THE

NEW-BRUNSWICK AGRICULTURIST.

SEPTEMBER, 1841.

Printed at the Brunswick Press, Prince William Street, by W. L. Avery.

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VOL. I.} SAINT JOHN, SEPTEMBER, 1841. {No. V.

AGRICULTURAL READING AND THE DIFFUSION OF AGRICULTURAL INFORMATION.

THE disinclination which is so generally manifested by our Farmers to avail themselves of the means of information within their reach, is one of the greatest impediments to the progress of agriculture in the Provinces. Improvements must be based upon science, and amelioration cannot take place advantageously, unless Farmers understand the principles of agriculture as well as the practices in it. This knowledge can only be acquired by reading, or hearing the researches and experiments of philosophical agriculturists and practical husbandmen. Other countries have reaped a rich harvest from the scientific labours of eminent men, and the names of Davy. Leibig, and a host of others, will descend through successive generations, and will be held in grateful remembrance by every intelligent agricultural enquirer. The generality of *our* Farmers have yet to learn that agriculture is a science, that the process of vegetation is regulated by laws and promoted by agents, which when known by husbandmen to the extent of the present discoveries in them, would give not only an increased interest in cultivating the soil, but an increased return for the labour upon it. Agricultural chemists have made most important discoveries in this science; and although it cannot be presumed that every farmer can comprehend the technical language in which those discoveries are described, nevertheless all can be benefitted by the results of them—as for example: the practical farmer finds by experience that some soils cannot be rendered productive even by the most copious supplies of manure; he spreads it bountifully over his land—tills the soil—sows his seed, waits the appointed time, and reaps disappointment; he is ignorant of the cause of it. The philosophical agriculturist can explain the difficulty—he has ascertained that the fertility of soils is dependent upon the presence of certain salts in them, and that when these have been exhausted by continued croppings, or when they were not originally present in them, manures, although they may have been abundantly employed, yet if they did not restore, or give these salts to the soil, would fail to render it productive. A farmer, speaking of manures, recently observed that his crop of wheat was a failure, although from the rank luxuriance of the blade in the early part of the season he anticipated a great return—he was unable to account for its failure: Agricultural chemistry has detected the cause: the soil contained silicate of potash, and the other principles requisite for the growth of the straw, but it was deficient in the phosphate of lime, the principle requisite for the production of the grain. Experience after many failures and trials may ultimately discover that some manures are superior to others on such soils, but science can direct the practical farmer to an immediate corrective, namely, to those manures which contain the phosphate of lime, and bone dust is one of the most powerful of them. Not long since a very respectable farmer observed that he had experienced most decided benefit from the use of fish as a manure, and that he had reaped a very abundant crop of wheat from the soil over which it had been spread—the old gentleman was satisfied with the fact, altho' he was not aware of the cause of it; and when he was informed that one of the principal agents was the phosphate of lime, he acknowledged the advantages of science, and the assistance that it would afford to the practical farmer; but still it must be confessed that too many prefer the darkness of their own conceits to the light of knowledge. In England and throughout the United States Agricultural Works and Periodicals meet with extensive encouragement and support. In Nova Scotia and New Brunswick the limited circulation of European, American, or Domestic Agricultural Works and Papers, is a sad evidence against our intellectual improvement, without which the cultivation of the soil will be correspondingly deficient. We do not claim originality in the various articles recommended to consideration in this Periodical, but we, do say that the valuable extracts from Leibig on the philosophy of Agriculture, as well as the practical observations taken from the British Husbandry, from which Jackson has copied most copiously, are sufficient to entitle it to the attention of our Farmers. Societies may form and re-form—resolve and re-resolve—elect officers, and publish their elections and nominations; but they will be vain shows, and evanescent efforts, without the necessary aid of agricultural reading. The cultivation of a soil destitute of fertilizing salts is unprofitable labour, unless it is supplied with them, and the formation of Societies, the announcement of office bearers and the scale of premiums for the best cattle, will be equally unavailing if the mind is not enriched with the fertilizing salts of science; and we are inclined to venture the opinion that Societies would advance the object of Agriculture, if, while they were appropriating funds in the shape of premiums for the best breeds of Cattle, they would at the same time offer some premium upon the best essay upon Manures, or the soils of particular districts, or upon any interesting subject of Provincial husbandry, which would act as a stimulus to, or imply the necessity of, reading agricultural works. It is entirely erroneous to assert that as agriculture is altogether a matter of labour and practice, that practice of itself will make the farmer perfect. Chemical analysis has detected the different constituents of various plants, and in this manner science has contributed greatly to the improvement of practical agriculture. Our farmers have adopted a very wasteful practice with their manures. Science has discovered that the gases or vapours which escape during the process of putrefaction are powerful agents in the economy of vegetation, and experience aided by this knowledge has ascertained the importance of retaining those gases, which is effected by the absorbent power of the earth when employed as a covering over a fermenting compost. It would be superfluous to enlarge on the benefits which science has conferred upon agriculture, and it is sufficiently conclusive of the importance of this science to refer to the splendid talents which have been devoted to the researches of it. The difficulties which have embarrassed the mercantile interests of the Provinces, and the wishful look which many now turn to the comfortable houses and competences in the country, which they exchanged for the hopes and fears of commerce will have a tendency to elevate the character of agricultural pursuits; and as it is universally acknowledged that agriculture is the basis of national prosperity, it thus follows that it is worthy of every public exertion, which is calculated to ensure and advance the success of it. The diffusion of knowledge, or in other words, useful education in all its varied departments, has a legitimate claim upon Legislative protection, which has been liberally extended over collegiate establishments for the resurrection and perpetuity of Dead Languages. We are not opposed to such establishments, although in our

Provinces there may be a vast disproportion between the sums expended upon, and the benefits conferred by them. The principle is good, altho' the system adopted to carry the principle into operation may be defective in some of its bearings. We confess our admiration of the aristocracy of learning, and we venerate the *Alma Mater*, which is venerable not only for antiquity in our mother country, but for the numerous examples of cultivated minds, which colleges have produced, and which have enlightened and adorned successive ages since the establishment of such institutions in Great Britain; nor are our Provinces, comparing small things with great, without some evidence of their usefulness. The acquirement of knowledge is not confined to chartered edifices; these may be favoured paths to the temple of science, but there are other roads which lead to it; and we should not consider a proposition in favour of the diffusion of knowledge wandering and visionary, merely because it is characterised by novelty. The time was, when the project to propel a ship against adverse winds and tides by the power of steam, was considered as the waking dream of a fanciful enthusiast —the time is, when distances are reduced, and land and water traversed with increased comfort and almost incredible celerity by steam. And the time will be, when the present greatness of this mighty agent will acquire still greater perfection. But to return from this digression. We have already observed that there is a prevailing apathy among our farmers respecting *book-knowledge*. We speak generally, for there are a few worthy exceptions; visit the country and ask for an agricultural book, or magazine, or paper; and you will meet with them "*Few and far between.*" The trouble of obtaining them, and the greater trouble of reading them after the toils of the day, with the prejudices of the farmer in favour of his own experience, all conspire to impede the progress of agriculture, and the introduction of those improvements, which science and experience unitedly have effected in other countries. But many who are indifferent about reading, are very willing to hear, and we verily believe that the great object of all agricultural associations would be secured, and this best interest of the Province advanced, by the appointment of some competent individual as an *Agricultural Lecturer*, under the direction of the Legislature. It should be the duty of such a person to visit in succession every county throughout the Province, and to give a familiar and popular course of agricultural lectures in each. Such a course should comprehend the most important and useful discoveries of agricultural chemistry, and the most approved practices of husbandry applicable to our climate and circumstances. It would have a decided advantage over printed information, in as much as instruction would be accompanied with explanations, not only during the lecture, but subsequently and conversationally in reply to questions respecting it. Many men would travel a few miles to hear a lecture, who would scarcely cross a room to read an agricultural paper. Curiosity, and gossip, and the love of congregating, which are universally demonstrated throughout both Provinces, would exercise in this instance a beneficial influence in bringing men together.—Such lectures, given always before the agricultural societies throughout the Province, would have a tendency to increase the numbers, strength and usefulness of such associations, and bring before the agricultural public in regularly printed records much useful information, which under the present state of such matters, is either lost or very limited in its influence. It should be the duty of such a lecturer to submit an annual report, to the Legislature, of the places he had visited; the number of lectures he had given, and the number of persons who attended them, with all other information upon the subject and within his observation.

The same lectures should be repeated in different parts of the same county, when a county was extensive and populous. It would be the interest of the lecturer to excite a general feeling in his favour, and therefore it would be his interest that as many as could conveniently, should hear him. We do not speak unadvisedly when we say, that we are convinced that such an undertaking would be followed with success. We have conversed with many farmers upon the subject, and there is a general opinion in favour of it. A person thus appointed would be enabled to publish a correct statement of rural matters and agricultural improvements. And such a statement, comprehending localities, would act as a general stimulus to agricultural ambition. There are twelve counties in the Province, a vast amount of useful information might be embodied in eight lectures, and supposing that these lectures were repeated twice in each county, for the greater convenience of hearers, it would make an aggregate of 192 lectures delivered annually throughout the Province. The winter would be the best season for giving such lectures, as the farmers have more leisure at that time, and travelling generally speaking is more easily accomplished. Admitting that the proposition is feasible, the accomplishment of it desirable, and that a suitable person could be obtained, who would assume the arduous responsibilities, another important question arises; how should the lecturer be paid? We answer! By a legislative appropriation; for we think, if this important subject was presented fairly and fully to legislative consideration, that the members of both houses would be convinced of its utility; liberal sums have been bestowed upon colleges, schools and Institutes, and we ask is there any institution that would yield its return more immediately than the instruction of our agriculturists in that science, which is the basis of national wealth and happiness, and cannot be studied without improving the moral as well as the intellectual powers of the hearers. The lectures should not consist of desultory communications upon agricultural matters, but they should comprehend a systematic course of instruction; continued from year to year. The introductory lecture each successive season should recapitulate the substance of the preceding lectures, so as to preserve connexion. Such a proceeding would not only diffuse information at the time, but it would create a spirit of enquiry, and desire for reading and experiment, which would soon give an improved character to the agricultural concerns of the Provinces. The dissemination of useful knowledge is not the only advantage that would result from the proposed appointment, for the person thus employed might at the same time be collecting correct materials for an interesting report of rural statistics, as he would receive information from numerous authentic sources, and he could report in many instances from actual observation.

We submit our remarks to the deliberate consideration of our agricultural friends, and particularly to those members of assembly who are more immediately interested in agricultural pursuits. The suggestion is worth the trial. It proposes the diffusion of agricultural science and practical husbandry, which would be diffused by the adoption of it. If knowledge is power, and if agricultural strength implies Provincial prosperity, then are we called upon to contribute our efforts to confirm that strength, which in return extends its influences from the highest to the most humble individual in society.

AGRICULTURAL CHEMISTRY.

(*Continued from page* 87.

The Art of Culture.—Experience has shown that a wheat crop should not follow a wheat crop in immediate succession upon the soil, because wheat is an exhauster of it, nor will it thrive in a soil abounding in humus but destitute of some other constituents requisite for carrying the plant to maturity. This has been exemplified in the rich soil of many parts of Brasil, and in Germany. In such lands the stalk attains no strength, and droops prematurely. The cause is the following. The stalk requires the *silicate of potash*, and the grain requires the *phosphate of magnesia*, to strengthen them; and humus does not contain, and consequently cannot supply either of these salts to the growing plant. The plant may become a shrub, but it cannot bear fruit. "Again," says Leibig, "How does it happen that wheat does not flourish on a sandy soil, and that a calcareous soil is also unsuitable for its growth, *unless it be mixed with a considerable quantity of clay*? It is because these soils do not contain alkalies in sufficient quantity; the growth of wheat being arrested by this circumstance, even should all other substances be presented in abundance."

Trees, which renew their leaves annually, require for those leaves from six to ten times more alkalies than the fir tree or pine, hence pines and firs attain a comparatively large size in soils, upon which hard wood trees acquire a stunted growth. This observation of Leibig is familiarly exemplified upon the plains of Wilmot and Aylesford, in Nova Scotia. *De Suassure* ascertained that 1000 parts of dried leaves of oak yielded 55 parts of ashes, of which 24 parts consisted of alkalies soluble in water; the same quantity of pine leaves gave only 29 parts of ashes, which contained 4 and some fractionals soluble salts. When a forest of pines or firs have been burnt, they restore alkalies to the soil, sufficient for the growth of beeches, wild cherry, &c., which spring up after them.

Wheat will not thrive on a soil, which has produced wormwood, nor will wormwood thrive where wheat has grown, because they each exhaust the alkalies of the soil.

100 parts of the stalks of wheat yield 15 parts and some fractionals of ashes. The same quantity of the dry stalks of barley yields 8 parts and some fractionals of ashes, and 100 parts of the stalks of oats yielded only 4 parts and some fractionals of ashes. The ashes of all these three kinds of straw are the same composition: hence we see what plants require for their growth, and that the field which can only yield *one* crop of wheat can raise *two* crops of barley, or *three* crops of oats.

All the different kinds of grasses require the silicate of potash, which is conveyed to the soil, or rendered soluble in it by the irrigation (overflowing) of meadows. Reeds and such plants containing large quantities of siliceous earths, or silicate of potash, thrive luxuriantly in marshes, agillaceous soils, ditches, streamlets, and other places where the change of water furnishes a constant supply of dissolved silica. The quantity of silicate of potash removed from a meadow in hay is very great. This was manifested near Heidelberg in Germany: a stack of hay was struck with lightning, the ashes contained a quantity of fused vitreous matter, which was found to be the silicate of potash.

Potash is not the only substance requisite for the existence of most plants: It may be replaced in many cases by soda, magnesia and lime: but other substances besides alkalies are necessary to support the life of plants.—Phosphoric acid has been found in the ashes of all plants, and always in combination with alkalies or alkaline earths. Many seeds contain phosphates, and phosphate of magnesia abounds in the different kinds of grain. Plants obtain their phosphoric acid from the soil, and it is a constituent of all land capable of cultivation. Phosphoric acid is detected in many mineral waters, and also in combination with, lead, clay, slate and lime. The soil furnishes phosphoric acid to plants, and plants give it out to animals for the formation of bone, and of those constituents of the brain, which contain phosphorus.

Flesh, bread, fruit and the husks of grain furnish the body, with more phosphorus than it requires; and accordingly the superabundant quantity is thrown out in the urine and excrements. Large quantities of concretions formed of phosphate of magnesia and ammonia have been taken from the intestines of a horse. It must have been obtained from the hay and oats.

The phosphate of magnesia is an invariable constituent in the seed of corn (grain), and is requisite for its maturity.

We may here observe that we have a familiar illustration of the presence of phosphorus in vegetable matter in the luminous appearance frequently met with in some decayed woods, and visible at night.

Other substances are occasionally detected in plants, which may be regarded as necessary constituents in some of them. These substances are common salt, sulphate of potash, nitre, and chloride of potassium; clay and slates contain generally small quantities of the oxids of copper, and these are sometimes found in plants, although it is doubtful whether they are necessary for their growth and perfection.

A combination of calcium which is the base of lime, with the fluoric acid, forming fluoride of calcium, may take place of the phosphate of lime in the bones and teeth: the earthy parts of bones are composed principally of the phosphates and carbonates of lime in various proportions, mixed with small and variable proportions of the phosphates of magnesia and fluates of lime. The bones of a man contain three times as much carbonate of lime as those of an ox, which in return contain a larger proportion of the phosphate of lime and magnesia.

Speaking of the fluoride of calcium taking the place of the phosphate of lime in the bones and teeth, Leibig observes "at least, it is impossible otherwise to explain its constant presence in the bones of antediluvian animals, by which they are distinguished from those of a later period. The bones of human skulls found at Pompeii contain as much fluoric acid, as those of animals of a former world, whilst the bones and teeth of animals of the present day contain only traces of it."

De Suassure has remarked "that plants require unequal quantities of the component parts of soil in different stages of their developement; an observation of much importance in considering the growth of plants;" thus wheat yielded 79-1000 of ashes a month before blossoming, 54-1000 while in blossom, and 33-1000 after the ripening of the seeds. It is therefore evident, that wheat from the time of its flowering restores a part of its organic constituents to the soil, although the phosphate of magnesia remains in the seeds.

Fallow time is that period of culture during which land is exposed to a progressive disintegration of its particles by the influence of atmosphere, which renders a certain quantity of alkalies capable of being received into the system of plants, and appropriated by them. Careful tilling of the land therefore must increase and hasten this disintegration or separation of particles. For the purpose of agriculture, it matters not whether the land is covered with weeds, or with a plant that does not extract the potash in it. Many plants are remarkable for the small quantity of alkalies or salts which they contain. Such plants therefore are favourable for fallow, as they do not exhaust the soil. The *vicia faba*, or Windsor bean, contains no free alkalies, and not one per cent. of the phosphates of lime and magnesia. The *phaseolus vulgaris*, or kidney bean, contains only traces of salts. The lucerne and lentil contain only fractionals of a part of the phosphate of lime with albumen. Buckwheat dried in the sun yields only the smallest recognizable quantity of soluble salts. These plants accordingly are termed fallow crops, because they do not exercise any injurious influence on *corn*, which is cultivated immediately after them; they do not extract the alkalies of the soil, and only a very small quantity of phosphates. Leibig supposes that the small value of beans and peas as articles of nourishment is owing to the small quantity of phosphates which they contain, and "as the component parts of bones, viz, phosphate of lime and magnesia, are absent, they satisfy the appetite without increasing the strength." It is evident from what has been shewn, that two plants, growing beside each other and requiring the same food from the soil, must naturally injure one another. This is exemplified in the growth of certain weeds with wheat, as the wild chammomile and flea-bane, and in proportion as these weeds flourish, the grain is impoverished. Plants on the contrary, requiring different constituents, may flourish on the same soil at the same time, or in succession; thus on a soil containing potash, wheat and tobacco may be reared in succession, because the tobacco does not require phosphates, salts which are invariably present in wheat, but requires only alkalies, and food containing nitrogen.

WE insert with much pleasure the following communication, respecting "*Banking accommodation for Farmers*," confessing at the same time our incompetency to venture at present any decided opinion upon the subject. We are willing however to encourage temperate discussions upon all subjects, intended and calculated to promote the agricultural interests of the country, and we therefore invite further information upon this important question. The communication contains many excellent observations, and as we know the writer of it to be an experienced, intelligent and respectable farmer, we recommend his suggestions to the deliberate consideration of agriculturists. We may here observe that a very imperfect experiment was tried in Nova Scotia in the shape of a Provincial loan for the relief of farmers. But as the amount appropriated for this purpose was very inadequate, the means proved insufficient, and like all half-way measures, they were found to do harm; and in the following manner: a farmer owed several persons to the amount of fifty pounds, but he could obtain at the loan office only a proportional part of the general amount in it, say £10 or £15. His creditors knew that money was within his reach by giving security on his farm, they fell upon him, and he was compelled to give it.—The sum thus obtained would not satisfy all the demands upon him, some were liquidated, and those persons who received nothing, in the plenitude of their disappointment, poured out their wrath from the phials of the law, and increased the unfortunate man's perplexities and debts with costs of court. The consequence was that farms were immediately sold, to satisfy the small securities that were upon them. We do not however consider that the foregoing can be adduced as a fair argument against Banking accommodation upon proper principles, and the judicious employment of it. The utility of banks has afforded matter for a contrariety of opinions. We can readily believe that the assistance, which they could afford to the enterprising and industrious farmer, would contribute to his own gain and the improvement of the country, and that although some individuals might make an injudicious use of the facility, still that the general benefits would more than counterbalance the particular objections. We are unwilling to express any decided sentiment, as we have not given the subject full consideration, nor viewed it in all its bearings.

We thank the writer of the article for the flattering expression of his sentiments in favour of the "New-Brunswick Agriculturist," and as the introductory paragraph referred exclusively to the editor of it, we have taken the liberty of omitting it, offering at the same time our grateful acknowledgments to our correspondent.

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[For the New Brunswick Agriculturist.]

UPON BANKING ACCOMMODATION FOR FARMERS.

Sir—Will you permit a plain man who has given some attention to the subject, to point out what I conceive to be absolutely necessary to ensure any decided progress in Agriculture in this Province, and to solicit your and your correspondents attention to the point as you proceed. This is a well matured system of banking, to enable farmers on proper security to get loans of money. Without this all powerful stimulant, I fear that even your valuable and well-intentioned labours will be in vain. It is well to collect information, without which, even capital might be expended in vain, but also without capital, I fear that knowledge itself will be all but useless. It imports little to the man who can spare no time from the labours necessary to the support of his family, that he knows modes of improvements which in a very short time would double or treble the produce or his farm. If he must labour on, and can spare no time for such improvement without risking the comfort or even existence of his family, his knowledge can be of little value. He will improve, but it will be with the pace of a snail. The country, as a whole, must thus improve almost necessarily, it is true, but our population, aided by emigration, will increase in a still greater ratio, than this slow improvement, and we will thus continue for an indefinite period to depend on other countries for our bread. The improvement of the country in production, without some extraordinary stimulus, will not go on in proportion to its population, even with increased knowledge, much quicker than it has hitherto done. The best land near to market is already occupied, and new settlers must go further and further back into the forest. Most of the intervals, and, I must say, all the sea marshes are already taken up. Settlers will therefore have to contend with the difficult of rearing or keeping stock on new farms by forming upland meadows, and pastures, a process requiring time and labour. Grass is the basis of husbandry; our cattle must be in proportion to it; our manure in proportion to our cattle, and our culture in proportion to our manure. If therefore no exertion be made to make and collect artificial and mineral manures, it appears to me very evident that we can make but little progress upwards in agriculture. Without capital, in a majority of cases, no time or labour can be spared for this purpose. In private society I have met with the argument, that some farmers have capital and yet improve but little. I know from considerable experience that very little available means are possessed by the farmers of New Brunswick; but supposing it true to some extent, my argument remains notwithstanding in all its strength. It is not, as all conversant with mankind know, the person who has inherited property who generally succeeds in his profession, or who pushes into activity the elements of prosperity around him, but the man who is first forced into activity by the necessity of his situation, and who when he amasses some capital keeps it, with all his acquired habits of industry and economy, in full and constant operation. His circumstances have at first forced him into exertion and economy, and these habits are engrained as it were in his character, and they carry him in most cases into a much higher degree of prosperity than the man who inheriting some wealth is at his ease, and inclined to enjoy life, as it is called, and to exert himself just a little, as he sees others do. This fact is as equally observable in Farming as in other Professions, with this difference, that in farming on a small scale, and with limited means, capital is seldom or never accumulated, while it is not so in other pursuits. Its first efforts should therefore be fostered by artificial means, if it be desired or intended that it should be secured; and the manner of doing this prudently has occupied the minds of the wisest and best in our Father-land. The farmers on this side the Atlantic generally own their farms, and in most cases have laid out all their available means in purchasing them. This, which leaves them bare of capital for improvement, gives them an advantage in being safe to credit. Could not therefore some mode of lending them on personal or landed security be devised which would enable them to go on with such evident improvements as increased knowledge of their profession would suggest, to the manifest and decided advantage of society at large. That it is practicable, first Scotland, and lately Ireland, prove. The cash credits of Scotland are too well known for me to say any thing of here, but the effect on Ireland of judicious loaning to the agriculturist is not so well known. I myself well remember when the north of Ireland imported largely bread stuffs from the south and from other countries; now within the space of thirty or forty years it exports largely to England and Scotland; and these exports are increasing in a ratio which is astonishing. Belfast and Londonderry, which used to be in the winter full of shipping discharging corn and meal for the spring and summer supply of the country, are now much more full of shipping all the year through loading the same kind of corn and meal for the use of the manufacturing proportion of Great Britain. All this was effected through the instrumentality of the landholders exerting themselves to put capital into the hands of their tenants accompanied, as it ever should be, with sound maxims of husbandry universally distributed. The south of Ireland has advanced by the same means, but its progress, though equally real is not so striking, as it has long been an exporting section of the empire. What can be done in one country can be done in another provided the same or equal means be taken for the purpose. But the institution of agricultural societies "*per se*" will not do this great work of regeneration. I will in a future number throw out a few ideas on this subject if you give me room.

I am, Sir, your's, most truly,

TYRO.

DISEASES OF THE HORSE.

INFLAMMATION OF THE LUNGS.

(*Continued from page 48.*)

Treatment.—This must be decided, as a few hours may determine the fate of the horse. The sooner the horse is bled after the commencement of the disease the better. Blood should be drawn quickly and copiously from a large opening, which should be made with a broad shouldered fleam. Blood should be drawn not only until the pulse begins to rise, but until it begins afterwards to flutter, and until the animal shows faintness. We must regulate the bleeding by the effect produced, and not by the quantity of blood drawn. If in six hours after the first bleeding the horse continues to stand stiff, and to breathe quickly and laboriously, and if his legs are cold and the inner membrane of the nostril is very red, the bleeding must be repeated until the pulse and faintness indicate reduction of inflammation, which will generally be effected by two copious bleedings. A third bleeding may sometimes be requisite, but not so copious as the former: two or three quarts may now be taken, if the breathing is quick, the legs cold, the nostril red, and the horse continues to stand up. A large opening, and a copious stream of blood are of the utmost consequence in this disease. The blood, when cooled, in this disease, generally shows a buffy coat, which is the yellowish, fat-like surface on the blood, varying from a slight thin covering to one or two inches in thickness.

When this buffy coat is very thick and tough, it indicates violent inflammation. After the bleeding, a *blister* should be applied over the brisket and on the sides, as high up as the elbows. *Blisters* are preferable to *rowels*. The hair must be shaved off for the application of the blister, which may be made of one part of powdered Spanish flies, one of rosin, and four parts of lard, well rubbed in. The lard and rosin should be melted together, and the flies added afterwards, after the lard has cooled a little. Previously to applying the blister, the brisket and sides should be fomented with cloths of hot water. Sometimes the blister will not rise, owing to the violence of the inward disease: this is unfavourable—the blister should be applied after the violence of the inflammation is relieved by bleeding. It will be of service to let the horse stand with his feet in a large tub of warm water; the temperature of which may be kept up and increased by the subsequent addition of hot water. After the violence of the disease is subdued, a rowel may be put either on the chest in front, or between the legs—this is done by raising the skin, cutting a hole an inch in length, forcibly separating the skin from the muscle beneath in a circular direction for two or three inches, and then inserting some tow smeared with blistering ointment, allowing a little of it to hang out of the wound to conduct the discharge. The tow should be changed daily—the ointment may, or may not be repeated, as the symptoms indicate. The piece of circular leather, so frequently used for rowelling, is objectionable as it sometimes leaves a blemish in the skin. *Purging* in inflammation of the lungs in a horse is injurious, owing to sympathy between the bowels and the lungs. In such instance a violent purge has brought on, or transferred the disease to inflammation of the bowels. A large clyster of warm water, back-raking, or eight ounces of Epsom salts in some warm gruel may be used. No castor oil must be given. "*It is a very dangerous medicine for the horse.*" Cordials, which are often given by farmers to prevent rottenness, "add fuel to the fire;" nitre, digitalis, and tartar emetic should be given until they produce intermission of the pulse. The nitre, which is the nitrate of potash, is a valuable cooling medicine and occasions a mild flow of urine, and therefore it is called a *Diuretic*. The dose is from 2 to 4 drachms, or from 2 to 4 small tea-spoonfuls. It may be given in some gruel. The digitalis or foxglove, acts as a sedative, and diuretic, and is given with the tartar emetic and nitre in the following manner:

Powdered leaves of Digitalis,	1 drachm.
Tartar Emetic, - - - -	1½ drachms.
Nitre - - - - - - - -	3 drachms.

This may be repeated twice, or thrice in the day; digitalis acts directly on the heart, causing an intermission in the pulse. "When at every sixth or seventh beat, the pulsations are suspended while two or three could be counted slowly, this is precisely the effect, which is intended to be produced: and however ill the horse may appear to be, or however alarming this interrupted pulse may seem to the standers-by, from that moment, the animal will begin to amend."—"The dose must then be diminished one half, and in a few days it may be omitted altogether." The tartar emetic and the nitre may be continued, until all the inflammatory symptoms have subsided. The effects of the digitalis should be watched, as an over-dose, or too long continuance of it would reduce the strength very much, and make the recovery from weakness tedious. The Helebore has been given with advantage in doses of 30 or 40 grains every six or eight hours, and continued until it causes a flow of saliva, or spittle, from the mouth, and the horse becomes half stupid, and half delirious. These symptoms pass away in a few hours, after which the horse seems better. But the tartar emetic, digitalis and nitre are the softest and most effectual. When the digitalis cannot be obtained, the tartar emetic and the nitre may be given; and we are inclined to attribute the principal power to the tartar emetic, which is one of the best remedies for inflammation of the lungs in the human body. The horse should be warmly clothed to keep up a free circulation in the vessels of the skin; but he should not be kept in a hot or warm stable, as the heated and vitiated air is found particularly injurious to the inflamed lungs of a horse. The stable should be cool and well ventilated, without allowing him to be exposed to a current or draft of cold air. The legs should be well hand-rubbed to restore circulation in them, and afterwards warmly bandaged with flannel rollers. The diet should be sparing—"a little hay—a *cold* mash, a little green meat, but not a particle of oats." Forty eight hours generally decide the case. If in this time there is no remission of symptoms; congestion in the lungs, suffocation or gangrene (*mortification*) will follow.—With such threatenings, we must repeat the medicine, blisters, and bleeding if the strength of the animal will admit of the last remedy. The legs should be rubbed more freely, and it is advised even "*to scald them.*" We have seen the best effects produced by allowing the horse, as before advised, to stand in tubs of warm or hot water, as high as the knees; the animal seems relieved by it, and stands quietly after the legs are placed in it. If the strength declines, the horse must be drenched with gruel; and some gentle tonic may be given, as chammomile tea, and if there is no fever urgent, and the strength seems to decline rapidly, we may give a little ginger in an infusion of gentian root. After the inflammatory symptoms have subsided in ordinary cases, the horse must not be put too soon on his full feed—the cold mashes; green meat, if it can be obtained, a little hay, or gruel may be continued some days. But if the debility is urgent; then the tonics, as above directed may be given, but the effect should be watched, as the liberal use might incline a return of the inflammation. When recovering; the horse should return very gradually to his former habits. Inflammation of the lungs can be easily distinguished from inflammation of the bowels, in this latter disease the pulse is small and wiry, the membrane within the nose is not so red, the belly is painful when pressed, the horse kicks at his belly, stamps, paws and scrapes his litter, and wants to roll, and the skin especially over the belly is hot.

Pleurisy.—The lungs are covered, and the inside of the ribs is lined with a membrane called the *pleura;* when this is inflamed, the disease is called *pleurisy.* It may be brought on by the same causes which induce inflammation of the lungs, and it requires a similar treatment. The pulse is hard and full, different rather from that of inflamed lungs, the legs are cold, but less so than in the preceding disease, nor is the membrane of the nose as red, pressure between the ribs gives pain; and the horse stands and extends his neck, and protrudes his nostril much as he does in inflammation of the lungs.

Copious bleedings—blisterings, and sedative medicines, as prescribed in inflammation of the lungs are requisite. Aperient or purgative medicines may be given with more safety in this than in the preceding disease. The tartar emetic and nitre will be beneficial. In violent attacks of pleurisy, and in neglected, and protracted cases of it, a large quantity of water is frequently thrown out from the vessels on the inflamed surface, and deposited in the cavity of the chest, forming dropsy of it. It is recommended by veterinary surgeons to puncture the chest, to draw off the water. This may give temporary relief. If this is done the opening should be made with a large trochar, used for tapping the human body, and it should be passed between the 8th and 9th ribs, close to the cartilages, or gristle. Diuretic medicines, such as increase the discharge of urine, and tonics should be given. Turpentine combined with linseed meal; or powdered rosin in doses of half an ounce—nitre and digitalis—sweet spirits of nitre; and cream of tartar, have all been given as diuretics. The sweet spirits of nitre may be given in doses of three or four drachms or as many tea spoonfuls in gruel or water. The cream of tartar may be given in ounce doses, dissolved in water or gruel.

A NEW DISCOVERY IN AGRICULTURE.

Extracted from the London PHALANX, *of Sept.* 18, 1841.

"We have before us some beautiful ears of wheat, which have been obtained by a new process of agriculture, i. e., without either tillage or manure, and from land of the worst quality. The straw is of more than ordinary length, and the grain is of the best quality. Some of our friends at Brest, who farm their own estates, being one day in conversation, observed to each other that agriculture, although the most important branch of industry, was suffering more from want of capital and enterprise than any other sort of industry, and one of them observed that nothing could be done without manure, and that was now becoming more and more expensive to obtain. On this, the conversation turned upon the relative importance of capital and science in obtaining agricultural results, when one of them observed that much might probably yet be discovered to facilitate production by a less expensive process than that of constantly applying artificial stimulants, which rendered agriculture a laborious, unattractive, and unprofitable industry. In continuing the conversation, they referred to Fourier's views of general progress, and his method of investigation and discovery, in which he quotes the maxims of philosophy which lead to truth in practice when attended to in theory. Among these maxims are the following:

1. All things are perfect in original existence.

2. The duty of man is to observe nature, and follow her indications in production and re-production.

3. Not to suppose that man's knowledge is perfect, and that nothing can be known of nature beyond the common practices of daily life.

4. To leave the beaten tracts of prejudice, and follow nature in her various developements.

"In accordance with these maxims our rural philosophers observed that nature in the wild luxuriant regions of the earth is vigorous and active in the reproduction of vegetable life, while barrenness seems limited to spots where man has ravaged, and exhausted her resources in his vain endeavors to assist her in her efforts: and it then occurred to them, that probably a closer imitation of the natural method might be more productive and less unattractive in the sphere of vegetable reproduction.

"In observing nature unassisted, or unthwarted rather, by the hand of man, in vegetable reproduction, it is found that when the seed is ripe it falls upon the ground, and then the plant which has produced it sheds its leaves, or falls itself upon it in decay, and covers and protects it from the weather, until germination has commenced, and the young plant is able to grow up in health and strength, and full developement, to recommence the same routine of seeding and reproduction.

From this it follows that—

"In nature every plant produces its own soil, or humus; and, that—

"The earth, properly speaking, or the mineral substance of the earth, only serves to bear the plant, and not to aid or nourish it in vegetation. The nourishment of plants is thus supposed to be derived from *air* and *water*, *heat* and *light*, or electricity in different proportions, adapted to the different varieties of general nature.

"With this general notion in their minds, and considering wheat to be in present circumstances one of the most important vegetable substances, our friends agreed to try experiments, and in October last they undertook the following operations:

"In a field which had been sown for rye because the land was deemed too poor for wheat, a plot of twelve square yards, untilled and left without manure, was carefully strewed over with the grains of wheat, and wheaten straw was laid upon it closely and about one inch in thickness. In a garden also, which had been neglected several years, a few square yards of earth were trodden over, and the surface being made close and hard, some grains of wheat were scattered on this hardened surface, and a layer of straw one inch in depth was carefully laid over it, and left as in the former case to take its chance, without any ulterior attention; and in order to make doubt impossible concerning the mere secondary functions of mineral earth in vegetable reproduction, 20 grains of wheat were sown upon the surface of a pane of glass, and covered with some straw alone, as in the other cases. The germination of the seed was soon apparent, and most healthy in developement. 'The winter has been rigorous,' say our correspondents, 'for this part of the country, and the earth has sometimes been frozen in one solid mass to a depth of six inches in the garden where the wheat was sown; and this has happened several times during the winter, to the great injury of many plants, and even to the entire destruction of some; while the spots protected by the straw were never thoroughly congealed, nor were the grains of wheat, though lying on the surface, under the straw, at all affected by the cold. During the spring excessive droughts, prolonged and several times repeated, have prevented vegetation on the common plan from flourishing in healthy progress, while our little spots of wheat had hardly felt the inconvenience of excessive dryness, for the earth protected by the straw has never been deprived entirely of the moisture; and our blades of corn were flourishing when all around was drooping and uncertain.—To conclude, then, we have thoroughly succeeded in our practical experiment, and the wheat produced is of the finest quality. The straw was more than six feet high, and in the ears were 50, 60, and even 80 grains of wheat, of full developement, the admiration of all who saw them; and particularly those, which grew upon the pane of glass, and which were quite as healthy and as large as those which grew upon the common earth. It must be observed also, that there was not the smallest particle of earth upon the glass, and that the plants were left entirely to themselves, without being watered or attended to in any way whatever from the time of sowing to the time of reaping. The result of these experiments has been admired by several influential agriculturists, who mean to make extensive application of the same principle next season; and we hope that you will publish to the world these practical results, that others may convince themselves of their importance by similar experiments. The cause of this success, we think, may be explained in the following manner: Straw being a bad conductor of heat and a great conductor of electricity, maintains the root of the plant in a medium temperature, and prevents the earth from being deprived entirely of moisture. The moisture of the earth, or the substratum, being continual, facilitates the constant and gradual absorption of carbonic acid from the surrounding atmosphere, and hydrogen and carbon, the chief elements of nourishment to vegetables, are thus economised in regular supplies, where they are constantly required, and pass in combination with oxygen from the roots up to the stems and branches of the plants, in which they are assimilated; and the oxygen thrown off in exhalations from the leaves. The straw decays but slowly, and thus furnishes its substance by degrees to the young plant in due progression and proportion, (such as the siliquious ingredients, for instance, of the pod or capsule,) so that the decomposition of the straw corresponds to the four phases of fermentation, in progressing from the saccharine to the alkoholic, the acid and the putrid states, analagous to those of infancy, budding youth, maturity, and seeding of the plant. We observed that our blades of wheat have but very few roots, and those are short and hard, something like a bird's claw, and this agrees with the remarks of Monsieur Raspail, who states that the most healthy plants in ordinary vegetation have the least exuberance of roots and fibres. Another important observation also is, that weeds and parasitical vegetation are prevented by this method, for the straw chokes every other plant but that of its own seed. Many other interesting observations might be made on these experiments, but we refrain at present from obtruding on your readers; and if any of them wish for further information on the subject, we shall willingly afford them every facility. The importance of the general result will easily become apparent without any further comment: and a revolution in the present modes of agricultural labour is the necessary consequence of this discovery. No tillage will be now required, or any artificial stimulants in manure, or other more or less expensive combination with regard to soil and culture. In fact it would be tedious to enumerate the various advantages that may result in practice from this casual experiment, and therefore we proclaim it simply to the world that all may profit by it.

"CHARLES PAILLARD,
"BERNARD.

"*Brest, August* 1841."

THE statements made in the preceding observations are certainly very interesting, but nevertheless we candidly confess our hesitation in yielding entire assent to them. Experimentalists are generally enthusiastic, and their zeal not unfrequently carries them into extravagant conclusions.—The influence of air, water, heat, light and electricity upon vegetation is indisputable, but we cannot believe that the earth merely bears the plant, acting as a floor for it to rest on without contributing to its support. If such was the case, and germination, vegetation and reproduction were dependent exclusively upon plants themselves, that is, upon the falling and decay of the perishable parts of the previous plant without any assistance from the soil, then all plants, thus circumstanced, should acquire a growth equally luxuriant upon poor and good lands. But we find unequal growths of similar weeds and grasses in the desert, which has not been *ravaged* by the hand of man. The rich mountain soils and alluvials of our Provinces are remarkable for the gigantic growths of their hemlocks, pines, and hardwoods, whilst trees of the same description in forests upon sandy plains exhibit a very inferior stature. Grass upon marsh and upland meadows left entirely to the reproduction of nature, untouched by the scythe, or teeth of cattle, should display equal luxuriance. But we unhesitatingly say, that this is not the case. It is true that, the decaying grass of a previous season falling upon the ground, acts as a covering for the roots from which it sprang, and in its progress of decay, favours the growth of a subsequent year; but we think this is satisfactorily explained by *Leibig*, who considers that fertility is dependent upon the presence of certain salts—these salts are extracted from the earth in the process of vegetation, and are again restored to it by the decaying grass, because nothing has been removed from the surface. The soil annually becomes richer for the plant restores not only all that it received from it, but it gives to it also the nourishment, which was absorbed by it from the atmosphere. And in this manner we can readily recognize the principle upon which straw would act, as an agent in reproduction. The experiment is a simple one, and the correctness or incorrectness of the statement can be easily ascertained. One thing we think we may venture to assert, namely, that if straw is good upon poor land, it will be still better upon good soil. If, in accordance with the conclusions of Paillard and Bernard, "*the Earth properly speakirg, or the mineral substance of the earth, only serves to bear the plant, and not to aid or nourish it in vegetation*," how is it that new burnt lands, which it is evident abound with alkalies, bear such luxuriant burdens of wheat, and marsh lands which also contain a large proportion of alkalies, yield such abundant crops, while poorer soils, deficient in such salts, although they may have been manured with stable manure and barnyard compost, which always contains a large quantity of straw, give a stunted and imperfect growth of wheat. This certainly proves that soil, and a peculiar state of it, has something to do with the process of vegetation.—If we admit the entire correctness of the statement made by Paillard and Bernard, and we are not authorized in doubting it, it merely proves that wheat in the climate of Brest may grow upon glass and poor soil, with a suitable covering of straw, but it does not prove that it would not have grown more luxuriantly with a similar covering upon a well tilled loam.—The influence of air, light, heat and electricity upon vegetation is undeniable, and it behoves the husbandman to be aware of this in the disposal of his seeds and plants, avoiding the burial of them beyond that influence. We have seen the error of this neglect frequently in the transplanting of fruit trees. A *hole* for the tree was dug in the earth, and it was filled with manure, the roots of the tree were buried in it, then soil was pounded and closely packed upon and around them, and after they had forced their way thro' the rich mould, and had reached the cold hard soil surrounding the hole, the tree languished, became moss-eaten, and withered away. We do not agree with those who think that we should implicitly follow and confine ourselves to nature in every instance; for it is well known that art and culture have effected their metamorphoses and improvements in agriculture, and horticulture. Had the almond been left to nature for its reproduction, it would not have been converted into the delicious flesh of the peach; nor would the melon have numbered among its improved varieties, the Green Flesh, Ispahan, and Dampsha. The sour crab of the forest would not have acquired the size and flavour of the golden pippin, nor would our potatoe have attained its present perfection. Wheat itself is a factitious production, and requires artificial means for its improvement, preservation and continuance; and although nature has wonderfully and wisely provided the siliquious ingredients for reproduction, still it does not follow that the constituents of the pod itself are absolutely requisite for perfect growth in all instances, for in many it bursts and the seed escapes from it, receiving no further support from it, for it contains within itself the necessary principles for reproduction, which it received from the pod during the process of seeding and ripening. Nature is an excellent guide, and Omnipotent Wisdom has so constructed our earth that various soils are fitted for various vegetable productions, and we know that poor soils by admixture with other and richer earths may be rendered fertile, whereas, without this admixture, they would have continued barren and unproductive. It may be said, that the different salts which are discovered in plants are carried into them through the agency of water or moisture—true; but they are derived originally from the soil, which whilst it bears, and gives mechanical support to the plant, contributes at the same time to its growth and developement. Various soils no doubt, exercise various influences as conductors of heat, light, air, moisture and electricity, and thus oppose, or favour the decomposition of their saline constituents, which have been discovered in different vegetables.—The goodness, or badness of soils may be in the ratio of this power; and this power may be increased or diminished by the presence or absence of saline ingredients; but still the plant is indebted to the soil, which yields its virtues to the agents which act upon it, and as tilling has hitherto been found to improve the powers of extraction, we are inclined to suspect that those sowers and reapers will have lazy times and a sorry harvest, who commit their seed to an untilled soil, and convert their ploughshares into sickles.

HORTICULTURE.

To the Editor of the Agriculturist.

Dear Sir—It is too much the fashion in this country, to rail at the climate, and deny its capability for bringing to perfection the fruits of the earth. Because our *winters* are long and severe, agriculturists *assume* that the summers are insufficient for producing the vegetable necessaries of life, in equal quality and quantity with the old country and the neighbouring States. I am convinced that this opinion, or *prejudice*, is groundless; and that nothing but due care, attention and skill are requisite, to render many of the nutritive products of the soil, in New Brunswick, fully equal to those of Old England, although the latter has so much the advantage in *latitude* over the former. As a single instance, in particular, I would mention, that last year, considering that the climate of this country might as well afford two crops of *Celery* in the season, as that of England, I allowed a few young plants, of *late* growth, to remain in the ground, in the open air, (covered only with straw) *throughout the winter*; I transplanted and trenched them in the middle of May, this year, and the result was, that by the latter part of *July* I had Celery plants three feet long, and (in the edible part,) ten inches in circumference; with the largest quantity of *solid* stalk that I ever saw. The experiment thus having proved so entirely successful, and it being evident that there is nothing to prevent our raising *both an early and a late* crop of celery in a season, I intend (D. V.) to try it again on a larger scale; both by *leaving* a considerable quantity of *young plants*, (without transplanting,) *where they were raised from seed; and by trenching out another* lot of late plants, and letting both remain throughout the winter; and I hope by this means, and by careful attention to them in the spring, to have *fresh* celery next season ready to use immediately after having consumed the winter stock, and sufficient to last from that time till the regular summer crop is fit for digging; thus obtaining a supply *the whole year through!* If the above hasty remarks should succeed in stimulating others to make similar experiments, and thus to improve the practice of either Horticulture or Agriculture in this Province, (which I am convinced is susceptible of much more improvement, and is liable to much less disadvantage from climate, than is generally imagined,) my object in troubling you with this communication will be fully answered, and I shall rejoice that it will not have proved entirely useless. I am, my dear Sir, yours, very truly,

G. B.

Saint John, October 6, 1841.

COMMUNICATION

Upon the general deterioration of Sheep, apparent from the Carcases in Market.

Sir—I have been much pleased to observe that you have, in your valuable publication, called the attention of our farmers to the various improved breeds of of stock so celebrated in the Mother Country, and I am convinced that a judicious selection of both cattle and sheep, suitable to the nature of the farm on which they are intended to be placed, followed up by a careful attention in always selecting the best of either kind from which to increase the breed, would in a few years satisfy the most obstinate advocate for the *old ways* that he might gain much by following this (in this Province at least,) new path of husbandry. But few years have elapsed since the attention of the people of this Province was called to the improvement of the different breeds of animals, particularly sheep, and a great alteration in their appearance was early manifested in the appearance of those brought to market; but for the last year or two there seems to be a gradual falling away; for if any person will enter our market, instead of the fine formed, fat-disposed animal one would expect from the Dishley or South Down, he will see a long-legged, scraggy-looking carcass. True it is, that here and there a fine form is observable, but it only makes the others more unsightly. To what then is it owing, that in so short a time, the fine breeds which were exhibited at the old Agricultural Cattle Shows, and which were so highly praised by every farmer who saw them, are in a measure extinct? Are they found to be unsuited to the climate, or is the quality of the wool disapproved of? Or is it, as I much fear, the fault of our farmers, in not selecting the best of their flocks from which to breed? Perhaps, Sir, you can explain this matter, and lead our agriculturists to apply the right remedy for this *murrain* in our flocks. G.

We believe a ready answer may be given to the question respecting the deterioration in our sheep. We know that many of our Farmers very injudiciously allow the Butchers to pick the best lambs and sheep from their flocks—consequently the worst in size, shape, and constitution, are kept for breeding, and deterioration must follow. Others again, anxious for an early market, take the finest of their lambs for the shambles. In England the case is different: the Farmer in the first place selects his breeders, and gives the butcher the second pick. If all our Farmers in these Provinces would adopt a similar precaution, they would soon find that the profits of an improving flock of sheep would amply compensate them for the trouble of attending to their own interest in this particular.

We are indebted to a correspondent for the following communication upon "Furrow Draining;" and in compliance with his suggestion, we have reprinted two letters on the same subject, which he published last Fall in the *Courier*, under the signature of "*Colonus Northumbriensis.*"

HINTS UPON FURROW DRAINING.

This plan of draining consists simply in opening drains parallel to each other, down the declivity of the land, at distances of from 10 to 40 feet or more apart, according to the nature of the ground.

These drains are made very narrow, being about 15 inches wide at the surface, from 3 to 5 inches wide at the bottom, and from 2½ to 3 feet deep. The bottom of the drain being well cleaned out, and as even as possible, it is filled half its depth with broken stones, similar to those used in repairing macadamized roads; or if they can be obtained, small stones gathered off the surface of the land; but in no case larger than will pass in all directions through a ring 2½ inches in diameter—it being found that stones of a larger diameter do not afford regular support to the sides of the drain; and indeed most farmers are aware that the old rumbling drain is apt to become choked.

These drains, which, from being generally made in the furrows of well managed fields, the ridges of which are in general at least 15 feet apart, are called furrow drains—empty themselves into main drains formed in the lower part of the field; or if the field consists of a series of hollows, main drains are formed in each, and the water which is collected in them is let off by a larger main. The main drains are generally piped, and vary in dimensions according to the extent of the field, or the quantity of water expected to flow through them. The stones after being levelled on the surface, are covered with a thin sod, and to the proper width, and neatly fitted and tramped down, so as effectually to prevent any earth getting into the drain; and the stuff taken out of the drain is then returned. The expense attending this radical improvement is stated by Mr. Smith, of Deanston, on whose farm not less than one hundred miles of such drains have been made, as follows:—Cutting 1s. 6d. to 2s. 6d. per rood, of 36 yards; the stones, if collected on the adjoining fields, from 1s. to 1s. 6d. per rood: breaking them, from 9d. to 1s. per rood, (1½ cubic yards of stone being sufficient for a rood of drain); filling in the stones 3d. per rood; sodding 1d. per rood. Thus the whole expense of completing 36 yards of drain will be 4s. 8d., or taking in a portion of the main drain, 5s. per rood; and this at 10 feet apart, drain from drain, is per statute acre, £9 10s.; 15 feet part, £6 6s. 7d.; 18 feet apart, £5 6d.; 21 feet apart, £4 10s.; 24 feet apart, £4; 32 feet apart, £3.

Mr. Kennaird says, "In some experiments which I made, in all of which the substratum was a hard tile, I find that on an average the drains can be cut 16 inches wide at the surface, 3 feet deep, and from 4 to 5 inches wide at bottom, for 2d. per lineal perch of 16½ feet, which is fifty per cent. under the lowest price mentioned by Mr. Smith.—Thus the expense of furrow draining a statute acre, the drains being 10 feet apart will be £6 13s.; 15 ditto, £4 8s. 6d.; 18 ditto, £3 15s. 4d.; 21 ditto, £3 3s.; 24 ditto, £2 16s.; 32 ditto, £2 2s. 2d. When the substratum abounds in large stones, and also when the materials for filling the drains are difficult to be obtained, the expense will be somewhat more; but, on an average I am of opinion that the work can be effectually performed, even taking in a portion of main drain, the furrow drains being 21 feet apart, at £4 per statute acre.

AGRICULTURE.

It is well known that evaporation produces cold, and that the seeds and roots of all vegetables, except those of the aquatic kind, perish if long exposed to excessive moisture. Considerations arising from these simple truths have been the origin of the greatest improvements introduced into the practice of agriculture within the last century—viz., the substitution of a regular and uniform system of under-draining for the old custom of laying out arable land in ridges and furrows. It was found that the old practice was not effective in ridding the land of superfluous moisture, even in soils possessing very absorbent qualities, and that water produced by the dew and the rain was retained so long as on those of an aluminous description; that the surrounding temperature was too much lowered by its evaporation under the influence of the wind and sun. In consequence of this, a degree of cold and moisture detrimental to vegetable life was produced, and in seasons when much rain fell, the clayey districts of Great Britain exhibited all the marks of sterility, though capable of yielding abundantly, if subjected to a rational mode of cultivation. Wherever the old practice prevailed, it was observed also that on the highest part of the ridge an exuberant vegetation was produced, but that, on its sides or declivities the plants gradually decreased in number and vigour, till in the furrow itself the earth became completely barren.

These phenomena were accounted for on the supposition that the soil, besides absorption, possessed powers of freeing itself of water varying directly with the position on the ridge;

that the furrow received and retained too much moisture, but that the other parts of the ridge retained less and less, according to their elevation, till on the summit itself, every particle of humidity, except what was necessary to perfect the different processes of vegetation, was discharged, absorbed, or exhaled.

Mr. Smith of Deanston, an ingenious philosophic farmer, in the Carse of Gowrie, was the first to devise a remedy for the evil incidental to this mode of cultivation: he placed under-drains at distances varying from 18 to 24 feet, throughout all his fields, at the same time making communications between them and the natural springs and well heads existing near the surface, which he happened to discover. These operations were greatly facilitated by the invention of an instrument called by him the sub-soil-plough (a plate would be necessary to render any description of this ingenious and efficent machine intelligible; we forbear, therefore, to say anything more about it, but we earnestly exhort the admirers of simple and clever mechanical inventions, or persons interested in agricultural pursuits, to procure a model of it, as without it the operations so successfully practised by Mr. Smith cannot be conducted with a sufficient regard to economy.)

After the complete success of the new practice was established, the result was, that the old and inefficient method of laying out land was abandoned by the intelligent and industrious agriculturist occupying the fertile and extensive valley, which once owned the feudal authority of the Ruthven, and the improvements of Mr. Smith universally adopted. In all their fields the earth was reduced to a plain and level surface, and possessing in consequence of the under-drains uniform powers of absorption, each field exhibited nearly the same degree of fertility throughout its whole extent. In fact every part of the field yielded abundantly, as the summits of its ridges had formerly done, and the crops raised by Mr. Smith's improved practice were better by 50 or 100 per cent. than those produced upon the same lands had been previous to its introduction.

By the use of ground or crushed bones as a manure, by subjecting the soils of the Carse to chemical analysis, and skilfully varying the manure applied to them, so as to naturalize or supply defects in their composition and to stimulate their productive properties, combined with the improved practice of Mr. Smith, the occupiers of the farms constituting the Carse of Gowrie, the Goshen of Scotland, and I suspect a pleasanter place and a richer district by far than its Egyptian prototype, have doubled the value of their lands within a comparatively short period. Many of the farms adjoining the Tay are let for £6 an acre, and the unjustly confiscated inheritance of the Ruthven yields, it is said, at this moment a rental of £1,000,000 sterling. Many other instances might be given of the immense increase of wealth, which accrues from the application of ingenuity and science to agriculture; out of several which present themselves to my recollection, I will give two. About the year 1770, Dr. Richard Watson, Bishop of Llandaff, the author of many theological works of the highest merit, and of some chemical essays, expended £20,000 in the purchase of lands in the English county of Westmorland. His philosophic acquirements naturally suggested to his high and reasoning faculties, many methods by which the value of his purchase might be enhanced, and those were immediately put into practice, with characteristic energy and prudence.

Plantations of trees were formed upon a most extensive scale, rocks were blasted and removed, bogs, marshes, and moors were drained, and the scientific knowledge of the philosophic Bishop was applied in devising and perfecting new modes of cultivation. At his death, about the year 1812, his property which had cost £20,000 was valued at £500,000, and was even then in a state of progressive improvement.

Mr. Smithson Tennant, the successor of Dr. Watson in the chemical chair of Cambridge, and himself one of the individuals to whom one of the three prizes of £20,000 each, offered by Bonaparte for competition among scientific men of all nations, was awarded by the French Institute, inherited an estate of considerable extent, but of no great value, among the Mendip hills, in Somersetshire. When he succeeded to this property, Mr. Tennant was one of the most eminent chemists in Europe, and had already distinguished himself very greatly, by discoveries relative to the properties of lime as a manure, he being the first who ascertained that the magnesian kind was inimical to vegetation. His scientific knowledge was skilfully and sedulouslyemployed in the improvement of his property: his operations have been published, but it is sufficient for our purpose to mention, that his property at the time of his death (which was occasioned by the overturning of a drawbridge in France, after the peace,) was at least ten times more valuable than it had been when it came into his possession, about thirty years before.

These are wonderful results, but they have all proceeded from adequate causes, and like every thing valuable in this life, were obtained in consequence of much composed exertion, and of the best faculties of man being exercised to procure them. Tennant and Watson received an education at Cambridge, which admirably fitted them for "seeking science in her coy abode," and their knowledge and its successful application need notexcite our astonishment, but let us enquire how it happened that Mr. Smith, of Deanston, and the farmers of the Carse of Gowrie have been enabled to avail themselves of the discoveries effected by the two talented professors, and even to excel them in the career of agricultural improvement.

Fifty years ago, a Professorship of agriculture was established in Cambridge, by Sir James Pultney; and Dr. Coventry, the first Professor, both by publications from the press and by oral instructions, endeavoured to excite the attention of mankind to his favourite pursuit, and to make them scientifically acquainted with its principles. The professor laboured successfully in his vocation, and at his decease, the important office was conferred on Mr. Low. This gentleman's opening lecture I had the pleasure of hearing in company with the most eminent of our men of science, and with some of the more noble and far descended of the British nobility.

The learned and ingenious Professor, stimulated by the high patronage he had received, delivered a discourse never exceeded in beauty of language, cogency of reasoning and felicity of illustration; all who heard him left the hall suitably impressed with the transcendent importance of the subject to which the Professor meant to devote his time and labour, and fully convinced that the agricultural chair of Edinburgh had been bestowed upon a gentleman whose talents and enthusiasm would leave nothing to be desiderated in the performance of its duties. The delighted audience were not deceived: if Dr. Coventry did much, Professor Low did ten times more to diffuse agricultural knowledge throughout Great Britain.

Mr. Smith of Deanston, and the persons in Scotland best acquainted with the science of agriculture, were indebted to these two Professors for that information, which when combined with industry and practical intelligence, has been followed with results so stupendous.

Having occupied a sufficient space

in your columns for this week, I shall conclude with an intimation that a series of letters, of which this is the first, will be published in the *Courier*, and that the design is to promote the views of the agricultural society recently formed in the county of Saint John.

COLONUS NORTHUMBRIENSIS.

BOTANY.

THE Cellular Integument lies immediately under the Cuticle, and is generally of a green colour, especially in the leaves and branches. It is in most instances the seat of colour—and resembles what is termed the Rete Mucosum, beneath the Cuticle in human beings, which is pale in Europeans and black in the Negro, the analogy holds no farther. *Mirbel* remarks that leaves consist almost entirely of this substance, covered on each side by the Cuticle. The stems and branches of annual and perennial plants are invested with it, but in woody parts it is dried up and reproduced continually, such parts only having that reproductive power.—The old layers remaining are pushed onwards by the new ones, and form at length the ragged dry dead covering of the old trunks of trees. The cellular integument is of the utmost importance in the function of leaves, which will be hereafter shown. In it the principle changes operated upon the juices of plants by light and air, and consequent elaboration of all other peculiar secretions take place.

The Bark.—Lies under the Cellular integument. In plants, on branches only one year old, the bark consists of one layer, and is often not distinguishable from the wood. In the older branches and trunks of trees it consists of as many layers as they are years old; and the inner is called the *Liber*, in which only the essential vital functions are carried on for the time being, after which it is pushed outwards with the Cellular integument, and like it, becomes a lifeless crust. These older layers are for some time *reservoirs* of the peculiar excreted juices of the plants.

In some roots, although only of annual duration, the bark is thick, as in the carrot, the red part of which is all bark. In the turnip it is thinner, though equally distinct from the body of the root. The bark contains a number of longitudinal fibres giving it tenacity, which when separated by maceration generally exhibit a beautiful net-work structure—which is one of the family of the Mezeron in Jamaica—may be separated into an elegant kind of lace, and is then called lace-bark. This peculiar structure is not discernible in the Fir tribe. The bark of the cluster Pine some inches in thickness is separable into thin porous layers, each the production of one season. The bark of oak trees, 20 or 30 years old, if cut and long exposed to the weather, separates into many fine thin layers, of a similar though less delicate texture than the lace-bark of Jamaica; all these layers in a living state are closely connected with each other by the cellular texture, as well as by transverse vessels necessary for the performance of several functions. The peculiar virtues of plants reside chiefly in the bark, and most powerfully in the layers nearest the wood. In this case appropriate vessels are found the rosin of the fir and Juniper—the astringent principle of the oak and willow, on which their tanning property depends—the bitter of the Peruvian bark, and the aromatic oil of the Cinnamon. The same secretions pervade the other parts of the plant but in a less concentrated form; when a portion of bark is removed, the remainder has a power of extending itself laterally but slowly until the wound is closed. This is accomplished by each new layer added to the bark internally, spreading a little beyond the edge of the preceding layer. The operation of closing the wound goes on the more slowly, as the wound underneath, from exposure to the air, has become dead, and frequently rotten, proving an incumbrance, which, though the living principle cannot in this instance free itself, it has no power of turning to any good account. If, however, this dead wood, be carefully removed, and the wound protected from the injuries of the atmosphere, the new bark is found to spread much more rapidly; and as every new layer of bark forms a new layer of wood, the whole cavity, whatever it may be, is in process of time filled up.

This operation of nature was turned to great advantage by the late Mr. Forsyth of Kensington Gardens; under his management, many timber trees, became entirely hollow, were filled up with new wood, and made to produce fresh and vigorous branches; and Pear-trees, planted in the time of King William, became so decayed and knotty as to bear no fruit worth gathering, were, by gradual paring away of the old wood and bark, and the application of a composition judiciously contrived to stick close and keep out air and wet, restored to such health and strength as to cover the garden walls with new branches bearing a profusion of fruit.

The Wood.—When the bark is removed, we come to the wood, which makes the principal bulk of the trunk or branch of a tree or shrub. When cut across we observe a number of concentric layers distinct in the fir and many other trees, each of these layers externally is hard and solid; they differ however among themselves in hardness and breadth; it often happens that all the layers are broadest towards one side of the tree, so that the centre of the layers is not in the actual centre of the trunk; the wood owes its strength and tenacity to innumerable woody fibres, and consists of various vessels running for the most part longitudinally, some having a special coat and others not; some of these vessels when young convey the sap from the root to the branches and leaves: others contain the various peculiar or secreted juices; others perhaps common air; and the whole are joined together by the cellular substance already described. Linnæus and other botanists believe that one of the circular layers is formed annually, and that the hardness of the external part of it is caused by the coldness of winter, and therefore that we may tell the age of a sound tree, when cut down, by the number of layers, and some are of opinion that the dates of very severe winters may be ascertained by the increased hardness of the rings formed during such seasons, and moreover that the north side of a tree may be known by the narrowness and density of the rings. Mirbel and Du Hamel contradict this theory, but their objections are not satisfactory. There may be occasional interruptions in the formation of the wood from cold or fickle seasons, and in some trees the thin intermediate layers, hardly discernible in general, that unite to form the principal or annual ones, may from such fluctuation of seasons become more distinct than is natural to them. Such intermediate layers are even found more numerous in some trees of the same species and age than in others. But Smith is of opinion that those trees which show the annual rings, will always show the peculiar influence of summer and winter in them. Trees in hot countries, as the Mahogany and Evergreen, have them but indistinctly marked, yet in these they are visible. With regard to the greater compactness on the north side of the tree, Smith agrees with Du Hamel in his objection to it.—The truth is, most wood is formed in that part most favourable to vegetation, where there is consequently most branches and leaves. This, in a solitary tree is generally towards the south; but the occasional variations, dependent upon local exposure, soil, moisture, and other causes, are obvious. In some trees many of the outermost rings differ in colour from those beneath them, and are called by workmen, the *Sap*. In the Liburnum the sap-rings are yellow, and the internal rings are brown. In the Oak and several other trees a similar difference is observable, although not so obviously, and in most trees the external layers are much less firm, compact and durable than the inner rings, retaining more of the vital principle and more of the peculiar juices of the plant: They are termed by Du Hamel "*aubier*"—alburnum; and he observes that this difference extends more on the one side of a tree, than on another, and that the more vigorous the tree, or a side of it is, the alburnum is converted into perfect wood. The alburnum however in its proper sense, signifies only the layer of new wood of the present year, which is not hardened.

In this sense we shall apply it.—Physiologists have long differed about the origin of wood, and the question is still unsettled. Malpighi and Gren thought that it was formed by the bark, and observation is in favour of their opinion. Hales thought that wood added a new layer to itself externally every year. Linnæus thought that the pith secreted a new layer annually and added it, internally, to the other enveloping layers, but there is neither proof nor probability of this hypothesis. The experiments of Du Hamel prove that the wood is secreted from the innermost part of the bark, which is called liber. He introduced plates of tin-foil under the bark of growing trees, he then carefully bound up the wounds, and in after years when he cut them across, he found the new layers of wood on the outside of the tin. Dr. Hope, the Botanical Professor in Edinburgh, cut the bark of a Willow, three or four years old, carefully through longitudinally on one side for several inches so that it might be slipt aside from the wood in the form of a hollow cylinder, the two ends being undisturbed; the edges of the bark were then united as carefully as possible, the wood covered from the air, and the whole bound up to secure it from internal injury. After a few years the branch was cut through transversely. The cylinder of bark was found lined with layers of new wood, whose number, added to those in the wood from which it had been stript, made up the number of rings in the branch above and below the experiment. Du Hamel engrafted a portion of the bark of a Peach tree upon a Plum—after some time he found the layer of new wood under the engrafted bark, white; like the Peach, and different from the dark wood of the Plum.

In all these experiments the layers of wood were connected with the bark and not with the old wood.—Du Hamel found that the thickness of the layer was influenced by the season, and that it was always thinner in proportion to the lateness of the season in which the operation was performed. It seems certain therefore that the bark produces the wood, but Du Hamel was inclined to believe that in certain circumstances the wood could regenerate the bark. This never happened in any case, but when the whole trunk of a tree was stript of its bark. A Cherry tree thus stript threw out in little points from the whole surface of its wood a gelatinous matter, which gradually extended over the whole, and became a new bark, under which a layer of new wood was speedily found, hence Mirbel concludes that the alburnum and the wood are really the origin of the new layers of wood, by producing first the gelatenous substance which he and Du Hamel call *cambium*, and which Mirbel supposes to produce the liber or young bark, and at the same time by a peculiar arrangement of the vascular parts, the *alburnum* or new wood. This opinion is supported by the Palms and Grasses, which have no real bark, and in which the woody fibres do actually produce the cambium. Dr. Hope's experiment will scarcely invalidate this opinion, because it may be said, that the cambium had already in that case formed the liber.

The Medulla or Pith.—The medulla or pith is situated in the centre or heart of vegetable bodies; it is a tolerable firm and juicy substance, in parts most endued with life, as roots and young growing stems and branches; it is of a uniform texture, and commonly of a pale green or yellowish colour. Such is its appearance in the young shoots of elder in the spring, but in the same branches fully grown the pith becomes dry, snow-white, highly cellular, extremely light, and capable of being greatly compressed. In many annual stems the pith, which is abundant and very juicy while they are growing, becomes little more than a web lining the hollow of the complete stem, as in some thistles. Many grasses and umbelli ferous plants have always hollow stems, lined only with a thin, smooth coating of pith, exquisitely delicate and brilliant in its appearance. There have been various opinions concerning the nature and functions of the pith. Du Hamel did not think that it performed any remarkable office in the vegetable economy, Linnæus on the contrary thought it was the seat of life and source of vegetation, giving growth to the branches and formation to the seed, an opinion which does not appear to be well-founded; for the pith is soon obliterated in the trunks of many trees, which continue to increase for a number of years, by layers of wood, added annually from the bark, even after the heart of the tree has become hollow from decay.

NEW MANURE CALLED GUANO.

THIS substance is obtained from islands in the South Seas, where it forms a stratum many feet thick, it being the accumulation for ages of the excrement of innumerable sea-fowl. It is used as manure with great advantage on the coast of Peru, where the soil is otherwise extremely sterile. Its composition is said to be

Earthy insoluble salts, principally phosphate of lime,	29 2
Soluble salts, fixed alkaline sulphate, and chloride,	2 5
Organic matter,	68 3
	100
The organic matter consisists of	
Lithic acid,	16 1
Ammonia,	8 7
Other organic matter,	43 5
	68 3

We extract the fellowing account from the *New Farmer's Journal*:—

"The Guano is of a brown chocolate colour, and forms a fine powder resembling snuff. Its extraordinary effects in fertilising the soil far exceeds all manures hitherto known, and though used in comparatively small quantities, was most satisfactorily shown. Equal patches of perennial grass, and of Italian rye grass, also of Swedish turnips, all sown at the time, some without manure, some with farm yard manure at the rate of 20 tons to the acre, some with Guano at the rate of 3 cwt. per acre, afforded undeniable proof of the great superiority of the latter as a manure, in the superabundance of the crop produced, amounting to probably a per-centage of 25 in its favor. In point of economy this new manure also promises to become invaluable, as it can be imported at 20s to 25s. a cwt. A similar difference is also obvious from the same manure used in a grass field belonging to the same gentleman, on the west side of Walton-road. Many of the members of the Agricultural Association who have seen its effects, have expressed an opinion that it is the finest thing they have ever seen, and that the import of the Guano will become of the utmost value to the agriculture of the country generally."