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
- ☑ Bound with other material/ Relié avec d'autres documents
- ☑ Tight binding may cause shadows or distortion along interior margin/ La reliure serrée peut causer de l'ombre ou de la distorsion 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
- ☑ Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- ☐ Pages detached/ Pages détachées
- ☑ Showthrough/ Transparence
- ☑ Quality of print varies/ Qualité inégale de l'impression
- ☐ Includes supplementary material/ Comprend du matériel supplémentaire
- ☐ Only edition available/ Seule édition disponible
- ☐ Pages wholly or partially obscured by errata slips, tissues, etc., have been refilmed to ensure the best possible image/ Les pages totalement ou partiellement obscurcies par un feuillet d'errata, une pelure, etc., ont été filmées à nouveau de façon à obtenir la meilleure image possible.

☑ Additional comments:/ Commentaires supplémentaires: Continuous pagination.

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

Canadian Agriculturist,

OR

JOURNAL AND TRANSACTIONS OF THE BOARD OF AGRICULTURE

OF UPPER CANADA.

VOL. XIV. TORONTO, NOVEMBER 16, 1862. No. 22.

Excrements of Poultry as Manure.

It has been known at least from the times of the ancient Romans, that the excrements of domestic fowls, and birds in general, possess highly fertilizing properties. A thrifty farmer will, therefore, carefully preserve the dung of his poultry yard and pigeon cots, and apply it mixed with earthy matters, as a dressing for his cultivated crops. As the fæces of birds are discharged through a single aperture, they possess the combined properties of both the solid and liquid excrements of other animals.

Poultry dung is one of the most powerful manures; and is, therefore, worthy of greater consideration than is generally bestowed upon its collection, especially as it so soon decomposes, and consequently loses so much ammonia; and it would lose a still greater quantity of that gas, did the excrements not dry quickly, and thus prevent a further decomposition of the urea. The strongest are those of pigeons and domestic fowls—a fact easily explained by the circumstance of their living chiefly upon grain, insects, and worms, while geese eat grass also. That we may lose none of the ammonia developed during the putrefaction of poultry dung, we should do well to strew the yard and house in which they are kept, with soil abundant in humus, for then the ammonia of the manure will be combined with the humid acid of the earth. The strewing of the ground with sand, sawdust, &c., as commonly practised, is in this point of view, of no use whatever.

The excrements of pigeons were carefully examined by Mr. Humphrey Davy, and Sprengel. Davy found in 100 parts by weight, 23 parts of substances, soluble in water, consisting of urea, urate of ammonia, common salt, and some others. According to the latter, pigeon-dung half-a-year old contained only 16 per cent of bodies soluble in water, consisting of very little urea, but of a large proportion of carbonate sulphate, and humate of ammonia, common salt, and sulphate of potash. The other 84 parts insoluble in water consisted of coarse siliceous sand, silica, phosphate of lime and magnesia, traces of alumina, and oxides of manganese and iron. The abundance of soluble substances explains the quick effect of pigeon dung, and also shows us once more the great value of mineral manure.

When the droppings of geese come in contact with the grass in pastures they destroy it in a short time, so that farmers do not readily allow geese to have access to pastures; not to mention that, when the herbage is rendered foul by the excrements of these poultry, it becomes loathsome to other animals. The speedy injury inflicted on plants by goose-dung is occasioned partly by the uric acid it contains, and partly by the ammonia which is so soon generated and developed on decomposition. When rain happens to fall, these caustic substances are diluted, and the grass grows the best in places where the excrements lay, as may be seen in any goose pasture.

As poultry dung is very rich in powerfully manuring matters, easily soluble in water, it should be applied only in very small quantities; and, in order to affect its due distribution

as it is generally dried strongly together, it must first be reduced into a fine state by thrashing, or other means. In Belgium they employ it particularly for manuring their flax, and calculate the annual value of the dung of 400 or 500 head of pigeons at 25 or 30 rix-dollars, (about £5 or £6 sterling). Poultry dung must always be used as a top-dressing, or only harrowed in very lightly; and it should be spread over the ground when there is no wind. we should generally choose damp, but not wet weather, for the purpose, otherwise the many soluble substances would be carried too deep into the soil, or washed away altogether. If a meadow be manured with poultry dung, and sheep driven on it soon afterwards, it is almost entirely eaten bare by them, probably on account of the many salts, including common salt, contained in this manure. Like all other manures containing much ammonia, it soon destroys moss in meadows. When it is wished not to employ poultry dung by itself, it will be found best to mix it into a common heap with some soil rich in humus; a soil of this kind should be used with all organic remains containing much nitrogen, as all loss is thereby prevented How much, however, of this invaluable manuring substance (nitrogen), in the state of ammonia, is every year wasted on all farms, it is impossible to say.

To the excrements of *birds* belong also the dung of the cormorant or gull, which occurs in immense quantities on some islands lying off the coast of Peru, and is named Guano. It is used in Peru with the most striking effects in manuring the maize-fields. Vanquelin and Fourcroy, who undertook a chemical examination of the "Guano," found it to contain 25 per cent. *of urate of ammonia, and urate of potash,* as well as the phosphates of potash, a fatty substance, and some silica. According to Klaproth it consists, on the contrary, of much humate of ammonia, common salt, phosphate of lime, some animal remains, and sand. More minute subsequent remans have shown that guano is very variable in its composition, from differences both of climate and situation.

Vice versus Labour.

Under the above heading we find in a recent number of the *Mark Lane Express,* an excellent and highly toned article on the moral and social condition of the cultivators of the soil, signed A Man O' The Mearns, which we select the following extract, length of which will be justified by the importance of the truths enunciated, and which are universal application:—

In all ages and in all kingdoms of the wo *vice* has proved itself diametrically opposed *labour,* and for the most cogent and tan reasons will of necessity continue to do s the end of time Virtue, industry, and wea whether viewed in an individual or in a coll ive or national light, have always been consi ed synonomous terms; and so have immora idleness, and poverty. Such is Nature's im cable fiat, pronounced against every race against every social rank of the human fac Neither kings nor queens, peers nor pars are excepted any more than country squi farmers and agricultural labourers. Wher we find virtue or vice, whether in the palace in the cottage, there we are also sure to their respective awards in some form or ot We may as well think to gather figs of thi as to realise the contrary. Indeed, it is wel mankind that it is so; for had the reverse t true, the heart recoils from the contempla of what would have been its inevitable co quence.

There is, perhaps, no branch of indu where immorality is attended with more ruin results than in agriculture, more especi amongst the labouring population; consequ ly there is no place where virtuous habits o to be more sedulously cultivated, both by cept and example, than in the cottage of the ricultural labourer. We repeat, *both by cept and example;* for if landowners and t factors (stewards) and tenants spend imm lives, it is hopeless to think of a virtuous, in trious, and prosperous peasantry.

The reason why immorality is attended results so adverse in agriculture arises from heavy character of the work and the fid with which it must be executed in order to tain from the soil abundant crops, such fid being incompatible with loose, immoral, vicious habits. There are, no doubt, "rou who will go through a vast amount of wor a short time, if you will only give them d or in some way or other bribe them to do and then look sharp after them; but "fits starts" of this kind are always attended shortcomings, that do far more than counte ance any benefit derived from them, while work can never be performed as it other would be, consequently it is never follow the same train of propitious results. In words, "the blessing of an Overruling P dence never has attended such a system of th never will do so; for although fruitful se are given to both good and bad, yet we Divine authority for the conclusion invol

above characteristic difference (Lev. xxvi. and Isaiah i, 19, 20)—a difference involving violation of Nature's laws and its never fail punishment, as we shall now proceed very ily to show.

Immorality is ruinous to both body and nd. Those who indulge in vice of any kind guilty of a species of self-destruction; for rt from the momentous question of ever- ting punishment in a world of spirits, they our their physical and intellectual faculties ing the currency of their lifetime on earth, le they greatly shorten the mortal period of duration. The nervous, muscular, and os- s systems are soon broken up, and rendered it to perform their respective functions in the al economy; and as a natural consequence, body of the agricultural labourer becom s and less able to execute its daily task. Thus nervous tissues become relaxed, and conse- ntly they lose their natural tone. The sen- pleasures of the voluptuary cease to be rel- d. And were this all, the loss would be ll; but the nerves have other functions to form than those connected with the senses: it is now an established fact that all those sses in connection with digestion and the ition of the body are greatly dependant upon healthy action of the nerves, while all the cles of the body, voluntary and involuntary, entirely under their control, so that when the er cease to perform their functions, so also, necessity, must the latter But the tissues of muscles also become relaxed, and thereby their contractile powers; so that the la- er, by immorality, not only sacrifices his cular strength, so essentially necessary at the heavy work of agriculture, but the mus- of the heart, and all the involuntary muscles aged in the performance of the other vital cesses, also loose their contractile force, con- ently they cease to perform their functions mally. Hence the prostrate condition of the ourer after a night's debauch, and the rapid- with which infirmity of every kind overtakes —even the withering hand of old age before reaches the natural meridian of life.

With regard to the intellectual faculties of the d, they also become impaired in a similar ner; the professional skill, judgment, dis- ination, memory, &c., of the agricultural ourer becoming of a lower and lower stand- as the physical system is broken up by im ality. It is now an established fact that, in cultivation of the mind, as in the education outh, the body must at the same time be sically trained before successful results can ealized And just so in the *vice versa* phil- phy; for if you lower the standard of the sical functions, you at the same time lay rate with them the more ennobling faculties mind.

Such is the very general outline of the effects duced upon the body and mind of the agri- cultural labourer by immorality. In many re- spects, the details are of a nature such as to pre- vent their discussion, practically, in the columns of an agricultural journal. The subject divides itself into three heads—the physical, the intel- lectual, and the religious, or spiritual; and these, in practice, can and ought never to be separated the one from the others; for their combined action is essentially necessary to make the cot- tage of the labourer virtuous, industrious, and happy; and therefore each of them requires to be thoroughly understood, and brought home to every cottage hearth, as a practical question of daily life, for professional consideration. No doubt, in a purely professional light, the skill and the handicraft of the labourer, or the sci- ence and practice of his profession, are mainly included in the former two; but in the reform- ation of the morals of the people religion can- not occupy a secondary place in the cottage of the poor man, any more than in the palace of the prince; for according to the purity of the religious standard, so will be found the morality of the family, high and low, rich and poor.— Now as the physical and intellectual standards are dependent upon the moral, as has already been shown, the importance of religion is man- ifest. Much is now being said about the low standard of morality in Scotch bothies; but, un- fortunately, this low standard is not confined to bothies, and the bothy system did not arise until a falling-off of religious principle and morality was first experienced. So long, for example, as the farm-servants of the father of the writer attended and respected family worship regularly every night, there was no clamour for a bothy: but when they began to sneer at the "Big-Ha- Bible" and those who kept family worship, and to absent themselves on Sunday evenings, so as to avoid being examined, or as Burns had it, "targed tightly," on the "Shorter Catechism," and thus have their ignorance of religious truth exposed, and otherwise to live an irreligious and immoral life, nothing would satisfy them but "a bothy and their meal," and as their conduct in the kitchen could no longer be tolerated, a bothy was consequently built for them. And now that a revival of religion has taken place, and that family worship is again beginning to be respected by all, and cherished by very many, in the castle, farm-house, and cottage, this vital work of Grace is beginning to produce its legit- imate fruits, so that the moral work of reformation thus begun cannot fail, in due course of time, of extending itself to bothies, when the more thoughtless unmarried labourers, male and female, wherever they live, will be obliged to succumb to the authority and example of the better-behaved. As yet, however, it is no easy matter to select virtuous, intelligent, and indus- trious farm-servants; and this is equally true, whether they are married or single. At the same time a separation of the sheep from the goats is evidently taking place in every rank of society,

both in town and country; and the labourers of the present day are not such bad characters as they were some time ago, or when bothies first began to be the common plan.

Application of Chemistry to Agriculture.

[Translated from the French.]

The application of chemistry to agriculture has been attended with results unquestionably beneficial to that science. True, there have been some disappointments, but they proceeded chiefly from expecting too much of the science, or from a wrong interpretation of its laws. In making use of figures which result from analysis as correct indications, when they ought not to be taken in their absolute terms; in taking account of the multiple circumstances which tend to modify the principles of chemical reactions when they pass from laboratories into the heart of arable land, owing their effects to contact with the roots of plants, we throw great light on agricultural operations, and, in the end, reach a production more economical and abundant. For this reason the names of Bossingault, Payen, Lawes, Gilbert, Way, Anderson, and many others have become popular amongst the cultivators of France and England; but in Germany another chemist has gained by his labours and writings great fame, and has retained it throughout the whole of Europe. A little adventurous, and apt occasionally to be carried away by his imagination, M Liebig—now one of the eight foreign members of the Academy of Science of the Institute of France,—has upon several occasions, given to agriculturists advice which does not appear to bear the stamp of prudence. In chemical agriculture experiments out to be conducted with wise deliberation. It costs too much to leave unrestrained a new system; but setting aside some too-determined efforts, which have only ended in disappointment, M. Liebig has written many good works, so that one ought to listen to him with respect; besides, one may learn much, by reading his numerous writings, beyond what is attached to the subject, from the lively and masterly manner in which it is treated. M. Liebig published for the first time about 1846, a series of about twenty-six letters on chemistry, as applied to manufactures, physiology, and agriculture. In 1851 he added eleven new letters to the preceding ones. This second series was translated into French by a chemist who died young, but who left a name illustrious and regretted—Gerhardt. We have now received a series of fourteen letters upon modern agriculture, of which Dr. Swartz, professor of chemistry to the University of Ghent, has given a good translation. We find in them many excellent principles, but also some points very disputable: thus a strong pleading in favour of mixed manures, and against the exaggerated use of simple manures, is worthy of all approbation; but the absolute condemnation of the commercial culture of tobacco and the vine appears to us far from the limits of truth. But however this may be, the theories of M. Liebig ought to be considered by agriculturists; for this reason we recommend them to read his new letters (a volume of 264 pages, price three shillings). In addition we think it would be useful to publish two lectures, delivered the year after, at Munich, and an estimate of his doctrines, which were received from our contributor, M. Adam Muller, *deputy to the Diet of Bavaria, and connected* with the illustrious chemist of Munich.

In the first lecture will be found a very interesting note on the school founded by Thaer from Moeglin; but also a critique, rather severe, *upon agricultural instructions*—such at least as have been given in some places. M. Liebig cannot combine, in the same institute, practice with theory. He says the two institutions ought to follow one another, and that is necessary to be well versed in the theory before commencing the practice. We reciprocate this opinion. The Agricultural Institute of Versailles would have been perpetuated if farm had not been annexed to it. The pupils, leaving the institute mere theorists, would have been with advantage sent on to good farms, this country or others, to complete their instruction afterwards as the pupils of the Polytechnic School, in the schools of application, and, above all, in the great public works, where they continue their studies before becoming masters.

M. Fouville translated the first lecture, and our learned contributor, M. Villeroy, very willingly translated the second, which is entirely devoted to the methods introduced by chemistry into agricultural science. It contains an excellent discussion upon the means of keeping up the fertility of the soil, on the importance of artificial and commercial manure, and the absurdity of losing the cleanings of towns. In an article M. Adam Muller gives a summary of thoughts of M. Liebig, such as occurred to him in a long attendance on the course of the learned chemist. J. A. Barral.

LECTURE I.*

By Baron Justus Von Liebig.

We celebrate the day on which, 102 years ago, the Elector Maximilian Joseph III. signed the constitutional patent of our academy. This event took place in that age so memorable in the history of sciences, when the foundation of the major part of the academies of Europe, those of Berlin, St. Petersburg, Copenhagen, Lisbon, and Dublin—showed the effect which a strong impulse had produced on the development of European mind.

* Delivered at the session of the 26th March, 1861, for the celebration of the 102nd anniversary of the foundation of the Academy of Sciences in Munich.

In England and France they broke the trammels which hindered the culture of intellect, and in every country of the world the desire was felt to take part in the movement begun, of making useful to the people generally the riches of the intelligence newly acquired. In Bavaria, as elsewhere, was found a nucleus cultivating the sciences, but without power to give them any influence whatever upon life. The patriots who had the courage to propose a change in this state of things had to strive against difficulties on all sides; for a false science of nature, and errors which had became popular, had taken possession of the soil in which ought to have been implanted the new truths. Without extirpating old notions, those which should be popular evidently cannot take root.

To the names of Lori and Linprun is attached the imperishable honor of having commenced the struggle of light against darkness. These learned men conceived the idea of forming, with the aid of a few others, animated by the same noble sentiments as themselves, a society for the purpose of cultivating the sciences, devoting itself to their extension, and struggling against ignorance and superstition. For this purpose their design was, to commence by accomplishing what would be necessary for the well-being of the country, and practicable at that epoch. They had first to level the soil, and thus open a way for scientific discoveries. From the heart of this union of learned men, the majority of which was composed of ecclesiastics, came forth the project of founding an Academy of Sciences. When the Elector of Bavaria had signed the patent for its commencement, the issue of the battle no longer remained uncertain. The victory for truth was henceforth assured. On forming the Academy it was publicly declared that liberty of progress existed then in Bavaria, for the academical writers were free from all censure other than that exercised by the body itself. This act declared that ignorance and superstition was only a necessary evil, and that in seeking to battle with it they would render service to the state.

In conformity with the idea which animated the founder of the Academy, the labours of its members were confined principally, during the first period, to the geography and history of the country, the study of language, and alteration in the system of schools. A taste for the study of mathematics was particularly insisted on by the professors of the Academy, and a fundamental knowledge of the most general phenomena was encouraged by treatises on natural philosophy.

Whilst the law of 1759 indicated but one aim for the labours of the Society—"the diffusion of all useful sciences and liberal arts in Bavaria"—the constitutional ordinance of 1807 went a step farther. Not only ought the members to propagate scientific knowledge, but in addition, by reflections, researches, observations, and other labours, new results would be introduced into the domains of science; while those already known would be rendered more useful.

At the time of its foundation, numerous practical questions which each understood had acquired a certain importance, and deserved to occupy the minds of these scientific men, so that every one was compelled to admit the utility of academical work, when, in conformity to its constitution, it employed itself with agriculture, hand labour, mineralogy, and metallurgy. Even the constitution of 1807 returned thanks specially to the members who would find means of improving agriculture, stimulating industry, and above all, destroying the prejudices which opposed the progress of manufactures.

In the organic law of 1827, with which commenced the current epoch, the members were particularly recommended to occupy themselves with the solution of problems of a practical nature. The Academy became "an association established under the protection of the King for cultivating the sciences, and extending knowledge by means of researches and collective works which are beyond the reach of isolated individuals."

It appears, in consequence, the Academy pursued another aim besides that of its foundation. Whilst it was at first merely an organ of enlightenment, an association occupying itself with certain material interests of the country, the members of the second period joined to that aim the conquests of fresh results, and those of the current epoch occupied themselves exclusively in extending the domain of science.

In reality, there was no contradiction in these different aims; they expressed only the idea, formed at different periods, of the influence of science on public prosperity. A hundred years ago it was thought that science could only operate upon the development of the material interests of the country, but now we know that science is merely useful because it developes the intellectual power of man—an advance which is a condition nearest to the development of agriculture, manufactures, and commerce.

Assigning a practical aim to the works of the Academy was not worthy of that body, nor beneficial to that which they proposed to do; and this error caused to be called in question for some time the utility of the institution. The labors of the academicians would necessarialy lose their the and important signification with the mass of the opulation, because they estimate their value by the nature of the services they have rendered to the agriculturists and workmen of Bavaria. The special nature of the researches was not calculated to supply the particular wants of each. The perfecting of an implement, a receipt for improving the soil, the preparation of soap, a method of dyeing a stuff, or tanning of leather, would be useful to one manufacturer, agriculturist, soap-boiler, dyer, or tanner, but not to all who were engaged in the same trade. Dif-

ferent manufacturers would have different tools to perfect; one farmer would require a different manure from another; all soap-boilers do not make the same soap; a dyer would require one colour for silk, another for worsted. In fact, each tradesman has, for the improvement of his art, some special wants which vary indefinitely according to his experience or degree of competency.

A society of scientific men cannot undertake to answer the wants of each individual; their efforts must be directed in a manner that will benefit all classes. For instance, it cannot occupy itself in perfecting implements of the industrial routine; it must search out principles which will conduce to practice.

With this latter view, our Academy has taken considerable in the progress of mechanics, manufactures, and technical arts. If ever complaints are made against its utility, they should be directed, not against the academicians themselves, but against the manufacturers and technologists who refuse to take part in their labours. If they have not done it yet, or have done it in an imperfect manner, that arises from there existing no real union between practice and science.

In order that two men enter into an intellectual treaty with each other it is indispensible that one speaks the language of the other; but not long agothe practitioner resembled a slave, who can only comprehend the language of signs; for he only recognized as true and real that which was visible and comprehensible: progress could only reach him indirectly. The practical man challenges the scientific to erect a theory on that which his reason suffers him to comprehend, and despises as purely speculative and impracticable the conclusions and lessons of science. Practice and not theory, is with him the true professor. "How can men who do not know how to manage a plough tell us what fields require, to produce a good harvest? or how rain acts on the growth of fruit?" This was for a long time the language of the practitioner.

It must be admitted that in general a theory only, does harm to the practical man every time he tries to put it in use; the attempts that he hazards produce results opposed to those that he looks for. He does not even know that the use of a theory is not a gift natural to man, and that he should be taught it just the same as he would learn the use of a complicated instrument. He does not know that the legitimate use of a law for a given case supposes the intelligent comparison of all specific circumstances, and that intellectual work supposes a series of operations in which it has no guide. In order that a theory can be made of use to him, he must give it due reflection, discern its property, in fact learn to make an exact observation. The, abyss between science and practice begins to be filled up successively, thanks to the wise princes who possessed the will and power to break down the obstacles which prevented the development of the intelligence of the people, and who by improving the system of schools and other means of instruction have extended knowledge among all classes of the population; their names are intimately connected with all the improvements that the state of civilization and culture of the mind permitted to be accomplished; they have gained immortal honour untarnished by blood or tears. In every country prosperity, riches, morality, and real power increase with the amount of knowledge that the people acquire. Is it not, in fact, the extension of knowledge which destroys the prejudices proceeding from primitive ignorance and paralyzing the expansion of individual force? Is it ot a deeper knowledge of things that gives us our laws, our inmost convictions, our customs, the commodities of civilized life, our arts, sciences, and manufactures?

The progress which has been made in schools, and other means of instruction, during the last fifteen years, is in reality greater than that of several preceding centuries. The education of the workman, manufacturer, technologist, merchant, the labourer, is no longer compri-ed, as formerly, of a lecture on writing and the four rules. Not only in our gymnastics and industrial schools are the faculties of the mind developed in such a manner, as that young men who leave them are fitted to accomplish the most complicated intellectual operations; but, further, it gives to the pupils a great amount of knowledge, by the help of which, without more attention, more order, or more activity than their fathers, they can undertake more difficult tasks, and perform them in a more satisfactory manner. In fact, this is the principal result of the education they receive—the young men learn to comprehend the language of science, and acquire in consequence the advantage of bringing to bear upon the wants of life and society, the discoveries which they make by its study.

It is worthy of remark that this improvement is universal in all spheres of society; in fact, the idea that a little of science is useful under all circumstances, even to the poor workman, is beginning to take root even in the minds of men who have had no occasion to follow the professed course in schools. We generally believe that some scientific knowledge of botany is useful to the gardener—that the baker, the soapboiler, the tanner, and the dyer, would feel, in the practice of their art, the want of possessing some knowledge of chemistry. One gardener is not worse than another because he comprehends better the life of plants; a baker is not the less useful because he knows the composition and properties of bread, the flour, salt, fermented dough, or yeast; a soapboiler will not be the less successful in his operations because he takes account of the character of the grease, the

pearlash, lime, and lye, because he knows the qualities that should be sought for in different substances, or has learned the signs by which they may be known. The simple inhabitant of a town or village knows himself that the science of his neighbor, the municipal counsellor, who possesses some knowledge of the principles, in virtue of which are determined the laws of the sanitary police, is truly beneficial to the community.

Surely, then, we may expect to gather in future much more important fruits from progress made by this opinion. Already sciences exercise a certain influence, to the profit of public prosperity (under restraint it is true, but increasing from day to day), over the system of arts and manufactures. Thanks to them, agriculture, as the illustrious founder of our academy has stated, will experience a revolution equally advantageous when it shall have recognized that the separation of agricultural colleges from other educational establishments of a general nature is an obstacle to intellectual progress; when it shall be admitted that the immediate cause of the general decadence and small success of these institutions is found to be the insufficient education, owing to the imperfect scientific instruction which is received in these schools, while they study there, at the same time, technical processes.

(Concluded in our next.)

The Scottish Highlands.

A small volume has recently been published, on "*Management of Highland Landed Property,*" by George G. Mackay, of Inverness. It consists mainly of a re-issue of several well written articles that appeared in the *Inverness Courier*. The writer displays an intimate acquaintance with the condition of landed property in the Highlands, and the hindrances to the development of its natural resources. A few extracts will be found generally interesting, particularly to those who hail from "the land of the mountain and the flood."—In reference to the recently much agitated questions of game and deer forests.

Mr. Mackay states—"We have said, and we confidently repeat, that farmers do not object to a fair stock of game, which it is conceded to be the undoubted right of every proprietor to preserve for his own benefit or enjoyment. Our forefathers could have no conception of what a modern game preserve consists. In those days game had merely a place in the equilibrium designed by the wisely ordained laws of nature, wherein the productiveness of every species is uniformly in the inverse ratio to its powers of self-defence; and the stock of game was, so to speak, natural and moderate, holding the position designed for it by the decrees of an all-wise Providence—proportionate to its importance and value, but subservient to the interests and prosperity of other species, and above all those of man. By the hand of man, however, this equilibrium has been destroyed; and hence the evils complained of. May it not be deemed an excess of game when three or four hundred blackcocks are found by the farmer in his morning walk snugly set down on the top of his stooks. We have known instances in which, from their unceasing attentions in this way, a field that was estimated to yield 6 qrs. per acre only yielded two! Ay, we have seen portions of a field on which the stooks were so thoroughly lightened in this way, that the lucky owner was entirely saved from the labour of thrashing them! How shall we characterise the state of the game where, perhaps, in a large field of thoroughly enclosed turnips, a premium may be offered for the discovery of a single unbroken bulb; or where the farmer, in his homeward walk at dusk, is gratified with the sight of perhaps fifty hares in his promising braird? Is it to be wondered at that a rent payer should occasionally give vent to a little grumbling in such circumstances?"

If the farmers in the Highlands can solve the problem, What constitutes "a fair stock of game?" they are much wiser than their English brethren, who gave evidence before Mr. Bright's committee. Nothing is more condemnatory of game preservation than the above extract, which describes a state of matters not exceptional. The general system of the owners of lands in the Highlands is to obliterate all signs of ancient as well as of advancing civilisation. Fashion is fostering a spirit of barbarism, the ultimate results of which appear to be that the Highlands of Scotland are ultimately to be rendered a comparative desert—the inhabitants and the domesticated animals being extirpated to make the country the domain of wild animals. Till the fact becomes more generally recognized that preservation of wild animals and high farming is incompatible, it is hopeless to expect the investment of capital, either in the reclamation of waste lands, or to lands already under the plough, so as to increase the agricultural products. Game and deer cannot be kept out of corn fields by any plan which has been adopted in the Highlands. With the extension of deer forests, the cultivator must recede, as well as the stock farmer. The onward march of the red deer is only to be stopped by the erection of a boundary fence more difficult to surmount than the Roman wall of Antonirus. Mr. Mackay thus describes the result of the annually increasing extent of deer forests:—"Besides the loss of population, we incur the loss of a large quantity of the staple food of the people. Those exten-

sive tracts of land now under deer, formerly teemed with flocks and herds, which, after supplying the wants of the home population, were annually exported in great numbers to meet the demand of our manufacturing brethren in the south. To this extent, therefore, the nation becomes less supporting than it once was, and we must look elsewhere to meet the deficiency. The supplanters of these flocks—the deer—are, as is well known, no value in commercial point of view, so that there is no compensating supply in this way for the loss sustained. When a proprietor converts a large portion of his estate into a deer forest, instead of desiring to see increased traffic, and more of the stir and bustle of active business, as he would otherwise naturally do, he now seeks stagnation and stillness—he courts solitude and isolation, and aims at the reconversion of the country into the desolate hunting ground that it was a thousand years ago."

With such a system in operation, where are the chances of the improvement of the agricultural resources of the Highlands. Mr. Mackay states—"There are thousands, aye tens of thousands, of acres of waste ground throughout the Highlands, which, by the simple adoption of a judicious and enlightened policy, might be increased from twenty to forty fold in value in twenty-five years, at very little expense to the propietor. This seems a startling statement; one apparently too good to be true. But is true, and we could adduce a hundred instances in proof of it. There are few farms, indeed, in the Highlands, to which there is not attached waste ground which might be profitably brought into cultivation. Yet there it remains, untouched and unprofitable in every respect, while the tenant would usually respond heartily to the offer of an advance by the propropritor for its reclamation. To the capitalist such improvement offers the highest possible inducement in the way of investment. The tenant will usually be found glad to pay 6 per cent. on the outlay; the proprietor has the best security for his money in the actual improvement of the soil, which he cannot possibly lose; so that such a safe and remunerative investment for money is rarely to be found. He reaps this interest for his money for the first nineteen years, and will derive from fifteen to twenty per cent. in perpetuity thereafter. And even where the proprietor has to borrow money for the purpose it will be seen that it is still his interest to improve. He can borrow from any of 'The Lands Improvements Companies,' at a certain rate of interest, to pay off principal and interest in twenty-five years. The tenant will be found willing to pay within, say one per cent. of the interest thus paid, and in many cases he will even pay the whole: so that the owner has his land converted from moor ground, worth perhaps a shilling an acre, without costing him anything but the trouble of negotiating the business, or at the most at a cost to him of perhaps five pounds per acre."

And again—

"To what purpose are our millions of acres of improveable waste lands allowed to lie unproductive? It is said they are generally incapable of remunerative reclamation; and no doubt there are circumstances of soil, position, altitude, or climate, where such an assertion holds good. But we deny its applicability in general terms, so long as we see so many thousands of acres in our own locality now lying waste, which we know to be adapted to the raising of every species of cultivated crops. We can point out 20,000 acres of such land within twenty miles of Inverness, the so-called capital of the Highlands. Is this on account of an adverse climate? Are the waste lands not in the same climate with our present fruitful fields? Is it on account of ther altitude? Have we not waving cornfields and a prosperous tenantry in the heights of Strathspey and Badenoch, in the brace of Urquhart, and in the very mountain gorges of the Monillia. And yet why are these more favoured lands not reclaimed? Not because they are not eminently adapted for cultivation—not because the people are unwilling to undertake the task (on the contrary, they are only too eager to do so,) but because the soil is not free. The entail laws so bind the hands of proprietors, that though they should have any disposition to improve, they cannot; neither can they treat with tenants on eligible terms; and, moreover they cannot sell their land to others who would improve them. The repeal of this law is one of the palpable modes by which it is in the power of the Legislature to advance, especially the Highlands of Scotland in which the evil effects of the law have been very severely felt. Tens of thousands of acres might thus pass into the hands of capitalists of every calibre. We might have our reclaimable moors sold out to industrious farmers in lots, as is now done in the forests of Canada. And if this were done, the grand climax of the emigrant's ambition—the goal to which he aspires, and which is the most attractive motive in inducing him to emigrate, viz., the possession of a piece of land of his own, on which he might labour and expend all his energies, with the satisfaction of leaving a certain patrimony to his family—this, we say, would be attainable at home as easily, and with as great a prospect of satisfaction, as it would be in Canada, or in any other country."

The author proceeds to state that in Canada the capital required to purchase and clear an acre of ground is equal to the fee simple of much of the reclaimable waste lands in Scotland. This may be correct in particular instances, but comparing the wild lands of the two countries, as a whole, for agricultural purposes, those of Canada are unquestionably very superior in point

of permanent money value and productiveness to the bleak and inhospitable elevations of the Scottish Highlands. No doubt but several of the wastes of the old country are susceptible of profitable improvement, but *in general* the same amount of capital and labour bestowed on the naturally rich level lands of Canada would, in the long run, be attended by much larger profits. The generally prosperous condition of our Scottish settlers is a sufficient proof of the correctness of this observation.

To effect an entire change in the present state of the Highlands, Mr. Mackay suggests several conditions, all more or less important aids for ultimate success. The abolition of the laws of Entail, increased facilities for the transfer of land, and the encouragement of railways by Government, partly by pecuniary aid, and also by ignoring and repudiating all exorbitant claims of damages by individual proprietors and corporate bodies, remarking that, "It is too bad that railway companies should in these days be under the necessity of buying up the good will of every small proprietor who may on the most trivial pretence threaten opposition. If Parliament ceased to listen to such claims, railway companies would not have to fear their opposition, and would be saved those heavy 'douceurs' which so cripple the resources and swallow up the rightful dividends of the undertakings. Parliament listens to these aforesaid claims, and to this fact we are further indebted for the expensive deviations from the simplest line which we so often see. If two lines are equally easy of construction, or nearly so it is, of course, the duty of a railway company to select that which may be least offensive to the taste or prejudice of the proprietor through whose land the line passes. But it is surely unfair, on the other hand, that the necessities of the public should be kept in subordination to the caprice or whim of anybody who chooses to put himself in their way.

"In the Highlands especially, railways are a benefit to all classes, and to none so much as to the landowners through whose property the lines pass; so that the very mention of damages seems ridiculous, when the advantages are so great and so self evident. Such are the benefits resulting to the landed interest from railway communication, that instead of anticipating claims for damages, on the score of affecting the amenity of residences, or the revenue of ordinary road-trusts, and such like, we might rather expect the landholders to come forward, offering their lands, free of all charge to any company who would undertake to supply them with such a boon as a railway. The grounds on which these claims for compensation are made are so utterly untenable that we only wonder that they have ever been given effect to.

"We heard not long ago of a proprietor exacting damages on account of having the amenity of his residence disturbed by the passing of a railway on the opposite side of a broad navigable river! The Inverness and Aberdeen Junction Railway, on equally good grounds, has had to pay heavily for anticipated damage to the trade and revenue of the Findhorn Bridge! And why has it not to compensate the steamboat companies along the coast for the presumed loss of traffic they will sustain? Why are not all the common carriers along the road compensated for their loss? Are there not vested interests at stake in these cases as well as in the other? It will be difficult to define the limit to which the principle, when admitted at all, is to be confined."

Are the Long-Woolled Sheep of Tweedside Pure Leicesters?

By John Wilson, Edington Mains, Berwickshire.

Happening a short time ago to meet with an acquaintance who is a breeder of Leicester sheep, our conversation turned upon the discussions which had taken place last year, first at Kelso and afterwards in Edinburgh, upon the proposal which had been made to have in future two distinct classes of Leicester sheep at the Shows of the Highland Society. This naturally enough led to the question which I have placed at the top of the communication. As the gentleman referred to seemed much interested by some facts which I then adduced in support of the affirmative of this question, and expressed the opinion that they would be equally interesting to many others, I am induced to give them publicity.

All who take an interest in this question are aware that the proposal referred to above was made with the view of obviating the very great dissatisfaction which has again and again been produced by the way in which the premiums for Leicester sheep have been awarded at the Shows of the Highland and Agricultural Society of Scotland. The Directors of that Society, with the laudable motive of avoiding partiality, or even the appearance of it, have usually endeavoured to procure judges wholly unconnected with the district in which their Show is held, and have frequently obtained a portion of them from the midland counties of England. When the latter class of judges have been a majority, as at the last Show at Berwick, they have with perfect consistency awarded the prizes in every instance either to sheep from the south, or failing these, to such as approached the nearest to the English type. And so it has happened that the Border sheep, although constituting the vast majority in point of numbers, have been entirely ignored, and the prizes have been given to animals which, in the opinion of near-

ly every spectator, were utterly inferior to all the better specimens of those which had been passed over. In such cases the third judge, being usually a north country breeder, has been placed in the disagreeable position of having to dissent from his colleagues at every decision and had better not have been there at all. At Perth last year the case was reversed: as two of the judges were Scotch and one Irish. The latter, having been used to sheep of the English type, could only look on and see his colleagues award the prizes quite contrary to his judgment. I do not see how the Directors could have come to any other decision than that which they adopted, viz., to deal with all Leicester sheep as constituting one breed. At the same time I am fully persuaded that their premiums will never be awarded in a way that will secure the confidence of the members of the Society, unless the decisions are made by men who at least recognize the genuineness of the Border sheep, and their eligibility to carry prizes when of sufficient merit. Now, it is well known that this is not the case with breeders from the midland counties of England, who for the most part, have no scruple in expressing the opinion that our Border sheep are not Leicesters at all. And our south country neighbours, while refusing to call our sheep *Leicesters*, have provided another name for them. In most of the reports of the recent show at Leeds, notice was taken of an experiment then in progress on the farm where the steam ploughs were tried, for the purpose of testing the comparative merits of a number of different breeds of sheep, amongst which was enumerated the *Barmshire* breed. Again, in the prize report on the farming of Yorkshire, in the 22nd volume of the "Journal of the Royal Agricultural Society of England," p. 122, the author speaks more than once of the *Barnshire* breed of sheep. Now, I daresay, many persons, in reading these reports, must have been puzzled as to the locality of this *Barm* or *Barn* shire, and may have felt some curiosity to know what kind of sheep was referred to. The explanation is just this: A fair for the sale of draft-ewes has for a long time been held annually, in the month of September, near Wooler, in Northumberland, which, from the day in the calendar on which it takes place, is known as St. Ninian's, or, in northern dialect, St Ringan's fair. The site of this fair lying in the part of Northumberland which in the olden time was called Bamboroughshire, the graziers and dealers from Yorkshire, by whom these ewes used to be bought, got into the way of calling their purchases "Bamboroughshire sheep," which for handiness was shortened into *Bampshire*, and has now as we have seen, got varied into *Barmshire* and *Barnshire*. The fair just referred to has now greatly declined from its former importance in consequence of the annual drafts of ewes from the innumerable flocks of Northumberland, Merse, and Teviotdale being bought up at home, or at local markets, by dealers who convey them by rail to the great markets annually held at York, Harwood, &c. Forty years ago the sheep bred in the districts just referred to were exclusively Leicesters, and it was to these that the name Bampshire was first applied. About that date, however, many of our farmers began to try a cross betwixt Cheviot ewes and Leicester rams, and these two breeds were found to blend so readily, not only in a first cross, but also with a continued used of the pure Leicester ram and the cross-bred ewes for successive descents, and to produce so useful an animal, at once hardy, prolific, of good size, with great aptitude to fatten, and excellent quality both of wool and mutton, that this mixed breed rapidly superseded the pure Leicester, *except in the case of ram breeding flocks.* I may here notice that in the Border districts a pure Leicester is invariably called a *bred* sheep *par excellence.* Sheep of the first and second cross betwixt Leicester and Cheviot are in like manner half *bred*, or two-parts *bred*, as the case may be; but when they are the produce of a pure Leicester ram and ewe of the mixed breed of three or four or more descents, I suspect that, when taken south, the old name of Bampshire is often applied indiscriminately to them as well as the pure Leicesters. The latter, as I have said, are now found only in the hands of regular ram breeders; but that their flocks are still comparatively numerous, may be inferred from the fact that, at the ram fair now annually held at Kelso in the month of September, from 1,600 to 2,000 shearing Leicester rams are presented for sale, and are most of them bred in the surrounding districts.

And now again for the question: Are these rams really pure Leicesters? They certainly differ much in appearance from the type of sheep now found in the midland counties of England. They are stronger in the bone, larger in frame, have white faces and legs, and are altogether of a more robust form than their modern English kindred. Are these diversities, then, due to crossing, or are they entirely owing to selection, and the influences of climate? Now, without claiming absolute purity for every flock, I do believe that those of the best breeders on the Borders can establish as direct and pure a descent from Bakewell's flock as any now to be found elsewhere. Let us inquire when, and by whom, the Leicester breed was first introduced to the Borders. It is well known that this was largely due to the Messrs. Culley, who in 1767, migrated from the county Durham to Tweedside, and brought with them excellent breeds of live stock, and in particular a flock of sheep of the pure Leicester, or *Dishley* breed, as they were then called. Mr. George Culley was the personal friend of Bakewell, and the author of a treatise on live stock, in which his description of the Dishley breed of sheep quite corroborates the opinion which it is my present object to

substantiate. Another person who took a leading part in introducing the new breed was the late Mr. Robert Thomson, of Lilburn, and afterwards of Chillingham Barns in Northumberland, who in his youth resided for some time with Bakewell as his pupil, and whose flock, long known as one of the best on the Borders, was bred directly from Bakewell's. I cannot, of course, speak of the flocks of the breeders now named from personal observation, as they had all either died or retired from business by the time I began; but I inherited from my father a flock of Leicesters which had been bred chiefly from their flocks, and I have thus been familiar from my earliest years with the style of sheep which they introduced. About thirty-five years ago, and for many subsequent years, there existed a small flock of Leicesters, the property of Mr. Luke Scott, formerly tenant of Easington Grange, near Belford, which I knew well, and which, in several respects, may be said to have been unique. Mr. Scott, although a steady and upright man, had not prospered in business. From ever I knew him he had no farm of his own, and his little flock, numbering some twenty ewes and their produce, to which he clung with fond affection and almost desperate tenacity, was boarded out, sometimes in one place and sometimes in another, often exposed to great straits, and never enjoying anything like fair treatment. He has often told me that the foundation of this flock was laid by the purchase of a few shearling ewes from a Mr. Yellowly, then in good repute as a breeder of pure Leicesters. As long as Mr. Robert Thomson continued a breeder, Mr. Scott had used only rams, or their progeny, of his own breeding; and for the 20 or 25 years which elapsed betwixt Mr. Robert Thomson's retirement from business and the final breaking up of Mr. Scott's little flock, the latter was maintained entirely by the use of his own rams. So jealously did this exclusive old man watch over the purity of his idolised little flock, that I recollect of his telling me how a favourite ewe had made her escape from the enclosure in which she was confined, and had got access to a ram of a neighbouring flock. Most persons would have thought it enough in such circumstances to have sold or destroyed the progeny of this *mesalliance;* but so irremediably did the old man consider his ewe to have been contaminated, that favourite as she was, he caused her instantly to be slaughtered. Mr. Scott let out on hire as many of his rams as he could, but never sold either male or female except to be slaughtered. And what, then, were the characteristics of this interesting little flock, separated from Bakewell's by but one intermediate link? Their faces and legs were invariably white—as much so as any Cheviot's. Their wool formed a close-set, compact fleece, inclining to coarseness in the breech, and often scanty, or altogether awanting, on the belly. The rams carried their heads well up, being strong and full in the neck-vein, and remarkably wide in the chest. They were particularly clean in the legs, and seldom suffered from foot-lameness. They were vigorous and active, and in token of this were pugnacious to a fault, being more troublesome in this respect than the rams of any breed of sheep I have ever had to do with. Owing to their own purity of breeding they possessed in a remarkable degree the capacity of imparting their own characteristics to every flock into which they were introduced. Mr. Scott never had many of our ram breeders as direct customers, as they objected to the comparative want of size of his sheep; but I have the best means of knowing that most of them freely availed themselves of his blood by hiring rams from those who did deal with him directly. So much was this the case, that there is probably no Leicester flock on the borders, of any considerable reputation, that has not this blood largely in it. The comparative want of size, to which I have just referred, always appeared to me to be less an inherent quality than the inevitable consequence of long continued hardships. I have thus shown that we got the genuine Bakewell blood to begin with, and that, in one instance at least, it was preserved amongst us, until a very recent date, in a degree of purity not equalled anywhere else, unless, perhaps, in Mr. Valentine's flock. Let me not, however, be misunderstood as if I wished to convey the impression that the breeders whom I have named were the only persons on Tweedside who were direct introducers of Bakewell's blood. There were many others whom I cannot enumerate. I may mention, however as being Berwickshire breeders, the late William Robertson, Esq., of Ladykirk, and his tenant and intimate friend the late James Thomson, Bogend, who both, down to a yet recent date, went annually to Leicestershire and hired rams from the best flocks there. Mr. Robertson's flock of about eight hundred ewes dispersed in consequence of his death about 1830, and is still represented in the district. Mr. Thomson's remains intact in the hands of his grandson at Mungo's walls, and is still used as a ram-breeding flock.

Much as the Leicester sheep of the south and of the Borders now differ from each other, I believe that both can equally claim and prove direct descent from Bakewell's flock. Diversity of climate and general treatment, and diversity of taste in the breeders, have for a prolonged period been at work to produce the change; and these are influences potent enough to account for all the change which has actually taken place, although both started with like materials. Bakewell, we know, had just the common long-woolled sheep of his day to work upon; and he by skill and perseverance, so changed them as to originate what has ever since been recognised as a distinct breed. The materials which proved so plastic in his skilful hands are still as susceptible of modi-

fication as ever they were. As a matter of fact, not our sheep only, but all our domesticated animals are constantly varying. It is not only the flocks of widely remote districts that exhibit this variation; it can be seen any day, and everywhere, by comparing together any given number of flocks in the same neighbourhood, each of which will be found to have well-marked family features, by which it can be readily discriminated from the others.

The point of real practical importance is, that everywhere the Leicester breed retains the qualities which from the first made it so valuable. It is true that it is not now put to the *same* use as formerly. It no longer yields directly our staple supplies of butcher meat; but crosses betwixt it and the Downs in the south, and betwixt it and the Cheviots and Blackfaces in the north, now constitute the main supplies to all our markets.

January, 1862.

Before publishing the foregoing statements, it occurred to me that it would be well to submit them to two gentlemen who I knew to be well qualified to judge of their accuracy—viz., John Gray, Esq., of Dilston, and Thomas Scott, Esq., late of Beal. It is with peculiar gratification that I append the following excerps from the letters with which they favoured me on returning my manuscript. Mr. Gray says:—

"I have been favoured by reading your paper on the genuineness of the Border Leicester, and, as I am going from home in the morning, I give you, at a late hour, a hasty line, to say how entirely my opinion concurs with your own as to the still existing purity of the *ram-breeding* flocks in the Border countries * * * * I quite agree with all you say of George Culley and Robert Thomson, first at Lilburn (when the first sale of auction in the North of a pure-bred Bakewell flock took place) and next at Chillingham Barns, where he had annual lettings, at which I took rams, and learned my first lessons *in the symmetry and quality of the pure* Leicester. I well remember also his sale of all his flock there in May, 1814, when I was, though young, one of the judges, and presided at the dinner in a barn full and overflowing. I regularly attended the public lettings at Mr. Culley's too, and hired rams, very often. Those two flocks were certainly pure Leicester, if Bakewell's were pure—and we can go no farther back. But then there were two families in Bakewell's flock, distinguished as *blue caps* and *red legs*, which came out at times in their descendants. You must have seen and known a kind of Leicester with blue faces, generally bare on the scalp, and red when lambed, and when mature, easily broken by flies, on which account they were not favourites with the shepherds. They were good feeders, but light of wool. The red or brown legs were a hardier tribe, and good in carcass also. I remember one of the best rams I ever had being one of that kind—hired at sixty guineas from Mr. Thomson (descended from Bakewell's). That class of sheep was then used and approved by Messrs. Jobson of Turvilaws, Vardy of Fenton, Smith of Norham, Smith of Hayfarm, &c., &c., and continued in those families until within the last twenty years. So long as a sheep-flock was kept at Millfield Hill no alloy or impure cross was ever admitted; but yet the character of the sheep was rather altered to suit the taste of those who hired my rams. The original breed was from Thomson's and Culley's, my father having bought gimmer's from Thomson at an early time. *By way of change, I hired sheep from* Burgess, and then I had three for two years from Lord Althorp, got by Buckley's best ram, called Big B., which his Lordship had for two seasons. Those sheep were perfect as to shape and quality, but on a low leg, with a round full carcass, fulfilling Bakewell's toast, 'small in size, and great in value.' If I had fed all my sheep to the end for the fat market none could have paid better than those for early maturity and the amount of mutton produced per acre, although not in large frames; but in that neighbourhood all the ewes are sold for breeding another year in Yorkshire, and the buyers like them to stand on a higher leg, and make a bigger, if not better, show in the pens of York and Wakefield: and so also with dinmonts sold in the autumn to be fed in the South. Chiefly on this account, and partly because more farmers reckon more by the price they get *per head* than by the *aggregate amount* of mutton and wool in sheep of smaller size, I was induced to follow the public taste and to cultivate a large sized sheep, but without sacrificing purity of blood. The taste prevailed, I think, pretty generally on the Borders, and has wrought, together with the effects of climate, in changing considerably the look and character of the Leicester sheep in those parts from that of the original Leicester sheep of that county and Warwickshire, &c. I have seen most marked changes produced by local circumstances on Leicester sheep. I once bought some shearling rams in this county for a friend in Ireland. I saw the sheep in Queen's County three years after and could hardly believe them to be the same, so coarse were they in wool, and so changed in character. * * * You are quite right as to the origin of the name Barm, or Barnshire sheep. I remember old Green, a large buyer from Yorkshire in the beginning of this century, who always used that term in speaking of the draft ewes he bought in Bamboroughshire and Glendale. Your account of old Luke Scott's little flock is very curious and strictly true. I knew him at Easington, and used to meet him at the shows at Chillingham Barns. The last of his diminished flock was at a poor place by the road south of Wooler, called Plea Place, where his son once asked me to stop and look at the sheep which he thought

combined in perfection what I had described at some meeting as the true qualities of the pure Leicester. * * * The flocks of Ladykirk and Bogend were purely Leicester to the end, Leicestershire rams hired at good prices were pure. I had the privilege of being well acquainted with both Mr Robertson and Mr. Thomson, who for many years used to have their horses rested with me in passing Millfield Hill, so that I might have a view of the rams. But even in these there was as great a difference between those from Stone, Stubbins, Burgess, and Buckley, as now exists between those of Nottinghamshire and Northumberland."

Mr. Scott says:—

"Your remarks are in perfect accordance with my recollection of the conversation which I have heard upon the subject by my seniors. There is nothing I could add of my knowledge to the very full history you have given of the breed in this district."—*Journal of Agriculture.*

Sewage Irrigation.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S

The use of the sewage of towns in irrigating grass lands is now exciting that attention which its public importance demands. A royal commission and a Committee of the House of Commons have been appointed, with full power to institute experiments, and to examine witnesses That Parliamentary Committee has recently published its first report, and from that we may readily learn how correct are the general conclusions of the farmer, and how absurd have been the reasons of those who have systematically decried the importance of these fertilizing streams.

It may be very true that the experiments given in evidence before the Committee were not always made with the requisite care; that the amount of sewage applied was often far too small, and at too distant intervals; but still, after allowing every necessary drawback, there yet remains in that report a very considerable amount of facts well worthy of my readers careful consideration.

In this inquiry the amount of sewage needed to produce the most profitable result is indeed the primary question. Now, in the great sewage irrigation operations so long successfully carried on at Milan, and at Edinburgh, the quantity annually applied per acre appears to be about 5,000 tons. In Northern Italy, where five or six crops of grass are annually produced by the irrigation of the meadows near Milan, with the river water, into which the city sewage is discharged, *no annual charge is made for the use of the water.* It appears from the report of Mr. Smith upon Italian Irrigation, that the price paid annually for the irrigation water is.... 5s. 9d.

That during the summer season the meadows are watered..... 18 times.
That the weight of water applied per acre each time is about..... 230 tons.
That the annual produce per acre of grass is about..... 224 cwts.

That this is about the most beneficial amount of liquid to apply per acre accords with what I had long since occasion to remark. It was after examining the amount of water required to saturate thirteen kinds of soil that I was led to conclude that if we calculate the mean amount of water in these thirteen varieties of saturated soils to be equal to 42lbs. per cubic foot of earth, or 378lbs. per square yard of soil a foot deep, then 378 × 4840 (the number of square yards in an acre) gives 1,829 520lbs. of water needed to saturate an acre of *perfectly dry* land to the depth of one foot, or about 816 tons. If we suppose that the saturation of the soil need only extend to a depth of nine inches, then about 543 tons of water would be sufficient; if a depth of only six inches, then 408 tons; and if only a depth of four inches, then 273 tons would suffice. It appears from the report of Dr. J. Stark, that the celebrated Craigentinny Meads, near Edinburgh, are annually irrigated by the city sewage about eighteen times. For instance, a certain plot was watered in its turn, May 3 and 14, June 3 and 20, Aug. 15 and 31, Oct. 8 and 29, Nov. 24, Dec 31; in 1845, Jan 30 Feb. 18, March 5 and 22, April 2 and 13. Now, if we calculate that, on an average of months, 250 tons of irrigation water would suffice to saturate the soil (*always partially and sometimes thoroughly previously moistened*), then it would require 4,700 tons of water to give these eighteen irrigations to an acre of land. I deem the quantities I have stated as likely to be an average amount of sewage fluid required for the irrigation of an acre of grass land to be nearly correct. In the report of Mr. George Buchanan, engineer for the irrigated meads of Craigentinny, near Edinburgh, he states the quantity of water necessary per acre to be equal to a stream of sewer fluid of 3¼ cubic feet per minute for 12 days of 10 hours each, or about 650 tons. It will be remarked, however, that the sewage fluid in this case had to sustain the soakage, leakage, and evaporation during thirteen days of the month of May. This slow irrigation is far from being the most economical mode of applying the sewage—the more rapid and copious application being to be preferred, as affording little time for the soakage of the substratum, and the leakage from the soil into the drains, and evaporation from the surface. Mr. Buchanan also adds, "In some parts the soil consists of very stiff clay, resting on a similar substratum, and other parts of a red sand, and the sand requires nearly twice as much water for saturation as the clay." We see, then, that the amount stated by Mr. Buchanan of about 700 tons per acre having been

used at Edinburgh upon a mead, and subject to many deductions from its saturating power, is not very widely different from the average amount of about 800 tons required, according to Professor Schubler, to saturate the same extent of nearly chemically dry earths. Then, again, by avoiding the soakage and drainage waste of twelve days, and taking the average rate of moderately retentive soils, a very material saving would doubtless be accomplished; and, moreover, by raising the sewage fluid to the contemplated elevations, it would be available as at Edinburgh, for the use of the irrigation a second time. The use of sewage waters a second time in irrigation, is an old-established practice in Italy. In the celebrated meads of the neighborhood of Milan, "the water of the draining channel," says Count Arrivabene, "is collected into another channel, which conducts it to irrigate another meadow in a similar manner. Upon the whole, therefore, I am inclined to think that the calculated quantity of 4,700 tons per acre annually is a tolerable approximation to the truth."

In the experiments instituted at Rugby by the members of the Royal Commission the amount applied per acre has been in these experiments 3,000 tons, 6,000 tons, and 9,000 tons per annum. In these trials two material objects were hoped to be attained, viz.:—1. To ascertain the amount of increase of produce from the application of different proportions of sewage to grass. 2. The most beneficial mode of using the grass produced, whether for milch cows or for fattening stock, given either by itself or with other food. These experiments were attended with very valuable results, although they were conducted under considerable difficulties, and the amount of sewage available was considerably less than was intended. The following results are given in the words and figures of the report:—

Two fields were employed in these experiments, viz., one of five acres, the produce of which was intended to be devoted to the feeding of oxen, to which the sewage was in these trials first applied on the 6th March, 1860; and one field of ten acres, to which the sewage was not conducted until the 1st of April. The chief results obtained were, that in the five-acre field the produce of grass obtained from four plots was as follows:—

	Tons.	Cwt.
1. Plot not dressed with sewage produced in two cuttings, of green grass per acre	9	5¾
2. Plot dressed with 3 000 tons of sewage per acre, in four cuttings	14	16
3. Plot with 6,000 tons, in four cuttings	27	1
4. Plot with 9,000 tons, in four cuttings	32	17

In half of the ten-acre field—

	Tons.	Cwt.
1. Plot, soil undressed, produced in two cuttings	8	1[illegible]
2. Plot dressed with 3,000 tons per acre produced in four cuttings	15	1[illegible]
3. Plot dressed with 6,000 tons in four cuttings produced	22	15
4. Plot dressed with 9,000 tons, in four cuttings	26	13

So that the increase of grass from the application of every 1,000 tons of sewage was, on an average, between three or four tons per acre.

In the experiment made with the grass in fattening cattle ten Hereford oxen were employed. They consumed, during sixteen weeks, per head daily 105½lbs of the grass; so that the grass of each acre was sufficient to keep an ox from

	Weeks.
The soil simple	32·9
The soil with 3,000 tons of sewage	45·
The soil with 6 000 tons	82·1
The soil with 9 000 tons	99·7

The value of the increase of the oxen in live weight per acre, at 4d. per lb., was as follows

	£	s.	d.
Grass from soil simple	1	8	11
Ditto 3,000 tons	2	4	3
Ditto 6 000 tons	4	0	9
Ditto 9 000 tons	4	18	0

So that the value of the live weight from the increased produce of 1,000 tons of sewage was, from the grass land dressed with

	s.	d.
3,000 tons per acre	8	2
6,000 tons ditto	10	10
9,000 tons ditto	10	3

In the trials with milch cows, twelve were selected, and fed upon grass alone for sixteen weeks. Two cows were fed on the grass from Plot 1, which had not any sewage, and ten cows with the grass from the sewaged plots 2, 3, and 4.

They consumed daily per head of grass from the plot without sewage	138·7lbs.
From the sewaged plots	125·9lbs.
The average daily yield of milk per head from the cows fed with grass grown without sewage was	25 05lbs.
From those fed with the sewaged grass	20·53lbs.

	Weeks.
The number of weeks the grass grown without sewage would keep a cow per acre	20·6
The grass from the land which had 3 000 tons of sewage per acre	40·3
From that which had 6,000 tons per acre	57 9
From that which had 9 000 tons per acre	67·9

The gallons of milk each acre would yield was from

	Gallons.
The grass without sewage	350·7
The acre with 3,000 tons of sewage	562·3
The acre with 6,000 tons	807·8
The acre with 9,000 tons	947·4

The value of the produce of the milk from ·h acre was,

	£	s.	d.
om grass without sewage, at 1s. 6d per gallon	11	13	10
e 3,000 tons of sewage grass	18	14	10
e 6,000 tons of sewage grass	26	18	7
e 9,000 tons of sewage grass	31	11	7

The increased value of the milk from the application of each 1,000 tons of sewage to the ·ss was therefore about £4 12s.

As some doubt had been entertained as to the mparative value of the milk from the cows d with the grass produced with and without sage, the composition of 100 parts of the milk m the cows fed on the grass from the unsewed and the sewaged grass was ascertained by ofessor Way. He analyzed nine samples of ch. The mean of these was as follows :

	With grass. Unsewaged.	Sewaged.
Casein, or cheese	3.246	3.241
Butter	3.604	3.430
Sugar of milk, &c.	4.505	4 218
Mineral matter	0.753	0.776
Total solid matter	12.008	11 665
Water	87 992	88.335
	100	100

From these analyses we may conclude that le composition of the milk is but slightly inenced by feeding the cows with the sewagegated grass. The results of the analyses of le sewage of a country town like Rugby will ot be without interest to my readers. Twenty-i samples of this sewage when analyzed gave le following mean result per gallon:

	Grains.
Organic matter in solution	10.35
" in suspension	15.22
Inorganic matter in solution	37.22
" in suspension	15 25
Ammonia in solution	5 27
" in suspension	1 50
Potass	1.04
Phosphoric acid	0 93

So that each 1,000 tons of such sewage convey on to the land, in solution and in suspension—

	lbs.
Organic matter	818
Inorganic matter	1,679
Ammonia	217
Potass	33
Phosphoric acid	30

In almost all the investigations into the agricultural value of sewage which have hitherto been made too little attention has been paid to the value of the mere water of the liquid. In the experiments carried on at Rugby, the water bestowed upon the grass in the sewage was equal to a rainfal of about 30, 60, and 90 inches per annum. Now, if this large amount of liquid had been only rain water, the increased produce of grass would have been very considerable.

The weight of grass produced in the east of England moistened by an annual rainfal of 20 inches, is, we all know, very inferior to that yielded by similar soils on the western part of the island supplied with a rainfal of 40 inches, and vastly inferior to the produce of the meads of the chalk formation annually watered with at least 50 inches of the bright waters as pure as when they issue from the chalk.

Then, again, it is not merely the amount of the organic and other matters conveyed into the grass which should be valued, but their thorough diffusion in the soil, and the state of solution in which they come in contact with the roots of the plant, is also a very material element in the case. The amount of guano which the Peruvian cultivators sprinkle over their fields is said to be very small in amount, but then they always irrigate the land as soon as the guano is spread. Every English farmer is aware how much more valuable is the effect of this manure, when he employs it in heavy rains; for its valuable portions are then dissolved in the rain water, and diffused through the soil. Irrigating with sewage accomplishes a similar object with far more certainty.

In the case then of lands so situated that the sewage can be conducted on to them by its own gravity, the importance of its employment in irrigation need hardly be advocated. In those many situations where the outfall of town sewers is too low for the sewage to be thus conveyed on to the land, recourse must be had to the steam engine and the pump. Now, supposing it is necessary to raise such a considerable amount of sewage from a lower level to the surface of the soil, then the following observations as to the consumption of fuel required to raise water to various heights may be useful: for these I am indebted to Messrs. Ransome and Sims, of Ipswich. The greatest effect in pumping water is found in the Cornish pumping engines: now, the average of these fire engines, reported in June, 1851 (being twenty-five engines) is 62,000,000 lbs. of water raised one foot high by the consumption of 1cwt. of coals. These engines are very large, the steam is used expansively, and condensed, and every appliance adopted to economise fuel. Probably we shall not be far from an average, if we estimate that the small engines used for agricultural purposes will not perform more than one fourth of this "duty," or say, 16,000,000 lbs. of water raised one foot high by the use of 1 cwt. of coals. It must be understood that the same weight of coal will lift half the water to twice the height, or one-fourth the water to four times the height, and so on. Now, supposing that we have to lift the water from a stream to the portion of a field which is ten feet above the level of the river, then 1cwt. of coal will lift to that height one-tenth of 16,000,000 lbs. of water, or 1,600,000 lbs. A gallon of water weighs 10lbs., and

therefore 160,000 gallons will be lifted, or, as 224 gallons weigh a ton, 714 tons of water may be raised 10 feet with the consumption of only 1 cwt. of coal: and this is almost exactly equal to an inch in depth over seven acres, or an average fortnight's rain in the southern and midland counties of England.

The subjoined table gives the gallons of water which may be lifted to various heights by the consumption of 112 lbs. of coal; the pumping apparatus being good, and adapted to the power of the engine, the calculation being based upon the preceding datum of 1,600,000 lbs.

			Gallons.
One cwt. of coal then will raise		1 foot	1,600,000
"	"	2 feet	800 000
"	"	3 feet	533,000
"	"	4 feet	400 000
"	"	5 feet	320,000
"	"	6 feet	266 666
"	"	7 feet	228,571
"	"	8 feet	200.000
"	"	9 feet	177,777
"	"	10 feet	160,000
"	"	11 feet	145,454
"	"	12 feet	133 333
"	"	13 feet	123,076
"	"	14 feet	114 444
"	"	15 feet	106 666
"	"	16 feet	130 000

The use of sewage in irrigation, as I long since ventured to predict, will, there is little doubt, be chiefly confined to grass lands. Of this opinion is Professor Voelcker, who on this subject recently addressed the members of the Royal Agricultural Society. In most of the conclusions to which he arrives I heartily concur, and in none more so than when in the course of his able lecture he had occasion to inquire why it is that grass is especially benefited by the sewage of towns. It is so, he added, because it is a quick-growing crop, which allows us to apply a fresh quantity of fertilising matter as soon as a given quantity is exhausted. We can repeatedly manure the grass crop, but we cannot the cereal crop. We should never get our wheat ripened, after it has passed through its grassy condition, and arrived to some extent at maturity—we should never get the grain formed, if we were to apply sewage to it. Neither can we well apply sewage to market produce; at least not on most soils; for sewage has a tendency to close up the pores of the soil, and to encrust it, which is a great practical inconvenience. We should also remember that we must dispose of the sewage of a town at all times of the year, and that we must therefore apply it in very large quantities at a time. Now, to grass lands we can apply very large quantities, because grasses grow very rapidly, and enable us to give a fresh dressing or a large dose of manure.

Upon the importance of these scientific researches I need hardly remark. The intelligent readers of this widely circulating magazine are well aware that in working out the great problem as to the best disposal of the sewage of towns, two noble objects are to be attained—1st, the improvement of the public health; and 2ndly, the increased fertility of our cultivated soils. The experiments to which I have drawn the reader's attention will materially tend to promote these great objects, for they will enable the cultivator to proceed on safer, because still better understood ground. Of one conclusion I am quite certain—that if the course of the streams of sewage, now commonly worse than wasted, are only so altered as to be available to the skilful agriculturists of our country, they will need no arguments to induce them to turn those now noxious streams to a nationally important purpose.—*Farmer's Magazine.*

Sir Edward Bulwer Lytton on Agriculture.

Sir Edward Bulwer Lytton was present at the dinner of the Herts Agricultural Association, and responded to the toast of the county members. The right hon. baronet adverted to the remarkable progress which had been made in farming, and pointed out the great distinction between fancy and practical husbandry. "I remember," he remarked, "an amusing anecdote of a certain nobleman, who was a great farmer, and also a great epicure. He kept a famous prize ox; he kept also a famous French cook. Once on a time he invited some distinguished friends to accompany him to his country seat, and sent the cook on a few days before to prepare for the entertainment. As soon as he arrived he was impatient to show his friends his prize ox, and carried them off to the farm yard. When he came to the stall in which the ox was kept, lo, and behold, the ox was gone! He called to the herdsman, 'Why, where is my prize ox?' 'Please your lordship,' said the man, 'the French cook came to look at him two days ago, and admired him greatly; since then the ox has disappeared.' Much astonished, my lord hastened to seek an explanation of the cook, and found him very busy in his private room near the kitchen. 'What is this story about my prize ox? What have you done with my Durham ox?' 'Ah, my lord,' said the cook, 'I have him here safe and sound;' and so saying, he opened the cupboard, and on one of the shelves showed his lordship a small jar. Pointing to the jar, he said, with great complacency, 'There! you see, my lord, he was rather too tough for a roast, but I have stewed him down into a famous sauce!' Now, I am sometimes reminded of that anecdote when some gentleman fancy farmer carries me over his model farm. One sees much to admire in expensive nick-nacks and clever inventions, but when one delicately inquires into the state of the balance sheet the admiration cools. And many a fancy farmer who wants to look at his net profit as my

lord wanted to look at his prize ox, may be astonished to find how many pounds of solid substance may be scientifically stewed down into a very small jar of sauce." He enlarged upon the advantages of agricultural societies both to the farmer and labourer, and then proceeded to speak of the importance of utilising the sewage of towns to agricultural purposes:—"I remember, when I held the Colonial seal, the trouble and toil it cost me to secure from some distant islands a scanty supply of guano, while all the time, close at hand, a few of the London sewers were every year casting away into the Thames more than half a million's worth of a manure considerably more valuable for the general purposes of agriculture than that guano which ships were fitted out to bring home, in order that it might be retailed at a price which rather fits it for the phials of an apothecary than the fields of a farmer. I said half a million's worth of money was thus thrown away, but that is a very low estimate of the real waste. In Flanders, for instance, where I have been lately, the value of sewage is calculated according to the numeral population, especially in towns. It is there calculated at £1 7s. a head yearly. In Belgium it is calculated at a still higher rate. So that, if the population of London be taken at 2,000,000 a means of increasing the productive wealth of the country, which, according to the estimate of Flanders would be worth £2,700,000, is exclusively devoted to poison the waters of the Thames, and administer gratuitous disease to her Majesty's metropolitan subjects. If we may condescend to take lessons from barbarians, the Chinese may, in this respect, be our teachers. The rapidity with which the Chinese bring almost any soil into cultivation, and, when brought into cultivation, the enormous crops which they contrive to take from mere handfuls of land, have been the wonder and admiration of travellers. But the great secret of the Chinese is in the utilisation of sewage. The proverbial fertility of Belgium is owing, in much, to the same cause. But it is not only the sewage of London which is wasted, but that of all our own rural towns; although in them there appears a more impatient desire to remedy acknowledged abuses than seems to be the characteristic of city aldermen and metropolitan boards. When I consider how many populous towns there are in this country, I heartily wish we could send among them a few enlightened Chinese engineers to devise the best practical means by which our townsfolk might be enriched by the manure they could sell, and our farmers enriched by the manure they could buy. But, in the meanwhile, until some such scheme is devised and agreed to, we must fall back on our old friend the farm-yard dunghill, assisted, indeed, by various chemical manufactures, but never to such a degree as to supply its place. Professor Liebig is, no doubt, right in considering the chief art of productive husbandry to consist in the skilful application of manure. David Hume tells us, in one of his essays, that all the vast apparatus of our government has ultimately no other object or purpose than the distribution of justice to the soil—in other words, the application of that manure which gives back to the soil the nutriment we take from it, or supplies the nourishing properties which nature had neglected to bestow. Eight hundred years ago there was a very learned dispute whether or not the earth was an animal. We have now discovered that the earth is so far an animal that it requires to be fed and will not bear to be starved. A remarkable instance of this truth is mentioned by a celebrated agricultural authority, in some of the Southern States of America—such as Maryland and Virginia. In these States there were large districts of some of the most fertile land in the world, the crops they yielded were prodigious; but, unluckily the cultivators neglected the manure; they took from the land the alkalies and salts, which they did not replace, and these districts had now become so hopelessly sterile that they have been altogether abandoned as a desert. Now, if it be true that the fertility of the soil thus depends on the nourishment we give to it, there can be no stronger argument for the perfect confidence which ought to exist between landlord and tenant, so that the enterprise of the former may not be checked by any reasonable fear that he should not have his fair share of the profits in whatever he permanently adds to the fertility of the soil. For, on the one hand, the farmer cannot, on the long run, enrich himself unless he does justice to the land, and, on the other hand, the landlard cannot, on the long run, benefit his estate unless he does justice to the cultivator. The healthiest condition of productive industry, whether in farming or anything else, must be that which attracts to its cultivation capital and intelligence by the rational calculation of adequate returns. Now, when I look forward I can see many causes at work to give assurance to investments in agriculture, whether for the owner or the occupier. The increase of population, the certainty that new towns will spring up in the neighbourhood of railway stations, the tendency to building even in the quietest old rural towns if sufficiently near to railway communication——above all, the vast and progressive influx of gold, all must serve every year more and more to increase the value of land, widen the demand for its produce, and maintain the standard of its remunerative prices."

Lake Superior Region.

The following facts as stated in a recent article of the *Globe*, are full of hope and interest in relation to an extensive and yet unsettled portion of British territory. The great North-west when surveyed and opened up to settlers

will afford a profitable and unbounded field to agricultural, as well as mining enterprize.

"We have received from Sault Ste. Marie some very satisfactory and pleasing proofs of the capacity of the neighboring region to sustain the human family. They came to us in the shape of specimens of fall and spring wheat, oats, peas, beans, barley, potatos, beets, turnips, carrots, cabbage and parsnips, grown in and around the village of Sault Ste. Marie, partly by Mr. Pind, the postmaster, the rest by neighboring settlers. As a matter of course, it has been known that root crops cou'd be grown throughout the entire Lake Superior region, but such specimens of roots as we have obtained are not often exceeded in the western peninsula of Upper Canada. The potatos would have bid high for the first prize at the late show in Toronto had they been exhibited. Spring wheat, oats, peas and barley, it was also known, could be grown very far to the north, but it was not believed until the experiment was tried, that fall wheat of the finest quality could be produced in the latitude of Sault Ste Marie. We think this fact of the greatest importance. There has always been an impression prevalent that the country lying between the Georgian Bay and the head waters of Lake Superior was not as fit for settlement as other parts of Upper Canada. It was thought to lie too far north, have too severe a climate. The same prejudice prevailed against the northern part of the western peninsula It is only a few years ago since it was believed the climate of the counties of Simcoe and Grey were too cold to permit of the lands affording a full return to the Agriculturist. The fine set lements in the townships on the shores of th Nottawasaga bay alone would have caused this prejudice to explode, even without the testimony of the magnificent range of country stretching west to the Saugeen. We fancy there will soon be a similar dis-allusion in reference to the Lakes Huron and Superior County. Certainly there will if this sample of fall wheat is a fair specimen of what can be grown throughout that region. People enquiring for a place of settlement will not be content to take hearsay evidence, and will make personal examination and act on their own judgment.

"It is not upon agriculture alone that this region will depend for its future progress. It has splendid timber, rich fisheries and minerals, the extent and value of which are known to be great, although, from the folly and lack of knowledge of the early explorers, but little has yet been done to make them practically available. It is a well watered country, inviting to the lumberer and the manufacturer, and there are many points along its shores where large and prosperous towns will unquestionably arise. Look, for example, at the position of Sault Ste Marie, situated on the highway which will pass the gigantic traffic of both sides of Lake Superior and of the North West. It has rich minerals within a few miles, abundant water-power easily made available, and a fertile tract of country behind it. Land within a few miles of this place can be had from the Government for 70 cents an acre, and at a greater distance for 20 cents. The demand for agricultural produce is already good.

"Throughout this entire region there are many things to attract the man in search of a new home, and we trust that explorers will be numerous during the coming spring Not only is it of great importance to Canada that this region should be itself opened up; its settlement will have a most important effect in incouraging movements still further to the westward. It is the first stepping stone to the Saskatchewan, Fort William is the second, Fort Garry is the third."

On the Commercial Value of Artificial Manures.

BY DR. AUGUSTUS VOELCKER.

Having in my capacity of consulting chemist to the Royal Agricultural Society, numerous samples of all kinds of artificial manures annually submitted to me for examination and opinion, and having, moreover, made myself practically acquainted with the manufacture of artificial manures, and attentively followed its rise and progress, I believe that I am in a position to say, without hesitation, that the true money value of a manure cannot always be calculated with anything like precision by mere reference to an analysis and certain valuation tables. I feel inclined to go a step further, and maintain that, at the present time, such mere rule-of-three calculations frequently convey wrong impressions of the value of certain manures, and do not further the real interest of the consumer. In proof of this, I may state that, not long ago, I saw a copy of an analysis of a manure, the commercial value of which, estimated according to the usual tables, was given at £11 10s. a ton. It may, perhaps be presumed that this manure is manufactured under peculiarly favorable circumstances; but this is not an exceptionable case, for the calculated value of certain superphosphates rich in soluble phosphate of lime is generally £2 or £3 higher than the price at which they are actually sold. On the other hand, it is no unusual occurrence to meet with really good and cheap fertilizers, which, submitted to ordinary commercial analysis, give apparently unsatisfactory results, inasmuch as their value, when calculated according to any of the approved tables, is set £1 to £2 lower than their true money value. Recent experience has convinced me that the buyer may now justly expect something more in a manure than the mere agreement of its calculated value with the price at which it is actually sold. It

is comparatively speaking, easy to prepare a manure say at £6 a ton, the calculated value of which amounts to the same sum; but such agreement, in my opinion, is no guarantee that the manure is really worth that price. It is well known to all acquainted with the peculiarities of the trade in artificials that many samples which, as the saying is amongst manufacturers, "analyse well," can be produced at a cheaper rate than others which do not analyse so well, but which, nevertheless, show a better result in the field, and possess a higher agricultural and commercial value.

I should much regret if these observations should induce any one to deny the utility of submitting artificial manures to chemical analysis Without a correct analysis, not even an approximate estimate of the value of a manure can be given; it is, therefore, and always will remain, the most important and the most indispensable instrument in conducting such an enquiry; but there are other data likewise to be taken into consideration before the true money value of manures can be determined.

Believing chemical analysis to be of the highest practical utility, and fearing that discredit may be brought upon it by our "Manure Calculators," I am anxious to place in a proper light the ordinary money calculations which are given by most chemists with the analysis of artificial manures.

These calculations in many instances, do not deserve the name of valuations, for instead of indicating what the manure is worth to the consumer, and at what price it can actually be bought in the market, they show an imaginary value, which, in some cases, is much lower, and in others much higher, than the price at which the manure can be supplied. Take, for example, the following numbers which express the

Composition of a Sample of Superphosphate selling at £6 10s. a ton.

Moisture	14.62
*Organic matter and water of combination	9 92
Bi-Phosphate of lime	18 02
(Equal to bone earth rendered soluble, 28 12.)	
Insoluble phosphates	8.46
Sulphate of lime	42.15
Alkaline salts	2.34
Insoluble silicious matter (sand)	4.49
	00.00
* Containing nitrogen	.59
Equal to ammonia	.71

An exceedingly simple method by which the value of artificial manures is calculated is to regard the analysis as representing the composition of 100 tons of manure, and to multiply each constituent by its assumed market price per ton, and then to add up all the products. We thus obtain by calculation the price of 100 tons, and, by dividing this by 100, the assumed value of one ton.

The following list gives the price per ton of each constituent, according to the valuation tables of Professors Way and Anderson, and Mr. Nesbit:

	Way.			Anderson.			Nesbit.		
	£	s.	d.	£	s.	d.	£	s.	d.
Organic matter	1	0	0	0	10	0	1	0	0
Soluble phosphate (*i. e.*) bone earth rendered soluble by acid	33	0	0	30	0	0	21	0	0
Insoluble phosphates	7	0	0	7	0	0	8	0	0
Sulphate of lime	1	0	0	1	0	0	1	0	0
Alkaline salts	1	0	0	1	0	0	1	0	0
Ammonia	56	0	0	60	0	0	60	0	0

Calculated according to Professor Way's table, we obtained the following value for this superphosphate:—

	Value per ton.		£	Total. £
Moisture	14·62 by	—	=	—
*Organic matter	14·62 by	1	=	14·62
Bi-phosphate of lime	18·02		—	—
Equal to bone earth made soluble	(28·12) by	33	=	927·96
Insoluble phosphates	8·46 by	7	=	59·22
Sulphate of lime	42·15 by	1	=	42·15
Alkaline salts	2 34 by	1	=	2·34
Insoluble silicious matter	—			—
	100·00			
*Containing nitrogen	·59			
Equal to ammonia	·71 by	56	=	39·76
Calculated value, £10 16s. per ton				£1086 05

Proceeding in the same manner, the price of the same superphosphate will be £10 according to Dr. Anderson's, and £8 6s. according to Mr. Nesbit's table. Whether we take Professor Way's or Anderson's or Mr. Nesbit's tables, in either case there is a great discrepancy between the actual price at which this article is sold and its calculated value. Similar, and in some cases still greater, differences can be noticed in the calculated and actual value of many samples of superphosphate, especially those made exclusively from coprolites and other mineral phosphates. It evidently appears from these facts that at the time when Professors Way, Anderson, and Nesbit drew up their valuation tables soluble phosphate of lime could not be manufactured so cheaply as at present, and that consequently the price per ton of soluble phosphate now requires to be reduced, especially if Professor Way's or Dr. Anderson's figures are taken as standard values in the calculation, and the manure under consideration is entirely or principally made from mineral phosphates.

* I purposely abstain from giving an amended price for soluble phosphate of lime, for such a price cannot be fixed in a general way and then applied to particular instances.

The fact is, the commercial value of phosphate of lime, like that of many other minerals, depends in some measure on the source from which it is derived, and the nature and the amount of other substances with which it is associated. Thus, soluble phosphates cannot be produced at as low a price when made from bones as from mineral phosphates. Then why not make it in the cheapest possible form? is a question which

naturally suggests its If, but which is answered by the fact that in many instances bones partially dissolved in oil of vitrol produce a better practical result on the turnip crop on light soils than a mixture containing an equivalent amount of soluble phosphate made from coprolites and insoluble bone phosphate.

We thus see that it is not enough that there should be a certain amount of soluble and insoluble phosphate in a turnip manure, but that the very source from which the fertilizer is obtained affects its agricultural as well as its commercial value.

A superphosphate containing say, 15 or 18 per cent. of soluble, 15 per cent. of insoluble phosphate in the shape of bone, and 2½ per cent. of nitrogen can be made much cheaper by producing in the first place the soluble phosphate from coprolites, and mixing the coprolite superphosphate afterwards with bone-dust and a certain quality of shoddy, or a similar nitrogenous refuse material, than by making it entirely from bones. But as superphosphate from bones has a better effect in the field, and costs the maker more money, and thus has a higher commercial value than a manure which on analysis furnishes the same amount of soluble and insoluble phosphate and nitrogen, the constituents of a bone superphosphate, and amongst them a soluble phosphate of lime, must have a higher commercial value in this combination than in mere mixture of dissolved coprolites, bone dust, and a nitrogenous refuse matter.

Again up to 28 or 30 per cent. of soluble phosphate (*i e*, bone earth rendered soluble by acid) may be produced in a superphosphate simply by mixing phosphatic materials with a certain quantity of sulphuric acid; but if a much higher proportion of soluble phosphate is required, recourse must be had to more complicated and expensive chemical processes; and these processes, of course, add to the expense at which the soluble phosphate is obtained in highly concentrated manures, such as Messrs. Burnard, Lack & Co's concentrated superphosphate, which contains no less than 44 per cent. of soluble phosphate.

Notwithstanding the increased expense in producing the soluble phosphate in a higher concentrated superphosphate, it may be good policy and economical to the consumer to prepare such concentrated fertilizers for exportation or for application in localities where the cost of carriage of the diluents in ordinary manures amounts to much more than the extra expenses of the process of preparing the effective constituents in a highly concentrated form.

Since then, in peculiar cases such a concentrated manure has a higher relative value for the consumer than an ordinary sample containing 18 to 22 per cent., and is prepared at greater cost by the manufacturer, it certainly would not be right to estimate the money value of the soluble phosphate in both at the same rate.

Another reason which deters me from attempting to fix a price for soluble phosphate—or, indeed, for any manuring constituent—is, that the price of the same substance in the same form varies continually from a variety of causes.

The commercial price of the raw materials employed in the manufacture of manures, like that of everything else, is dependant upon demand and supply, and regulates itself accordingly. The consumer, in my opinion, has a far better guarantee for a supply of cheap fertilizers in the competition of respectable firms than in the publication of any fallible. because constantly changing, price list. There exists, moreover, the danger that the price lists fixed by chemists of standing are frequently applied by others whenever it suits their purpose long after they have become obsolete. In the interest of the farmer I feel, therefere, bound not to publish an amended price list of fertilizing matters.

(To be Continued.)

Agricultural Intelligence.

Thorndale Short-Horn Blood.

The *Country Gentleman* in his last issue observes in reference to this celebrated stock at a recent sale in England :—

Farther testimony is given in our last foreign mails to the vale of the Thorndale blood. "Another high—and what is better still, a thoroughly honest—average has been added to Short-Horn history," says the *Mark Lane Express* in opening its account of the sale of Mr. Hales' herd at North Frith, Sept 24th. Mr. H. was the purchaser last year, it will be remembered, of the 4 h Duke of Thorn ale," sent to England by Samuel Thorne, Esq, at 400 guineas (say $2,000); and his wisdom in paying such a price has been fully vindicated in the results of his own sale. The 4th Duke it seems, was started at 200 guineas, and ran up rapidly, between the bids of Capt. Gunter and Lord Exeter's agent, until he was finally knocked down to the latter at *four hundred and ten guineas*—in other words, Mr. Hales has had more than a year's use of the bull, and disposes of him now for $50 more than he paid Mr. Thorne in 1861.

There were also sold at the same time several calves sired by "4th Duke,' as follows :—

HEIFER CALVES.

2d Kentish Gwynne,	calved	Feb. 15, 1862,	for 41	guineas
Heiress.	do.	June 4,	64	do.
Perfection.	do	July 19,	35	do.
Concord.	do	Sept. 20,	16	do.

BULL CALVES.

Athelwald,	Calved	May 12, 1862, for....	26	guineas.
Marmion.	do.	July 17.....	155	do.
The Friar.	do.	July 15.....	26	do.
Fastus.	do.	July 23.....	50	do.
Clifford.	do.	Aug. 16.....	30	do.

Here are nine calves, the average age of which the day of sale, according to our computation, was only 2 months 25 days, sold at an average price only a small fraction less than 50 guineas each, or very nearly $250.

There were 22 head of other females sold—including young and old, and all but four of them bred in 1860 or previously—which brought an average price per head of about 56 guineas. One of them, "Moss Rose,," by Marmaduke of Cambridge Rose 6th, going for 245 guineas. Excluding her the average for the other is lower than that for the four young heifers got by "4th Duke." Of the bulls, beside 4th Duke and his five calves, there were four sold at an average of 43 guineas each. But in referring to the prices at which the cows were sold, it should have been remarked that 14 of them had been served by "4th Duke," which would of course have added considerably to the prices they commanded.

Horticultural.

PROCEEDINGS OF THE FRUIT GROWERS' ASSOCIATION of Upper Canada, at the General Meeting held in the Agricultural Hall, corner of Yonge and Queen Streets, Toronto. on Wednesday, Nov. 12th. 1862.

The meeting was called to order by Mr. Vice-President Leslie, the President, Judge Logie, being absent. After the reading of the minutes of the last meeting, the Association proceeded to discuss and determine the varieties of Plum best suited to our climate.

JEFFERSON PLUM.

Mr. Arnold, of Paris Prefer the Jefferson to all others. It ripens about the middle of September, is of good quality, while the tree is hardy and grows well.

Mr. Gray, of Toronto—I do not think it quite as desirable for this locality.

Mr. Geo. Leslie, jr., of Toronto—Is a large, fine Plum, but not so desirable here as the Washington.

Mr. Laing, of Hamilton—I do not find it the best, would prefer many other varieties before it.

Mr. Johnston, of Norval—I do not find it to do well. It did not succeed with Mr. Young of Georgetown In flavour and productiveness is not equal to some others.

Mr. D. W. Beadle, of St. Catherines—It has so far proved to be but a moderate bearer, and the tree a very poor grower, not much better than the Green Gage.

Recommended for further trial.

GREEN GAGE.

Mr. Arnold, Paris—The fruit is too small for market, though of the highest flavor. The tree is a very slow grower, and exceedingly subject to the black knot.

Mr. Gray, Toronto—The tree is a very slow grower and requires very good cultivation, but the first is of the first quality.

Mr. Geo. Leslie, jun, Toronto—It is the worst grower of all the plum trees in cultivation, yet one of the highest flavoured of plums.

Mr. Laing, Hamilton The fruit is of the best quality, tree good bearer, dwarf habit, and requires good cultivation.

Mr Johnston, Norval—is one of the slowest growers and most abundant bearers, but the fruit is too small, and not desirable when we have so many other varieties that are larger and better for market purposes.

Mr. D. W. Beadle, St. Catherines—It must be admitted that in excellence of quality the fruit is unsurpassed, but the tree is a most miserable grower, and unsatisfactory to nurserymen.

Recommended for general cultivation as a dessert plum.

WASHINGTON.

Mr Johnston, Norval—It will not do for this climate, tree too tender and not very abundant bearer.

Mr. Fleming, Toronto - I have seen very good crops about here; the tree thrives well; have fruited it for 25 years and found it quite hardy.

Mr. Bruce, Hamilton—It does well about Hamilton.

Mr. Laing, Hamilton—A very good plum, tree hardy and a great bearer.

Mr Geo. Leslie, jun, Toronto—Is one of the best; a good grower and good bearer, and hardy tree.

Mr Gray, Toronto—Know of none that succeed better in this vicinity

Mr. Arnold, Paris—The tree is perfectly hardy; fruit good, but a very poor bearer.

Mr Geo. Leslie, sen,—One of the best bearers; an excellent market variety; tree perfectly hardy

Mr D. W. Beadle, St. Catharines I have found it to bear immense crops on sandy soil.

Recommended for general cultivation.

SMITH'S ORLEANS.

Mr. Keating, Jordan—Is a very good plum; tree hardy, and a great bearer.

Mr Johnston, Norval—A good bearer, good grower, worthy of cultivation; good for preserving.

Mr. Lea, York—A valuable variety; good bearer.

Mr. Fleming, Toronto—An excellent variety.

Mr. Bruce, Hamilton—It is a general favorite with us.

Mr. Gray, Toronto—Have known it for many years, and have always found it first class.

Mr. Arnold, Paris—Is a good plum, tree a very good bearer, a dessert fruit, not large enough for market.

Mr. Vice P. Leslie, Toronto—Is a medium bearer, but very good fruit, size medium, larger than any of the common blue plums, tree hardy and good grower

Mr. D W. Beadle, St. Catherines—A very desirable variety in quality of fruit and growth and hardihood of tree.

Recommended for general cultivation.

IMPERIAL GAGE.

Mr. Johnston, Norval—Is a good plum, medium quality, size medium, not a sure bearer.

Mr. Fleming, Toronto—A great bearer, not first quality

Mr. Bruce, Hamilton—Bears freely, medium quality, hardy.

Mr Laing, Hamilton—Most prolific bearer, hardy, but fruit of second quality.

Mr Geo. Leslie, jr., Toronto—Is a good bearer, but fruit of poor quality

Mr. Gray, Toronto—It succeeds well here, the tree does not seem to be subject to the Black Knot, fruit of second quality.

Mr. Arnold, Paris—I find it to be of the finest flavour, tree a fair bearer, my soil is rather light.

Mr. Vice P. Leslie, Toronto—Very great bearer, very healthy tree, a fine market fruit, though of only second quality.

Recommended for cultivation, particularly on light soils.

REINE CLAUDE DE BEVARY.

Mr Arnold, Paris—of the very first quality where the season is long enough to ripen the fruit.

Mr. Lang, Hamilton—a very desirable sort.

Mr. Gray, Toronto—A late but very desirable variety, will keep well and improve after being gathered.

Mr. Geo. Leslie, jr.,—A very valuable late plum

Mr. D. W. Beadle, St Catharines—The best late plum.

Recommended for general cultivation.

PRINCES' YELLOW GAGE.

Mr Gray, Toronto—Is a good plum, bears well, medium size, of second quality.

Mr. Arnold, Paris—Medium size, medium bearer and second quality.

Mr. Laing, Hamilton—A fair quality and a good bearer.

Mr. Geo. Leslie, Toronto—It is the least liable to the black knot, size and quality medium.

Mr. Fleming, Toronto Is a second quality plum, but the tree is a good bearer and grows well.

D. W. Beadle, St. Catharines—It seems to flourish finely in the County of Lincoln.

Recommended for general cultivation.

LOMBARD.

Mr. Arnold, Paris—The fruit is of medium size, and not best quality, but will resist the attacks of the Curculio the best of any variety, the tree is very productive.

Mr Bruce, Hamilton—Is a great bearer, free grower and a very valuable sort.

Mr. Johston, Norval—I have a very high opinion of this variety, it is very hardy, very prolific, very free from Black Not and from every other disease. Is the best adapted to Canada of any known variety.

Mr. D. W. Beadle, St.Catharines—While I do not consider the quality of the fruit as fine in flavor as many other sorts, yet I do esteem it the most valuable and desirable for gen cultivation. The tree is remarkably hea and if not perfectly exempt from the Bl Knot is much less subject to it than many so On a sandy soil where the Curculio is m troublesome, this variety never fails to mat a good crop in spite of that insect.

Recommended for general cultivation.

COES GOLDEN DROPS.

Mr.Johnstone,Norval—Is very free from disca late sort, and very desirable on that account, good flavour, juicy.

Mr. Fleming, Toronto—Very valuab should be in every collection

Mr. Gray, Toronto—Very desirable

Mr. Vice P. Leslie of the first class.

Mr. Arnold, Paris—I should call this the b late plum

Recommended for general cultivation.

LAWRENCES FAVORITE.

Mr. Geo. Leslie, jr., Toronto—Very early a of very fine quality, one of the best for tabl tree hardy.

Mr. Gray, Toronto—Fine early dessert fru hardy

Mr. Johnstone, Norval—A very good plu early.

Mr Vice P Leslie, Toronto—Very sweet ar fine, but small size.

Recommended as an early variety.

Mr. Johnstone, of Norval spoke of the Pond Seedling, that he believed it to be one of th best varieties now grown, the largest plu color red or a yellow ground stone small, th flavor very sweet and rich, fruit will keep lon after being plucked, tree a very thrifty growe and requires a good strong soil with high cult vation

This variety not having yet been furnishe in Canada the Society took no action upon i Mr. Johnstone stated that he had resided i Norval only about two years,and that he had ne seen the fruit in Canada but at the place of hi former residence near Rochester.

YELLOW EGG PLUM.

Mr. Vice P. Leslie, Toronto—This is one o the very best for cooking and preserving; tree hardy, good bearers and rapid growers.

Mr. Arnold, Paris—A showy, coarse fruit, fo preserves, tree tender with

W. G. Leslie, jr., Toronto—Good for preserv ing, and market.

Mr. Gray, Toronto—One of the best for cook ing and market; tree hardy.

Mr. Laing, Hamilton—Very handsome an profitable

Mr Bruce, Hamilton—Hardy and valuabl for market.

Mr Fleming, Toronto—Very hardy, good bearer, excellent for preserving.

Mr. Johnston, Norval — Excellent marke variety; hardy tree, fruit coarse.

RECOMMENDED FOR GENERAL CULTIVATION.

The Association then proceeded to the dis

sion of the question, which are the six best eties of Grape for open air culture in Cana- ? Gentlemen were requested to write down names of such as they thought most desir- e, and hand the list to the Secretary.

Mr. Gray, Toronto—Delaware, Concord, Hart- Prolific, Diana, Isabella, Ontario.

Mr. Arnold, Paris—Concord, Diana, Delaware, Rebecca, Ontario, Hartford Prolific.

Mr. G. Leslie, jr, Toronto - Delaware, On- io, Concord, Hartford Prolific, Rebecca, ana.

Mr. J W. Keating, Jordan—Delaware, Re- cca, Concord, Diana, Ontario, Clinton.

Mr Johnston, Norval Delaware, Concord, abella, Dura, Clinton, Ontario.

Mr McNab, Hamilton Rebecca, Sweetwater, laware, Diana, Hartford Prolific, Clinton and milton, supposed to be a seedling of the Isa- lla.

Mr. W. J. Keating, Jordan—Deleware, Sweet- ter, Clinton, Diana, Rebecca and Concord.

Mr Vice P. Lesslie, Toronto—Concord, Dela- re, Diana, Hartford Prolific, Ontario, Isabella.

Mr. D. W Beadle, St Catharines—Said he s not yet prepared to recommend six varie- es, but would name only Concord, Rebecca, elaware and Hartford Prolific, as being from s experience most likely to give satisfaction A conversational discussion then ensued upon e best mode of planting, pruning, training, d cultivating the grape vine in the open air, ring which much valuable information was ited

Upon motion of Mr. J. W. Keating, seconded Mr Fleming, it was unanimously resolved, at Mr Charles Arnold, of Paris, be requested prepare a paper upon the open air culture of e grape, to be read at the next meeting of the sociation.

The Secretary read a letter from Mr. S. B. reeman, of Hamilton, relative to an apple und growing on his father's farm, specimens f which were exhibited. Upon testing the pecimens, they were found to be of excellent uality, and the Association requested the Se- retary to publish a description of the apple, nd give it the name of the Freeman apple, eeming the fruit worthy of more extended rial

Description of the Freeman Apple.—Size mall; color, light yellow, with a bright blush n the sunny side, thickly sprinkled with small usset dots or specks. Calyx closed, set in a hallow finely plaited basin. Stem long and lender, set in a deep cavity. Flesh tender, ine grained, juicy and breaking Flavor a ery pleasant, sprightly, sub-acid. Quality very good," if not "best."

Mr. Fleming produced a branch bearing two pples in such close contiguity that they touch- d each other, the one a Pomme Grise, the other ellow, with a red cheek and wholly free from usset.

The Secretary read a paper from Mr Laing, f Hamilton, which is published below. On notion of Mr Arnold, the thanks of the Society ere presented to Mr. Laing for his interesting paper, with the request that he would allow it to be published in the Transactions of the Association.

On motion of Mr. Laing, seconded by Mr. Keating, the Secretary was requested to communicate to the Board of Agriculture the thanks of the Association for their kindness and liberality in granting them the free use of their Hall for the purposes of the meeting.

Mr. Geo Leslie, of Toronto, exhibited 25 varieties of apple. Mr. Johnston, of Norval, 20 varieties of apple. Mr. Keating, of Jordan, 3 varieties of apple. Mr. McNab, of Hamilton, 4 varieties of grape D. W. Beadle, of St. Catharines, 5 varieties of pear, and among them the Fulton, a very hardy sort, originated in Waine, of good quality, and promising to be very valuable for Canada.

On motion adjourned to the Annual Meeting, to be held in the City of Hamilton on the third Wednesday (the 21st) of January, 1863.

Remarks on the Planting and Culture of Fruit Trees.

Mr. President and Gentlemen.—At the meeting of the Association held in St. Catharines in July last, a remark of importance was made by Dr. Craigie, which was passed over without much notice. At this I was somewhat astonished, as it applied so specially to the most essential points of fruit culture, such as situation, aspect, soils, preparation of soils, planting, pruning and the general management of the orchard. It is a well-known fact that to secure success in anything, right measures must be adopted and the proper means used. It must also be very clear to all, that a knowledge of, and a proper understanding on those points are absolutely necessary. I think I am justified in saying that much ignorance exists on this matter all over the country, therefore the sooner something is brought out to bear fully on it, the better, and it would be a great matter for the benefit of this Association and for the good of the Province if every member would lay before this Board what practical knowledge he may possess, so that it may be enabled to point out to the country a sure and safe course to pursue. I have been connected with Horticultural and Agricultural pursuits for the last 40 years, and have during that period practised professionally in Scotland, England, Ireland and upwards of six years in this country, and I maintain that more failures are caused by ignorance, mismanagement and a misconception of what Dr. Craigie referred to than anything else that I know. Thousands of good healthy young trees are yearly put out into bad situations and unsuitable soils, where they soon die, or linger out a few years of an unprofitable, miserable existence. Every fruit tree has its own peculiar kind of soil such as it likes, and which practical men may know, but many of the agricultural community do not, therefore it becomes the

duty of this association to tell them. With a view to this I shall notice the heads of this subject by a few practical remarks from my own experience and observations.

First, then, as to situation. It should neither be too high nor too low, if too high the trees are exposed to sharp cutting winds, if too low they will be subjected to hard frosts and damp apours, all of which are very injurious. This the nature of the location with judgment must determine. A south and south-east aspect is invariably prefered in the old country, here the south and south west are so.

Abercrombie observes, "An open aspect to the south-east is itself a point of capital importance in laying out a garden or orchard"

Downing says, "It is difficult to give any precise rules as to aspect." "Perhaps," he says, "the very best aspect on the whole is a gentle slope south-west, because in such a position the trees, when in blossom, are sometimes protected from the bad effects of the morning sun after spring frosts." Good shelter should in all cases, if possible, be provided.

Drainage and trenching are the next things in order as preparatory operations. Of whatever nature the soil may be, if the least damp or retentive, drainage is necessary. I may say, whether damp or not, unless on a dry substratum of lime stone The good of drainage is not altogether confined to carrying off the water and drying the land. The circulation of air that continually passes through the ground will be found productive of the most beneficial effects. Let the drains be put in of tiles 2½ or 3 inches, say 20 feet apart, more or less, as circumstances may direct, and from 3 to 4 feet deep according to the nature of the subsoil,—place vertical air tubes made of tile at all the corners and in the straight lines at every 100 yards; the tubes to be inserted into the bottom tiles, and to have wood stops or plugs of sufficient length or height so that they may easily be seen above the ground and used when required. Care must be taken if a plough or cultivator be used not to disturb them. This mode of drainage has a wonderful effect on all kinds of soils, and in no way is it more marked than in ground under fruit cultivation. It may be considered expensive, but if well done will very soon amply pay for the outlay. All orchard grounds must be well trenched either by the plough or spade,—the latter is the best. Then have it properly prepared for the different kinds of trees—a few of which I shall notice, with what I consider their suitable soils. All fruit trees like loams, some of a light nature, others more heavy and strong —soils of a calcareous nature are desirable for all, particularly for stone fruits Stiff clays of all kinds are considered injurious to all trees, and particularly so for fruit, unless thoroughly drained and pulverised and brought into a proper state of fertilization. When so it is most productive, very durable, and will answer well with many of the kinds.

The Apple prefers a rather soft loam, containing a small portion of sand with a due proportion of good, well decomposed, stable yard manure. In such a soil the trees grow very clean, are productive, and flourish long. The fruit attains good size, colour and flavour, and is not subject to disease. It is not necessary that the soil should be very deep, say from 20 to 2 inches, even less in some locations. Depth is more necessary in this country than in the old on account of the long terms of dry weather and hot scorching sun.

The Pear on a stock of its own species requires a deeper and stronger soil than the apple—more rich and mellow. In my own experience I have seen the pear succeed remarkably well in a drained pulverised clay, the trees healthy and productive. The Quince stock thrives best in a rich moist soil, but of course drained. In both cases plenty of good manure is necessary.

The plum answers best in a medium soil, not too heavy or too light. I have known it succeed very well in a compost of light loam, garden soil and road-scrapings.

Cherries delight in rather a sandy soil, but not gravelly—in the latter they will grow for a few years but soon die. The Cherry will thrive in mostly any soil if rich enough and dry.

Of the Peach it may be said that of late years it has been almost a failure, in some places totally so. This season it looks better. I believe that if the ground into which the peach is to be planted, be of a right nature, well sheltered. properly drained, and prepared, the trees cutivated on the dwarf principle, and well attended to during the summer all would yet be well. Unless the soil is in a proper state, and the necessary attention bestowed, the trees will not mature their buds nor ripen their wood sufficiently to stand the frosts. The dwarf system of culture has many advantages; the trees are easily protected, handy to go about, and are so completely under the eye that nothing can escape unnoticed. The Peach may be grown of any shape to suit convenience, either as a dwarf, Pyramid, or Bush not larger than a Gooseberry or Currants, and planted in a similar manner. In this way the snow will do much to protect the trees in winter, and their foliage the stem and branches in Summer. Being near the ground the heat is more congenial than it otherwise could be when they are grown higher up. as they in general are almost like broom-sticks, and if not staked, shaken about by every wind, and the stems exposed to the hot scorching sun, which often proves very injurious. The Peach, the Nectarine and Apricot, all answer in a rich calcareous soil.

As orchards have been grown, the trees are far too high in the stems to admit of cultivation and pasturage under them. Trees a

feet distance apart, branching within two or three feet of the ground, and properly kept under the knife and thumb, would be found preferable, and more profitable, though not not admitting of pasturage or cereal crops.

Planting, or rather transplanting. To secure success, this operation ought to be done with great care, otherwise a failure is sure to be the result. Whether the operation be performed in the spring or fall, have all things in readiness; in case of need, have a prepared planting compost at hand, and the pits all dug. In my early days it was the custom to lay a circular space of from 3 to 5 feet diameter of slate or flag stone under the trees, so as to prevent the roots getting down into the subsoil. At the present time in England, on some occasions, they concrete or flag the vine and fruit tree borders, a very excellent plan where it may be necessary. In ordinary orchard-planting such a mode is not much practised, neither is it requisite if the ground be well drained and the planting properly executed, carefully spreading out all the roots, giving them the right direction which they will naturally retain afterwards, keeping near the surface for the benefit of the heat and moisture; great care ought to be taken in lifting the plants not to injure the roots. Avoid deep planting, have the pits wide enough to receive the roots when extended so that none of them rest on the sides of the pit. Before planting prepare the roots by pruning off all the injured or broken parts, taking care of all the finer fibres; cover the bottom of the pit with the prepared compost, raising it a little in the centre, then carefully spread the roots out on the bedding stuff. If the natural soil be not good, plant and fill up the pits with the composts, otherwise use only a little, carefully working it in with the hand amongst the roots; afterwards fill up or spread out the common earth, pressing it down with the foot. It is a very common practice to have a trough or tub with a puddle made from the drainings of the dung hill ready at hand, in which the roots of the plants are immersed before planting, this is very advisable particularly, if the roots be dry. When the whole is completed, if the plants are standards they ought to be staked, and the ground over the roots mulched with litter from the stable-yard. If planting be done in fall it should be performed as early as the plants will admit of being lifted (as a general rule from the 15th of October until the freezing up of the ground) in order that they may have time to take to the ground, and the roots form spongeoles before the winter sets in.

I cannot conclude this paper without noticing the necessity of a careful selection of ... in varieties suitable for the location and climate. It is also very necessary that the public be induced to deal with respectable nurserymen for their trees, and warned to have on no account or consideration anything to do with the Fruit tree jobbers, or, as they term themselves, *agents* for the sale of Fruit trees. It is not only disappointing, but also a very serious loss when a young orchard comes into bearing to find the fruit almost worthless. Nurseries or nurserymen are not all alike commendable, no more are their trees, but the respectable and those of standing I trust will, and ought for their own interest do what is right. Every purchaser ought to satisfy himself that those from whom he purchases are the duly authorised agents of some responsible and respectable nursery, and make sure in getting good, clean, well-rooted healthy trees, taking care to avoid all prong or carrot-rooted plants, selecting plants of good shape, with well furnished fibrous roots. Such will be found in all well managed nurseries.

GEORGE LAING.

Hamilton, 11th Nov., 1862.

P. S. I may at some future period have something to say on the general management of the orchard, pruning, training, &c.

G. L.

Peterboro' Horticultural Society.

We are glad to learn that this young Society is making steady and healthful progress. The autumnal show (the report of which got for a while mislaid), considering the lateness of the season, was on the whole quite satisfactory; comprising flowers, fruits and vegetables, highly creditable to ther producers.

The flowers were good, especially a new Petunia, *marginata*, exhibited by Mrs. Robert Nicholls, to which the judges awarded the first prize as a "specimen plant." The collections of Asters raised by Sheriff Hall and Mr. Cooney, of Verbenas by Mr. William Hamilton, and of Cock's-combs by Rev. J. W. Beck were much admired; and Captain Rubidge and Mr. Scobell afforded a profusion of cut flowers of considerable merit.

The exhibition of Fruit was very superior to that of last year. Mr. Carver's Peach-plums and Egg plums were especially praised, and Mr. Gilmour's collections of Apples, Pears and Plums deserved and received a large share of notice.

The collections of Vegetables were not so large or so good as heretofore, owing chiefly to the season. Mr. English placed some fine tomatoes upon the table, and a new kind of Savoy Cabbage, the "Fine Waterloo," grown by Mr. Giles, is a great improvement on the older and coarser sorts.

There was a large attendance in the evening when the attraction of music was superadded to the Floral display, two senses being thus simul-

taneously gratified; and such of the remarks of the visitors as reached our ears were calculated to inspire a hope that those who honored the Exhibition with their presence were not dissatisfied with the effort made to please them.

At 9 o'oclock p. m., the President of the Society, the Rev. Vincent Clementi, addressed the visitors. He took occasion, in behalf the Society, to thank the Mayor for the very cordial manner in which he had granted the gratuitous use of the Town Hall for the purpose of the Exhibition; and Mr. Philp and the members of the Peterboro' Band for ther valuable and unrequited services.

He intimated that he should, at the next Annual meeting, recommend that the Horticultural Show be held in future at an earlier date, when flowers, with such fruits and vegetables as are in season, may be exhibited to the greatest advantage; an opportunity for the display of the later products of the garden being afforded by the Agricultural Association whose show takes place early in October.

The Dairy.

Josiah Quincey's Milk Farm.

(Abridged from the Boston Cultivator.)

The estate in question is that of the Quincy family, in the town of Quincy, the venerable head of which has lived so long to enjoy the respect of the community for his valuable public services and the fruits of his labours. The farm is one of the finest in New England, having been in the possession of the family for many generations, and the title obtained from the Indians. The land lies in one body of three hundred acres, as level as that of a western prairie. The drive from the public way to the mansion-house is through long rows of magnificent trees, for a quarter of a mile, most of which were planted by the patriarch who yet lives to admire their proportions, and take delight under their shadows.

The whole estate is devoted almost entirely to the business of the dairy. Some 400 tons of hay are cut upon it, the land having been brought to that degree of productiveness as to yield from two to three tons per acre; and the amount of other crops cut for green fodder is probably much larger. Corn, millet, barley, rape, and other grain and plants are cut green, yielding in some instances an enormous amount to the acre.

The number of cows kept ranges from one hundred to one hundred and thirty. They are all stalled in a large barn, one-half or more on the main floor, facing each other, and the remainder in the basement on either side of the main building—the centre under the main floor being reserved as a manure cellar. the main floor there is the best ventila the large doors at either end being oper most continually, not excepting the wi when it is found to be too warm to keep t closed. Besides this ventilation, there is opening through the lofts, and a large ve lator upon the top of the barn. On the lo story, although the ventilation may not b perfect, it is very thorough, the cows fac the openings on the side of the building. T are bedded with sand, obtained on the est and this is believed to be advantageous many respects. The animals are kept r curried and in good order.

In regard to their feeding and habits, t are kept within doors all of the time, and entirely in their stalls. This is found to the most convenient on an estate enti open, within one enclosure. They are fed times a day, and turned out into a yard joining the barn for three or four hours in forenoon, a shed open to the south protect them from storms. The only exception to door feeding is in the fall, when they are tur out for six weeks, with an attendant to k them from uncut crops. This feeding wi doors, and keeping them shut up so much not believed to be injurious, as cases of s ness among them are rare. Whether or there is such a disease as the pleuro-p monia, this herd has so far entirely escape although it is reported to prevail on an adj ing estate, none of the cows coming in con with their neighbours. With such a dis among so large a herd, sad havoc would be made.

In the morning and at night they are with two quarts of grain or cotton seed n the grain being a mixture of corn, meal, and c the meal being believed to be of two heati character to be eaten alone. Their other three times a day is of green fodder, gene mixed, and alternating from grass, clover, c millet, rape, &c., each being fed with the food at the same time. A meal of salt h given occasionally, and to make the g fodder extend as far as possible through year, early and late crops are raised, and ley is cut green, salted, and laid away narrow watering trough runs before each of cows, covered, and they are at liber drink at all times, a cover of the trough fore each cow being easily raised by her. water is raised by a ram from a brook fifty rods from the barn, and the supply be increased or lessened by faucets at the of the troughs. In winter an infusion of takes the chill from the water, too much tending to lessen the quantity of milk by the cows.

The cows are selected for their mi qualities, without regard to breed. The

early pure natives with an occasional re, the natives and, the Ayrshire being med as the best milkers. They are gener- from Vermont and the upper part of New , and a change is made of from thirty to yearly. No cow is desired under five of age, and she is kept so long as she s to be a good milker, and when she falls five or six quarts a day she is fatted for et, and will bring enough beef to replace with another good milker. There are of the cows who give fifteen quarts a at the present time, eight or ten being the ve. There must necessarily be some are dry, and with calf; these are pastured in sight of the estate, on a peninsula, they are easily secured. There are at from thirty to fifty so pastured. The t number kept is in winter, when there greater number of customers for milk, the yield is nine hundred quarts per day, ing in summer to seven hundred.

mediately upon milking, the milk is put gh a large strainer into cans, and the cans in a large trough with ice; when the heat is driven out of the milk, the cans losed up. They are then taken to a build- evoted to dairy purposes, in which there rge well. The well is twenty-two feet with seven feet of water, quite cool. wells divided, making each part about . A platform containing the cans of bout two hundred quarts each, is low- down so that the top of the can only is the water. Milk has been kept good days in warm weather in this well. But ot designed to keep here long as much is to keep it cool while on hand. The g's milk of each day is kept in this well, with the night's milk supplies the cus- the next day. The consumer has the tion of knowing that the milk cannot o days old before a new supply comes, cannot be true of the mixed dairies up at a distance of fifty or a hundred on the railroads. This milk is supplied omers in this city by two teams, which the farm about two o'clock in the morn- nd which deliver no milk except that ed from this farm. It must be obvious, at there can be little difference in the , the cows having the same feed. In instances where families desire the milk same cow for their children, cans of own are provided, in which the milk is separate from that of any other. Four are required for the carriage of the milk, h day, with one day's rest intervening.

he same apartment with the walls is a the steam heating the water for wash- cans, and in the winter tempering the or the cows. Under the floor of the partment, where are kept the milk carts, is an ice house, which furnishes all that is needed for the dairy. The milk cart horses occupy the rear of the building, and outside, facing the south, is a rack for the drying of the cans. Everything is kept in the best condition, leaving the impression that the milk may be relied upon as a genuine article, free from all foreign substances.

Veterinary Department.

(Conducted by A. Smith, V. S.)

Prevention Better than Cure,

[The following remarks, relating especially to pleuro-pneumonia, especially apply, nevertheless, to small-pox in sheep; and we extract them therefore from Mr. Gamgee's lately published work.*]

The great essential in attempting to mitigate losses amongst stockowners is to study the means of prevention. On this point we have been very deficient in Great Britain, not as regards the epizootic lung disease, but other forms of cattle murrain.

These imported plagues in poorer countries than ours, lead governments to establish *cordons militaires*, to slaughter and bury diseased animals, and to compensate individuals for their loss. The whole country is under careful inspection, and persons are bound to report the appearance of a contagious disease, or submit to the infliction of a severe penalty. Such measures would not find favour here; but are we to fly to the other extreme, to continue from one year's end to the other without perceptible abatement in the mortality amongst our cattle, and not only to manifest the greatest carelessness regarding the presence of contagious disorders, but to favour their spread by permitting frauds of the vilest description?

A farmer goes to the market and buys a lot of lean cattle; shortly after purchase pleuro-pneumonia breaks out, and as the condition of the animals prevents a good price being obtained from the butcher, he sends the whole to the market again, knowing them to be unsound, and either the lot is transferred to another farm, or sold to a number of purchasers. I have been asked, when the disease has broken out among a lot of yearlings whether they should be sold at once or chanced. The law takes no cognizance of such a case, the practice is advocated and carried out by those who, in ordinary transactions, are scrupulously honest, and yet if you probe the matter you cannot but admit that the selling of a lot of lean cattle affected with a

* Our Domestic Animals in Health and Disease. Second division,—Organs of Circulation and Respiration. By John Gamgee, Principal of the New Veterinary College, Edinburgh; Author of "Dairy Stock," "The Veterinarian's Vade-mecum," &c., &c. With numerous illustrations. Edinburgh: Thomas C. Jack, 98, Princess Street. London: Hamilton, Adams, & Co.

spreading malady, though perhaps only in the stage of incubation, is defrauding the purchaser and the nation. Some may find relief under the absurd supposition that diseases are not catching; but if any such individual is cross-questioned it will be found that he would not have sold the cattle had he not believed that the whole were in imminent danger, and that the majority must die.

It is evident that such a practice is totally opposed to the nation's best interests; but in reality the public interest is made up by the sum of private interests involved; and although at first sight the individual threatened with loss thinks he had better clear out his bad stock, he may at his next purchase, be not a whit better off, *from the very practice he has encouraged* and followed out. I have satisfactorily found, in numerous cases, that it is unadviseable to clear out a farm stock, and local means can be adopted to check mortality with the greatest success.

But there is another way in which the owner of diseased animals is permitted to spread contagion. He is allowed to send them by railway, to entrust them to a salesman, and to expose them amongst healthy cattle that are to be transferred to different parts of the country for grazing purposes. Fat or not fat they are exposed without restriction, and any amount of good stock may be contaminated. A dairyman in town has a cow taken seriously ill. A number of hungry fleshers are ready for her at a good sum, but in order to cause keen competition, the poor animal is walked into the public market, and stands with a number like herself amongst store animals. Such a practice is as reckless and horrible, as if a patient with small pox were placed amongst a lot of non-vaccinated people for hours together; and the healthy cows just fresh from the country are especially prone to imbibe a deadly virus.

I am conversant with another evil demanding instant suppression. A cow-dealer may buy a fine lot of healthy cows for the town. They are trucked, and somewhere near their destination a truck, containing diseased animals is attached to the train. I know an instance of a dealer, who, with three large trucks full of fine English cows, had, on reaching Carstairs, to submit to their being placed behind a lot of three suffering from lung disease. Imagine how favourable the breeze and the proximity of those animals to spread contagion! It should be a standing rule that every cattle-truck should be washed thoroughly, and sprinkled with an antiseptic substance, before other cattle are exposed in it. There are animal poisons such as that of epizootic aphtha, which may be found to adhere to places, and spread disease with the greatest certainty.

The home trade in diseased cattle is sufficient to keep up for an indefinite period of time pleuro-pneumonia in a country like our own, but I have specially alluded, in the *Edinburgh Veterinary Review*, to the necessity for legislation to prevent the constant importation of diseased cattle from foreign lands. In the June number for the current year, I state;—Free trade has its disadvantages. The impetus it gave 25 years ago to the cattle trade led to the introduction of much disease on British soil, and unless some influential men will take an interest in this subject and exert themselves for the common good, we shall continue to import disease and lose millions by such importations. In an article on pleuro pneumonia in Holland, which appeared in our last number, and the facts of which were gleaned from a blue book, it is shown how extensively that country is swept by cattle-plague, *whence we chiefly obtain foreign store cattle* for our dairies or for feeding purposes. If our imports of live cattle vary from 30,000 to 60,000 per annum, it is evident that there is a wide field for the contamination of our home stock, and this is facilitated 1stly, By the wants of the country throughout its whole length and breadth; 2ndly, By the totally unchecked trade in diseased animals; 3rdly, By the absence of all proper means to detect and counteract disease. If thousands of men were landed from country infected by yellow fever or other pestilence, and systematically communicated these amongst us, vigorous efforts would soon be made, and effective quarantine enforced for our own protection; but we observe precisely such an occurrence daily affecting our cattle, and as the country is wealthy enough not to be destroyed by it, the loss is tolerated, and no attention paid to the consequences of a most pernicious traffic.

Free trade is surely not incompatible with enlightened inquiry as to the countries which are clear of cattle-plagues, and those that are suffering from them. We need not court a trade *with that part above all others in Europe, which* is overrun with pleuro-pneumonia, and as fat cattle ready to slaughter are needed by us more than lean cattle and cows, which we can breed in such enormous numbers, and better than our neighbours, we do not see why some restriction on the importation of cattle to be exposed amongst healthy stock here, should not be enforced.

Can a Member not be found in Parliament to move in this matter? The subject is worthy of most anxious and careful study. It has been well proved that epizootics, like epidemics appear if permitted to do so, and if they are encouraged by facilitating contagion, &c. It is also easily demonstrated that the United Kingdom is naturally the most healthy portion of Europe, and in which cattle plagues are rarely seen as the result of importation. The diseases which prove so destructive now were known us last century, but trade was not so active, importations were few, and the disorders appeared.

The veterinary profession in this country

not hitherto turned its attention to the great questions which affect our national prosperity, and which are purely veterinary in their nature. We must do more than learn how to physic, blister, and operate; we must study prevention. This is the great field for future workers and for men of science, trained to the investigation of laws governing health and disease.

Veterinary Progress.

The veterinary, if properly educated, would be able to teach the human surgeon much; mutual intercourse would be productive of mutual benefit. It must, moreover, not be forgotten that in the study of physiology, the facilities of experimenting on the brute creation have ever caused human physiologists to engage in the comparative study of animals; and the astonishing fact is that veterinarians have not yet appropriated the stores of learning, which lies interspersed in treatises on the functions of man. There is a very satisfactory explanation of all this, in the fact that observations on the functions of animals and experiments on brutes have only been made and performed with a view to illustrate the physiology of man, and thereby the details of experiments, which were irrelevant in researches so planned, have been lost sight of. Men have generalised boldly, only knowing a limited number of incomplete facts; and it will only be when veterinarians will work seriously at physiology that certain questions, even respecting the functions of man, can be settled. But, though much remains to be done, it is comforting to reflect that Hering, Colin, Chauveau, Gurlt, Hertwig, Ercolani, Vellar and a few others, have done enough to render veterinary physiologists renowned; and they prove that the means in our profession for such study are inexhaustible and unrivalled.

History reveals the tardiness with which medicine in general has progressed, especially as compared with other sciences: it reveals, moreover, that it was only after such men as Galileo, Newton, and Bacon had lived and created an experimental philosophy, and taught us a system of induction of facts to displace conjectural or hypothetical argument, that all sciences of experiment and observation followed the right path of progress and extension.

We have expressed a belief, which it will not be out of place to reiterate, that it is possible, by increase in learning, to raise our profession in public esteem, by enabling, through a proper system of education, its individual members to confer upon the community a larger share of substantial advantage than has hitherto been practicable, and by enabling them to hold a higher intellectual standing. We fancy we hear an indiscreet section of practical men depreciate this proposition of increased intellectual culture, and scoff at the statement that practical utility can be enhanced in proportion with engagement in appropriate studious pursuits. But the epoch we live in is singularly prolific in facts and arguments to confute these absurd and impotent sneers, which would never have had utterance had their authors possessed the will and ability to attain meritorious distinction. Reflect an instant on the heroes whose noble blood this terrible war has spilt. All that carnage the superficial observer may attribute to the aroused passions of impetuous warriors—to the strong sinew of their herculean arms; but these are agents, secondary to the intellectual workings which, through a long course of training, and the application of the highest branches of science, have been made to influence the movements of each individual soldier to rule the course of each bullet. Even murderous warfare is successful in direct proportion as its operations are guided by well-trained minds.

The first step now is to thoroughly educate the youthful veterinarian, and afford him every facility for acquiring knowledge—to effect which object a strict observance of the rules for the regulation of the Veterinary College is necessary.—*The Field.*

Miscellaneous.

The Dainties of our Ancestors.

Taste, indeed, was more capricious than refined, and the epicure exulting over strong flavours included cetacea among his Friday fare. The whale was eaten by the Saxons; and when men were lucky enough to get it, it appeared at table late in the fifteenth century. In 1246 Henry III. directed the sheriffs of London to purchase one hundred pieces of whale for his table. Whales found on the coast were the perquisites of royalty; they were cut up and sent to the king's kitchen carts. Edward II. gave a reward of twenty shillings to three mariners who had caught a whale near London bridge. Those found on the banks of the Thames were claimed by the Lord Mayor, and added to the civic feast. Pieces of whale were often purchased in the thirteenth century for the table of the Countess of Leicester. England was supplied with this choice dainty by the fishermen of Normandy, who made it an important article of commerce. The Normans had various ways of cooking it; sometimes it was roasted, and brought to the table on a spit; but the usual way is to boil it, and serve it up with peas; epicures looked out for a slice from the tongue or the tail. The grampus, or sea-wolf, was also highly esteemed; but of all the blubber-dainties the porpoise was deemed the most savoury. The Saxons called it sea-swine, and the ecclesiastics of the middle ages *porco marino*. Porpoises were purchased for the table of Henry

III. in 1246; and Bishop Swinfield, in the same century, dined off it whenever he had an opportunity; it was served up at a sumptuous entertainment given to Richard II. at Durham House and at the grand installation of Archbishop Neville, in 1846, four porpoises were on the table. In 1491 the bailiffs of Yarmouth sent a fine porpoise as a present to Lord Oxford, whose favour they were anxious to propitiate, and accompanied it with the message that if they had any other "deyntes to do him a pleasir," they would have sent them also. The worthy bailiffs could find no more savoury present in all the fish-markets in Yarmouth. At the marriage of Henry V, the guests were treated with "roastid perpes," a dish fashionable in the fifteenth century. We find it again at the first course at the coronation of Henry VII. The king was probably fond of this dish, for it was served up at his table on the feast-day of St. George, and my lord cardinal courted his Majesty's favour by sending a fine porpoise to the palace. The cooks not only roasted and boiled it, but made it into pies and pasties; and a learned "Maister Coke" gives a receipt for a delicious "puddying of purpasse," whilst another tells us how to serve it up in fermenty; the wheat was to be seethed in milk, in which finely chopped almonds had been boiled to thicken it; the porpoise was to be dished up smothered in this delicate sauce, which was also coloured with saffron. A poet in 1452 gives directions how to carve "salte porpyesse and seele." In the "Boke of Kerving," mustard is recommended as the best sauce for porpoise, which was to be carved after the manner of venison; and the proper term to employ in asking the carver to help the guests, was to bid him "undertraunche that purpos." This coarse animal was esteemed as food until late in the sixteenth century; it was often on the table of Henry the VIII; and Wolsey, Somerset, and other lords of the Star Chamber, having in 1509 a snug little official dinner together, feasted sumptuously off a porpoise which cost eight shillings. Even Queen Elizabeth, who was rather choice in her appetite, had porpoise among her Friday diet; and it was sold as food in the market of Newcastle, as late as 1575, from which time it appears to have fallen into disrepute.—*Our English Homes.*

THE DISCOVERIES OF GRAVITATION.—We may further mention that Sir Isaac Newton largely availed himself of Herrox's suggestions to explain the general principles of perturbation, as laid down in the 66th proposition in the first book of the *Principia.* These improvements are so substantial that there is no difficulty in ascertaining the author to whom they are to be assigned. They stand out as a landmark in the history of the science. Taken in connexion with his comments upon the subject of planetory motion, they prove that Horrox holds a prominent position amongst those who have succeeded in developing that great principle by which creation is held together. Few men are permitted to originate, to confirm, and to promulgate a great discovery. This is usually the work of successive generations. Each master spirit pushes the enterprise a step further; and hence it is often difficult to decide who is fairly entitled to the credit. The final elucidation may be the result of an accumulated experience. The ground is first broken up, then the seed is sown the tender plants is trained, and it grows and thrives, until some one more fortunate than the rest gathers the fruit. So it was with the principle of gravitation, the discovery of which cannot be wholly attributable to one man. It was no doubt, reserved for the transcendant genius of Newton fully to define and to apply it; but the existence of such a power was known to others who came before him; and their ideas respecting it formed part of the data fromwhich he drew his sublime conclusions. Thus Kepler had considerable knowledge of the subject, and many of his conjectnres have been substantiated. Dr. Gilbert published similar doctrines in this country, and gave them a more extended application. But Horrox, by his explanation of the perturbative influence of the sun, and by his illustration of celestial and projectile motion, unfolded the theory more completely than any of his predecessors. He seems to have perfectly understood the identity and universality of this unseen power; for he often tells us that the planets in their orbits are affected by it in the same manner as bodies upon the surface of the earth. His accurate views were at length adopted by Newton, and made the foundation of his philosophy—*Memoir of Jeremiah Horrox*

GREEN, OR ARSENICAL PAPER HANGINGS.—Doctor George Selwyn Morris, of Guisbro', writes, as follows, to the *Leeds Mercury*: "Now that the season is approaching when many persons paper and re-paper their rooms may I be allowed to advise that they should never use green paper, on account of the great quantity of *arsenic* which it contains? From experience, as well as from what I have proved by testing green paper, I am convinced of its pernicious effect upon the system of *some people.* For more than four months my own children were suffering from irritable stomach, irritation of the bowels, loss of appetite, and a deadly paleness of countenance. I was dosing, and doubly dosing, and yet could not conceive the reason why they did not recover, the place being healthy, and the water good which they drank. At last it struck me that the green paper in the room in which they slept had something to do with it. I went up stairs and pulled down all the green paper, and from that day they have never required a single dose of medicine, and now, instead of pale faces, they have rosy cheeks."

LABELS.—A cheap and durable label is a great desideratum. There are some good patent labels, but their cost prevents their general use; besides this, many of them must be purchased with the name already on them. If these points are no objection, Bliss' labels possess the other requisites to a considerable degree. A zinc label, written on with prepared ink, is both good and durable. It will last for many years when the ink is good. But the cheapest and most durable label of all is thin sheet lead; it will last an indefinite length of time. It is cut into narrow strips, about three inches long, stamped with a steel die, and rolled around a small branch of the tree to be labeled.. It is most convenient to use figures and a memorandum book, in which the names are put down opposite the figures. A wooden label well painted, and written upon while the paint is fresh, will last a considerable time; so also a wooden label, if *wetted*, may be written upon with Dunn's pencil, and relied upon for two years at least; but wood in any form cannot be regarded as a durable material.—*Horticultur*

DRY FOOD FOR HOGS.—A correspondent of the *Country Gentleman* says: "Many hogs are kept comparatively poor by the high dilution of their food. They take in so much water that there is not room for a good supply of nutriment. Hence the reason that those farmers who carefully feed *undiluted* sour milk to their hogs have so much finer animals than those who give them *slop*. The hog has not room for much water; and if food which contains much is fed to him, it makes him big-bellied, but poor." Hogs, as well as all other animals should be allowed all the water they wil drink, but it should not be mixed with their food in excessive quantity.

THE

JOURNAL OF THE BOARD OF ARTS AND MANUFACTURES,

FOR UPPER CANADA,

Is Published on the first of every Month,

AT $1 per annum for single copies, or to clubs of ten or more at 75 cents. per copy; to members of Mechanics' Institutes, and of Literary, Scientific, and Agricultural Societies, through their Secretary or other officer, 50 cents per annum per copy.

Subscriptions payable in advance.

Printed for the Board of Arts and Manufactures for Upper Canada, by W. C. CHEWETT & Co., King Street East, Toronto.

Contents of this Number.

The Agriculturist,

OR JOURNAL AND TRANSACTIONS OF THE BOARD OF AGRICULTURE OF UPPER CANADA,

IS published in Toronto on the 1st and 16th of each month.

Subscription—Half a dollar per annum. Single copies; Eleven copies for Five Dollars, Twenty-two copies for Ten Dollars, &c.

Editors—Professor Buckland, of University College, Toronto, and Hugh C. Thomson, Secretary of the Board of Agriculture, Toronto, to whom all orders and remittances are to be addressed.

Printed at the "Guardian" Steam Press, 65 Street East, Toronto.