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AGRICULTURAL JOURNAL,

AND

TRANSACTIONS

OF THE

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We willingly give insertion to the prospectus of a work published in New York, by Leonard Scott & Co., entitled "The Farmers Guide to the Science and Practice of Agriculture," by Henry Stephens, F. R. S. E., author of the "Book of the Farm," assisted by John P. Norton, M. A., Professor of Scientific Agriculture at Yale College, New Haven. We have received the first four numbers of this work, and they are all that could be expected from gentlemen who are so well known to reading Agriculturists. We have seen Mr. Stephens' "Book of the Farm," and we have looked upon it as one of the best works on Agriculture that we are acquainted with. We can safely recommend "The Farmers Guide" to Agriculturists, as one of the best and most useful works they can purchase, so far as we can judge of the numbers published, and we have no doubt whatever that the forthcoming numbers will be fully equal to those we have seen, and that the highest character we could give of the work will be sustained to the end of the publication. We give the following extracts from the work.

But a *book* might be made an efficient assistant-monitor. If expressly written for the purpose, it might not only corroborate what the farmer inculcated, but serve as a substitute in his temporary absence. In this way the tuition of the pupil might proceed uninterruptedly. The usual deprecations against the acquirement of practical farming from books, would not apply to such a one. I would give no such counsel to any pupil. Books on farming, to be really serviceable to the learner, ought not to constitute his sole study: the field being the best place for perceiving the fitness of labour to the purposes it is designed to attain, the book should only present itself as a monitor for indicating the best modes of farming, and showing the way of learning those modes most easily. *By it the practice of experienced farmers might be communicated to the pupil. By consulting that which had been purposely written for his guidance, while carefully observing the import of daily operations,—which are often intricate, always protracted over considerable portions of time, and necessarily separated from each other,—he would acquire that import in a much shorter time than if left to be discovered by his own sagacity.*

Such a book would be useful to every class of pupils—to him who, having finished his scholastic and academical education, directs his attention, for the first time, to the acquirement of practical farming, or who, though born on a farm, having spent the greater part of his life at school, determines, at length, on following his father's profession. For the latter class of pupils, tuition in farming, and information from books, are as requisite as for the former. Those, on the other hand, who have constantly resided on a farm from infancy, can never be said to have been pupils, as, by the time they are fit to act for themselves, they are proficients in farming. Having myself, for a time, been placed precisely in the position of the first description of pupils, I can bear sincere testimony to the truth of the difficulties to be encountered in the first year of pupilage. I felt that a guide-book would have been an invaluable monitor to me, but none such existed at the time. No doubt the farmer ought to possess the ability to instruct every pupil he receives under his charge. This is his bounden duty, which, if rightly performed, no guide-book would be required; but very few farmers undertake the onerous task of instruction. Practical farming they leave the pupils to acquire for themselves in the fields—theoretical knowledge, very few, if any, are competent to impart. The pupils, being thus very much left to their own industry, can scarcely avoid being beset with difficulties, and losing much time. It must be acknowledged,

however, that the practice gained by slow experience is, in the end, the most valuable and enduring. Still a book expressly written to suit the circumstances of his case, might be a valuable instructor to the pupil, in imparting sound professional information.

Such a book, to be a useful instructor and correct guide, should, in my estimation, possess these qualifications. Its principal matter should consist of a clear narrative of all the labours of the farm as they occur in succession, including the reasons why each piece of work is undertaken. While the principal operations are thus being narrated, the precise method of executing every kind of work, whether manual or implemental, should be minutely described. Such a narrative will show the pupil, that farming is really a systematic business, having a definite object in view, and possessing the means of attaining it; and the reasons for performing every piece of work in one way, rather than another, will convince him that it is an art founded on rational and known principles. By the perusal of such a narrative, with its reasons having a common object, it will impart a more comprehensive and clear view of the management of a farm in a given time, than he could acquire by himself by witnessing ever so many isolated operations. The influence of the seasons on all the labours of the field is another consideration which should be attended to in such a book. In preparing the ground, and during the growth of the crops, the labour appropriated to each kind of crop terminates for a time, and is not resumed until a fit season arrives. These periodical cessations from labour form natural epochs in the progress of the crops towards maturity, and afford convenient opportunities for performing the work peculiarly adapted to each epoch; and, since every operation must conform with its season, these epochs correspond exactly with the *natural* seasons of the year. I say with the *natural* seasons, in contradistinction to the common annual seasons, which are entirely conventional. Such a necessary and opportune agreement between labour and the natural seasons, induces a corresponding division of labour into *four* great *seasons*, bearing the same names as the annual seasons. Each operation should therefore be described with particular reference to its appropriate season.

If, by a course of tuition from such a book, the pupil could be brought to anticipate results whilst watching the progress of passing operations, his pupilage might be shortened by one year; that is, could a *book* enable him to acquire the experience of the second year in the course of the first, a year of probationary trial would be saved him, and he would then learn in two years what at present requires three; and it shall be my endeavour to make *The Farmer's Guide* accomplish this.

Ploughman.—The duties of a ploughman are clearly defined. The principal duty is to take charge of a pair of horses, and work them at every kind of labour for which horses are employed on a farm. Horse labour on a farm is various. It is connected with the plough, the cart, the sowing-machines, the roller, and the thrashing-mill, when horse-power is employed. In the fulfilment of his duties, the ploughman has a long day's work to perform; for, besides expending the appointed hours in the fields with the horses, he must groom them before he goes to the field in the morning, and after he returns from it in the evening, as well as attend to them at mid-day. Notwithstanding this constant toil, he must do his work with alacrity and good-will; and when, from any cause, his horses are laid idle, he must not only groom them, but must himself work at any farm-work he is desired. There is seldom any exaction of labour from the ploughman beyond the usual daily hours of work, these occupying at least 12 hours a-day for 7 months of the year, which is sufficient work for any man's strength to endure. But occasions do arise which justify a greater sacrifice of his time, such as seed-time, hay-time, and harvest. For such encroachments upon his time at one season, many opportunities occur of repaying him with indulgence at another, such as a cessation from labour in bad weather. It is the duty of the ploughman to work his horses with discernment and good temper, not only for the sake of the horses, but of the work he executes. It is also his duty to keep his horses comfortably clean. Ploughmen are never placed in situations of trust; and having no responsibility beyond the care of their horses, there is no class of servants more independent. There should no partiality be shown by the master or steward to one ploughman over another, when all do their work alike well. An invidious and reprehensible practice exists, however, in some parts of the country, of setting ploughmen to work in an order of precedency, and which is maintained so strictly as to cause the men to go and return from work in the same order, one being appointed *foreman* or leader, whose movements guide those of the rest. Should the foreman prove a slow man, the rest must not go a single bout more than he does; and if active, they may follow as best they can. Thus whilst his activity confers no superiority of work beyond his own, his dulness discourages the activity of the other ploughmen. This is sufficient ground for farmers to abolish the practice at once, and place the whole of their ploughmen on the same footing. I soon felt the evils attending the system, and put an end to it on my own farm. When one ploughman displays more skill than the rest, he is sufficiently honoured by being intrusted to execute the most difficult species of work, such as drilling; and such a preference gives no um-

brage to the others, because they are as conscious of his superiority in work as the farmer himself. The services of ploughmen are required on all sorts of arable farms, from the carse-farm to the pastoral, on which the greatest and the least extent of arable land is cultivated.

Dairy-Maid.—The duties of the dairy-maid are well defined. She is a domestic servant, domiciliated in the farm-house. Her principal duty is, as her name implies, to milk the cows, to manage the milk in all its stages, bring up the calves, and make into butter and cheese the milk obtained from the cows after the weaning of the calves. The other domestics generally assist her in milking the cows and feeding the calves, when there is a large number of both. Should any lambs lose their mothers, the dairy-maid brings them up with cow's milk until the time of weaning, when they are returned to the flock. At the lambing season, should any of the ewes be scant of milk, the shepherd has his bottles replenished by the dairy-maid with warm new milk to give to the hungered lambs. The dairy-maid also milks the ewes after the weaning of the lambs, and makes cheese of the ewe-milk. She attends to the poultry, feeds them, sets the brooders, gathers the eggs daily, takes charge of the broods until able to provide for themselves, and sees them safely lodged in their respective apartments every evening and, sets them abroad every morning. It is generally the dairy-maid, where there is no housekeeper, who gives out the food for the reapers, and takes charge of their articles of bedding. The dairy-maid should therefore be an active, attentive, intelligent, and skilful person.

On the Branches of Science most Applicable to Agriculture

I believe I have said enough on the best means, in existing circumstances, of acquiring a thorough knowledge of practical agriculture, it is now incumbent on me to indicate those branches of science which will most enlighten the mind of the pupil for the most ready appreciation of agricultural practice; and I may, perhaps, excite general surprise, when I state that no art bears so close a relation to so many branches of science as agriculture.

Indeed agriculture may perhaps be considered one of the experimental sciences, as its principles are no doubt demonstrable by the test of experiment, although farmers have not yet attempted to deduce principles from practice. The necessity for such a deduction is, no doubt, the less urgent, that husbandry is usually pursued as a purely practical art; and the facility of thus pursuing it successfully of course renders practical men indifferent to science, as they consider it unnecessary to burden their minds with scientific results, whilst practice is sufficient for their purpose. Could the man of practice, however supply the man of science with a series of accurate observations on the leading operations of the farm, the principles of these might be truly evolved; but I conceive the greatest obstacle to the advancement of scientific agriculture is to be sought for in the unacquaintance of men of science with practical agriculture. Would the man of science become acquainted with practice, much greater advancement in scientific agriculture might be expected than if the practical man were to become a man of science! because men of science are best capable of conducting scientific research, and, being so qualified, could best understand the relation which their investigations bear to practice; and, until the relation betwixt principles and practice is well understood, scientific investigation, though important in itself, and interesting in its results, would tend to no practical utility in agriculture. In short, until the facts of husbandry are acquired by men of science, these will in vain endeavour to construct a satisfactory theory of agriculture on the principles of the inductive philosophy.

If the science of agriculture in its present position be thus correctly represented, it may be expected to remain in an incipient state until men of science become practical agriculturists, or, what would still prolong such a state of lethargy, until farmers acquire scientific knowledge. It is certainly remarkable that so few scientific men were for a very long period induced to subject agricultural practice to scientific investigation; though of late many, both at home and abroad, have devoted a portion of their time to such a study, and which has already afforded abundant proof, that extensive as the field of research is, it has only to be occupied by numerous observers to produce results interesting alike to the man of science and the man of practice. The long neglect of agriculture by scientific men may perhaps have arisen from the circumstance of its having so intimate a relation to almost every physical science, so that until all its relations were first investigated, no sufficient data could be obtained for a satisfactory explanation of its practice. A short review of the actual relation which the physical sciences bear to agriculture will render this suggestion the more probable.

The sciences which agriculture most immediately affects are mathematics, natural philosophy, chemistry, natural history, comparative anatomy, and veterinary science. Of mathematics, the most useful parts are geometry and trigonometry, and the application of these to the measurement of surfaces and solids. Without a knowledge of mathematics no one can understand natural philosophy; because it is they alone which can demonstrate the powers of those laws which determine the motion of matter. Of natural philosophy, the most useful branches to the agriculturalist are *mechanics*—

"the science of the laws of matter and motion, so far as it is accessary to the construction of machines which, acting under those laws, answer some purposes in the business of life," such as the culture and manufacture of crops; *pneumatics*, "that branch of physics which treats of air, and the laws according to which it is condensed, rarefied, or gravitates;" *hydraulics*, that branch of hydrodynamics which treats of fluids in motion, and in particular of the conveyance of water through pipes and channels; *electricity*, which endeavours to determine "the operations of a principle of very wide influence through nature;" a cause which is, and perhaps can be no otherwise conceived, than as a highly attenuated form of matter existing in different substances, and passing from one to another, with various effects, among such bodies as can be excited to give or to receive it," *optics*, by which the laws of light, as affecting vegetation by the influence of colour, are investigated; and *heat*, which by diffusing itself through neighbouring substances, gives to every object its existing form. By the aid of chemistry, "the manufacture of manures may be expected to continue to improve the supply of manure further augmented and cheapened, and the devolopment of the resources of the soil thereby hastened and increased." Of the branches of natural history, the most useful to agriculturists are," *meteorology*, the science of the atmosphere and its phenomena;" *botany*, "which treats of the structure, functions, properties, habits, and arrangement of plants;" and *zoology*, as restricted to the natural history of quadrupeds and insects. The branches of the medical science useful to agriculturalists are *comparative anatomy*, which treats of the structure of the bodies of animals as compared with that of the body of man; and *zootomy* which treats of the structure and explains the principles of the art of healing the diseases of the domesticated animals.

Viewing the general aspect of these sciences as presented to the agricultural pupil, in the definitions just given of them, he must at once observe the advantages he would derive by studying them. It is well observed by Sir John Herschell that, "between the physical sciences and the arts of life there subsists a constant mutual interchange of good offices, and no considerable progress can be made in the one, without of necessity giving rise to corresponding steps in the other. On the one hand, every art is in some measure, and many entirely, dependent on those very powers and qualities of the material world which it is the object of physical inquiry to investigate and explain." It is evident that most farming operations are much affected by external influences. The state of the weather, for example, regulates every field operation, local influences modify the climate very materially, and the nature of the soil generally determines the kind of crop that should be cultivated. Now the pupil should desire to become acquainted with the causes which give rise to those influences, by understanding the laws of nature which govern every natural phenomenon. The science which investigates those laws, is called *Natural Philosophy*, which is divided into as many branches as there are classes of phenomena occurring in the earth, air, water, and heavens. Those who being unerring in their operation, admit of absolute demonstration; and the science which affords the demonstration is called *Mathematics*. Again, every object, animate or inanimate, possesses an individual character, so that it can be identified, and the science which makes us acquainted with its characteristics, is termed *Natural History*. Farther, every object, animate or inanimate, is a compound body made up of certain elements, of which *Chemistry* makes us acquainted with their nature and combinations. The pupil thus sees how suitable those sciences are to the explication of the phenomena around him, and their utility will be the more apparent to him, the more minutely each science is investigated.

THE HONEY-BEE

The honey-bee belongs to the genus Apis, and is also the only one of that family that is gregarious with us throughout the year. Its history and economy have been studied in all ages; and though an exotic to us, it is met with in almost all climates, both in a wild and domestic state. When it was introduced into this country has not been ascertained. It is not indigenous, and this may account for its being less hardy than the humble bee, and not so lively an insect as the wasp. It is frequently at home, while they are busily employed abroad, both early and late. A complete colony of bees consists of three kinds—queens, drones, and workers; but strictly speaking, of only two; that last being only females in an undeveloped state. Their number in a strong colony amounts to many thousands; they are of a light brown colour, but become darker with age, and have dull tarnished wings. On their hinder legs they have strong curved hairs for holding the pollen or dust, which they collect from the anthers of flowers. Their usual term of life seems to be about a season, or six months; their places are quickly filled up by the increase of young bees; which are of a light colour when first hatched. These vary a little in size, which may be caused by the irregular size of the cells in which they are bred; which is observable in the case of small drones which happen to be reared in workers' cells. This difference in size has led some of our leading writers to consider that there are different sorts of bees for various occupations; but we maintain with Golding, that working bees are "ser-

vants of all work," and that all of them are "equal to all occupations."

The drones, or male bees, have been abused by almost all writers; but without their presence at the usual season, in May, and June, a colony would soon be useless. They have no sting, are very harmless, appear to number from 100 to 200 in a hive; they are thicker than the workers, but of similar colour, and shorter than queens. As they never visit flowers they require no strong hairs on the hinder legs to hold pollen, and accordingly are not furnished with them. They take no part in the construction of the cells, nor seem to take any interest in the hive; they seldom leave it except in the middle of warm days, and make a buzzing noise readily distinguished from the hum of the workers. Nothing satisfactory is known of their real use and character, except that they concur with the queens in the increase of their species; but when, or how is uncertain. Most apiarians, following Hubers' opinion that they meet in the open air, complain of their number as superfluous; but it should be known, that the males in hive are few when compared with the workers, who in reality, are barren females, and also that they come at the time of plenty, when their number tends to keep up the requisite heat in the hive, by which more collecting bees can be spared abroad. As the season draws to a close, they are all destroyed by the bees. Some writers recommend assisting the bees in the slaughter, but that seems needless; for their hatred is raised to such a pitch, that it extends even to the larvæ in the drones' cells, which are afterwards usually filled with honey. It sometimes happens that the drones are spared. In such cases, it is supposed that some misfortune has befallen the queen bee, and that their presence is wanted till another is bred. And it also happens, though rarely, that drones are hatched late in the Autumn. This agrees with what we are told respecting bees in hot countries repeatedly swarming during the year; but evidence cannot be obtained with us concerning the time that elapses between the swarming period. Neither is the precise age of the drone bee known; we have seen them, however, alive at the end of November.

The queen or head bees are readily known from the workers or drones, by the greater length of their bodies, which make their wings appear shorter. They vary a little in size, according to the cells in which they happen to be bred, some being scarcely larger than common bees. They are of a similar colour, and their sting, which we never knew them to use, even though provoked, is bent. Unlike other bees, they live several years, and what is more remarkable, seem to increase in size with age, a thing at variance with the rule that insects complete their growth in the nymph state. Much has been said in praise of the queen bee, but she is less active than the workers, and is helpless without them. They certainly are greatly attached to her; still they do not pay her all the homage which some imagine. She is seldom seen abroad, her sole occupation appearing to be depositing eggs.

Of Wax and Comb-making.—Though some in our day pretend to have revealed the mystery of comb-making, we may, with safety, say, that of the manner in which bees build their combs, we know but little beyond this—that they are of wax, which exudes like a sort of perspiration, in small scales, through the segments or rings underneath their bodies, as they cluster together to cause heat. Some of the flakes may be seen upon the floor of a common hive, that have fallen from the bees when they commenced comb-building. They begin one comb at the top of their hive; and it may contain both a little honey and some eggs on the second day, when only about the size of an oyster shell then another is begun, and so on, the centre ones always being in advance, until the whole number reaches within about half an inch of of the floor; space enough to allow free egress from the combs. A common hive may contain seven or eight divisions of combs, generally arranged in parallel lines, north and south, which a strong colony, in good weather, will construct in a fortnight. During the process, in glass hives, some of the bees may be seen having scales of wax oozing out from their bodies; other are busily employed in masticating these scales, and forming cells with their strong mandibles or jaws, surrounded by other bees clinging together in every way. Much has been said in praise of these cells, but in reality they cannot be compared with the hexagonal cells. In fact, they are more like those of humble bees inverted. We know of no writer who has noticed that bees can also eject wax from their stomachs or mouths; a thing easily observed when they are at work without clustering, in a bell glass, on the top of a strong colony. It is more questionable how they come by the wax, which differs but little from that obtained from plants. The fact, that bees frequent young shoots, and the underside of the leaves of plants abounding with wax, especially common laurel, when comb-building, led us to think that they previously collected and refined it by the curious process already noticed. But Bevan, and others of good authority, adopt Hunter's opinion, that wax is an excretion of oil, produced solely by the bees; though the manner in which it is produced seems beyond the "ken of Faraday or Leibig."

Besides the wax above noticed, bees make use of another substance, of a resinous and glutinous nature, called *propolis*. With this they lay the foundation, varnish their cells, and stop up all little crevices. During hot weather,

they collect much of this substance from the buds of trees, and carry it home on their hinder legs, as they do pollen. And though the fact is known to every school-boy, still naturalists have not clearly shown how the little balls accumulate. When bees are collecting pollen, especially on bell or pea flowers, they use their fore feet, which are hairy, as a brush, to convey the farina into the basket on the hinder legs already noticed. While this is going on they frequently mix it, with a little honey from their trunks, it order to make the powder adhere to the surrounding hairs, which are like eye-lashes. Their form gives shape to the substance which varies in colour, according to the flowers they frequent. It is surprising with what accuracy the balls are formed of equal size; if they were otherwise, they would, of course, hinder the flight of the bee, by their unequal balance. One must be a patient and close observer to notice this, or he may be induced to take for granted what a writer in the *Quarterly Review*, vol. 71, states on this subject: "when bees collect *pollen*, they will at times, roll and revel in a flower, like a donkey in a dusty road." It is true that bees are dusted or powdered whilst among flowers; but they collect no powder to store up, except what is on their legs. After depositing the little balls by merely placing their legs in the cells, and quickly brushing off the pollen into them with their fore feet, they issue forth again almost as dusty as when they entered the hive. What happens to fall from them tends to darken the combs, and soon makes them look old. The anxiety of bees to collect pollen is as great as their desire of honey, the one being as essential to the prosperity of the colony as the other. We doubt the assertion, that they lay up more than they want, and that "its decomposition becomes to them a sore trouble and annoyance." Bees are good chemists, and know how to preserve it with honey, as proper food for their young The young bees are bred from eggs. The queen bee lays all her eggs in a colony, however weak or strong it may be. The proper cells for their reception are, in general, in the heart of the hive; consequently, it is not easy to see her thus engaged. She deposits one egg, or rarely two, at the bottom of the cell; and the combs being placed perpendicularly, the eggs, of course, rest in an horizontal position, and not on one side of the cell, like the eggs of wasps. When thus employed, she is not attended by a host of bees paying her homage, as some imagine. In fact, those that happen to be near her, seem to take no more notice of her than they do of their neighbours.

Many thousands of eggs are laid early in Spring, long ere the queens of the wild bees have left their solitary hiding places in the ground; and about the time that they appear, about the first of March, or middle of April, the queen of the hive bees is surrounded by a numerous progeny, and has begun to lay drones' eggs, and in a few days later will deposit those for queens.

The eggs are hatched in about four days, by the warmth in the hive, from the bees on the combs. At first, the grubs lie in a curved position, at the bottom of the cells. As they advance in growth, they lie horizontally, with their heads towards the entrance, and are fed by the bees with pollen, probably mixed with honey, and adapted to the age of the grubs. After six or seven days, the larvæ close the openings of the cells by spinning a sort of web over them. More protection than this is not required, except a coating of wax, which the bees give the web or mouth of the cells, in order to stand against the traffic in the hive. When the larvæ of bees are thus entombed, they are at first soft and milky, and thus continue even after they take the insect form; they gradually change colour, harden, and in about eight days come forth bees of a silvery colour, while the cells are again replenished with more eggs or honey, according to their position in the hive. The larvæ of drones are hatched in the same way, but the time of their growth is less than that of the queens. The queen cells are not originally constructed of full size, otherwise their necessary depth would, in some measure, prevent the proper attention required. We pay no attention to what is called royal jelly, as the peculiar food for queens, but consider their diet to be the same as that of other bees. It may be remarked, however, that owing to the position of their cells, they are reared like hornets and wasps, with their heads downwards—that is, the cells are inverted, and they have room to move a little in them. We never could discover openings in the cells for admission of food, as noticed by most writers; still, as the inmates are evidently in an active state at times for several days in the cells, they may be fed before leaving them. During that time they emit a piping sound like *off, off*. But a few days, sometimes nine, previously, the old queen is already off, and has left the hive with a numerous progeny of all ages; this is called a swarm.—*Cyclopedia of Agriculture.*

Swarming.—The way that honey bees form fresh colonies differs from that of wild bees, whose queens begin their nests in Spring alone, while those of the hive bees are surrounded by thousands, and would be helpless indeed without them, incapable even of forming a cell or providing for themselves. Much doubt prevails respecting what causes them to break off into colonies; and we can only say, that nature has wisely ordered that to be the way to increase their species. Apiarians have paid great attention to this subject, in order to come to a proper conclusion as to what induces bees to swarm. At all events, a knowledge of it is very essential towards their culture. In general, they agree that want of room hastens off the first swarm, led by

the old queen; but this cannot be said of after swarms, for they come forth, room or no room. Rivalry of the queens seems to be the primary cause; for however crowded a hive may be, the queen will not quit with a swarm until more are in the field to dispute her sway. It is true, that the old queen leaves a few days before her successors appear, but she knows, of course, when to expect them; and if the swarm is delayed by bad weather, rivalry and piping commence as before the first swarm. It is to be remarked, that working bees know by instinct about the time they are to quit their hive, and at times sally out without the queen, but return as soon as they miss her: they frequently have another home cleaned out beforehand, especially the first swarms. In these it sometimes happens that there are no drones, whose appearance, with the clustering of the bees outside the hive, are generally the first signs of swarming. This may be owing to the forward state of the young queens and the crowded condition of the hive. First swarms are always the strongest, and the bees are well stocked with provision to begin fresh structures. They usually muster on a branch or bush near the hive, and are readily taken, though at times they fly direct to an empty hive in the neighbourhood, or a cavity in an old wall a mile or two off. So much do they prefer a place of their own choosing, that they will sometimes quit a hive when their owner imagines that he has secured them. The old stock may be said to be without a head for six or nine days, according to circumstances, till another queen is hatched. Then she begins to attack her rivals in the cells, and utters the shrill sound *peep, peep*, while the imprisoned ones cry *off, off*. This is termed the calling of the queen bee, and the evening is the best time to hear these remarkable sounds in a hive, which go on night and day until one or more rivals appear. Then a general uproar ensues in the hive, and another swarm issues, perhaps on the third day after the sound began. The same process goes on with the next, which is smaller in population, and at a shorter interval, corresponding with the time between the laying of the queens' eggs and the state of the weather. It is stated, on good authority, that the bees prevent the queen destroying her rivals, and that they quit by seniority. We have seen her attacking them in the cells without resistance on their part, and it often happens that several queens quit together in one swarm. Some newly hatched can scarcely fly; therefore it can hardly be said that they depart by rotation. It appears that one is supreme at the departure of a swarm, and that she drives out all other rivals that happen to be bred. A worse fate attends them immediately when the swarm settles; they are destroyed by the bees, or more likely by the head queen, for queens are such enemies that they will sting one another to death when confined and separated from the bees. The succeeding swarms certainly have not the instinct or care to provide themselves with a future place of abode, like first ones. They often fly from place to place, and if not disturbed, will sometimes begin comb-building on a branch. We possess combs that contained both honey and brood, taken from a hedge. This may be accounted for in two ways, either by their being suddenly driven from the hives by the rival queens, or by a partial instinct in bees for a warmer climate. The reader may perceive that we consider swarming to be a natural instinct; and one not easily prevented, especially when the colonies are in good condition. Additional room is considered the best remedy; but if this be delayed till April, or until eggs for queens are laid, a thing not easily known, it will be fruitless: neither will the wary bee-keeper depend much on shading or ventilating the hives, nor even upon the destruction of the young queens, which might only retard swarming until more were reared to the injury of the colonies.

In connection with this subject, we may mention that bees seldom sting during the time of swarming, having no store to defend. We have just returned from securing two swarms; one of them was on a branch, which we cut off, and brought the suspended cluster down, and merely put the mass of bees on the ground with a hive over them, of which they readily took possession. The other was settled round the stem of a gooseberry bush; a hive was put over the bees which seemed unwilling to quit the bush, but after a little rousing by a stick, they ascended into the hive. Both will be removed in the evening to their proper place of abode. There is little or no occasion for rubbing the hives previously with sweet mixtures, or fencing off the sun, unless in great heat. Bees pay remarkable attention to their queen, while forming fresh colonies. Wherever she alights they cluster round her, as if their sole existence depended upon her. Nevertheless artificial colonies may be made without her presence, by merely putting a part of the bees into a hive in which there is a bit of comb containing workers' eggs, and confining them for a day. From one of those they rear a perfect female or queen, by widening and lengthening the cell, to complete the growth of the insect, whose cell is not inverted, but in the same position as those of the workers. Some recommend this plan when bees cluster and lie idle outside the hive, especially before the first swarm. Such experiments, however, are but hazardous, and at best only make weak colonies. Indeed, it may be asked, what is gained by premature separation? If done in bad weather there is, perhaps, an injury; for of what use are bees in an empty hive at such a time? If the weather were good, a few days might be sometimes gained, but when the unnatural disturbance of the hive and the uncertainty of suc-

cess are taken into consideration, we think the scheme is best let alone. Indeed, the practical bee keeper has more reason to complain of the propensity of bees to increase colonies, which prevails so powerfully, that a strong stock will sometimes throw off four or five swarms, while the first of these may cast off two also during the season; and we have known an instance of the original head bee of a hive having established three in one season. This great increase strengthens our belief, that bees were originally natives of a hot climate, where they would repeatedly swarm, and collect store during the whole year, as they would with us if we had no winter. And thus we may conclude, that they have no foreknowledge of winter, and that the primary cause why bees collect store of both honey and pollen is merely to enable them to increase their species.

Management of bees.—In rural economy the management of bees is interesting, and it is best to begin with a strong, early swarm, which may be purchased for 10s. and should be placed, if possible, in its abode in the evening of the same day that the bees left the stock; or a good, old colony, at £1, removed late in autumn or in Spring, before the bees begin to collect store. In removing old stocks, care must be taken to carry the hives level, otherwise the combs may be disturbed. A warm corner, open to the south, is the best spot for the hives, sheltered from the weather and very hot sunshine, otherwise the combs might melt, of which we have known instances. Water ought to be near at hand; it matters not how filthy. Success, of course, depends much on the pasturage and management. It cannot be expected that bees can prosper in large, agricultural districts, where they have to fly at times over hundreds of ploughed acres ere they can even come to a flower. Now and then they may fall in with seed turnips, a rich field of white clover, or buck-wheat, all of which afford much honey; but gardens, woody or heath countries, abounding in wild flowers, afford the most lasting pasturage, where bees thrive best, on whatever plan they are kept.

In general, hives are made of wood or straw, and vary in shape and size according to fancy; but we prefer *bar-hives* made of straw, such as were in use amongst the ancient Greeks—a proof of their skill in the management of bees, since no other hive can be so readily inspected by the removal of the combs.

The common straw-hives with but little trouble, will make very good bar-hives, which are indeed more easily managed than those in common use. The following is the substance of a notice of the Greek hive, in the *Gardener's Chronicle* for 1845. The best hives are made of straw, which is the most suitable material, and resists the heat and cold better than wood; and according to Bevan, who has paid much attention to this hive, it should be of a round form, thirteen and a quarter inches in diameter at top, and tapering gradually downwards to twelve and a half inches. This admits of eight bars, which should be one one-eighth of an inch broad, and half an inch in depth. The bars of wood are placed parallel, north and south, on the top of the hive, on which there is a wooden hoop, having a rabbet to receive them. A small piece of fresh comb ought to be fixed on two or three of the centre bars, as decoy combs; otherwise the bees may depart from their common rule, by placing their combs the reverse way. With the assistance of a lighted candle these pieces of comb may be made to stick readily to the bars. This of course is only required at first with a new hive, which should be covered with a lid of straw, fitted close to its sides, and there ought to be an exterior band or two on the top, for the lid to rest upon, to give the whole a more finished appearance. The precise width between the bars must be attended to, especially in the centre, and if there is room to spare, give it to the side ones, for they are considered to contain honey combs, whose cells are often of an unequal depth. No sticks must be in the hives as props for the combs; they would prevent their extraction, for the honey is obtained by removing the bars, to each of which a comb is attached. The middle of a warm day is the proper time for the operation: indeed that is the best time to extract combs from all sorts of hives, there being fewer bees at home, and all being busily occupied, they take less notice of the theft. The bees that happen to be on the combs soon return to the hive, and are not so apt to sting as in the evening. We may remark, that laden bees returning to the hive seldom sting like those that issue forth; the same thing is observable with wasps. There should be duplicate bars to fill the places of those taken away, and if the lid does not fit close to them, a sheet of strong brown paper had better be placed tight over them, to prevent the ascent of the bees above the bars. Any common hive near the size specified can be easily made into a bar-hive, by merely cutting of the top and inverting it. The honey should be taken from these hives, as well as from all other kinds, as early as possible, in order to give the bees time to store up enough for winter.—*Cyclopedia of Agriculture.*

Lectures on the study of Chemistry, and Discourses on Agriculture. By JOHN DAVY, M.D. F.R.S. L. & E., &c. London: Longman, Brown, Green, and Longmans.

The learned Doctor has introduced a series of papers on "*the Atmosphere*," "*the Earth*," and "*the Ocean.*" These are more interesting to the general reader. The agricultural reader will judge better of the work from the following extract, which we take from the Doctor's third discourse, "*On Manures and the Principles of their Action.*"

Plants and animals have in common the distinctive property of reproduction, a power exercised by means either of a bud, slip, seed, or ovum, the seed of one being analogous to the ovum of the other; whilst the bud or slip manner of generation are common to both, and constitute one of their most remarkable links. Having a common mode of origin, so they have of growth: as the animal grows, not like the mineral from accretion from without, but by deposition from within, so likewise does the plant. Both plants and animals are nourished by, and owe their growth to, foreign matter introduced from without; and both cease to grow, both waste, and ultimately perish, if the foreign matter constituting their food be withdrawn. To both, warmth, light, air, and moisture are in certain degrees, essential to their well-being; and to both, in other degrees, these are injurious. Whilst there are thus certain resemblances between plants and animals, there are also marked and characteristic differences. The two most remarkable are intimately connected with the subject under consideration—the kind of food required by each, and the kinds of organs belonging to each for its reception. A mouth and stomach appear to be essential to the animal, in which the food taken is prepared, more or less, for distribution and nourishment. In the plant, the preparation appears to be external, viz. in the soil, from whence the nutritive fluid is absorbed by the delicate roots, and by them conveyed for distribution where required. As to food, animals are dependent for their support on one another, or on vegetables. Plants, on the contrary, are not so dependent; they derive their support from the soil and from the atmosphere: and whilst animals, in the act of supporting themselves, convert organic into inorganic matter, vegetables in their growth have the opposite effect—they create or form organic or inorganic materials; are, in brief, organizers for the sustentation of animal life. Let us take an example:—A single seed of Guinea corn (*Sorghum vulgare*), weighing about a quarter of a grain, planted in an artificial soil composed of several earths, and containing a little phosphate of lime, and salts of the vegetable and volatile alkali, under favourable circumstances, with sufficiency of moisture from rain, will rapidly vegetate, give rise to a plant many feet in height, and in less than six months yield a ripe head of corn, weighing, in its dry state, 1685 grains and containing 3537 grains of seed; for such I have found to be the weight of a head of average size, and such the number of the seed it contained: the weight of the seed alone was 1460 grains. What a vast increase is here! And if we examine the parts of the plant, its roots, its stem, its leaves, its seed, we shall find them composed of substances differing altogether from the materials which had constituted the food of the plant; a difference depending on a new combination of elements,—on a change, in brief, from inorganic compounds.

There is another point of difference, and a very interesting one, between plants and animals—the effect on the atmosphere, comparing the leaves of the one with the lungs of the other. Animals inhale common air, consisting of azote and oxygen; a portion of the latter disappears, and its place is supplied by carbonic acid, which is a compound of carbon and oxygen, and which is expired; and consequently, in respiration, animals are consumers of carbon, and its consumption is attended with the production of animal heat. Vegetables, on the contrary, absorb, or take in carbonic acid, and exhale oxygen, by their leaves, and, consequently, are accumulators of carbon, and it may be, have the effect, in evolving oxygen, of occasioning a reduction of temperature, or of creating a cooling process. Should this be proved to be the case, it will be another example of wise and most happy adaptation.

I have spoken of vegetables as organizers, or the producers of organic compounds for the support of animal life: taking another view, animals may be considered as performing a part as essential to vegetable life, that of disorganizers; what is excrementitious from them being so reduced as to have the character rather of inorganic than of organic compounds; whether it be carbonic acid, with which they contaminate the air in respiration—their gaseous excrement—or their liquid and consistent, derived from the other excreting organs and passages of the body. These matters, which are destructive to animals, and not only to the animals that void them but to animals generally, may be held to be the highest kind and most appropiate food of plants. And the more we reflect on this, the more we are convinced of its truth, the more we must admire the connection and mutual dependence. The animal enriching the air for the use of the plant, and the same in the regard to the soil, offer a lesson to man of a very instructive kind, most beneficial when carried practically into effect, most injurious when neglected: in the one instance insuring fertility, and, I may add, salubrity; in the other, the production of sterility and disease.

Let us now, for a moment, take a glance at the composition of plants and animals. Both may be considered as composed of nearly the same elements, few in number, but variously united, so as to give rise to very many different compounds. The principal constituent elements of both are carbon, hydrogen, and azote, oxygen, lime, potash, silica, and phosphorus. Of these, carbon and silica preponderate in plants (silica, indeed, strictly is confined to plants); azote and phosphorus preponderate in animals. In plants a large proportion of carbon and silica are expended in forming the woody fibre, the framework of the vegetable structure, and the epider-

mis, the resisting outer covering; whilst in animals, the azote and phosphorus are as largely expended in producing the organs of locomotion, the muscles and bones. And in each instance we witness the usual happy economy of nature, and fitness of means to an end. Plants, being fixed to the soil, take from it that which is almost always abundant in a fertile soil,—silica, a substance, even in a thin and delicate layer, imparting great power of resistance, and far less soluble when acted on by rain than the less common, or at least less abundant, phosphate of lime. Animals, on the contrary, being able to range abroad in quest of food, select such kinds as contain phosphate of lime and azote, and these kinds such as admit of digestion and assimilation, and of conversion into bone, muscle, &c.; following, in so doing, their natural tastes, undoubtedly instinctively directed.

Leaving these general views, it may be well to consider the subject we have entered upon somewhat in its details.

Physiologists who have directed their attention specially to the food of animals have arrived at the conclusion that, amidst the extraordinary variety of articles capable of supporting animal life, there are three which may be considered as of most importance, and, as it were, elementary alimentary substances—substances which are found in milk, viz., an albuminous matter, the curd; an oily matter, the cream; a saccharine matter, the sugar of milk. It seems to be proved, by a wide induction of facts, that articles containing these substances, or their analogues, such as starch for sugar, muscle for curd, any kind of fat for cream, are fit for the food of animals generally, and that no articles are fit that do not contain more or less of these. These substances, taken into the stomach, are converted into a pultaceous semi-fluid chyme; from whence a milk-like chyle is formed; and from whence blood, by which every part of the body is nourished in its constant circulation.

The results of the inquiries of physiologists as regards the food of vegetables, have not been so well defined and satisfactory. As the sap of plants is a fluid, and transparent, we are sure that complete solution is essential as a preliminary, and that nothing enters the spongioles of the roots organic in its structure, a state of perfect solution being incompatible with such structure. The principle part of the sap is water; in it are dissolved carbonic acid, phosphate of lime, carbonate of lime, carbonate of potash, and, in very many instances, silica. And these inorganic substances, I apprehend, are to the plant for its food what the organic substances before mentioned are to the animal for the same purpose; and these are not less elementary than those as nutritive principles. The sap so impregnated, passes from the rootlets by ascending vessels to the leaves, undergoing some change in its passage, but a greater change in the leaves, where carbonic acid is decomposed under the influence of light, oxygen evolved, and woody fibre either formed completely, or a substance formed about to become woody fibre, and to be deposited by the sap in its descent through another order of vessels. And as in the animal frame very different compounds are secreted by different glands, so, too, in the vegetable a vast variety of compounds are produced by an analogous function of secretion; tubes and cells in the latter corresponding to glands in the former, the ultimate structure of which is also similar, the glands being congeries of tubes or cells.

Returning to the sap, it may be asked—and it is an important question—How are certain of the substances, which I have mentioned as essential to this nutritive fluid, dissolved in the water of the sap; such as phosphate of lime, carbonate of lime, silica, themselves insoluble in water? My belief is, and it is founded upon experiments which I have made, that their solution is effected by the carbonic acid in the sap. It is well known how soluble carbonate of lime, and, I may add, carbonate of magnesia, are in water containing carbonic acid; it is quite certain that phosphate of lime is also soluble in the same, and that not in an inconsiderable degree; and the experiments which I have made on silica to me are convincing that it likewise is soluble in water impregnated with carbonic acid, though in a degree very much less than phosphate of lime.

Taking this for granted, a certain simplicity is imparted to the theory of the nutritive process of plants. A fluid medium, water, holding a gaseous acid, carbonic acid, is the menstruum of the inorganic substances derived from the soil which the plant requires for its growth. This compound solution becomes exposed in the leaves to the action of light, and to the evaporating agency of the wind; the carbonic acid undergoes decomposition as already mentioned, carbon being detained for the use of the plant, oxygen being exhaled; a portion of the water is removed by evaporation, and, in consequence, the solvent power of the menstruum is diminished and depositions of silica and carbonate of lime and other ingredients take place. This view, it appears to me, is not only recommended by its simplicity, but also by a certain beauty and exactness of adjustment and economy of means. Is it not very admirable that a gaseous acid, which with water, is to yield to the plant, by decomposition, its organic elements, should be the solvent and vehicle of its inorganic parts?

The talented writer of these Lectures on Chemistry, &c., concludes his remarks on this subject by noticing the fertilizing means derived from the atmosphere, and animal, vegetable, mineral, or inorganic matters.

Report of the Agriculture of the County of Lancaster, with observations on the means of its improvement; being a practical detail of the peculiarities of the county, and their advantages or disadvantages duly considered. By WILLIAM ROTHWELL, Winwick. London: Groombridge & Sons.

We have great pleasure in drawing the attention of our readers to this work. Mr. Rothwell has for many years been a supporter and contributor to this journal; and although we have not the pleasure of his personal acquaintance, he is well known to us as one of the best practical agriculturists in this part of the kingdom. This will be at once apparent to all who have the advantage of reading his book. Practical utility is stamped upon every page of it, which contains his own views on any practical point; take, for example his observations, "*On Ploughing*:"—

In ploughing old grass for oats, the *depth* of the furrow must be two-thirds of the breadth, or the work will not be good. If *less*, the furrows will lie too flat; if *more*, they will stand too much on their edge, and there will be a great loss of seed. Some farmers are in favour of ploughing only four inches deep, as by this, a greater number of rows of corn will be grown in a given breadth than with deep ploughing, and of course, broader furrows. I should never, in any case, recommend less than six inches, but, of the two, should prefer eight inches deep. In this case, the furrows would be twelve inches broad, and of course, have only half the number of rows of corn upon a ridge, as he who ploughs only four inches deep. Old lea ploughed four inches deep, cannot produce much loose mould in harrowing, and what there is, is full of grass roots, and requires double the time for harrowing and ploughing, to that ploughed eight inches deep. The deeper old lea is ploughed, and the easier it is harrowed, the better the seed will be covered, and a less quantity will answer; there is also less risk of the grub and of drought, and more loose mould for the crop to grow in. It is not the greatest number of rows of corn in a field which produces the best crop, but where the plants are most vigorous, and clearest from the grass or weeds. To plough deep, in old lea, is quite as easy for the horses as shallow ploughing, because the ploughshare goes below the grass roots in the former case. The best crop of drilled wheat I ever saw, was drilled at twelve inches.

In ploughing old lea, in the autumn, intended for potatoes or turnips the following season, the common practice of ploughing as shallow as possible is quite right; but in this case, I should give the land another ploughing very deep, before the winter sets in, unless I intended to delve the land with the spade, and put the turf below.

When the ridges are *very high and broad*, in old lea, and a crop of oats is intended to be taken, the best way is to plough it into half ridges, as it is impossible to raise the ridges sufficiently by the common method of ploughing crown and furrow. This is common in Scotland upon stiff soils. The land is easier to plough, the water can get better off the land, and the crop will be better. In ploughing the land on this plan, the ploughman takes his first furrow on each side the ridge to the full depth, and eighteen inches from the side of the old furrows or reins. They will thus fall over to the side of the old furrows, but not into them.

Mr. Smith, of Deanston, recommends all land to be cultivated flat without open furrows; or with as few as possible, when it is thoroughly drained. But if he had farmed a stiff clay soil in Lancashire for twenty years, and paid a rent for it, he would not, I am satisfied, have done so, however well the land had been drained. I have drained clay land quite as well as ever he did, but still it would not be cultivated on the flat. It may do on light soils anywhere, and also on heavy ones, perhaps, in the *eastern* counties of England and Scotland, and also in the south of England, where far less rain falls, than in the western countries.

2nd.—Fallowing. All suitable land intended for potatoes, turnips, beet, cabbage, beans or plain summer fallow, should have a clean deep ploughing after harvest, and left in ridges all winter.

In the Spring, let the ridges be well harrowed, and ploughed down by another clean deep ploughing, taking care that the ploughman never takes a furrow so wide, but that *every inch of soil be turned over to one uniform depth*. After this, with care never to go upon the land when out of condition as to moisture, no more ploughing will be required in preparing the land for the crop, if a proper use be made of the cultivator, the roller, and the harrow.

For a plain summer fallow, another ploughing or two will be necessary. One clean deep ploughing in dry weather is worth three bad ones in any weather. In all cases of fallowing, without the eye of the master, an unprincipled or careless ploughman will pay more attention to what is called "*blacking*" the land, than doing the work well, and will appear to have done a good day's work when it is not half done; and I am sorry to say that too many farmers pay more attention to the "blacking" system, than to real utility.

And also his remarks "*On Stall Feeding, or Soiling*," as it is called in the northern counties, from which we make the following extract:—

Stall feeders say, that stock kept in the stall, will, *feed faster*, and *milk better*, than when a pasture; this will depend upon circumstances *In hot, or cold and rainy weather*, this is true; but in *mild, temperate weather*, it is *not true*, if other circumstances are the same. And here again the stall feeders, or rather I should say, theorists

do not state things fairly. If a cow be kept on clover in the stall a week, and then on pasture a week, to try the difference in her produce, she ought to pasture in clover, and not on a piece of poor pasture; and, *in this case*, the experiment would not be fair, except the *weather* was the same in both cases. For cattle to run out of doors in the *winter season* is folly, to say the least of it, if the land be clay, clay loam, or a black soil. If the pasture be dry and sandy, there can be no harm in the cattle going out a little in the middle of the day. Cattle turned upon strong land in the winter, is of no use to them, and they do injury to it for the succeeding summer.

By soiling stock in summer, a far greater heap of manure is made in the course of the year. This is considered by soilers to be one of their great guns in argument, and yet it is the weakest, or one of the weakest arguments they make use of. It is quite true, a *far greater quantity* of manure is made by soiling stock, than by *pasturing it*; but then, *more is required*. If the produce be carted off a field to the farm yard, the manure made from that produce, together with the urine, must be carted on to that field again, or the field must be poorer than it was. If cattle pasture the produce to a field, both the dung and urine are left upon it, and the field remains in the same state of fertility, or poverty, in which it was before the pasturing commenced, unless the land be naturally very bad soil. Land which is a deep rich soil, will improve in richness by pasturing, but will never do so by mowing or ploughing, except the produce be returned to it in the shape of manure, solid and liquid. If a stall feeder purchase a great quantity of provender for his stock, he will enrich his farm more if all the manure and urine be applied to it, than if pastured and no provender given to the cattle, But in making a comparison, this would be unfair, except manure was purchased to put upon the land pastured. It is said, that manure and urine dropped upon the land by cattle pasturing, do little good: this is not true. Why do landowners tie their tenants to have a certain portion of their farms in pasture? Why, from the well known fact that pasturing land does not impoverish it. To manage pasture land in the best style, it should first be put in good condition, and made dry; it then requires a little care every year, to pull up any weeds which may grow in it, and keep the droppings properly spread. If a farmer be too careless or too indolent to do this he would be completely unfit for a stall feeder. He would make sad work in that system, for he would waste his cattle food, their dung and urine, and, consequently, the land and himself would soon be brought to poverty.

A careless or indolent man should never be a stall feeder. It may be asked, why are there so many poor pastures in this country? Because they are made so by ploughing and mowing, before they are laid down to pasture.

Mr. Lawrence, a great writer on agriculture, in advocating this system, and in combating the argument that pasturing does not impoverish land, and that mowing does, asks this question. "Whether there be some charm in the mouth of a cow?" Now, if Mr. Lawrence had been a practical man, he would have known that the charm lay elsewhere. He would also have known that it is not mowing a field that makes it poor, but carting the produce off the field after it is mown. If the manure made from that produce be spread upon the field again, then the field is in the same state of fertility as before it was mown, or as it would have been if it had been pastured. It is quite clear that the extra quantity of manure made by soiling is required by the land, and of course no profit arises from that.

In pasturing *feeding stock*, they are driven to the field and remain there till fat. They feed themselves, and leave their manure and urine on the land. In this there is little expense. In stall feeding, the food has to be cut and carted from the field to the yard, and the dung carted back and spread upon the field. This, including the attendance of the cattle in feeding and cleaning them, in paying attention to the manure and urine, and in loading the manure, &c, is a considerable expense, which has to be paid for, from the profit of keeping more stock upon the same land.

In a *milking stock*, the difference of expense is not so great between pasturing and soiling, as in a feeding stock; because in pasturing a milk stock, they have to be driven from the field to the farm yard twice every day, and carry their milk home to the dairy. In either case the expense of labor will be about half the cost of carting the food to the cattle.

In a *feeding stock, pasturing*, there is no wear and tear of roads in driving stock twice a day to or from the field. In a milk stock there is, except they are milked in the field, and there is always great inconvenience in this.

In stall feeding stock, there is great wear and tear of roads in carting the manure to the field, and the food from it, particularly if the weather be wet; and in Lancashire we have too much of this sort of weather.

In pasturing strong loams, stiff clays, and peaty soils, in *wet weather*, great damage is done to the grass by treading; but there is also great damage done to this land in such weather, by carting the produce in a green state from it. In stall feeding, the food should be brought fresh cut to the cattle twice every day; therefore, the horse and cart will have to go twice upon the field every day, to the place where the food is cut. It will not do to carry it to the gate, and it would never do for a stall feeder, except he makes up his mind to raise good crops. Labor

seeds, &c., would eat up the value of light crops. I will suppose a good crop of clover to be carted home green to cattle; the weight will be ten or twelve tons upon a statue acre: this would make twenty or twenty-four journies, perhaps, upon every acre, with a horse and cart; and if the stock soiled were few, the number of journies would be greater. It will thus be clearly seen, that on the above description of land, in wet weather, the damage by carting must be great. Almost every writer on soiling overlooks this, and yet they can write on the damage done by pasturing such land in wet weather. We are not yet got to that perfection in the arts as to be able to remove our crops from the fields in balloons. In a few years, perhaps we shall be. "Agriculture," it is said, "is only yet in its infancy." It was so when I was a boy, fifty years ago.

One advantage of stall feeding is, that the cattle never get into mischief, if there be proper conveniences at home in the yards and stalls; and without these conveniences, the system will not answer. Another advantage is, there requires few fences upon a farm; of course the expense of keeping them in repair is done away with; the land they take up applied to better purposes; and that, for a couple of yards on each side of the removed fences, made of more value. But, will the landowners allow the fences and hedge row timber to be grubbed up? Game preserving and stall feeding will never do together. When the land is continually under the plough, as it must be under a proper system of stall feeding, except occasionally, when in clover, it will never do to have small fields and crooked fences.

If a farm be very large, it necessarily follows that some parts of the land will be a considerable distance from the farm yard, and will, of course, increase the expense of carting food and manure. A small farm will have the advantage over a large one in this respect.

Under a complete system of stall feeding, the horse and manual labor is very great; and to carry it out to the best advantage, the farm house and outbuildings should be convenient and extensive. They should be situated in the centre of the farm, whether in a large or small one, with good roads from the yard to every field or part of the farm. Whatever part falls short or this, adds to the expense of carrying on the system, and not for one year but every year. Where the soil is very thin, and the subsoil very bad, or where the surface of the land is very hilly, stall feeding, as a general system, never can or will pay the exense.

Two very great advantages of stall feeding are, the finding of more labor for the working classes, and raising more food for man from the same extent of land. These are two very great and important considerations. Every farmer, before he commences the system, must consider his circumstances—the soil he has to work upon—the state it is in—the climate he has to contend with—the prejudice of his landlord as to ploughing up the old grass—and the number of game to be kept. I have no doubt, but as the population increases, stall feeding will, and must be extended. But before it can be extended very much to the advantage of farmers, there must be a reformation in landowners' opinions on many points; a reformation in the habits of farmers, in their general intelligence; and a complete reformation in farms and farm buildings.

Stall feeding requires the constant attention of the master. An attentive, humane, good tempered servant, who has the care of cattle, in any case is invaluable; but more particularly so in stall feeding, as the cattle are then always under his care. Great loss may arise from giving too much food at once, or from neglect in giving it in proper time. A hasty tempered man should never be intrusted with the management of cattle.

It will be seen, that weighing the advantages and disadvantages of the system, is a very difficult task, if we desire to come to a correct conclusion. I shall therefore conclude by giving my general opinion, leaving each one to calculate the odds for himself.

On small farms of from two to twenty-five or thirty statue acres, I have no doubt of its advantage, if the land be of fair quality, and not hilly; likewise dry, or can be made so. Upon a middle sized farm, if the land be good and dry, lies convenient to the farm buildings, not too hilly, and the stock kept, a milking one, I should say the advantages were in favour of stall feeding. If the soil was a stiff clay, or very hilly, or the farm very large, or lay very inconvenient I should not recommend stall feeding cattle at all, and particularly if a feeding stock. In every case, I should recommend work horses to be fed in the stall. To conclude, I would recommend no farmer, whether his farm be great or small, to adopt stall feeding, except he be industrious and preserving, having a full determination and the power to do full justice to the land and the stock.

HEREDITARY TENDENCY TO DISEASE. AND THE REPRODUCTION OF MALFORMATION IN THE PROGENY OF BREEDING ANIMALS.

BY MR J. M'GILLAVRAY, V. S., HUNTLY.

I have long been of opinion, that, in the breeding of young horses, farmers and others pay too little attention to the physical qualifications and general conformations of the animals they employ as parents. It is an *old*, a true, and well-known saying, that "like produces like;" and it requires only a careful observation of facts to be convinced of the correctness of this laconic

maxim. From circumstances that have forced themselves on my notice for some time back, I have been led to pay particular attention to the above branch of our rural economy. The circumstances to which I more immediately refer consist in uprightness of pastern occurring in foals, in consequence of which they walk too much on the toe or front part of the hoof. These parts are in the young animals extremely soft—they are soon worn off—the toe becomes too short; as a matter of course, this increases the evil; the foot is thus placed in a false position, as regards the limb and the animal. The coronet bone is pushed into the upper part of the hoof, which then projects over the lower part or toe; and very soon the little animal is fairly *knuckled* forward, and can neither stand nor walk but with extreme difficulty. A peculiar method of shoeing becomes necessary, so as to bring the foot again to its proper position, and save the beast from utter uselessness.

It being a fact that the evils alluded to have appeared among the progeny of a certain stallion and likewise a variety of mares, leaves little room to doubt but that the stallion is the cause; and we are of opinion that the cause is hereditary, and may be transmitted from sire to son. Indeed, it is natural to suppose that, if "the *good* qualities of the animals are communicable to their offspring so are *bad*." It is the proper study and application of these prinples that constitutes the grand secret of improving the different breeds of animals. And not only may natural defects be communicated from one generation to another generation, but deformities the result of accidents are also communicable. In the endeavour to investigate the above subject abundant evidence has been found to warrant this conclusion.

A stallion named 'Dominie Samson,' who had run very successfully in this country, but was fired in both hocks for *curbs*, was purchased by the East India Company, and sent out as a covering stallion to the stud at Buxar, where, for five years, he had much about 40 foals annually; they were generally affected with *spasms* or *curbs*, so much so, that only one of his stock passed into the cavalry; and, consequently, he was discarded from the Company's stud."

A Major Hunter also records that he knew a stallion that had encysted tumours at the point of his elbows, and most of his stock were affected in the same manner.

"An Irish stallion, named 'Musician,' had very bad fore-legs, and none of his stock were strong in the fore extremities."

An accidental natural defect is often propagated from parents to their offspring and continues thus a peculiar breed. Mr Blaine mentions a singular breed of swine that did not *part* the hoof, but were what naturalists calls solidungular, having *feet* resembling the *feet of horses*. There is also the *Ancon*, or otter breed of sheep, described by Colonel Humphries, in the Phil. Trans for 1813, part 1. These sheep were derived from an American lamb, born with legs deformed and most disproportionately short to the rest of his body; the fore-legs were extremely crooked, which, added to their shortness, rendered him unable to run or break fences. With these qualities it was determined to attempt a breed of this kind; and, by confining the intercourse between him and his future offspring, it succeeded, and the Ancon or otter breed is now established.

In the records of the transactions of the Linnean Society of London, is found an account, by Mr Milne, of a pregnant cat, his own property, the end of whose tail was trodden on with so much violence as appeared to give the animal intense pain. When she kittened, five young ones appeared, perfect in every other respect except the tail, which was, in each one of them, distorted near the end, and enlarged into a cartilaginous knob. In this case it is probable the tail of the animal had been so much bruised as to stop the circulation; the vessels would become enlarged at the ends, and Nature, true to the principle that "like produces like," produced kittens with the deformity alluded to. Mr Blaine also mentions his having seen a breed of tailless cats, the offspring of one accidentally born without a tail.

The above facts show the importance of paying proper attention to every thing connected with the animals intended for breeding, more especially the male. The female being the property of the farmer, with all her defects he is likely to be well acquainted: not so the stallion; he often comes from a distance, little of his history or character can be accurately ascertained, and, therefore, his physical conformation ought to be made the subject of severe scrutiny.

During the season that is now past, I have required to get a good many foals shod in consequence of the fault mentioned at the beginning of this paper. And, as the form of shoe I have adopted is peculiar, and, so far as I have been able to ascertain, has proved effectual in removing the evil, should any of the readers of this Journal have occasion for such an operation, I shall be glad to furnish him with the necessary information regarding the construction of the shoe, &c., on application.

LEGAL WOOL GATHERING.—Lord John Russell took the greatest pains to prevail upon Lord Langdale to resign the permanent Mastership of the Rolls, and accept the unstable position of Lord Chancellor. The Premier paid very high compliments to the talent and learning of Lord Langdale, who drily requested Lord John to desist from flattering, inasmuch as "so long as he, Lord Langdale, enjoyed the Rolls, he cared little for the butter."—*Punch.*

MOUNTAIN STREAMS.

(An Inspiration from Town.)

BY CHARLES MACKAY.

What time the fern puts forth its rings
What time the early throstle sings,
I love to fly the murky town,
And tread the moorlands, bare and brown;
From greenest level of the glens
To barest summit of the bens,
To trace the torrents where they flow,
Serene or brawling, fierce or slow;
So linger pleased and loiter long,
A silent listener to their song.

Farewell, ye streets. Again I'll sit
On crags to watch the shadows flit;
To list the buzzing of the bee,
Or branches waving like a sea;
To hear far off the cuckoo's note,
Or lark's clear carol high afloat,
And find a joy in every sound,
Of air, the water, or the ground;
Of fancies full, though fixing naught,
And thinking—heedless of my thought.

Farewell! and in the teeth of care,
I'll breathe the buxom mountain air,
Feed vision upon dykes and hues,
That from the hill top interfuse,
White rocks, and lichens born of spray,
Dark heather tufts, and mosses gray,
Green grass, blue sky, and boulders brown,
With amber waters glistening down,
And early flowers, blue, white, and pink,
That fringe with beauty all the brink.

Farewell ye streets! Beneath an arch
Of drooping birch or feathery larch,
Or mountain birch that o'er it bends,
I'll watch some streamlet as it wends;
Some brook whose tune its course betrays,
Whose verdure dogs its hidden ways—
Verdure of trees and bloom of flowers,
And music fresher than the showers,
Soft dripping where the tendrils twine;
And all its beauty shall be mine,

Ay, mine to bring me joy and health,
And endless stores of mental wealth—
Wealth ever given to hearts that warm,
To loveliness of sound or form,
And that can see in Nature's face,
A hope, a beauty, and a grace—
That in the city or the woods,
In thoroughfares or solitudes,
Can live their life at Nature's call,
Despising nothing, loving all.

Friend,—one who will tell you your faults in prosperity, and assist you with his hands and heart in adversity.

RECOGNITION OF VOICE BETWEEN THE EWE AND THE LAMB.—The acuteness of the sheep's ear surpasses all things in nature that I know of. A ewe will distinguish her own lamb's bleat among a thousand all braying at the time, and making noise a thousand times louder than the singing of psalms at a Cameronian sacrament in the fields where thousands are congregated, and that is no joke neither. Besides the distinguishment of voice is perfectly reciprocal between the ewe and the lamb, who, amid the deafening sound, run to meet one another. There are few things that ever amused me more than a sheep-shearing, and then the sport continues the whole day. We put the flock into a fold, set out all the lambs to the hill, and then set out the ewes to them as they are shorn. The moment that a lamb hears its dam's voice it rushes from the crowd to meet her, but instead of finding the rough, well clad, comfortable mamma, which it left an hour, or a few hours ago, it meets a poor naked shrivelling—a most deplorable-looking creature. It wheels about and uttering a loud tremulous bleat of perfect despair, flies from the frightful vision. The mother's voice arrests his flight—it returns—flies, and returns again, generally for ten or a dozen times before the reconcilement is fairly made up.—*The Ettrick Shepherd.*

PURIFICATION OF DWELLINGS.—Last October I addressed a letter to the Board of Health—when the plan of house visitation was in full operation—with a suggestion that a cesspool visitation might be attended with much benefit. The connection between the cholera and the accumulation of those impurities which daily ought to be removed has been so amply demonstrated that we need bring forward no additional proof thereof. I beg then to recommend to the public that, during the approaching Summer and Autumn, particular attention be paid to the daily cleansing of these most attractive sources of the cholera poison. The disinfection of these places all throughout the densely inhabited metropolis can be efficiently secured by the weekly application of chloride of lime and white washing. This may be accomplished at a very trifling expense indeed, and now is the time to put in active execution all the subordinate means we have at command to mitigate the severity of epidemic disease. The intrinsic nature of cholera it would be out of place to inquire into here, but its immediate relation with all organic decomposing impurities is contested by none. That the principle should be successful, it should be carried on throughout every street, close, lane, and alley simultaneously; and as it is likely it will be some time ere an efficient system of sewerage can be put in active practice, this temporary expedient cannot, I think, with safety be neglected.—*The Builder.*

Agricultural Journal

AND

TRANSACTIONS

OF THE

LOWER CANADA AGRICULTURAL SOCIETY.

MONTREAL, AUGUST, 1850.

COUNTY AND OTHER AGRICULTURAL SOCIETIES.

There is no way by which these Societies can produce more benefit to Agriculture than by offering and giving premiums for well managed farms, under proper regulations. We conceive that this would be the most certain mode of producing improvement, not in a few acres of crop, while all the rest of the farm was neglected, or not in a few animals, when the stock in general were not judiciously selected or well managed, but the premiums for well managed farms would take in the general management of the farm including stock, crops, &c.; and this is the best mode of encouragement to good farming in Lower Canada. We have seen premiums awarded for *chance* crops here, where the farmer had neglected altogether his other crops, and allowed the weeds to grow without any attempt to check or remove them. This we conceive, is a mis-application of the funds of Agricultural Societies. Well managed farms once obtaining the *first* prize, should be excluded from entering for competition again, and allow other parties to have a chance of prizes. It is not so easy to bring a farm into good condition certainly, but when once in good order, it is less difficult to keep it in that state, by observing a good system of rotation, and a due application of manure, and if there was no regulation that would prevent parties from obtaining the first prizes a second time, they might as well prohibit any competition. Every means should be adopted to prevent "prize catching" and encourage general competition. We only refer to well managed farms, and to animals once receiving prizes. Good crops require attention every time they are produced, although they may be easier to produce on a well managed farm than on one that is not so, but still we see no objection to a farmer receiving premiums on good crops every year if they deserve it, and if all his farm is kept in good order. Premiums should not, however, be given for crops to parties obtaining premiums for well managed farms, nor should the same parties be allowed to compete for both. There is another matter connected with cattle shows, that appears to be very objectionable, that is, allowing the same parties to show more than one animal in the same class. Indeed to encourage more general competition, it would be well to restrict parties from receiving more than one premium for any species of animals,—one for horses, —one for neat cattle—one for sheep—and one for swine. We do not think it is conducive to Agricultural improvement to allow any party to "catch" too many premiums. It is only for the credit, and not actually for the pounds, shillings and pence, that any farmer should be anxious to be awarded premiums, because it is an absurdity to pay a man for doing or having, what is for his own advantage to do, and have. Agricultural Societies should be governed in all their proceedings, by a desire to produce the improvement of husbandry, where improvement was most required, and this is the only grounds that would justify, granting them aid from public funds. To encourage improvement rather than pay for it to those who already know the value and advantage of it, should be the object of Agricultural Societies. Well executed Summer fallows, the largest quantity of green crops, the best pastures, the best general state of drainage of a farm, the best and most economical fences—all these are objects that might be separately encouraged

by a lower class of prizes than would be paid for well managed farms. For well managed dairies premiums should also be offered, but of course competitors for well managed farms, could not compete for any of these separately. More general competition is what should be encouraged, and this would be sure to introduce more general improvements, when no parties would be awarded any premiums unless the general state of the farm was creditable in the estimation of the judges. This would prevent the awarding of premiums for merely chance crops, when the judges would have to go upon the ground and on the farm. We do not propose to disqualify a party from obtaining a premium for a good crop, because all his crops were not equally good. We only submit that a farmer should not be awarded a premium for any one crop while all the other crops, &c., appeared to be neglected and not managed judiciously. This regulation would cause every farmer to cut his weeds, at all events, before he could compete for any crop. For any District or Provincial Exhibition where premiums would be awarded for samples of grain, the samples should belong to the Society, to be sold or distributed by them for seed only, on certain conditions. By this regulation, the best seeds would be sure to be distributed in the country, and employed as seed. The premiums offered in this case should be sufficient to amply reward the party for giving up the samples exhibited, and if they were honest samples of larger quantities, as they should be, the exhibitors would suffer no injury, by losing the samples at a high price paid for them in the shape of premiums. In the same way we would propose to open District or Provincial Exhibitions to all competitors—native or foreign, for every description of farm implements, and award such premiums as would fairly reward the owners for those implements, but in all cases they should become the property of the Society, and might be placed in a museum, and given out as Prizes by the Society at the next year's Exhibition. This would not be doing any injustice to the manufacturers of Implements who would sell so many at a fair price, for the premiums paid them, and they would have the further credit of having their names published as exhibiting the best Implements, which would be a very material advantage to them. A separate class of premiums might be offered to parties exhibiting Implements purchased and made use of by themselves on their own farms, whom it would not be just to deprive of them, but these premiums need not be of large amount. By thus opening the field of competition, we would obtain the best implements of other countries, if better than our own, which would be a great advantage. The duty upon articles coming from a foreign country for exhibition, might be easy to manage, by giving security at the Port of Entry, that for any articles that might be sold in Canada the duty would be paid. This is the course proposed to be adopted in England for foreign products coming to the great London Exhibition in 1851, and we may well follow so good an example. For any implements to which premiums may be awarded and would become the property of the Society, we would propose that the duty should be remitted, on the exibitor showing a certificate of being awarded a premium. This plan would be a new feature in agricultural exhibitions, and we presume a useful one. The giving of approved implements as Prizes, we conceive, would be much a better plan than giving money, as those implements would be brought into use and into notice with other farmers. It would also, after the first year, be a great saving of the funds of the Societies, as they could award two Prizes for every one money premium actually paid, and this without doing injustice to any party, or giving any just cause of complaint. A fair price for

the implement as a premium to the manufacturer, and the credit of being awarded this premium, is a fair principle, and should be perfectly satisfactory. There are many other regulations that might be usefully introduced for the management of agricultural societies, which we shall submit occasionally.

AGRICULTURAL REPORT FOR JULY.

The month was exceedingly hot and dry up to the night of the 13th, when we had a most refreshing rain which continued 24 hours and produced great improvement in the crops, particularly root crops and grain that was sown late. We had occasionally showers the first few days of July, but they were not general, nor in sufficient quantity to soften the soil, parched by excessive heat and drought. The rain on the 14th came most seasonably to moisten the thirsty soil and growing crops, and we hope it may have a beneficial influence on the crops throughout the country. Rain, if not in excess, is very necessary to fill the grain in crops coming into ear—but long continued rain between the middle of July and middle of August, never fails to be injurious to all grain crops, except, perhaps, oats. We have had rain on St. Swithin's day, but we do not attach much consequence to that circumstance, except that when the weather changes at particular periods of the year, from wet to dry, or from dry to wet, it is very apt to continue so for some time, and the middle of July is one of these periods, and being the most critical period for the growing crops, it has attracted more the attention of agriculturists. We hope, however, that rain on St. Swithin's day this year, will not bring us unfavourable weather for forty days, as it would be a most serious evil indeed. We do not believe that the crop of hay is a heavy one generally, particularly on old meadows that are not very fertile. The month of June was warm and dry, and we have never seen a very heavy crop of hay when this was the case. Heat and moisture in June will produce good crops of hay even on poor and old meadows. The rain on the 14th will increase the length of straw that would certainly have been generally short, only for this rain. The wheat has not generally come into ear before the 15th of July, except that which was early sown, and we are almost certain that we had not the fly for some days previous. We did not at any time this year see much of the wheat fly. We sowed some of the bearded wheat, heretofore grown in Canada, on the 20th of April, and on the same day, some of the Black-sea-wheat, in the same field, and were surprised to find the former wheat in ear before the latter, or three months wheat. We cannot say, however, which will come first to maturity. It is probable that wheat will not suffer this year by the fly; so far there is no appearance of injury, even to fall wheat that came into ear before the end of June, the most dangerous time for the fly. It would indeed be a great advantage to this country if this insect would leave us, that has caused so great loss to the people. Experiments have been made this year by early and late sowing that will show whether we can venture upon early sowing in future. We have examined wheat sown at various times from the 20th April to 20th May, and perceive that there are scarcely any larvæ of the fly in the ear. The early sown old Canadian wheat is decidedly the best and fullest grain up to the present moment and is likely to continue so. To sow clean samples of unmixed varieties of wheat, would be very desirable, and there is a considerable loss incurred when this is not carefully attended to. When seeds of weeds are sown they grow in the crop, and when mixed varieties of grains are sown, they do not mature properly together, and never make a good sample.

Wheat should be cut before it is perfectly ripe, or there will be a risk of losing some of it before it is housed. In land that is properly prepared for a wheat crop there should not be much grass or weeds produced with it, and in that case, when the crop is clean, the best way to manage it when cut is to bind it up in small sheaves, and stook it in the field, placing ten or twelve sheaves standing together and covering these with two sheaves on the top They may remain in these stooks, until fit to house or stack. When the crop is not clean, and is mixed with grass and weeds, there is no better way to manage it than the Canadian plan, of allowing it to wither and dry before it is gathered. This is certainly a slovenly plan of managing wheat and other grain, and a very objectionable one in a wet or changeable harvest, but where the crop is not free from weeds, there is no better way of drying both grain and weeds, and it is the least expensive way of managing crops that are not very heavy. For a good clean crop of wheat, barley, or oats, there is, however, no better and safer mode of management, than the English mode, of gathering and binding, as it is cut down, and making it up into stooks in the field. In Ireland, and frequently in Britain, when the harvest is not dry and fine, they stack the wheat when cut and bound, into small stacks, placing the first sheaves nearly standing to save the grain from the ground, and then making the stacks the width of the length of two sheaves meeting in the centre. They are generally made by men standing on the ground, and placing the sheaves round with the grain inward until sufficiently high to bring the stack to a point, and it is then covered by fixing two or three sheaves with the ears downwards as a cap to the stack, and tied there with a rope of hay or straw. The grain is preserved in these stacks, and will dry and season very soon for the barn or stack yard. Of course, these stacks should not be left too long in the field, but should be carted as soon as the wheat is seasoned and dry. In the old country, we always secured our wheat in this way, and found it to answer well in the changeable climate of the British Isles.

Canadian farmers suppose that allowing the grain to remain upon the ground for some time after it is cut, improves it, and makes it easier to thrash. No doubt of this, and in dry seasons, there is no objection to their plan ; but when the season is changeable, and in any case that the crop is clean, and heavy, we think the better way would be to bind up the crop in small sheaves, when cut, and stook or stack it immediately. Indeed, when made properly in small stacks, by persons who know how to make them, there is no way by which wheat can be better seasoned and preserved. In case of high wind and rain, a field of wheat in stooks, is apt to be very much injured, and sometimes the sheaves never get properly dry until opened out. We submit these suggestions for the consideration of the farmer. Small stacks must be carefully and neatly made by persons who understand doing this work, and if they are, there is no doubt but the wheat will dry and season. We know that in dry seasons, both barley and oats are frequently mown down, and left upon the ground until dried, and then gathered and carted like hay. We do not object to this plan under certain circumstances, as a great saving of labour, but it is certainly a dangerous plan, should bad weather come upon it in this state. When the crop is poor and thin it may answer, but we should not have poor and thin crops. None except average crops are worth the labour, and we would do much better to allow the land to rest, or summer fallow it, than to sow land not fit to produce an average crop. Now would be a good time to sow seed for ploughing in, as green manure. Where there is summer fallow it

might be sown now, with rape seed, with buck-wheat, or with white mustard, (not the black), and before the end of October, there might be a considerable crop to plough in; severe frost might certainly hurt any of these crops, but perhaps they might be ploughed in before there would be any frost that would hurt. At all events, the price of the seed would not be much, and although frost might do some injury, the land would be sure to be improved by a young crop of any of these species ploughed in before the winter. The seed should be sown thick so as to have the ground well covered with the young plants to plough in as manure. It is greatly to be regretted that when our lands might in the summer season be producing something for their own improvement we do not assist them to do this. A crop that would be sown now as we propose, would attract a great part of the nutriment necessary for its growth from the atmosphere, and thus we would take from the atmosphere a portion of manure to improve our lands. Rape, buck-wheat, and white mustard, are plants that grow rapidly, are soft, and have a considerable quantity of leaves, and, consequently draw a great part of their nutriment from the surrounding atmosphere. By adopting this plan, we arrest, as it were, the fertilizing qualities suspended in the atmosphere and bring them in our soil, to produce future crops. This is not theory but a certain fact. Any plants of large leaves and rapid growth, will alway draw their chief nutriment from the atmosphere, and from heat and moisture. Lands are capable of great improvement by simply draining them sufficiently, ploughing them properly, and keeping a good proportion of every farm in good pasture and meadow. It is, however, contrary to all good farming to support the cattle and sheep on the straw, instead of putting the straw into manure for the land. Except on farms that have the hay produced upon them sent to market, we believe that most farms might produce sufficient manure to keep them in good fertility, provided a rotation of crops was observed, and a due proportion of the land cultivated for green crops or summer fallow every year. Unless there is something like a regular system of agriculture observed, it would be absurd to expect good or profitable crops. How is it at present—the straw is nearly all eaten by the cattle—the manure is consequently in very small quantity, and that not applied in the most judicious manner—the grain is sold or consumed by the family, and how then, we would ask, is the fertility of the soil to be kept up? No soil can be maintained good if always producing, and receiving nothing in return. We have been told that in some parts of the country the wheat plant has been injured by the wireworm and slugs. The wireworm is a most destructive insect to the roots of any grain crop that it attacks here, as well as in the British Isles. Heavy rolling, or the application of soda ash at the rate of 100 lbs. to the acre, is found to be the best remedies. We do not know to what extent this injury has been inflicted. We have also heard complaints of crops of wheat standing very thin, and this we suppose to arise from the soil not being in a very fit state when sown. In many cases it was too wet, and in others, the seed being sown late, and in very dry weather, much of the seed did not grow.

The rains we had from the 14th to the 20th has injured any hay that was cut and in the field, but the hay harvest was not generally commenced before the 22nd. We do not believe that the rain was injurious to any other crop, but on the contrary, it was beneficial to all crops and to pastures. There is a good supply of butcher's meat this year, and prices moderate. The butter market is also well supplied, and prices not high. Oats brings a fair price, 2s. the minot, and peas from 3s. to 3s. 6d.

At the present moment with, we hope, very little injury done to the wheat crop by the fly, there is every prospect that the crops will be a fair average in proportion as skill and industry have been employed in their cultivation and management. We cannot expect that crops will be very heavy, and good, if the farmer has not done all that was possible for him to do to make them so. Land, however good, and seasons, however favourable, will not produce good crops, if the lands are not properly cultivated for them. It is the farmer's duty to do all that he can to be prepared for all contingencies for favourable as well as unfavourable seasons. It is by the exercise of skill and industry that good crops may be raised, even in seasons that are not the most favourable for them, and this is one of the many advantages of skill and industry.

25th July, 1850.

In the July number of the Agricultural Journal we submitted several questions in reference to the state of Agriculture in Lower Canada, in the hope they might be answered by parties taking an interest in the subject. We shall make a commencement by replying to a few of these questions according to our view of the subject. We believe that the true state of Agriculture will be better ascertained by answers to these questions, than by any *general* opinions that might be offered by parties, however, well qualified they might be on the subject. By answering the questions correctly, a just conclusion may become to as to state of our agriculture, and the improvements that are necessary to be introduced will be perfectly manifest. This, we conceive, would be a better mode of proceeding than to act upon any general opinions that might be offered. If we can see clearly the system of husbandry that is generally practised, there can be no difficulty of understanding its defects, and the necessary improvements to be introduced to remedy these defects.

The first, and four following questions, we cannot reply to with any pretensions to accuracy, and will leave them to other parties to answer.

The 6th as to the state of drainage generally, we can reply, that we have never seen a farm drained in Canada, to come up to our ideas of what was necessary. Even as regards open drains, they are not generally well formed or sufficiently deep to carry away the water with the necessary rapidity from the lesser drains, and this is a matter of great consequence that the water should discharge rapidly from the lands. The country is generally level, and unless the main drains are considerably lower or deeper than the lesser drains, the discharge of water will be too slow from the lands, and hence they become saturated with moisture until dried up by the sun, and it is from this cause that the soil becomes baked and hard. We feel persuaded that improvement in draining so as to make it sufficient to dry the land, would double their *annual* produce. Lands insufficiently drained cannot be cultivated properly, or to advantage, for any crop. Drainage is more necessary here than in England. We know some parties entertain a different opinion, because there is so much heat and drought in Summer here, it is, however, a great mistake to suppose that the stagnant water remaining in the soil would be beneficial to the crops in dry and warm Summers. Any farmer may be convinced of this by examining the crops upon the insufficiently drained parts of his lands, and comparing them with the well drained parts in the dryest Summers we have. The latter will have a good crop, while the former will have scarcely any crop upon it. There is another defect in our drainage, that in general the drains are cut perpendicularly and the earth taken out is heaped upon the bank of the drain. Hence the parts of the

lands nearest the drains are much the highest instead of being the lowest, as they always should be. The drains from not being properly sloped are continually falling in from the effects of rain and frost, and hence in the Spring, when the action of the drains is most required, they may be nearly useless from the earth of the sides falling into them. The high banks or mounds formed upon the edges of the drains are undermined by the water in its passage to the drains, and cause the soil to close in at the bottom of the drains or to waste in from the sides. All drains should be very much sloped, and always in proportion to their depth, allowing that for every foot in depth, they should be two in width at the top, and any drain under four feet deep, requires to be only the width of a shovel at the bottom. When a large quantity of water has to be discharged, and the drains are large and deep, the bottom may be wider; but in very few cases does it require that the bottom should be over from 12 to 18 inches wide. A well sloped drain takes away the water better than one that has the sides nearly perpendicular. Every particle of earth taken out of drains in making or sloping may be applied to useful purposes as compost, for filling up low places, and as dressing on soils of different qualities, which latter application might be better than manure for it. It would be a great improvement to remove all the banks of drains, and would pay well for the trouble. In all cross drains in farms it would be well to slope the drains so that the plough might pass over them, unless where water was constantly running. Made in that way it would be easy to keep them in good order by a simple channel in the centre, kept clean, the width of the shovel. The grass might grow upon all the slopes except this small channel. When a large quantity of water was to be carried off, the drains being wide would admit of its rapid discharge, and subsequently the small channel in the centre would be sufficient, and no other part would be waste. The first expenditure in constructing drains properly, might exceed the cost of making drains in the usual manner, but this extra expense would be amply repaid, by the saving of expense in keeping the drains in order subsequently. The banks of drains, as generally made at present, are much higher than the lands adjoining instead of being lower, as they should be. There are many small rivers and water courses that would require to have obstructions removed, that dam the water and cause great injury to the lands through which they pass. We have seen many of these where a trifling expenditure would remove the obstructions, but as several parties would derive benefit from the improvement, it is altogether neglected, because all parties do not unite to execute the work required to be done. In England the Legislature have made large loans to landed proprietors for drainage and other improvements, and are doing so this Session of the British Parliament, and these loans are made on very favourable terms. These loans are made in a country where there is a great amount of capital already employed in Agriculture. Some of the best lands in Canada are waste for want of draining. Clay lands in particular that require draining, would produce immense crops if drained. Cultivation and manure is all but wasted when employed on undrained land, and we are convinced there are not many farms in Canada sufficiently drained throughout. We have been more particular on this subject, as draining should precede all attempts to improve our Agriculture in this country.

No. 7 we shall not answer, but leave it to other parties.

No. 8, usual course of cropping, and modes of cultivation and manuring for each? we may make some reply to, but not so fully as would be necessary.

The practice most general in Lower Canada amongst Canadian farmers is to have the farm divided nearly in two equal divisions, and sow one half one year, and the other half the next year, without sowing any grass seeds on the half left for pasture for one year. The manure from the farm yard is frequently put out on a small portion of the pasture in the month of July, and left in cart loads unspread, until the fall ploughing when it is spread and ploughed in. We have often seen as much manure put out in this way upon an arpent or two as would be a reasonable dressing if properly applied, for ten arpents, or more, while these ten arpents are left without any although requiring it as much as that which had so much over what was necessary. The manure upon a large portion of farms is thus nearly wasted. It loses while in the yard, a large portion of its valuable properties, and is then put out to the field to be exposed in cart load heaps, to the hot sun at the most warm and drying season of the year. It thus must loose three fourths of its value before it is employed in the production of crops. The land that has been thus left for pasture is generally ploughed once in the Fall for sowing in the following Spring with wheat, peas, oats, &c. The ploughing may be executed so as to turn over the soil, but is seldom ploughed according to the established rules of good ploughing, as regards the width and depth of the furrow slice, and the proportion they should bear to each other. The ridges are not straight, nor the furrows properly finished and cleaned out for the water to run off. The bottom of the furrows should always be lower than the ploughed soil of the ridges in order to carry off the water from the ridges that would otherwise lodge under the furrow slices which form the ridges. By passing the plough once in each furrow, after all the land is turned over, a deep furrow would be formed which would completely drain the ridges if there are proper outlets, provided to command the furrows. The want of attention to these matters is a great defect in Canadian ploughing, and the cause of the lands being so saturated with moisture at the Spring sowing time. These defects are easy to remedy, if farmers would take time to do the work. It is not a defect of a doubtful character, but one that must be plain to any man who will examine ploughed lands. If the bottom of the furrows are not *decidedly* below the under sides of the furrow slices, that form the ridges, it will be impossible for the water to pass off from the ridges, but it will remain under the furrow slices, to the great damage of the soil, and whatever crop sown upon it. We admit that good crops are frequently raised by this defective system but certainly only where the soil is of the very best quality, and where it would give still better crops, if cultivated properly. There is no such thing as a regular rotation of crops observed that is so necessary in good farming. The land is allowed to repose every alternate year, and cropped every alternate year by the simple preparation of one ploughing and harrowing in the seed in the Spring. If this system was practised in the British Isles, they would not raise crops of one fifth the value of those that are raised in these countries, under a better system of husbandry. Parties may think that improved systems of Agriculture would be unsuitable for Lower Canada, but there is no doubt that many improvements are required in our system of husbandry that might be introduced with advantage to farmers and to the country generally.

9th. Weeding the crops, &c.

We reply to this that weeding the crops is very much neglected generally, and that weeds prevail very injuriously in consequence of defective cultivation, the total neglect of rotation of crops, the small proportion of green crops, and the want of Summer fallowing to clean the soil properly. Thistles,

Wild-mustard, the Ox-eye-daisy, Wild-pea, Wild-oats and Mugwort are amongst the most prevailing and troublesome weeds, but there are many other very injurious. Couch-grass is very general and scarcely any exertion made to remove or destroy it, consequently it is to be seen in almost every crop, and in the hay crop when the land is seeded down. It is almost impossible to get rid of this grass, except by Summer fallow properly executed, when all the roots of this grass are harrowed up and hand-picked off the land. A large proportion of the nutriment of the soil is absorbed by worthless weeds in Lower Canada, and there is no effectual means adopted to check or remove them, on the contrary our system of husbandry tends to augment their number every year, and make them more injurous to the farmer. When weeds are allowed to mature, their seeds are sure to find their way to the fields in the manure, mixed with the seeds sown by the farmer, or fallen from the plants where they have grown in the lands.

No 11. Pastures.

The pastures are generally poor, compared with those of the British Isles, and with what they might be here. We have seen some excellent pastures in Lower Canada where justice has been done to them. It is a great mistake to lay down land in an exhausted state, and without any grass seed or clover for pasture. It cannot produce good pasture for animals, particularly when it is again ploughed up before it is covered with a natural herbage of grasses, or has time to be enriched by the manure of the cattle pastured upon it. If lands were allowed to remain in grass several years, they would become good pastures, although they might have been laid down exhausted and without clover or other grass seeds. By keeping the weeds checked, lands would soon become stocked with natural grasses, and make great improvement as pastures. The roots of grasses that would be found in a pasture well stocked with them, would be a great means of manure when ploughed up for a cultivated crop. New pastures, unless laid down properly, and in a state of fertility have not fattening qualities, and will not be very productive in butter or cheese. In England, they frequently top dress the pastures where dairy cows are kept, supposing that cows giving milk, butter, and cheese, must withdraw from the pastures more nutriment than the manure of the cows returns to the soil, and we believe they are correct in this opinion. Pastures instead of being neglected as with us, should be a matter of great importance to us, to have them as good as they could be made, and then our cattle and sheep might be improved to the uttermost, and our farms would be altogether more valuable.

We are very sorry that the Legislature have not introduced some measures this Session for the establishment of "Associations of Agricultural Credit," or for authorizing their establishment. The new Banking Bill now before Parliament, should it become law, will not be likely to give much direct relief of agriculture. No doubt if we had many Banks, we should have more capital in circulation, but we cannot see that the Bill in question is likely to bring capital into circulation that would be much direct benefit to farmers. The plan we have submitted is, we humbly conceive, the one that would be suitable and beneficial for agriculturists, and to refuse them the privilege to provide capital from their own property, is not the way to advance their interest or afford them the means of improvement or prosperity. There is no doubt that agriculturists have ample security for the establishment of "Associations of Agricultural Credit," and while the authority for their establishment is withheld, it would appear, as if jus-

tice was not done to them, or to their interests. We should be glad to hear the objections advanced against these Associations, if there are any sound ones possible. We should then be better able to meet these objections. Until, however, these Associations can be clearly proved to be objectionable, and unsafe for the country, we shall continue to urge the right of agriculturists to have the privilege to establish them. Their establishment could not be unjust towards any class or party in the country, and it would be only granting agriculturists the same advantages that have been possessed by other classes long ago. We may not be able to discover all the advantages that the new Banking Law is to offer to farmers, but as we have given much thought to the plan we have submitted, we understand it better, and suppose that "Associations of Agricultural Credit," would be more suitable for them, and better calculated to promote their interests. It is well understood that Banking accommodation, unless in the way of "Cash Credits," as in Scotland, or by way of "Associations of Agricultural Credit," as in several countries in Europe, is the only means of accommodation that would be suitable for farmers, whose returns are slow, and generally annual. We would not propose that any farmer should obtain large loans, but only moderate assistance to enable him to improve and work his farm to more advantage, and the principle of these associations would be to see that any farmer obtaining accommodation should apply it judiciously, and make his annual payment regularly. These annual payments would be such a moderate per centage upon the loan granted, that no farmer who was industrious, and employed the loan judiciously, could have any difficulty in making the payments regularly: and not having any large amount to pay at once, there would not be any ill consequences to be apprehended. It is quite a different affair from what is known as "Building Societies" Parties may have borrowed money to build houses in the hope that the rents of these houses would enable them to meet the payments to the Building Societies. This expectation at best, is a dangerous uncertainty, and has caused the ruin of many who had borrowed from Building Societies. It would not be so with agriculturists. Capital obtained by them in moderate amount, and employed in draining or improved cultivation, would yield a sure return that would enable them to meet the annual payments to the Association. A small amount to a farmer who would employ it judiciously, would in many cases, enable him to increase his productions the first year to the full extent of the amount borrowed. We have seen many instances when ten pounds laid out properly in draining alone, might have doubled the annual produce of the farm. This matter is one of vast importance to the whole Province, and deserves the most serious consideration.

The new School Bill for Lower Canada, will, we hope, contain some provisions for Agricultural Education. It appears quite unreasonable that this provision should not have been long since made. It may be very well to follow precedents in many cases, but we do not see any reason why we should not make precedents for others, as well as follow them. Can there exist any question that our Youth would be more benefited by reading suitable books on the theory and practice of agriculture, than any other description of books usually found in our country schools? There is much entertainment, as well as useful instruction to be found in agricultural books, and it is doing a great injustice to the most noble, most delightful, most useful, and necessary of all employments, to withold books connected with this employment from the children of the rural population, while every other trashy work is forced upon their notice and study. We do

not object to necessary books for the study and instruction of youth, to give them a knowledge of the world and of mankind; but let them also have agricultural books to read and study—to give them some idea of—and attachment to their own profession. What are the objections to this course? Would it be likely to make the children of the rural population worse members of society, or less fit for the occupation of farmers? Why should these books, and this system of education have been excluded from our country schools up to this period? Without hesitation we answer, that this extraordinary system of teaching and training, for any thing, or every thing, but the business which they are to be employed in for life, has been a great bar to agricultural improvement, and has been productive of much injury to the rural population. Agriculture requires and is entitled, to as much training and instruction, by books, and by practice, as any other business or profession, and it is from the neglect with which it has been treated in this respect, that it is so little valued, and reading and study for it not considered necessary. Let agriculture and agriculturists have fair play in future, and we shall not long have to lament its backward state, but on the contrary, rejoice at its prosperous condition.

We have received a letter from the Secretary of the Agricultural Association of Upper Canada, George Buckland, Esq., inviting at the request of the Directors of that Association, the attendance of the President and other officers of the Lower Canada Agricultural Society, at the Annual Exhibition to take place at the Town of Niagara on the 18th, 19th and 20th of September next, and shall submit this letter to the next Quarterly Meeting of the Directors of the Lower Canada Agricultural Society to take place on Friday the 23rd of August instant.

We humbly conceive it would be most desirable, that frequent communication and friendly relations should be maintained between the two great Agricultural Societies of the United Province, as the best means of promoting the objects for which the Societies were first organized and we are not aware of any excuse that should prevent those friendly relations, and frequent communications. It would greatly increase the influence of both Associations that they should be on the most friendly and intimate terms, actuated by the same spirit of pure and patriotic motives in promoting the improvement of agriculture and thereby the general prosperity of our country. When these friendly relations do not exist between Agricultural Societies who profess to have the same object in view, it renders them liable to have their motives questioned. The general, and not the sectional improvement of husbandry, should be the object of every Agricultural Society receiving Legislative grants, and this should appear manifest in all their proceedings. Mr. Buckland has sent several premium lists, which we have distributed agreeably to his request, retaining one at the Rooms of the Lower Canada Agricultural Society, which may be referred to there by any parties wishing to see it. We observe with much satisfaction that there are two classes of premiums, including horses, neat cattle, sheep, and agricultural implements, open to all competitors, although the prizes are certainly small compared with other classes and we only regret this circumstance as it may discourage parties to bring animals from a distance at a considerable expense. We do not by any means think it necessary to have a high scale of premiums, and the Highland Society of Scotland, and the Royal Irish Agricultural Society, act upon this principle this year. A numerous list of moderate premiums, will answer best in this country, and they have adopted this plan in the State of New York. The Premium List before us is also moderate, and numerous and reflects great credit upon the Association. We wish them every possible success and as numerous a meet-

ing as they can desire. We hope, though late in the field, that the Lower Canada Agricultural Society, may yet hold their proposed Exhibition, in Montreal, if not in Quebec. There is abundant time for advertizing for an Exhibition in October, and it would be better that farmers should come with their stock and produce as they are, rather than they should be previously prepared for the occasion.

It is generally considered in the British Isles, that in the improvement of stock by crossing, it is not judicious to proceed further than the first cross without having purity of blood on the one side. The first cross, if from judicious selections, may produce a very good breed, but to continue to breed from this cross, both male and female, will not produce the most profitable breed, particularly for dairy purposes. After the first cross, it will always be prudent to provide a bull of some pure breed, that is not greatly over the size of the cross breed. If we desire a good and profitable breed of cattle, careful selection, and attention to keeping a pure breed on one side is actually necessary. It is by this means alone that such perfection is attained in the British Isles in cattle and sheep, and without the same care and attention here, we never can obtain the best breeds of stock. The Canadian race of horses are extremely deteriorated by crossing and continued crossing until there is scarcely an unmixed breed of Canadian horses to be found. We every day see marks of a cross with other breeds in horses that are represented as pure Canadian. These marks are unmistakable by any good judges, and we are confident that continued crossing in breeding horses, without perfect purity of blood on one side, is calculated to produce an inferior race of horses, and more particularly if the first cross is not a superior and suitable breed to cross with. A vastly increased value might be given to the stock of this country by due attention to these matters. Proper attention to feeding would also be required. But by judicious management in all these particulars our stock might be doubled in value in a very few years, and this would be a great increase of the wealth of the country, that might be easily attained. No *decided* breed of animals can be produced by constant crossing, and no certain perfection can be attained from such mixtures. We recommend this subject to the consideration of farmers, and we can assure them it is worthy of all the attention they can bestow upon it.

In England, where it is admitted, they practise a better system of Agriculture than in any other country on earth, they find that one rotation of even "high farming" is not sufficient to bring land up to what it is capable of producing, but that it requires a series of rotations to put land into condition, necessary to render the cultivation of it profitable. It may, therefore, be imagined what state the generality of farms are in here, where so few adopt a regular rotation, and follow it up constantly. Indeed we think that as the proportion of green crops cultivated in Canada is so small, compared to the whole quantity of arable land, that it is impossible to adopt a good rotation, or keep the land in proper condition, unless a considerable proportion is regularly Summer fallowed to make up the deficiency of green crops. Summer fallow, must be kept up in the rotation, to keep the lands clean and in a due degree of fertility. Where a large proportion of a farm is kept in meadow and good pasture, there is not much danger of its becoming exhausted, by top dressing the meadows occasionally, and ploughing them up, (when natural grasses are found to prevail over the artificial grasses,) and putting them through a regular rotation and seeding them down again with suitable grass seed and clover. On farms kept for the supply of hay near towns, the cultivation of other crops should only be a secondary consideration, and they are

only necessary so far as required to keep the meadows in good condition for producing good hay for the market. This is not a difficult mode of farming, where the land is suitable, and convenient to market. The chief requisite is, that all lands in meadows shall produce the best quality of hay, as this will make the acreable value much greater. It is as much expense to dispose of inferior hay as that which brings the highest price. The grand foundation of all Agricultural improvement in the British Isles, is considered to be the feeding of stock. We are convinced that in Canada, we shall never have any profitable improvement in our Agriculture where most required, without having more of good pasture and meadows. Without these we cannot have good cattle, and without cattle properly kept, we cannot have good manure or good crops. The manure of stock barely kept in existence, fed on straw in winter, and poor pasture in Summer, is not much value to the land. In England, farmers use a proportion of oil-cake to feed stock, with a view of improving the manure of cattle, and they find that feeding on a proportion of grain also improves the manure. How different it is in this country. Few farmers here think of improving the manure of stock, by making use of grain or oil-cake for feeding. It has been clearly proved in England, that, the manure of cattle or sheep fattened on roots, is not of much more than half the value of the manure of cattle and sheep that have a portion of grain or oil-cake given to them with the roots. Farmers may imagine their own farming very superior, who have never seen or read of any other, but this is a very injurious delusion and checks improvements.

We recommend to our readers the following speech of Professor Johnston. It will give an idea of his estimation of Agriculture in North America, and there are few gentlemen better qualified to make a correct estimate on the subject. He has seen good farming, and he can understand the difference between what is a good and what is a defective system of agriculture, and we may take his word for it that our agriculture is far behind that of Britain, and the sooner we are able to lessen the distance the better it will be for us. There is nothing in the climate or soil of Canada to prevent our agriculture approaching very closely the most perfect system practiced in the British Isles:—

PROFESSOR JOHNSTON.

At a recent meeting of the East of Berwickshire Farmer's Club, Professor Johnston, returned from America, at the request of his friend Mr. Milne, of Milne-Garden, delivered the following address, which we have much pleapleasure in laying before our readers:—

I will briefly refer to some points which came under my observation in that part of the country which I visited. First of all, as to the state of agriculture in the northern parts of America, in our own provinces, and in New England, with which we are ourselves more familiar, when I tell you generally that the state of agriculture in those parts of America is what the state of agriculture in Scotland probably was 80 or 90 years ago; and when I tell you that in some parts of New Brunswick they are very nearly in the precise condition in which Scotland was 120 years ago, you will have an idea of the state of agriculture in North America. The system of agriculture is no farther forward—it is exceedingly far behind. They are not even acquainted with the improved methods of farming, or the improved implements which are now in common use in this country; while the increased facilities which Mr Milne would still further introduce have never even been heard of by them. Now, in regard to this state of things in the whole of the northern parts of America, go as far west as you like, and as far south as you like, the same general description applies to the whole. Now, the next question is, how has this state of things been brought about? You are probably not all so well acquainted with the state of agriculture in this country 100 or 120 years ago as I have found it my duty to make myself, and at the time to which I refer, I allude not only to the state of great ignorance in regard to the cultivation of the soil, but the state of exhaustion in the soil itself. So in referring to the present state of agriculture in America, I refer to two considerations—the condition of mind brought to bear upon the cultivation of the land and the state of the land itself. In regard

to the cultivation of land in America, its condition arises from a variety of causes, and very few considerations will enable you to understand how it has come about. If you ask yourselves to what class does the majority of emigrants belong; you will have no difficulty in coming to a conclusion. Look at the great crowds of people who go from Ireland, from the Highlands of Scotland, and the hundreds of thousands proceeding from the great towns of England and Scotland—ask yourselves of what class they consist—what amount of intelligence and agricultural knowledge they possess; and in the answer to this you will at once find the key to the state of the land in the whole northern part of America. The people who first settled in America knew nothing of agriculture, and their descendants generally copied the habits of their predecessors. Thus it came that their sons knew nothing; out of the way of books—out of the way of instruction, supposing them to have even read books which gave instruction, they would have made very little progress; but we must suppose them not to have had an opportunity of gaining knowledge and therefore instead of advancing, they have retrograded in agricultural knowledge and practice. Now, what has been their procedure—by what kind of procedure have they brought about the state of exhaustion to which the soil has been reduced? Of course, in speaking of the exhausted soil, I do not refer to the virgin soil which has never received the plough or the spade, but to the soil under their cultivation, and which they are now exhausting. When I tell you how the land is cultivated, you will understand how this exhaustion has been produced. The forest is in the first place cut down and burnt, after which the ashes are scattered, and a crop of wheat and oats is sown. When this crop is cut down another is sown; but they do not always remove the straw—they do not trouble themselves with any manure. The second year they sow it in succession. When they can take no more out of it, they either sow grass seeds, or as frequently let it seed itself. They will then sometimes cut hay for 13, 14, 16, 18, or 20 years in succession, in fact as long as they can even get half a-ton an an acre from it. And you may suppose what is the natural fertility of the land when they are able to obtain as much as three or four tons per acre at first and go on cutting it for 12 years. They will probably have two tons an acre during a l that length of time. The land is then broken up, and the crop of oats taken—then potatoes—then a crop of wheat—and then hay for 12 years again, and so the same course is repeated. Now this is the way in which the land is treated—this is the way in which the exhaustion is brought about. This exhaustion exists in Nova Scotia, New Brunswick, Lower Canada in Upper Canada to a considerable extent, over the whole of New-England, and extends into the state of New York. The next inquiry which you will make, is, what steps they are taking to remedy this state of things? Are they doing anything to bring back the land to a productive condition? and, in order to do this, are they taking steps to put any knowledge into the heads of those who cultivate it? Now, on those points I am happy to say that I can speak very favourably. They possess the spirit of their forefathers, and having become conscious of the state in which agriculture really is, they are endeavouring to improve it. But you will ask what inducement have they to make these exertions? They grow corn enough—they have no want of agricultural produce as we have; but when I tell you what is the condition of New England in reference to the Western States you will understand. All the new States—all the virgin land, when it is cultivated, yields a crop for little or nothing, but it cannot yield by means a large crop. In the State of Michigan, between Lakes Superior, and Erie, the average produce is not 12 bushels an acre, but it is got for nothing. In New Brunswick, which is very thinly populated, I was told that 10 bushels an acre paid well; but the produce is not large. In the Western States they are enabled to produce it very cheaply.

Mr Hay.—What was the value of a bushel of Wheat?

Professor Johnston.—At the time I was there the price varied from 60 to 80 cents a bushel, *i. e.*, 100 cents being 4s 4d. In the extensive western states, and part of New York, where it is shipped to England, the price varies according to the distance. Now, the condition of things in the western States in reference to England is precisely the same as the condition of England in reference to the wheat-producing countries of the Baltic. The condition of the farmers is exceedingly bad, and in Maine, I was informed that they were all in a state of bankruptcy. The land is all mortgaged, which hangs like a mill stone round their necks, and is worse even than the state of the farmers in this country. They are thus unable to compete with the western parts of New York or Lake Ontario. You have all heard of the famous wheat of Genessee, where the land is more fertile than in any part of Great Britain, and I learned there that they are laying the land down grass, because they cannot afford to grow wheat. As a remedy for this state of things, they are establishing agricultural societies in the different states, and the legislature is providing funds to support these societies, and for the diffusion of knowledge. The central Society is in Albany, and to it the different branches send reports. The Legislature publish these in one thick volume, and circulate 20,000 copies gratuitously throughout the States. This central society asked me to give their annual address at Syracuse, and a course of Lectures before the legislature at Al-

bany. These lectures are to form part of this year's report; and the Legislature have resolto print an additional 20,000 copies, making 40, 000 altogether, and to circulate them gratuitously through the different States. Let us now come to another point of great importance, and to which you would perhaps like me to advert, viz., what will be the effect of an improved condition of agriculture in America upon us—what influence will the growth of wheat in the States have upon us—or what influence is the progress in agriculture, consequent on this great desire for improvement likely to have upon the state of agriculture in Great Britain? In New Brunswick, New England, Vermont, New Hampshire, Connecticut, and New York, the growth of wheat has ceased; and it is now gradually receding farther and farther westward. Now, when I tell you this, you will see that what I believe to be the case—that it will not be very long before America will be unable—in fact the United States are unable now—to supply us with wheat in any large quantity. If we could bring Indian corn into general use, we might get plenty of it; but I do not think that the United States need be any bugbear to you. I believe the great source of competition you will have to contend with is the Baltic and the countries on the borders of the Black Sea. Now, in regard to the other point, viz., what effect will the desire for improvement in agriculture have upon the agriculture of this country—it ought to stimulate us to still greater exertions. Sure I am, that with proper exertion, we will always keep a-head of them. There is as good blood in this country as ever went out of it. I hope English and Scotch heads and hearts will not become lanquid and dull on a matter of such moment as this, but that we will continue to beat them, as I am sure from what I have seen, that we are able. What the Americans can do well, we ought to to be able to do better. (The learned Professor sat down amid great applause.)

Envelope Machine.—We (*Manchester Examiner*) have been favoured with an inspection of a newly-invented envelope machine, patented ed by Remond, which is now being made at the Atlas Works (Messrs. Sharpe and Co's), Oxford-street. It is small and of simple construction, consisting of a "carrier," with "plunger" and "folding box," which has on one side a stamper, continually supplied with colouring matter, and on the other a plain bit of wood, covered with felt, and supplied with gum. The whole is worked by means of bellows. In working, the paper, which has already been shaped by a die, is placed on the "carrier," from which it is immediately taken off by a powerful aspiration from the bellows, and carried forward to the "folding-box," when the "plunge" drops on it, and squares it, the "stamper" and "gummer" on either sides dropping simultaneously on the edges. By another operation these edges are blown down, and the envelope, now gummed and stamped, is thrown off the machine by a side opening. The machine is worked by steam, and is capable, we believe, of throwing off from fifty to sixty envelopes per minute.

Fresh Beef From Australia.—We have lately had some beef submitted to our notice of most excellent quality, and perfectly preserved in tin cases, from Newcastle, near Sydney, New South Wales, of which considerable quantities are being imported into this country; and we earnestly recommend it to shipowners, as an invaluable substitute and change for their crews once or twice a-week, instead of salt beef and pork, especially as this change will not involve an extra expense. Many masters of ships have used this Australian beef and certified to its general fine quality; and with emigrant and passenger ships it must come into extensive use, because it does away with the necessity for taking such large supplies of live stock; but a powerful recommendation is found in the fact that the Admiralty, aware of the great utility of using preserved boiled beef, for the crews of her Majesty's ships, have required tenders for the supply of 1,000,000 lbs.—*Shipping and Mercantile Gazette.*

A trial of Ploughs is to be made every day during this week, under the direction of the Executive Committee of the N. Y. State Agricultural Society; nearly forty different ploughs have been entered for the trial, the competitors being from New York, New England, New Jersey, Michigan and Canada. The Judges, who have been selected by the executive committee of the society, are gentlemen in whom the public have confidence; and they are directed, we understand, to pursue this trial until every implement shall be tested in the most thorough manner, and its character for performing the work desired, ascertained.

The trial commenced at 11 o'clock yesterday with stubble land. For this 12 ploughs were entered.

Alex. Fleck, of Montreal, drew No. 1.—Ploughman, Mathew Hutchinson, from Canada. The ground was in bad order from the excessive rains, yet the work was done in a manner that reflects great credit on the ploughman, as well as on the Wilkie Scotch plough, made by Mr. Fleck.—*Albany Argus.*

Party-Spirit—a species of mental vitriol, which we bottle up in our bosoms that we may squirt it against others, but which, in the meantime, irritates, corrodes, and poisons our own hearts.

Praise—that which costs us nothing, and which we are nevertheless the most unwilling to bestow upon others, even where it is most due, though we sometimes claim it the more for ourselves the less we deserve it: not reflecting that the breath of self-eulogy soils the face of the speaker even as the censer is dimmed by the smoke of its own perfume.

The intelligent have a right over the ignorant—the right of instructing them.

Pleasure loves the garden and the flowers; labour loves the fields and the grain; devotion loves the mountain and the skies.

We should be cautious in indulging in feelings of a virtuous indignation. It is the handsome brother of anger and hatred.

NOTICE.

THE Quarterly Meeting of the Directors of the Lower Canada Agricultural Society will take place at their Rooms in this City, on FRIDAY the 23rd day of August instant, at 11 o'clock, A. M.

By order

WM. EVANS,
Sec. L. C. A. S.

1st August, 1850.

Agents for the Agricultural Journal.

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