Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- [ ] Coloured covers/ Couverture de couleur
- [ ] Covers damaged/ Couverture endommagée
- [ ] Covers restored and/or laminated/ Couverture restaurée et/ou pelliculée
- [ ] Cover title missing/ Le titre de couverture manque
- [ ] Coloured maps/ Cartes géographiques en couleur
- [ ] Coloured ink (i.e. other than blue or black)/ Encre de couleur (i.e. autre que bleue ou noire)
- [ ] Coloured plates and/or illustrations/ Planches et/ou illustrations en couleur
- [x] Bound with other material/ Relié avec d'autres documents
- [x] Tight binding may cause shadows or distortion along interior margin/ La reliure serrée peut causer de l'ombre ou de la distortion le long de la marge intérieure
- [ ] Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/ Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.

- [ ] Coloured pages/ Pages de couleur
- [ ] Pages damaged/ Pages endommagées
- [ ] Pages restored and/or laminated/ Pages restaurées et/ou pelliculées
- [x] Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- [ ] Pages detached/ Pages détachées
- [x] Showthrough/ Transparence
- [x] Quality of print varies/ Qualité inégale de l'impression
- [ ] Continuous pagination/ Pagination continue
- [ ] Includes index(es)/ Comprend un (des) index

Title on header taken from:/ Le titre de l'en-tête provient:

- [ ] Title page of issue/ Page de titre de la livraison
- [ ] Caption of issue/ Titre de départ de la livraison
- [ ] Masthead/ Générique (périodiques) de la livraison

- [ ] Additional comments:/ Commentaires supplémentaires:

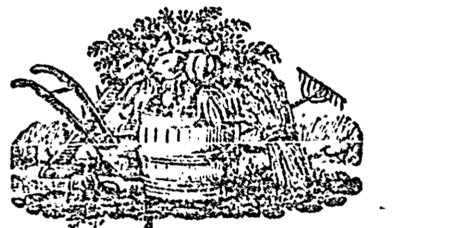
This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
							✓				

THE COLONIAL FARMER,

EVOTED TO THE AGRICULTURAL INTERESTS OF NOVA-SCOTIA, NEW-BRUNSWICK, AND PRINCE EDWARD ISLAND.

OL. 2. HALIFAX, N. S., JUNE 1, 1843. NO. 23.



THE COLONIAL FARMER.

HALIFAX, N. S., JUNE 1, 1843.

LEIBIG'S AGRICULTURAL CHEMISTRY.

No person hitherto appears to have discovered in what manner ypsum operates as a manure. It is well known that upon some a spoonful in a hill of corn will increase the crop at least one ird; while near the sea it has no visible effect. Leibig, whose rks on Agricultural Chemistry and Physiology are at present gaging considerable attention, thinks that it attracts and decomes the Carbonate of Ammonia which falls in rain water, thus ming soluble Sulphate of Ammonia and Carbonate of Lime. r. Partridge, a Chemist at New York, has denied the possibility such a combination at a common temperature; and Dr. Bond, Yarmouth, has also stated that no decomposition would follow Gypsum were added to Carbonate of Ammonia, but that if Sulate of Ammonia and Limestone were brought in contact, Gypm and Carbonate of ammonia would be formed; and the Doctor upported in his reasoning by all the Tables of Chemical affinity hich we have seen. We are not, however, prepared, to say that ig it certainly in error, as we know from experience that the ive attractions of certain substances differ considerably at fferent temperatures, but in his works we find many paradoxical ertions,* so intermixed with demonstrated facts, that the person ho has no knowledge of Chemistry would, we think, be liable to astray if he took Leibig for a guide, notwithstanding the great antity of real Chemical knowledge he possesses. A chemical rk, to be useful to the farmer, should teach what has been disvered, rather than what has been conjectured. We think the llowing extracts from a sensible Agricultural Chemist much to e purpose:—"The farmer is too anxious that the Chemist should once shew him what can be done to *improve* the *present state* of riculture, and cannot well understand why Chemists are not *at* ast as far advanced as he is on the road to improvement. It is evint very little reflection is necessary to point out the incorrectness such a conclusion. It is calculated that two hundred millions individuals spend their daily toil in the practice of agriculture, d that this state of things has continued for thousands of years; hereas, as regards the science of agriculture, it has never yet cupied *exclusively* the attention of even twenty individuals in the hole civilized world, and even these during scarcely more than e present century. How then is it possible that a science so cent and so sparingly cultivated, should be capable at once to ep pace with a practice the most ancient, and the most extensive pursued, of all the varied arts with which man is acquainted?

"I have noticed with regret, that almost all the popular works hitherto written upon agricultural science, have fallen into one common error of endeavouring to make a Chemist of the practical farmer the authors all seem to think it necessary that in order to the improvement of agriculture, every farmer must study Chemistry. In this respect, however, I hold a totally different opinion. It appears to me that it would be a precisely analogous case, if writers on climate had said, that in order to preserve health, it were absolutely necessary that every individual should study Medicine. It is not an extended *knowledge* of Chemistry that is required—it is only a *confidence* in the results obtained by Chemists that is absolutely necessary. If the farmer becomes acquainted with the facts as they apply to his practice, and if he has such confidence in these facts, that he is willing to act in accordance to them, there is not the least necessity that he should occupy his time and burden his mind with all the abtruse processes of reasoning and experimental proof by which the Chemist has been enabled to trace out their connection with the complex phenomena which they serve to illustrate.

"I admit that it is requisite, in the first instance, to enter just so far into chemical detail as to convince the farmer of its accuracy, but still I believe that this can in general be much better accomplished, by merely pointing out the connection which subsists between various phenomena, and their mutual dependence on each other than by attempting to follow out, step by step, the chemical reasonings which form the ground work of these opinions. * * * If a person satisfies himself with *book knowledge* for his practice, and contents himself with sitting in his closet, and drawing up codes of agriculture according to his preconceived opinion of what is right, he will never be able to render any real service to the practical farmer He may indeed, by his scientific investigations, throw such light upon some abstruse question as to be essential in guiding others, who understand both theory and practice, into the right path of enquiry; but still I feel confident that the farmer cannot be too cautious in receiving the advice of the *purely scientific*, of those who consider it essential to make *Chemists* of every farmer who comes to them for advice. by those he may frequently be misled, but seldom will he be essentially benefited. The man of science who would devote himself to the improvement of agriculture, must himself become acquainted with all the minutiæ of practice."—Dr. Henry R. Madden, 'On the state the soil should be in when the seed is deposited in it;" Published in the 58th Number of the Quarterly Journal of Agriculture.*

"The opinion that the substance called *humus* is extracted from the soil by the roots of plants, and that the Carbon entering into

* Some virgin soils, such as those of America, contain vegetable matter in large proportion; and as these have been found eminently adapted for the cultivation of most plants, the organic matter contained in them has naturally been recognized as the cause of their fertility. To this matter the term "vegetable mould" or *humus*, has been applied. Indeed this peculiar substance appears to play such an important part in the phenomena of vegetation, that vegetable physiologists have been induced to ascribe the fertility of every soil to its presence. It is believed by many, to be the principal nutriment of plants, and it is supposed to be extracted by them from the soil in which they grow.

its composition serves, in some form or other, to nourish their tissues, is considered by many as so firmly established that any new argument in its favour has been deemed unnecessary; the obvious difference in the growth of plants according to the known abundance or scarcity of *humus* in the soil, seemed to afford incontestible proof of its correctness. Yet this position, when submitted to a strict examination, is found to be untenable, and it becomes evident from most conclusive proofs, that *humus*, in the form in which it exists in the soil, does not yield the smallest nourishment to plants.

"The facts which we have stated in the preceding pages prove that the Carbon of plants must be derived exclusively from the atmosphere."—*Leibig's Agricultural Chemistry.*

Notwithstanding all these "facts" adduced, we still believe that the plants which we cultivate derive most of their nutriment from the mould or *humus*. We know that houseleek, and some kinds of Cactus, (Prickly Pear,) and also many Lichens, draw most of their food from air and water, and we are convinced that every plant which we cultivate derives a part (but we think the smaller part) of its nutriment from the same sources. We have often seen new land which had a proportion of mould, cultivated without manure, the mould and the fertility of the soil constantly decreasing, till at the end of ten years no mould could be seen, and the land was no longer worth cultivating. Of this *humus* or mould it should be observed there are endless variations, from the peat and coarse turf produced by the decay of the productions of the most barren soils, to the fine soapy mould formed from the plants which grow on the richest. When the farmer finds a very thick layer of this last on his new land, he expects that it will produce large crops for a long time, nor is he ever disappointed in his expectations.

Among the "facts" addeced, we find some very problematical assertions. "Let us now enquire whence the grass in the meadow, or the wood in the forest, receives its Carbon, since there is no manure—no Carbon has been given it for nourishment? and how it happens, that the soil thus exhausted, instead of becoming poorer, becomes every year richer in this element? A certain quantity of Carbon is taken every year from the forest or meadow in the form of wood or hay, and in spite of this, the quantity of Carbon in the soil augments; it become richer in humus."—*Leibig.* The Chemist is here in error,—his "facts" are not as he has stated; a natural meadow which has never been mowed or grazed, but on which all the grass falls and decays, holds its own, and in some cases improves, but when it is mowed and the hay removed from it, it has, in every instance that we have seen, grown poorer, except it was annually flowed by water, which brought a considerable portion of alluvial soil upon it. Mowing soon destroys the blue joint grass, which is replaced by a much inferior sedge, and on many meadows, constant mowing reduces the sedge so much that it is found best to allow the grass to rot on the ground every alternate year. The soil also in the old forest, which has never been disturbed by the axe, is found to be more fertile than on tracts where part of the wood has been carried away for a considerable number of years. "It is not denied that manure exercises an influence upon the developement of plants; but it may be affirmed with positive certainty, that it neither serves for the production of Carbon, nor has any influence upon it, because we find that the quantity of Carbon produced by manured lands is not greater than that yielded by lands that are not manured."—*Leibig.* Every farmer knows that manure will greatly increase a crop of hay, and consequently the quantity of Carbon. '2755 lbs of hay contain 1111 lb of Carbon.'

"It is universally admitted that humus arises from the decay of plants. No primitive humus, therefore, can have existed—for plants must have preceded the humus.—*Leibig.*

Where is the proof? Is it more difficult to create humus than plants?

"Large forests are often found growing in the soils absolutely destitute of carbonaceous matter."

We have spent years in "forests," but have always found the poor soils covered with turf, and the rich with fine mould. In seeming contradiction to these assertions, Leibig states that when plants first begin to grow, they are nourished by carbonic acid gas formed from the union of a portion of the mould with the oxygen of the air. After the leaves are grown, he thinks that plants take all their food from the atmosphere. Agricultural Chemistry is a new science, and the most that has been published upon it, has been written by men who had very little knowledge of practical farming. It is not strange, that in this stage of the science, opinions should be advanced that will be hereafter abandoned as more knowledge is acquired. We would wish that Dr. Bond, or some other person would ascertain by experiment, whether Carbonated Ammonia can be decomposed by Gypsum at a common temperature. Leibig says that it is slowly effected, but he repeats it with such confidence, that he ought to have more than conjecture for it. Any cheap material to mix with heaps of manure that would prevent the escape of Ammonia would be useful.

For the Colonial Farmer.

ELEMENTS OF AGRICULTURAL CHEMISTRY AND GEOLOGY.

[Continued from No. 19]

THE STRUCTURE OF PLANTS AND ITS USES.

The substances which we have viewed as constituting the food of plants, when taken into the system of a vegetable, have entered into a Chemical and vital laboratory, where they are destined to undergo a series of changes, ending in their assuming forms and properties very different from those which originally belonged to them. It is therefore necessary that we should consider the organs of plants; the vessels or utensils as it were, which nature employs in converting the unorganized matter of the soil and air, into food for men and animals.

The *general structure* of all plants is nearly the same. The wood of the hardest tree, as well as the stem of the most delicate herb, is composed of an immense number of very small tubes and cells, whose sides consist of woody matter, enclosing cavities suited for containing or transmitting sap or other fluids. These cells and tubes assume many different forms, varying from those of nearly round bags or bladders, to those of long pipes, sometimes extending through the whole length of a plant. They also differ very much in dimensions, direction, and mode of management; and it is to these differences that we must ascribe the various degrees of coarseness and fineness, toughness and brittleness, hardness and softness, which we observe in the wood of different trees, as well as the various kinds of texture which appear in the organs of every individual plant. To examine these varieties of structure, and the purposes which they serve, is a pursuit full of interest and instruction; for the present, however, we must content ourselves with a very general outline of the subject, taking for our example the structure of trees, which are the largest and most perfect specimens of vegetation.

The trunk and branches of a tree, may be viewed as consisting of three parts—Bark, Wood, and Pith. The *Bark* consists of tissue of vessels and cells, closely embracing the tree, of a white or brownish colour on the older parts of the trunk, and green on the young extremities of the twigs. This inner or true bark is covered and protected from the air by an outer skin or covering, which in some trees, as the white birch, consists of numerous thin and tough layers. In some plants, as the grasses, this outer bark is the only extreme covering which appears, and in these plants it often consists of dense inorganic matter, constituting the strongest part of the stem. The *Wood* is principally composed of cells and vessels of various forms and sizes arranged lengthwise in the stem and crossed by bundles of cells placed horizontally, and extending from the centre of the wood to the bark, so as to form thin plates extending across the wood, and called the *Silver grain, or medullary processes.* The office of these is supposed to be that of conveying fluids from the bark to the heart of the tree. The *Pith*, which is present only in young branches and small stems, consists of large cells placed horizontally, and it probably serves to store up superabundant sap till it is required by the plant. These structures, though most obvious in the trunk, are continued into the roots and branches, and in some degree, into the leaves. Though the structure which we have noticed prevails in trees, and in a great number of herbaceous plants, there is a large proportion of the vegetable kingdom which shows no regular arrangement of bark wood and pith; and the whole of the grains and grasses are of this last kind. In these plants however, the parts discharging the different functions of wood and bark, are not wanting, but rather intimately united instead of being separated into different portions We may now therefore consider the functions of those organs which belong to nearly all plants.

THE ROOT.

The larger branches of the root, like those of the trunk, consist of bark and wood; but in their smaller ramifications both bark and wood become soft, porous and easily penetrated by water: and these minute and greatly divided extremities of the roots penetrating to every part of the soil around a plant are its true mouths or feeders.* The spongy rootlets are capable of taking only fluid food, no particle of clay or other undissolved matter can enter them; they absorb water and this in so large a quantity that a sunflower three feet high has been stated to draw from the soil thirty ounces of water in twelve hours of a sunny day. But the water of the soil is not pure, it contains a great variety of mineral and other substances in solution, and these it must carry to the roots of every plant which grows upon it. Do all plants then which can grow on the same soil, require from it the same kinds of food? Experiment shows that this cannot be the case. If a pea and a plant of wheat grow side by side, and if both be gathered and burned, the ashes of the wheat will be found to contain a large proportion of silica or flint, which served to strengthen its straw, while those of the pea will be found to afford scarcely any of this earth. The water of the soil must have brought a certain quantity of silica to the roots of the pea as well as to those of the wheat, but by the former plant it was rejected as useless, while to the latter it was absolutely necessary. It becomes therefore an interesting question whether the roots themselves have the power of selecting from the soil what is required by the plants, or whether they absorb all matters indifferently, and leave to the other parts of the plant the office of selecting the most proper kinds of food.

This point has been much disputed, it may however be rendered more simple by a reference to animals. Of these we know tha every species is endowed with the skill necessary for choosing the most suitable nourishment, and yet that the ordinary food of each includes much that must be afterwards rejected; while all are liable occasionally to mistake what is poisonous for what is nutritive. In the same manner it can be shown that plants altogether refuse to receive some substances even when placed in contact with their roots in a soluble state; and yet that they do absorb much which they afterwards reject, and in some instances that they admit matter which proves highly injurious or poisonous to them. In plants also as in animals there are always matters of various kinds, which have served some purpose in their economy, but have finally become useless; and the roots of plants are the organs by which the admission and excretion of these matters are effected.

The substances thus excreted by plants, are either organic or inorganic. *With respect to the former*, Macaire found that vegetables carefully taken from the ground, and placed in water, gave forth from their roots substances having the properties of gum, extractive matter, opium, and other organic compounds, more recent observations however, have shown that at least a part of these effects is due to the escape of the juices from wounded parts of the roots. A better instance of the excretion of organic matter is found by the fact that when grain is made to sprout in powdered chalk; after germination has taken place, a part of the chalk (carbonate of lime) is found to be converted into Acetate of lime; acetic acid (vinegar) having been produced in the young plants and given out by their roots to combine with the lime.

The quantity of *inorganic* matter voided by plants is well shown by some experiments of De Saussre. First—he found that after vegetables have attained nearly to their full growth, they yield much more ashes, in proportion to their own weight, than afterwards when the seed is ripened, thus a plant of wheat when ripe, contained less than one half the proportionate quantity of ashes contained in a plant before flowering. Secondly—that this was caused by an actual return of inorganic matter to the soil, and not by an excess in the growth of the organic parts, was shown by the circumstance, that while the whole quantity of ash diminished, some of its ingredients greatly increased in quantity. This wheat contains a large proportion of silica, and it was found that the quantity of this earth in the ripe plant was to that in the green in the proportion of four to one, so that the other ingredients must have been lost to a much greater extent than the proportion before stated. Thirdly—the quantity of silica contained in the ashes of wheat affords in another way a proof of the excretion of inorganic matters Silica alone cannot be dissolved in water, but when it combines with Potash, soda, or alkaline substances, in certain proportions, it becomes soluble, and in this state it enters into the vessels of plants. Silica however requires nearly half its weight of Potash or Soda to render it soluble, and on examining the ashes of ripe wheat, it was found that the quantity of silica which they contain is four times that of their alkaline matter; or that there is present in the ripe plant only half the quantity of alkali required for the solution of the silica which it contains. It is evident therefore that a portion of potash or soda has been separated from the silica with which it was combined, and has been expelled, and perhaps this process may take place repeatedly, so that a small quantity of alkali may be the means of introducing much silica into the straw of wheat. Plants have therefore the power of sending back to the soil useless or injurious substances, whether obtained unaltered from the ground or formed in their own system; and it is even possible that some of the matters thus ejected may, as in the case of the alkali just noticed, combine with substances

* Hence, in transplanting, great care should be taken to preserve uninjured the small fibres of the roots. Plants should not be carelessly " torn out of one place and thrust into another."

in the soil, and thus become fitted to be again absorbed with beneficial results

The well known benefits of a rotation of crops have been attempted to be explained by supposing that the excrements disengaged from the roots of a plant, must be hurtful to others of the same kind if planted in the same soil, while on the other hand they might be nutritive to plants of other kinds. Thus if the roots of a pea be placed in water, they communicate to it in time a brown colour, in consequence of gummy secretions being thrown off from the plant; and if, after the water has thus been filled with excrements, another plant of the same kind be placed in it, it will not flourish; but if instead of a second pea, we place in it a plant of wheat, this will grow luxuriantly and take from the water a part of the matter previously deposited in it In the same manner, the soil in which any species of vegetable has long been cultivated may become surcharged with its excrements, and the substitution of some other crop, which can free the soil from these, may be rendered necessary. It is evident that the *inorganic* matters rejected by plants cannot have much influence in this way, since these previously existed in the soil; and we shall afterwards see that the quantity of these mineral matters *taken from the ground* and not returned to it, is one very powerful cause of the rapid deterioration of plants when long cultivated on the same soil. The *organic* excretions derived from that food which is obtained from the elements, afforded by air and water, are alone capable of rendering the soil poisonous to the plants from which they proceeded. We must not however forget that these secretions may, like other organic matter, be decomposed; so that after a sufficient interval, their injurious effect must entirely cease; hence it is found that fallowing, which gives time for the excrements in the soil to decompose, is a partial substitute, though a very wasteful one, for a rotation of crops.

THE ASCENDING SAP.—THE STEM.

The water absorbed by the roots is carried upwards into the stem, becoming, in its progress, more or less mixed with the fluids existing in the plant. In consequence of this intermixture, and probably also of changes effected by the agency of the cells and recesses through which it passes, the sap of trees, even in the lower part of the trunk, differs much from the water which the roots are sucking from the soil. Thus in spring, the sap of the maple is rich in sugar, a substance which could evidently have never been obtained from the water in the ground. The presence of this sugar is due to several causes—1st, the water and carbonic acid drawn up from the soil contain the elements of sugar, and may possibly be converted into it by the action of the wood, or of the young buds; to what extent such transformations can be effected by the wood, is not however very certain. 2nd, many trees store up in autumn, a quantity of starch, and possibly other substances, in the cells of their stems and roots; and that the starch thus prepared may be rendered useful in advancing the growth of the young leaves, the first process necessary is its conversion into sugar, a change as will afterwards be seen, very easily effected. 3rd in spring before the leaves are developed, growth is going on very slowly, and the sap not being used in the formation of wood and leaves, is allowed to accumulate in the wood, and when the tree is stimulated by the light and heat of the sun, may be obtained by tapping it. But as soon as the leaves are formed, the sap is rapidly withdrawn to furnish materials for their growth, and for the formation of wood; and for this reason it cannot then be obtained in the same quantity or of the same quality as in early spring.

THE LEAVES.

A leaf, as it appears to the unaided eye, consists of a framework of tough fibres, proceeding from its stalk, and branching over it in every direction; on these are stretched two skins or membranes forming its upper and under sides, and the space between these is filled with soft and pulpy matter. When examined with the microscope other structures appear. The surfaces of the leaf, especially the lower one, are found to be perforated with numerous minute openings, communicating with small cavities in its interior; the green matter is found to consist of cells filled with a soft green substance; and the fibres are found to be formed of vessels similar to those of the wood. Into the leaves thus constructed, the sap is conveyed from the stem, by means of the stock and fibres; from these it passes into the cells of the green matter, where it is exposed to the action of the external air, and of the light and heat passing the outer membranes. Under the influence of these powerful causes of Chemical change, the leaf becomes the seat of important processes.

1. A large portion of the water of the sap escapes from the leaves by evaporation and perspiration. Water contained in a vessel in which the roots of a growing plant are placed, is gradually drawn up and given out by the leaves, until at length, if not renewed, it becomes altogether exhausted; and then the plant droops and withers, because the leaves are rapidly exhaling their fluids, while the roots are receiving no new supplies. The emission of water proceeds with the greatest rapidity when the plant is exposed to the direct rays of the sun, and in darkness it becomes very slow or ceases altogether. Thus the sunflower which in a sunny day can give off 30 ounces of water, emits only 3 in a dry night, and none in a dewy one. In consequence of this rapid escape of water, the substances which it held in solution are left in a more concentrated state, and ready to be deposited wherever they are required The large quantity of water which thus passes through their system, also enables plants to obtain from the soil abundance of many substances which are contained in it in very small quantity, or are with difficulty soluble in water.

The powers of the leaves, with reference to water, are not limited to exhalation; they also in some cases can absorb it from the atmosphere, or from the rain and dew which falls upon them. It is thus that drooping plants may be revived by watering their leaves and that thus the air plants of China and Buenos Ayres flourish when suspended from the walls and balconies of houses, without any connection with the ground.

2. The leaves absorb and decompose Carbonic acid, a gaseous substance which as before stated, exists in small quantity in the atmosphere, and is the principal source of the Carbon in plants. If a vegetable be confined in a glass vessel containing air, with the usual proportion of Carbonic acid, or having a little more artificially added, and then placed in the sun, after some time it will be found that a part of the Carbonic acid has disappeared, and that a quantity of Oxygen, corresponding to that which it contained occupies its place. This change is effected by the leaves, which therefore have the power of absorbing Carbonic acid and retaining the Carbon, at the same time expelling its Oxygen.

But while this process proceeds with rapidity in sunshine, it goes on much more slowly in the shade, and in darkness gives place to one of a contrary nature. The leaves, which by day receive and decompose Carbonic acid, by night emit Carbonic acid and absorb Oxygen. In plants growing in ordinary circumstances, the former process is carried on to a much greater extent than the latter, which appears in some respects to serve for resting and renewing the exhausted powers of the leaves.

The decomposition of Carbonic acid by the leaves of plants, is most important to their growth, because upon the Carbon thus fixed in their structures, their strength and solidity in a great measure depends; and as this decomposition can only proceed in the presence of air and light, plants cultivated where these are deficient, become blanched, slender and watery. For the same reason, potatoes and other vegetables, cultivated for the starch and similar substances contained in their roots, are unable to obtain the necessary quantity of Carbon, and in consequence produce a crop of inferior quality, when cultivated in the shade or too thickly crowded. It is thus also that where plants can obtain light only in one direction, they grow towards it; for the side next the light being able to fix most Carbon, becomes firm and woody, while the other being soft extends more rapidly, and hence the stem bends towards the light. From the same cause the wood of trees which have grown in open ground, is more hard and durable than that of those which have lived in thick forests.

3. The leaves absorb and emit other gaseous bodies besides Carbonic acid. To what extent they can take Nitrogen or Ammonia from the air is uncertain, but both of these gases are given out by some families of plants in appreciable quantity; and the various odours and perfumes exhaled by many leaves and flowers are all volatile matters, formed in their cells and vessels, and which would probably be injurious if retained.

In the leaves then, the sap loses much of its water, receives an additional quantity of Carbon, and is subject to other changes afterwards to be considered; thus altered it passes into the vessels of

THE BARK.

The principal office of the inner bark is to apply to the formation of new tissues, the substances contained in the thickened sap which it receives from the leaves. For this purpose this fluid is carried downward, adding new matter to the outer surface of the wood, and the inner surface of the bark, and penetrating by the medullary rays to nourish the interior of the tree. In this manner it returns to the roots, by whose extremities its waste and useless portions are probably returned to the soil; and the remainder becoming mixed with the ascending sap, is again carried upward to the leaves. In some plants, such as the grapes, which have no true bark, the descending sap passes through a particular set of vessels, which are mingled among those which carry the ascending sap.

From the very short and general view which we have taken of the nutrition of vegetables, it appears that their food is obtained from the water contained in the soil, and by the leaves from the atmospheric air; that the substances obtained from both these sources, are united in the leaves; and that they there undergo changes, fitting them for being converted into the various matters which are found in the roots, stems and fruits of plants. The nature of these changes, and of the substances which result from them are next to be considered.

From the Central New York Farmer.

SHEEP HUSBANDRY.

I apprehend, however, that there is an error fatal to the true interests of the farmer, continually adverted to in the agricultural journals of the day, whether designedly or inadvertently I will not say—that is of raising mammouth cattle, swine and sheep, without taking into account cost of production. And it is greatly to be regretted, that gentlemen giving accounts of great and splendid animals, do not have them accompanied by accurate statements of the cost of production, which it would be very desirable to know, as farmers then could make an estimate whether there is any more profit in raising them or those of less size. For if one calf has the milk of one, and as is sometimes the case, of two cows all summer, and as it grows up, meal and other niceties besides, and another, half the milk of one cow four or five weeks, and then skim milk a few weeks longer, it is easy to calculate which costs the most!

I have, however, not intended to make any remarks on cattle at this time, and, therefore return to my subject. I say then that we see many statements of extraordinary large and fat sheep and heavy fleeces, but I have always looked in vain for statements accompanying them, of the amount of feed they have consumed to produce that heavy carcase or fleece. I have searched all the English and American authors in my possession, but they are all silent on the subject, except one, and that is Youatt. He states that a writer in the Farmer's Journal '*fed his ewes with twenty-five pounds of mangel wurtzel and five pounds of good hay each per day.*" I can keep at least five ewes on that quantity! What breed of sheep they were is not stated, and we are left to surmise that they belonged to some extraordinary breed of which some "Crack articles" appear in the agricultural papers of the day, and which are held up to the wonderment of the world, and as examples for the farmer to follow. But let them belong to any breed whatever, certain it is that they are monstrous great consumers, and would never compensate the farmer of this country, who has got to sell his mutton at a low price, for raising them. In England where meat is very high, they may answer. but in a country like ours, where it is generally low, they would not answer, as the flock owner's main dependance is the wool.

The large mutton sheep have been tried, faithfully tried, and actually experimented with in Germany where mutton brings more than double the price it does here. They did not answer there, and were abandoned; and it was found that the pure Saxony Merino, and the well bred grade sheep, (crosses of the native and Saxon,) returned a greater profit, for a given quantity of feed. If then they were not profitable in that country, I would ask what prospect there is for the great mass of farmers, to make them more profitable than the smaller breeds of sheep bearing fine wool?

Let us then return to the true principle of agricultural economy; *that he who produces most, at least expense, is most deserving, and the sheep which returns the greatest profit, at the least expense of keeping, is most valuable.*

From the New England Farmer.

PICKLING SEED WHEAT.

We copy the following from the May No. of the "Book of the Farm," by Henry Stephens, Esq., of Scotland.

"Seed wheat should be *pickled*; that is subjected to a preparation in a certain kind of liquor before it is sown, in order to ensure it against the attack of a certain disease in the ensuing summer, called *smut*, which renders the crop comparatively worthless. Some farmers affect to laugh at this precaution, as originating in a nonsensical faith in an imaginary specific. But the existence of smut, and its baneful effects on the wheat crop, are no imaginary inventions: and when experience has proved, in numberless instances, that the application of a steep has the effect of warding off the evils of smut, the little trouble which pickling imposes may surely be undertaken, rather than the whole crop be put in jeopardy. *Why* pickling *now* should have the effect of preventing the smut at a *future* period, is a different question; and it is, perhaps, because this question has not hitherto been satisfactorily answered, that pickling is thought lightly of by some farmers, rather than because any valid objection can be urged against its practice. Indeed there cannot, for the palpable fact stands obvious to conviction, that one field sown with pickled wheat, and managed in the usual way, will escape the smut, while an adjoining one, managed in exactly a similar manner, but sown with plain wheat, will be almost destroyed with the disease. I have seen this identical case tried by two neighbouring farmers, the Messrs. Fenton, late tennants of Nevay and Eassia, in Forfarshire. It is true that on some farms, wheat sown in a plain state, escapes the disease; and it is also true that pickling does not entirely prevent the recurrence of the disease on the farms; but such cases are exceptions to the rule, which is, if wheat is not pickled it *may* be smutted; at least no one can aver beforehand that it *shall not* be so; and while uncertainty exists in the recurrence of a serious disease, the *safer* practice is to bestow the trouble of pickling, the expense being very trifling, rather than incur the risk of disease. It is now a well ascertained fact, that inoculation will not insure immunity from small pox, yet it will certainly modify the attack when it occurs, and so it is with pickling wheat; and as long as means are used to ward off small pox, so long also, from analogy, ought wheat to be pickled.

"Wheat is pickled in this way. For some days, say two or three weeks, let the tub be placed to receive a quantity of chamber ley, and whenever ammonia is felt to be disengaging itself freely from the ley, it is ready for use. It is better that the effluvium be so strong as to smart the eyes, and water added to dilute the liquor, than that the ley be used fresh. This tub should be removed to the straw barn, as also the wheat to be pickled, and part of the floor swept clean, to be ready for the reception of wheat. Let two baskets be provided capable of holding easily about half a bushel of wheat each, having handles raised upright on their rims. Pour the wheat into the baskets from the sacks, and dip each basketful of wheat into the tub of ley as far down as completely to cover the wheat, the upright handles of the baskets preventing the hands of the operator being immersed in the ley. After remaining in the liquor for two or three seconds, lift the basket up to drip the surplus ley again into the tub, and then place it upon two sticks over an empty tub, to drip still more till another basketfull is ready to be dripped. Then empty the dripped basket of its wheat on the floor, and as every basketful is emptied, let a person spread by riddling through a barn wheat-riddle, a little slacked caustic lime upon the wheat. Thus basketful after basketful of the wheat is pickled, till it is all emptied on the floor, when the pickled and limed heap is turned over and over again, till the whole mass appears uniform.

'Other substances beside chamber ley are used for pickling wheat, such as brine of salt, sufficiently strong to float an egg; solution of blue vitrel; all good enough I dare say: but when so simple and efficient, and easily obtained an article as ley, can be had, it appears to me unnecessary to employ anything else. It is a powerful ingredient, destroying vegetable life in the course of a few hours, and it is perhaps to this property that is to be ascribed its efficacy as a protection against the attack of that vegetable enemy of the wheat crop—smut. The wheat pickled with it should therefore be used immediately after the process, and as danger may be apprehended to pickled wheat being kept over night, the quantity pickled should be sown at once, and no more should be pickled at one time than can immediately be sown. The use of the quick-lime seems to be to dry the ley quickly, so that the grains may be easily separated from one another in the act of sowing; but there may some chemical change arise between them in the circumstances, which may be serviceable to the purpose which both are employed. Can it be that the lime fixes the ammonia of the ley, and preserves it for use until wanted by the plant or seed."

A writer in the Southern Planter says;—I had like to have forgotten my cartwheel composition; it is the best, black lead excepted, of anything I ever used; it is both simple and cheap. I am now, and have been using it for some time; try it before you condemn it. It is clean wood ashes mixed with any kind of common grease, or train oil if you please.

BUTTER MAKING.

From the Albany Cultivator.

Messrs. Gaylord & Tucker—In the May No. of the Cultivator, "The Neighbor's" propound some questions as to butter making. Living as I do in Orange co., which ranks A, No. 1 in the manufacture of butter, I felt an anxiety to give the desired information, and for this purpose have obtained the following directions from an aged female friend, who for upwards of 40 years has had the management of a large dairy, and has probably made and packed down 1,500 firkins of the very choicest Orange Co. butter, with her own hands.

Here you have it "*verbatim et literatim.*"

Newburgh, May 15, 1843. T. M. Niven.

One of the first requisites is perfect cleanliness in every utensil and implement used about the dairy. The butter should always be made and worked in a cool cellar. The milk pails (wood is preferred,) should never be used for any other purpose; they should be thoroughly cleansed daily, and be well aired and dried after washing. Immediately after milking, the milk should be strained into tin pans usually holding 12 or 14 quarts—the pans of course being clean and sweet—a little cold spring water being put into each pan before the milk is put into them.

In warm weather, the milk should stand in the pans about 36 hours, or until it becomes thick. The milk is then thrown into the churn, filling it about half full, (always remembering the first requisite of cleanliness and sweetness,) and is permitted to stand about half an hour before the churn is started. Care is to be taken that the churn works moderately, as too great rapidity of motion is injurious both to the flavor and colour of the butter.

Dissolve one table spoonful of saltpetre to 15 gallons milk, and put it in before the churn is started, adding as little water as possible during the process, merely to prevent the milk frothing. As soon as the butter is formed, the churn should be stopped. A pail full of cold spring water may now be added, as it will aid the gathering of the particles of butter. The wooden butter ladle and tray are now required; they both need scalding with boiling water, and are then kept in cold water until the moment they are needed. The butter is gathered with the ladle and put into the tray, where it is worked with the ladle for some time, until the milk is all expressed from the butter, a little cold water being used for this purpose. Too free use of water at this stage is injurious, as it tends to destroy the rich flavor of the butter.

The salt may now be added, (best Liverpool fine salt is preferred,) it should be thoroughly worked through the butter. In very warm weather it may be necessary to let the butter stand in the tray 12 to 18 hours, in a dark cool cellar, frequently working it over during this time, and expressing the brine until it becomes cool and solid; it is then in a situation for packing away in the tub or firkin, and should be carefully excluded from the atmosphere until used.

TO COLOR RED AND YELLOW.

From the Albany Cultivator.

To color red and yellow, we give the following receipts, which we are assured by those most competent to judge, will produce superior colors. The receipt is for dyeing wool or woollen cloth. To dye one pound of yarn or flannel requires the following articles:

3 ounces of alum,
1 " cream of tartar,
8 " of madder,
½ " of stone lime.

1. Prepare a brass or copper kettle with about five gallons of water, bring it to a scalding heat, then add three ounces of alum pounded fine, and one ounce cream of tartar; then bring the liquor to a boil, and put in the woolen and boil it for two hours. It is then to be taken out, aired and rinsed, and the liquor thrown away.

2. Prepare the kettle with as much water as before, and add to it eight ounces of good madder pounded fine, and well mixed in the water before you put in the woolen. When the dye is as hot as you can bear your hand in, then put in the woolen, and let it remain in the dye for one hour, during which time the dye must not boil, but only remain at a scalding heat, observing to stir about the woolen constantly when in the dye.

3. When the woolen has been in one hour, it is to be taken out, aired and rinsed.

4. Add to the dye one half pint of clear lime water, which is made by slacking half an ounce of lime to powder, then add water to it, and when settled, pour the clear part into the dye, and mix it well. Now put in your woolen, and stir it about for ten minutes, the dye being only at a scalding heat. It is then to be taken out, and rinsed immediately.

N. B. If you wish the red very bright, add quarter of an ounce, or nearly half a table spoonful of what dyers call aquafortis composition, at the time of putting in the madder.

For yellow dye the same proportion as for red, excepting that for the eight ounces of madder, one pound of fustic is to be substituted. The woolen must be boiled in the alum and water an hour and a half, then taken out, cooled, and rinsed slightly.

In a new liquor put in your fustic, secured in a thin coarse bag, and boil it for two hours; then take out the fustic and put in the woolen, and stir it while boiling for one hour. Then to be taken out, cooled and rinsed.

From the Cultivator.

GRAFTING SCIONS, &c.

As the season for grafting is near at hand, I will, with your consent, relate to your readers my small experience in this business. Though much has been written upon this subject, there may be some useful hints given yet.

I usually cut my scions some time in the month of March, or before the buds have become swollen by the summer's heat. Select the most thrifty and vigorous shoots of the last year's growth. I cut them off to a little below the circle where it was commenced; tie them in bunches and affix their proper labels. Select a dry piece of ground and dig a hole two or three feet deep, and wide enough to admit of the scions freely. Place pieces of boards upon the bottom, and around the sides of the pit, to prevent the scions from coming in contact with the earth. Cover the hole with a good sound board, then draw the earth over the top in the form of a mound, so as to have the centre of about one foot in thickness. Boards are thrown over the hole, to prevent the rain from entering the pit and injuring the scions. Kept in this manner, I have never failed of having good success, when they were set at the right time. Many writers direct them to be set in April, but I never had them do as well when set so early, owing to cold and chilly weather which frequently occurs, and checks the supply of sap, and the scion dies for want of nourishment. I think the best time for setting, is a short time before the trees begin to blossom, as the sap is then in full and steady circulation. A small quantity of wax spread upon the scion will prevent the moisture from escaping, and the union will take place more speedily.

Have any of your readers ever tried the experiment of grafting the cherry upon wild stocks? I purchased several trees of this description of a gentleman who says that "the wild stock is more hardy and better to graft upon than the cultivated kinds;" and I think he is right, for I saw some very large and thrifty trees, which have borne good crops and have all the appearance of living to a "good old age." Yours, &c.

LAWRENCE SMITH.

Mansfield, Mass., Feb. 14, 1843.

From the American Agriculturist.

The white carrot is a most excellent root for stock; horses, cattle, and hogs are very fond of them. It was near the middle of June last year before I obtained my seed and got it planted.* It was sown on a light piece of sandy loam, naturally strong, cleared up about seven years ago, and was never manured. They grow partially out of the ground like the mangel wurtzel, and have a beautiful clean taper root. They pull as clean and easy as a radish. I measured a small piece of about four square rods, and the yield was at the rate of 1,000 bushels to the acre. Could they have grown another month, it would have added greatly to their size and product. I intend trying them extensively next year. These and sugar beets are the best roots I have ever grown. The latter have always yielded abundantly with me; 800 to 1,200 bushels is a fair crop. I never have succeeded uniformly with ruta-bugas.

The White field bean is a valuable and profitable crop, and yet with all its value, little attended to by our farmers. I planted this year about one third of an acre of the large kidney variety—hoed them only once, and harvested upwards of ten bushels. I planted in hills, about two and a half by two feet apart. Had they been better cultivated, I presume the crop would have been much greater. There is no more profitable vegetable for food. Observing housekeepers have remarked that one bushel of beans for family consumption, is worth four bushels of wheat, and I believe it. No better, more savory, or substantial diet can be produced than the luscious pork-crowned "pot of baked beans."

L. F. ALLEN.

Black Rock, N. Y. Jan. 1843.

GROWING WHEAT CROP.—I have been much surprised that none of our papers give any account of the state of the wheat now in the ground, which appears to be almost, if not entirely destroyed by the severity of the winter. Many farmers have made up their minds to plough up their wheat lands for corn. By this time last year, our young wheat was ancle high, and now the lands are as bare as a turnpike road, and yet on the face of these prospects, which are general throughout the Western country, our poor farmers haul wheat, the finest ever produced, fifty miles, and get 37½ cents per bushel.

Surely if this expected failure was known in our Southern and Eastern markets, there would be a change in the price for wheat now on hand. Respectfully,

A FARMER.

Winslow, April 1, 1843. *Louisville Journal.*

ICE HOUSES.

From the Dollar Farmer.

The following description of the manner of erecting ice houses we select from the Farmer s Gazette. Having ourselves witnessed the superiority of houses constructed in this manner, we can recommend them as far superior to the under ground houses, which are usually found in this section of country:

The most powerful agent we have to contend with in preserving ice is dampness, which arises from the gradual melting of the ice and that which the atmosphere naturally contains. There is more difficulty in excluding this than warm air from the ice. It is of the first importance therefore to locate your building in a spot divested of trees and exposed to a free circulation of air. It should not be in a cellar, nor sunk in the earth, nor walled up with stone, for such locations are inevitably damp, independent of the vapor arising from the ice.

Erect a plain wooden building of eight or ten feet, posts entirely above ground. Size according to your wants The outside covering of boards and planks, placed perpendicularly with batting over the joints. The inside boarded up, clapboard fashion, lapping on each other to prevent the water from running into the filling, which should be of charcoal if to be had, if not, well dried tanner's bark may answer, but will need renewing occasionally. The filling should be put in as the inside boards are put on, or as may be most convenient, leaving places for the purpose open. The floor of three or six inch plank, high enough from the ground to allow a free circulation of air, and descending enough to drain off the water which drips from the ice, with ribs of narrow boards to keep the ice above the water, and holes in the lower side to let out the water as it flows down, and a good drain to convey it away from the building.

Let there be a moveable floor above the ice, that there may be but little vacancy between that and the ice when the house is filled. Let the floor down as the ice is dissolved or removed. On the floor lay dry rye straw, two or three feet thick, make a hole in the center of the floor, with a trap door large enough for convenience to put in the ice, and to go in and out. Let two opposite sides of the building be boarded down to the ground, the other two open to admit a draft of air to convey off all the dampness.

Thus your ice is thoroughly shielded from dampness and warm air, which is all that is desired, and with proper care in going in and out during the summer, you will have this great luxury and necessity of life in perfection, provided you put up good solid ice.

The largest and most complete ice houses of which we have any knowledge, are those on the Hudson river, from which New York city is furnished with a most elegant article of Rockland county ice.

"THE COLONIAL FARMER,"

TITUS SMITH, EDITOR, R. NUGENT, PROPRIETOR,

Is published semi-monthly at the Novascotian *Office, Halifax.*

TERMS – One copy, 5s., Six copies, 25s.; Twelve copies, 50s.; Twenty five copies, 100s per annum – *in all cases in advance.*