor?" they all o' them cried.
"The dickens a docthor am I, dear."
"Then why, on your luggage, M. D. have we spied?"
"Because they'er my right to apply, dear."
"M. D. manes a docthor!" they join'd in our cry,
"Or titles are not worth a stiver!"
"If M. D. betokens a Docthor," says I,
"They stand quite as well for Mule Driver!"

SAMUEL LOVER.

—*Once a Week.*

SIGNS OF MADNESS IN DOGS.

The first symptom which appears in a dog about to be attacked with hydrophobia is a restlessness, which impels him to move continually from place to place, to hide under chairs and tables, and in corners of the room. He appears sullen and discontented, but has no disposition to bite, and if called by his master obeys as usual, but slowly and unwillingly. Then he becomes more restless, seems as if no position was comfortable, and wanders from one member of the family to another, looking at each inquiringly, as if seeking some assistance from them. As the disease developes the animal becomes more and more agitated, and has delirious hallucinations, constantly making motions, indicating that he sees and hears imaginary objects. After this he scratches up the mats, carpets, &c., as if to make a bed for himself, and then suddenly scatters them in all directions, and he wanders from place to place as if in search of something, staring vacantly round him, without fixing his gaze on anything.—During all this time he frequently shows attachment to his master, and even comes up to him and endeavours to lick his hands and face; but already at this stage of the disease the saliva is poisonous, and this sign of affection may, if the skin be anywhere abraded, plant in the system the germ of the terrible disease to which the animal is about to succumb. This affection sometimes remains even after the animal is really rabid, and he will frequently abstain from directing his attacks against those to whom he is attached. This must not, however, be relied upon, as he may, even against his own will, make a fatal snap. In the first stages of the disease the animal does not refuse his food, but after a short time leaves it untouched. He has no horror of water, but, on the contrary, frequently even swims in it, and drinks inordinate quantities, until he has arrived at the stage in which a spasm of the throat prevents him from swallowing it, and even then he sometimes plunges his nose in it, and bites at it when he finds he can no longer drink. As the disease advances the dog seems to experience an unreasonable desire to bite, tear, and swallow everything that comes in his way, his bed, the cushions of the sofa or chairs; sticks, stones, earth, glass—all are bitten, swallowed, or crushed. Soon after this he begins to turn his fury against animals. One very important peculiarity to be observed in a dog about to become rabid is the change of voice which he undergoes. Instead of consisting of a succession of sounds equal in intensity and duration, his bark becomes hoarse and stifled, and is in a lower key than usual. To a full-voiced bark succeed a series of howls from the bottom of the throat, each less loud than the preceding, during the emission of which the dog stands with his mouth partially open. Another very remarkable fact is that a rabid dog appears to lose the power of expressing pain. No matter what is done to him—if he be kicked, pinched, pricked,

beaten, or even burned, he never gives vent either to the growl or the sharp cry with which a healthy dog expresses anguish, although his efforts to escape and his change of countenance are sufficient proof that he is not insensible to suffering. It is generally supposed that a mad dog always foams at the mouth. This is an error, although in most cases the throat and mouth of the animal are filled with foam, in some they become completely dry. In these cases the dog makes a movement with his paws against his cheeks, similar to that made by one who has a bone stuck in his throat, and tries to free himself from it by the aid of his paws. This movement has sometimes been the cause of fatal accidents, resulting from some one endeavouring, by introducing his hand into the dog's mouth, to remove the obstruction which appeared to trouble him, and getting bitten in the attempt.—*Shilling Magazine.*

Professor Agassiz, in the course of some interesting lectures on the physical features of Brazil, which he is giving at New York, stated that he has discovered in the basin of the Amazon alone 2000 different kinds of fishes—(ten times as many as were known a century ago to Linnæus as existing in the whole world) —of which he has brought back with him more than 1500. He also found among many of the shell fishes of the Amazon, in fresh water, a singular tendency to ape the marine shells, whilst their internal structure is entirely different.

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.

The Journal of Agriculture

—is published monthly by—

A. & W. MACKINLAY,
No. 10, GRANVILLE STREET,
HALIFAX, NOVA SCOTIA.

TERMS OF SUBSCRIPTION:—

Fifty Cents per annum—payable in advance.

A limited number of Advertisements in connection with Agriculture will be inserted on application to the Publishers.