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MANUFACTURED FOODS FOR CATTLE.

Among the most obvious and important improvements in modern agriculture may justly be included the superior breeding and management of live stock. It is now well understood, and in some degree generally practised, that the improved breeds of the domesticated animals of the farm, in order to sustain their excellence, necessarily require a liberal and systematic course of feeding. Hence the general introduction of root crops into arable husbandry; the cutting of hay and straw, and steaming them with turnips, carrots, linseed, &c., for the susfentation of animals. These processes have unquestionably been marked improvements; a much less amount of raw food, by mixture and artificial preparation, has been made to support and fatten cattle in a much more effectual manner than could have possibly been accomplished under the old systems of agricultural routine.

Very recently a bold step in advance has professedly been taken in England, which, if one half that has been said of it be true, it would mark quite a distinct and important era in this department of agricultural progress. Foods artificially composed, containing nutritious ingredients, it is said, in a highly concentrated state, have been offered to the farmer; and as some of these have found their way into Canada (Thorley's for instance,) our readers may not feel altogether uninterested in the subsequent remarks.

In the last part that has come to us of the *Journal of the Royal Agricultural Society of England*, a very clever paper appears from the pen of that extensive and well known experimentalist, J. B. Lawes, Esq., F.R.S., on this interesting and important subject. As we have not had the opportunity of testing any of these preparations, nor of knowing any one who has on this side the Atlantic, we will endeavour to place in a familiar light the results at which Mr. Lawes has arrived after a careful investigation of the subject.

It would appear that the cost of these manufactured foods is from 40s. to 50s. sterling per cwt. Taking the ordinary stock foods at the current market prices in England, such as hay, linseed, and the different kinds of grain, it appears that, weight for weight, they are only a fourth or fifth of the cost of these manufactured compositions. Very undeniable evidence of their superiority when given in much smaller quantities should be required to induce the farmer extensively to employ them. The following is the result of an analysis of one of these foods, as performed in Mr. Lawes's laboratory at Rothamsted :- -

Water	12.86
Nitrogenous substances	15.51
Fatty matter	6.22
Starch, sugar, &c.	55.97
Woody fibre	5.50
Mineral matter	3.94
	100.00

Now, independently of coloring matter and flavoring with cumin, anise, or other stimulating seeds used in cattle medicine, which these foods frequently exhibit, the constituents stated in the above table could be readily supplied by a mixture of barley-meal, with peas, beans, and linseed, at a cost of about one-fourth of the price of the manufactured cattle food.

We subjoin, in a tabulated form, the results of a practical trial of the food, the proximate analysis of which is above recorded. The plan of the experiment is stated to have been as follows:—six pigs were selected and divided into two lots of three each, the collective weights of the respective lots differing from one another by only 2 lbs. To lot No. 1 a mixture was given, composed of nine parts barley-meal and one part bran. To lot No. 2 the same mixture of barley meal and bran was given, with the addition of two parts of the manufactured food to every ten parts of the barley and bran mixture. The food was in each case stirred up with hot water, and both lots were allowed as much of their respective foods as they choose to eat. The results of this comparative experiment were as follows:—

Description of Food.	No of Pigs.	Duration of Experm't (Days).	Original Weight.	Final Weight.	Increase.	Total food consumed	Food consumed to produce 100 of Increase.
			lbs.	lbs.	lbs.	lbs.	
Lot 1. Nine parts Barley meal, one part Bran	3	28	357	496	139	547	393
Lot 2. Nine parts Barley meal, one part Barn, two parts manufactured food	3	28	355	494	139	556	400

The amount of increase for a given quantity of food consumed was in both cases good. It is obvious, however, that so far from there being less total food consumed when the manufactured meal was employed, there were 9 lbs. more of the mixture eaten when one-sixth of it consisted of the expensive manufactured

food; whilst the amount of increase in weight was exactly the same in the two cases. In fact, the results are so nearly absolutely identical that the difference cannot, perhaps, be fairly attributed to any intrinsic difference in the character of the food. But it is, at any rate, clear that nothing was gained by adding to the barley meal and bran one-fifth of its weight of food costing about five times as much money.

It is recommended that these foods be used in comparatively small proportion to the total food consumed; the animals thus having mainly to rely on ordinary food, the comparatively innutritious matters of which, such as bran, straw, &c., are thereby rendered palatable and nutritious. Mr. Lawes however, contends that no evidence has been brought forward to show that these manufactured foods will so stimulate digestion as either to extract more of its already existing nutritious matters, or to render the woody fibre of the coarse foods mentioned more directly serviceable to the nourishment of the animals. All kinds of live stock, especially such as are in a growing or fattening state, require, in their daily food, a given amount of digestible constituents; such as starch, sugar, pectine, gum, oil, nitrogenous compounds, &c., all of which they must obtain from their food. No condiment or highly concentrated preparations, by acting as a stimulant, can adequately supply the waste and wants of the body, caused by respiration and perspiration, the loss by urine and fæces; the gain therefore in weight of fat, flesh, bone, &c., must all come from constituents actually contained in the food.

Mr. Lawes refers to some very elaborate experiments which he made on the feeding of animals at Rothamsted several years ago,—the results of which were published in the agricultural and scientific journals of the day,—when it was clearly ascertained that the ordinary foods, when in proper admixture with one another, supplied the several constituents far more economically, than mixtures in which some of the constituents, (starch, sugar or oil, for instance) were employed in a comparatively pure state. So that unless cheaper sources of food can be discovered than exist in hay and grain, &c., we cannot hope effectually and economically to replace the latter by any special manufactured foods for stock. It has been urged by the venders of concentrated foods that, as plants are rapidly pushed on by special, stimulating manures, so can the growth of animals by the prepared foods in question. But the analogy between plants and animals in this respect does not hold good. The supply of waste and increase of bulk in animals, it has been shown, are effected by the supply of materials contained in the ordinary food supplied them; whereas the greater bulk of matter contained in the plant is not derived from any special, concentrated, stimulating manure that may be applied, but essentially consists from materials derived from the atmosphere, and such as naturally belong to the soil, and are therefore dependent only in a subordinate degree on the will or skill of man.

Mr. Lawes further observes, that the virtues which such preparations do really possess over and above those which could be secured at one-fourth or one-

fifth the price, are confined to the action on the health and digestion of th animals of the small amount of stimulating and carminative seeds which the contain. In fact, so far, they are sauce or medicine, rather than food. As suel they are likely rather to increase than to diminish the appetite for furthe nutriment. Still, it is possible that, if judiciously compounded, they may be o service in keeping horses in a more healthy state of body, or in aiding the diges tive powers of weakly animals. Still it should always be borne in mind tha such preparations can never supply, in the ordinary way, the proper amount o the necessary ingredient contained in ordinary food. "I feel bound to sa [observes Mr. Lawes,] that I should require much clearer evidence than an that has hitherto been adduced, to satisfy me that the balance-sheet of my farn would present a more satisfactory result at the end of the year were I to give t each horse, ox, sheep, and pig, a daily allowance of one of these costly foods."

THE PROGRESS OF ENGLISH AGRICULTURE.

Continued from Page 210.

The farmers were too often worthy of their ploughs. In Leicestershire, where rich pastures made tenants indifferent to careful cultivation, the present presi dent of the Royal Agricultural Society, Lord Berners, found the farmers, as late as 1825, intentionally ploughing crooked with a long string of horses; and the Duke of Rutland, when in the chair at an agricultural meeting, was alarmed lest a storm of disapprobation should disturb the harmony of the day, because Lord Berners' brother ventured to suggest ploughing straight as a first step toward improvement, and exchanging the strings of slow hairy-legged horses for cur ricle pairs of lively steppers. Young calculated that at least one-half of the draught cattle might have been saved in Essex. The long file of men and beasts which were wasted upon the work provoked his indignation. He exhorted the farmers to raise less oats and more wheat, and to expend their summer provender in fattening bullocks, which were food for man, instead of maintaining superfluous horses, whose ultimate destiny was to furnish food for the kennel. Truths which to us seem truisms were heresies then, and such a simple suggestion as that of Young was distasteful to many a farmer of the olden time. There is no ground to triumph over them, for they were what their circumstances made them, but we may at least rejoice that the present system gives us an ox to eat where our ancestors had a horse to feed.

The pecuniary gains of agricultural progress are not to be estimated by the mere saving in wages, horse-labor, seed, or manure. Thorough draining not only diminishes the cost of ploughing, but it renders it possible to grow great crops of roots—of mangold-wurzel from thirty to thirty-five tons an acre, and of turnips from twenty to twenty-five tons. Ten times more live stock is thus fed on the land than it maintained before. The corn crop follows the roots in due course without further manuring, and is made certain, in addition, even in wet seasons. The well-shaped modern plough saves in horse-labor, as compared with the clumsy old-fashioned swing-plough, a sum which can only be calcu lated in reference to the tenacity of each kind of soil, but which on an average exceeds the power of *one* horse, besides enabling youths, skilful but not strong, to act as ploughmen, encouraging deep ploughing, the foundation on the best

land of good root crops. The advantage of the drill over broadcasting is not only in the smaller quantity of seed and manure required, or in the power to sow seed and manure together, or in its permitting the use of the horse-shoe, though these effect a saving in money equal to one-fourth of the value of the crop; but its great saving in the moist uncertain climate of England is time.—A day's delay in sowing by hand has lost many a season, whereas one horse-drill does the work of fifteen men. The clod-crusher, again, reduces the lumps to tilth, that no wooden "beetle," no loaded "sledge," no army of clotters could have broken, while on light land it gives consistence to the soil, making thousands of acres of corn stand upright which would otherwise have been rotting on the ground.

Under high farming, the manual labor employed is both increased and concentrated. A greater number of men are required per acre, and a lesser number in proportion to the produce. With mechanical assistance the crops are less dependent on the seasons, and each operation is more quickly performed. With improved breeding the stock is increased in quantity, more early and matured, and bears finer and more profitable meat. Four-year-old horned sheep are replaced by mutton grown in thirteen months. The aged cows or worn-out oxen, which form the staple of the continental meat-markets, lose from fifteen to twenty per cent. more in cooking than our well-fattened oxen and heifers, to say nothing of the difference in the quality of the flesh. At every stage the farmer who farms for money profits—not like the backwoodsman, the metayer, or peasant proprietor, merely to feed his family — loses by rude implements, ignorant cultivation, and coarse-bred live-stock. At every stage of progress the modern English farm becomes more like a manufactory, producing on a limited surface enormous quantities of food for man, turning Peruvian guano into corn, bones from the Pampas into roots, Russian oil-cake, Egyptian beans, Syrian locust-pods, into beef and mutton. The gain to the farmer and the landlord is, we repeat, the most insignificant part of the benefit. The agriculturist is the manufacturer of food for the nation, and upon his skill, under Providence, it depends whether plenty or scarcity prevails in the land.

To give some idea of the modern system of English agriculture, we subjoin a brief description of three farms in three different districts of England — the first, a light land self-drained; the second, clay, sand, and good pasture; the third, stiff clay; and all cultivated by tenants who have not expended money to purchase glory, but who have invested capital in order to earn a profit.

Mr. John Hudson, whose name is familiar to all English, and many French and German, agriculturists, began farming half a century ago. In 1822 he entered upon his now celebrated farm of Castle Acre, which consists of self-drained land, and is a fair specimen of the Norfolk light soil. At that period the only portable manure was rape-cake, which cost £13 a ton, and did not produce any visible effect upon the crops for a month. The whole live-stock consisted of 200 sheep and 40 cattle of the old Norfolk breed. He adopted what was then the new, now the old, and what is perhaps destined to become the obsolete four-course Norfolk system—that is to say, 250 acres pasture, 300 wheat, 300 barley; or, in dear years, 600 wheat, 300 roots, and 300 seeds, the rest being gardens and coverts. On these 1200 acres he at present maintains 10 dairy cows, 36 cart-horses, a flock of 400 breeding ewes, and fattens and sells 250 Short-horns, Herefords, Devons, or Scots, and 3000 Down sheep. The crops of swedes average from 25 to 30 tons, the mangold-wurzel from 30 to 35 tons per acre. His wheat had, in 1855, averaged, for the previous five years, 48 bushels per acre; the barley 56 bushels. Of the seeds, the clover is mowed for hay, the trefoil and white clover are fed down by sheep, and there are no bare fallows. The purchased food given to the cattle in the straw-yards and

sheds, and to the sheep in the field, consisting of oil-cake, meal, and beans, cost £2,000 a-year. The greater part of this oil-cake is charged to manure, which it enriches in quality as well as increases in quantity; but the direct expenditure on artificial manures—guano, nitrate of soda, and superphosphate of lime—amounts in addition to £1,000 a-year. Wages absorb from £2,600 to £3,000 a-year. Seven or eight waggon-loads per acre of farmyard-manure are ploughed in on land intended for roots, besides above 30s. worth per acre of superphosphate of lime drilled in with the turnip-seed; while wheat has a top-dressing of 1 cwt. of guano, ½ cwt. of nitrate of soda, and 2 cwt. of salt, mixed with earth and ashes. No weeds are grown. The turnips are taken up in November, and a troop, called by the vile name of a "gang," consisting of "boys and girls," under the care of an experienced man, traverse the ground, forking out and burning every particle of twitch or thistle. The same "troop" is called in during the progress of the root-crop whenever occasion requires, and immediately after harvest they go over the stubbles with their little three-pronged forks, exterminating the slightest vestige of a weed. The expenses of cleaning are thus kept down to 1s. an acre, a price which excited the admiration and doubts of that admirable agricultural essayist, the late Mr. Thomas Gisborne, and which proves that, by stopping the evil at the source, and never allowing the enemy to get ahead, land may be kept wholly weeded more cheaply than half weeded. Lord Berners mentioned as recently as 1855 that he found in Leicestershire hundreds of acres netted over with twitch as thick as a Life-guardsman's cane, and studded with clumps of thistles like bushes. Such neglected land required an expenditure of £5 to £6 an acre to put it in heart. The farmer who saw a thief daily stealing from his dung-heap, would soon call in the aid of a policeman. The weeds are an army of scattered thieves, and, if the pilferings of each are small in amount, the aggregate is immense. The wise and thrifty farmer, therefore, keeps his constabulary to take up the offender, and consign him as quickly as possible to death. He who allows himself to be daily robbed of his crop, and the community to the same extent of food, and all the while looks helplessly on, is not only a bad farmer, but in effect, though not in design, a bad citizen also.

Mr. J. Thomas, of Lidlington Park, our second example, farms about 800 acres of a mixed character under the Duke of Bedford, of whom it is the highest praise to say that he is a landlord worthy of such tenants, consisting in part of clay, which has been rendered profitable for arable cultivation by deep drainage, and in part of what is locally called sand, which has been reduced from rabbit-warrens to corn-fields by the Norfolk system. This intelligent cultivator read a paper some time since to the Central Farmers' Club, in which he stated, with the assent of his tenant audience, that, under very high farming, it was not only possible but advisable to reduce the fertility of the soil by the more frequent growth of grain—as, for instance, by taking barley after wheat, and returning to the once fatal system of two white crops in succession. He said that, under the four or five-course he began to find his "turnips subject to strange, inexplicable diseases; his barley (where a large crop of swedes had been fed on the ground by sheep, with the addition of cake or corn) laid flat on the ground by its own weight, and in a wet harvest sprouted, thus rendering the grain unfit for the maltster, the straw valueless as fodder, while the young clover was stifled and killed by the lodgment of the barley crop." Thus, while Roman agriculturists, with all their garden-like care, were tormented by a decreasing produce, on an exhausted soil, we, after ages of cropping, have arrived at the point of an over-abundant fertility—an evil to be cured, not by any fixed rule, but "by permitting the diligent and intelligent tenant-farmer a freer exercise of judgment." In this speaker we have another specimen of the

invaluable class of men by whom, during the last ten years, on tens of thousands of acres, the produce of meat and corn has been doubled.

At Lidlington, where there is strong clay to deal with, and more good grass-land than exists at Castle Acre, it is not necessary to purchase so much food to keep live-stock for manure. But there are about one hundred and fifty beasts and one thousand sheep sold fat, besides a choice breeding flock of four hundred Downs, the result of twenty years' care. By these sheep the light land is consolidated and enriched. If they are store sheep they are allowed to gnaw the turnips on the ground for part of the year; if they are young and to be fatted for market, the turnips are drawn, topped, tailed, and sliced by a boy with a portable machine. Thus feeding by day and penned successively over every part of the field by night, they fertilize and compress, as effectually as any roller, the light-blowing sand, and prepare soil which would scarcely feed a family of rabbits for luxuriant corn-crops. The cattle, consisting of two-year-old Devons, Hereford, or short-horns, or three-year-old Scots or Anglesea runts, purchased at fairs according to the supply and market-price, in spring or summer, are run on the inferior pasture until winter, then taken into the yards or stalls, fed with hay, swedes, mangold, ground cake, linseed, or barley meal, and allowed an unlimited supply of clean water. When the spring comes round they are put on the best grass, and sent off to market as fast as they become ripe, having left behind them a store of manure, which is the capital from which everything else must spring.

Ten years ago four miles of rough bark fences were cleared away on the clay half of this farm, and replaced by single rows of blackthorn, dividing the fields into square lots of forty or fifty acres. Under the old system two hundred acres were poor pasture; now under the rotation system the strong clay feeds four times as much live-stock as before, and bears wheat at least twice in six years. According to the latest experience, the most profitable system in its present light condition would be, to devote the farmyard dung to growing clover, to eat down the clover with folded sheep, and then to use the ground fertilized by the roots of the clover, without home-made manure, for cereal crops, assisted by a top-dressing of guano, to be followed by roots nourished with superphosphate of lime. Good implements come in aid of good methods of cultivation. Mr. Thomas has eight or nine of Howard's iron ploughs—both light and heavy—iron harrows to match the ploughs, a cultivator to stir the earth, a grubber to gather weeds, half a dozen drills, manure distributors, and horse-hoes, a clod-crusher, a heavy stone-roller, a haymaking-machine, and horse-rakes. Reaping machines are to follow. To deal with the crops, a fixed steam-engine, under the care of a plough-boy, puts in motion the compendious barn machinery we have already described, which threshes, dresses, and divides the corn according to its quality, and raises the straw into the loft, and the grain into the granary, besides working a chaff-cutter, a bean-splitter, a cake-crusher, and stones for grinding corn or linseed. With machinery no large barn is required in the English climate; the corn can remain in the rick until required for market.—About twenty men and thirty trained boys, under an aged chief, are constantly employed.

No land is here lost by unnecessary fences; no food is wasted on ill-bred live-stock; no fertility is consumed by weeds; no time or labor is thrown away. One crop prepares the way for another, and the wheeled plough, under the charge of a man or boy, follows quick upon the footsteps of the reaper. The sheep stock is kept up to perfection of form by retaining only the best-shaped ewe-lambs, and hiring or buying the best South-down rams. The profit of keeping first-class stock was proved at the Christmas market of 1856, when twenty-five pure Down shearlings, of twenty months old, which were sold by

auction at Hitchin, made an average of £4 5s. each, being nearly double the usual weight. The large produce, whether in corn or meat, is the result of a system the very converse of that practised by the Belgian peasant proprietor, or French metayer, whose main object is to feed his family, and avoid every possible payment in cash. As for laying out sixpence on manure, or cattle food for making manure, no such notion ever crosses the minds of those industrious hard-living peasants, and the diminution in the means of subsistence in consequence, is almost past calculation. He who puts most into the land, and gets most out of it, is the true farmer. The bad cultivator gives little, and receives accordingly.

When the Central Farmers' Club discussed the advantage of returning to the plan of more frequent corn crops, which before the days of artificial manures was found to be utterly ruinous, the then chairman said that he "had for several years taken a crop of wheat every other year; and that on such soil as that of his farm, as long as he manured accordingly, he considered that he was not using the land (one-half of which is his own freehold) unfairly." This Weald of Sussex farm shall be our third example; and we adduce it to show what may be done with the most intractable class of retentive soils. A few years ago it was divided into enclosures of from four to eight acres each by broad hedgerows, many of them with ditches on both sides. It was among the evils of these small enclosures that they facilitated the old make-shift plan of draining by surface furrows to shallow sub-drains of bushes, because the water had not far to run. A partial cure postpones complete remedies. In the numerous hedges, according to the custom of the county, the landlord grew oak timber and the tenant underwood for fuel and for mending fences. Before railways had made coal cheaper than hedgerow cuttings, the laborers were employed in fine weather during the winter in trimming the hedges, and clearing out furrows and ditches; in wet weather they retreated to a large barn and threshed out wheat or oats with a flail, in a damp atmosphere the most unfavorable for the condition of the corn, and a time of the year most convenient for pilfering it. The usual course of cropping was—1, fallow; 2, wheat; 3, oats; 4, seeds. The seed crop were fed until the beginning of June with all the stock of the farm, and then broken up for a bare fallow with a wooden turnwrist plough.—The crops were about twenty bushels of wheat per acre once in four years, about forty-eight bushels of oats the year following, and hay and seeds in the third year. The stock consisted of about twenty-five cows, and ten young beasts, which were sold half-fat. The horses ploughed four at a time in a line, and were usually the plumpest animals on farm. Sheep there were none, nor was it believed possible to keep them without Down feed. Lime was the only manure purchased, and hay the only winter food. The present owner and farmer of Ockley Manor, after travelling through England to study the best specimen of modern tenant-farming, began by reducing a hundred enclosures to twenty, and by borrowing enough money from the public loan to drain the whole of his clays, the stiffest imaginable, three feet six inches deep. He would have preferred four feet deep, but the expense lopped off six inches. This indispensable preliminary process enables him to grow roots and keep a large stock of Southdown sheep on his clovers and seeds, with plenty of cake, running them on the land almost all the year round. To assist in disintegrating the drained clay he avails himself of "Warne's box-feeding" system, manufacturing a large quantity of long straw-dung, which, when ploughed in, exercises a mechanical as well as a fertilizing effect.

There are three modes of feeding cattle in use—open yards, stalls, and boxes. Well-built yards are surrounded by sheds for shelter, the open space is dish-shaped, thinly sprinkled with earth, and thickly covered with straw, which is

renewed from time to time as the cattle trample it into manure. The roofs of all the surrounding buildings are provided with gutters, and the rain is carried into underground drains. The liquid manure is pumped back upon the prepared dung-heaps. These yards are attached to all root-feeding farms, and by their appearance and the quality of the cattle fed in them a fair opinion may be formed of the management of the tenant. In stalls the cattle are tied by the head under cover, with more or less straw under them according to the proportion of arable land. On the "box system" each beast is penned in a separate compartment under cover, and supplied from day to day with just as much straw as will cover the solids and absorb the liquid dung. By the time the beast is fat his cell is full of solid well fermented manure, of the most valuable description for clay land. The cattle, whether in yards, stables, or boxes, and all are often to be found on the same farm, ought to be bountifully fed with sliced or pulped roots mixed with chaff, hay, oil-cake, linseed, or corn. The extra buildings make boxes the most expensive plan, but in no way do the animals thrive better, and where there is an ample supply of straw it is the most advantageous method of manufacturing manure. Box-feeding affords one more instance of the antiquity of many modern agricultural practices. In Sir John Sinclair's "Statistical Survey of Scotland," published 1795, we read that in the Shetland Island of Unst, "The method of preserving manure is by leaving it to accumulate in the beast-house under the cattle, mixed with layers of grass and short heather, till the beasts cannot enter. When the house is full the dung is spread over the fields." Doubtless the islanders of Unst found, in their damp climate, that dung collected out of doors lost all its fertilizing value. At Ockley farm, with the assistance of the grass-land, from one hundred to one hundred and twenty of the best class of Sussex, or Devons, or Scots, are fattened every year in boxes, built cheaply enough of the timber from the condemned hedgerows, interlaced with furze and plastered with Sussex mud. Though not very sumptuous externally, they are warm and well ventilated. Twenty Alderney cows eat up what the fat cattle leave on the pastures (each cow being tethered), and supply first-class butter for Brighton—a market which requires the best description of farm produce. In manufacturing districts quantity pays the grazier or dairyman the best, in fashionable quarters quality. Eight hundred fat Down sheep and lambs, and about eighty pigs, which are sold off cheaply in the shape of what is popularly called "dairy-fed pork," complete the animal results on this Weald of Sussex farm.

On four hundred and fifty acres devoted to arable cultivation wheat is grown every alternate year, at the rate of from forty to forty-eight bushels per acre.—The sheep and lambs, which get fat on the clover or other seeds, assisted by cake, prepare the soil for the alternate corn crops, and have doubled the original produce. The roots fatten the cattle in boxes, and, while they are growing ripe for the butcher, they manufacture the long straw manure, which both enriches the tenacious soil, and by its fermentation assists to break it up. Space, light, and air have been gained by clearing away huge fences, which, besides their other evils, harbored hundreds of corn-consuming vermin. By these and such-like methods, all novelties in Sussex, the produce of the farm has in ten years been trebled, and the condition of the soil incalculably improved; and all would have been vain, and much of it impossible, without the adoption of deep, thorough gridiron drainage. This has done in the Weald of Sussex clay what sheep-feeding and drill-husbandry did for the warrens of Norfolk, the sands of Bedford, and the Downs of Wiltshire and Dorsetshire. The result, however, is not so satisfactory in a profitable point of view as in light land counties, because, as Talpa has shown in his "Annals of a Clay Farm," it is almost impossible on a retentive soil, with any paying number of horses, to get through more than

one-third of the ploughing before winter sets in, with its rain and snow. The cultivators of the farms which from their natural fertility in dry seasons were in favor for centuries, while what are now our finest corn-growing districts were Moorland deserts, are often beaten by time, prevented as they are by the wet from getting on the land, and obliged to work slowly with three or four horses. Yet on autumnal cultivation depends the security of the root-crops—and the root-crops are like the agricultural "Tortoise" of Indian mythology, the basis on which rests the rent-paying corn crop. Much, therefore, as deep drainage has done for advanced farmers on retentive clays, it has not done enough, and they look anxiously forward for the time when a perfect *steam cultivator* will make them independent of animal power, and enable them, if needful, to work night as well as day during every hour of dry weather.

We have not thought it necessary to dwell upon any of those profitless agricultural miracles which are from time to time performed, to the great amazement of the class with whom turnips are only associated with boiled legs of mutton, and mangold-wurzel with salad. As little have we cared to describe liquid-manure farms, netted over with iron pipes, irrigated by hose and jet, and a perpetually pumping steam-engine, for the simple reason that, while deep drains, guano, superphosphate of lime, long straw manure, and other aids to agriculture introduced within the last fifteen years, give an early result, liquid manure, under an English sun, has never been proved to be effective, except for grass crops on a dairy farm. We have contented ourselves with selecting illustrations which, though not specimens of perfection in every department, for they all have defects, and in two out of three the buildings and implements might easily be improved, are yet fair types of the system of cultivation which is making rapid progress through every district of England. These are farms which are cultivated on commercial principles, instead of being mainly expensive raree-shows—farms which pay fair rents, and return fair profits, and yield an amount of meat and corn which is at least double that raised by unintelligent farmers in England, and above fourfold that obtained from a more fertile soil and genial sun by the peasant proprietors of France and Germany.

In the absence of agricultural statistics, we have no exact data for comparing the produce of England before and since the era of "high farming;" but the following figures will convey some idea of the fixed and floating capital invested by landlords and tenants in modern improvements. Since 1839 at least twelve hundred thousand tons of guano have been imported, for which not less than twelve millions sterling have been paid. In the year 1837 the foreign bones imported were valued by the Custom House authorities at £250,000. After that date we have no return, but since 1840 one million at least has been paid annually for bones, sulphuric acid, and artificial manures, independently of guano. Since 1846 at least sixteen millions have been invested in deep thorough drainage. Thus we have an expenditure of upwards of thirty millions, without counting the value of new implements and machines, purchased every year by thousands, or the large sums laid out in adding to the productive acreage of farms by throwing down useless hedgerows, or in rebuilding the rude homesteads that served the preceding agricultural generation, and in replacing the inferior local breeds of stock by better animals suited to the soil and climate.

There are other facts which are full as significant. In 1847 the proprietor of a now prosperous school of agricultural chemistry could not, out of a large number of pupils, find one who was willing to be gratuitously instructed in the science for which farmers willingly pay him at present a heavy extra fee. Even Mr. Pusey, who devoted his life to improvements in cultivation, made the mistake, in his last report, of undervaluing the services which chemistry had rendered to agriculture. Such, however, is found to be its practical value, that the

demands of farmers have created a class of chemists who make the relative value of manures and artificial food and the constituents of soils their especial study. To such inquiries Mr. Lawes devotes the Rothamsted experimental farm and laboratory, an establishment over which Dr. Gilbert presides, at an expense for the last fifteen years of more than £1000 a year. Professor Way, who has lately been succeeded by Professor Voelcker, was bound by his appointment under the Royal Agricultural Society to supply analyses to the subscribers at certain low fixed rates, and he was amply employed by the tenant-farmer community. In the West of England, long considered the very Bœotia of agriculture, Professor Voelcker delivered last year at Exeter, Barnstaple, and Newton Abbott, at the request of the Bath and West of England Agricultural Society, a series of most admirable lectures, the results of experiments carried on at Cirencester, on such subjects as 'The Value of Artificial Manures,' 'Farm Yard Manures,' 'The Composition of Fertile and Barren Soils,' 'The Nutritive Value of different Oil-cakes.' In 1840 there was no chemist sufficiently familiar with farming to treat usefully on these topics; and if he could have talked the very quintessence of practical wisdom, there certainly was no agricultural audience prepared to listen to him. That he spoke the language of science would of itself have been sufficient to convince the tenantry throughout the country that he did not speak the language of common sense. It is true that Coke of Holkham, with his usual acuteness, had long before invited the attention of Sir Humphry Davy to the chemistry of agriculture, and even specially retained a Mr. Grisewood's services for Norfolk; but the public were not yet ripe for instruction, and the lever of superphosphate of lime and guano was wanting to move their minds from traditionary routine. From that period the work went on with railroad celerity. When Mr. Josiah Parkes called on Mr. Handley in 1837, he found him experimenting on 'a new manure called guano.' Ten years later, although the consumption was enormous, many farmers looked upon its use as a sort of treason, and met innovators with a maxim, which is in one sense sound: "Nothing like muck.' Others equally ignorant but more enterprising used it freely, and grew great crops without caring to know the reason why. The desire to ascertain the reason why quickly followed, and has already converted many a farmer into a creature of reason from a creature of rule-of-thumb.

If it be asked what has been practically gained within the last twenty years by the investigations of the agricultural chemist, we would answer, *certainty*. We knew years ago, that farmyard manure was excellent; by the light of chemical science we learn why it is 'perfect universal manure,' we learn how to manufacture and employ it best, and we learn why on clay soils it may be safely, nay advantageously, left for weeks on the surface before being ploughed in. Chemical science again teaches us why lime, which is not an active manure, although valuable as a destroyer of elements hostile to fertility, produces great effect for a series of years, and then not unfrequently ceases to show any profitable results; it teaches us to what crops guano, to what superphosphate of lime, to what farmyard manure may be most profitably applied, and when a mixture of all three. Chemistry settles the comparative value of linseed cake, cotton cake, and karob beans; shows when pulse should be used for fattening pigs, and how to compound a mixture of Indian corn and bean-meal which shall produce fat bacon neither hard nor wasteful. The conclusions of science were previously known empirically to a few, but their range was limited and their application accidental. They have been reduced to order and rendered universally available for the use of plain farmers by the investigations of men like Lawes and Voelcker. As the latter observes, 'there are too many modifying influences of soil, climate, season, &c., to enable us to establish any invariable laws for the guidance of the husbandman; but the more we can trace effects to their causes and ascertain the

mode in which nature operates, the nearer we are to fixed principles and a sure rule of practice.

It would seem then that the first great epoch of modern agricultural improvement began with Lord Townshend, who demonstrated the truth embodied in the adage,

"He who marls sand
May buy the land,"

showed the value of the turnip, and, as we presume, must have been a patron of the four-course system, which had its rise in Norfolk about the same time. The second epoch was that of Bakewell, whose principles of stock-breeding have ever since continued to raise, year by year, the average value of our meat-producing animals. The third epoch dates from the exertions of such men as the Duke of Bedford and Coke of Holkham, the latter of whom, combining usages which had been very partially acted upon, brought into favour drilled turnip husbandry, carried all the branches of farming as far as was permitted by the knowledge of his time, and did the inestimable service of inoculating hundreds of landlords and tenants with his own views. The fourth epoch, if we were to take each advance from its earliest dawn, would comprise the various dates of the opening of the first railroad, the importation of the first cargo of guano, the publication of Liebig's first edition of the 'Chemistry of Agriculture,' and the deep draining of the Bonesetter's field on Chat Moss; but in general terms it may be said to date from the first meeting of the Royal Agricultural Society at Oxford in 1839, when farmers began to be familiarized with men of science, and men of science learned not to despise agricultural experience. This last era is almost the birth of yesterday, and already, as compared with any former period, the results read more like a page from the Arabian Nights than like a chapter in the history of agricultural progress. Deep drainage, artificial manures, artificial food, improved implements, and railroad conveyance, have been the leading means by which the change has been wrought. Deep drainage has brought into play the unexhausted fertility of our strong clays: portable manures and purchased food have increased the crops on land of every degree. Mangold and swedes have been made to flourish on stiff soils, and cereals on sieve-like sands. Downs have been transformed from bare pastures to heavy root and rich grain-bearing fields. The visitors to Salisbury Plain at the agricultural show of 1857 were surprised to find a large part of it converted into productive corn-land—a change which has been almost entirely effected within the last twenty years. The scientific mechanic has provided the tools and machinery for breaking up and pulverizing the ground, for sowing the seed, for gathering the crops, for preparing it for market, for crushing or cutting the food for the stock, with an ease, a quickness, and a perfection unknown before. The railroad is the connecting medium which maintains the vast circulation, conveying the agencies of production to the farmer, and the produce of the farmer to the market. The steam-cultivator is, perhaps, about to be added to the triumphs of mechanism, and then will be realized the expression in the fine lines of Mr. Thackeray on the Great Exhibition of 1851—an expression which was premature if it was intended to be historic, but which we hope, and almost believe, will prove to be prophetic.

"Look yonder where the engines toil:
These England's arms of conquest are,
The trophies of her bloodless war;
Brave weapons these.

Victorious over wave and soil,
With these she sails, she weaves, she *tills*,
Pierces the everlasting hills
And spans the seas."

To be Continued.

MR. JONAS WEBB'S SHEEP SHOW.

It is again our pleasing duty to record the ovine triumphs of Mr. Jonas Webb, whose celebrity as a breeder of Southdowns has now become a historical fact. The Babraham sheep show of 1858 was held on Friday, the 16th ult., and notwithstanding several heavy showers which fell fast just before the commencement of business, there was a very large attendance of gentry and agriculturists. It could not be denied, however, that the rain detracted somewhat from the comfort of the visitors, to whom the Babraham show, and Mr. Webb's hospitable house and pleasant grounds, constitute an annual treat, all the more enjoyable when no umbrella intervenes between their eye-sight and the blue sky.

It would be supererogatory to enter now into the merits of the Babraham flock, which each succeeding year only serves to bring out in a stronger relief; let it suffice to say, that they have not deteriorated in the excellence of their quality; on the contrary they have improved, if it be possible to improve upon perfection. The letting took place in the usual paddock, in which tents had been erected as a protection against the rain. On this occasion the premier ram was hired for 75 guineas, the weight of his wool was 8lbs. 8oz.

The fleece of one animal weighed the enormous weight of 12 lb. 8 oz., the average weight of wool being about 8 lb.

The following is the highest price fetched at the last three lettings:—

1855	....	170 guineas.
1856	....	150 "
1857	....	197 "

and the accompanying list shows the number of rams let, and the average price per head for the last six years:—

	Number Let.	Average Price.
1852	.... 69	£22 3 1
1853	.... 71	22 6 3
1854	.... 75	25 4 3
1855	.... 77	25 15 2
1856	.... 77	33 1 4½
1857	.... 65	27 17 7½

This year the average figure was £21, a slight falling off, which may be accounted for by the state of the weather. Sixty-one sheep were let.

The company on the ground included visitors from almost every country and district where Mr. Webb's successes are known and appreciated; it were vain to attempt to give anything like a list of them.—*Cambridge Chronicle.*

THE PROBABLE YIELD OF THE LAST HARVEST.

To the Editor of the Agriculturist.

BUREAU OF AGRICULTURE AND STATISTICS,
October 16, 1858.

SIR,—Having received one hundred returns from Municipalities and from private individuals, many of whom state that they have consulted other parties likely to give correct and truthful information, with regard to the probable yield of the crops of 1858, I am desirous of laying the result before the public, as it may be important to know what we are to expect with regard to the probable supply of grain, &c., in our markets this season, and thence the probable export as compared with other seasons.

The hundred returns are the united opinions of about five hundred of the most intelligent farmers, and have all the appearance of truthfulness.

They comprise fourteen from Lower Canada, from the Counties, and eighty-six from Upper Canada from thirty-six counties. Seven Lower Canada and three Upper Canada returns report that no winter wheat or very little is grown.

The average growth of the thirty-six winter wheat growing counties is only twelve bushels. That of forty-six spring wheat growing counties is 13½ bushels per acre.

Taking the average of winter wheat at 18 bushels per acre, the deficiency of this year's crop will be 33 1 3rd per cent.; and taking the average of spring wheat 16 bushels per acre, the deficiency will be about 15 per cent.

The acreable extent of winter wheat is probably one-third greater than that of spring wheat, but this year's experience will diminish the extent of winter wheat and extend that of spring wheat, particularly that of the species called "Fife" or Glasgow wheat, which nearly all the returns represent as entirely free from rust, and very nearly free from midge, and especially so when sown in April or after the 24th of May, either very early or very late.

The winter wheat called Mediterranean is also stated by four parties to be entirely free from rust or midge, and this is corroborated by several writers in the *Country Gentleman* and other New York papers.

The opinion as to its quality in other respects varies very materially. It is not universally recommended, but has some warm advocates as a prolific wheat. Had the Fife wheat been universally sown the crops of spring wheat would have been a full average.

When it is considered that winter wheat on summer fallows requires the occupation of the land two years and spring wheat only one, the farmer will probably endeavor to adapt his system to the cultivation of spring wheat, where naked summer fallow can be dispensed with, and this year's experience is very much in favor of spring wheat.

The breadth of winter wheat already sown, is much diminished, but what is growing has been generally sown very early, and has a most flourishing and luxuriant appearance.

Three counties of Lower Canada, Two Mountains, Argenteuil and Pontiac have reported the successful growth of winter wheat—two having reported 20 bushels per acre and the other (Argenteuil) 16. The Counties in Upper Canada which have reported freedom from the midge are Stormont, Carleton, Grenville, Lanark, Russell, Renfrew, North Simcoe, Grey and Bruce. The new townships of Addington and North Hastings, Peterborough and Victoria are also free.

Stormont returns 30 bushels per acre, Carleton 28, Russell 27, Renfrew 22, Simcoe 21.

The insect does not appear to have reached the cultivated lands in the north, although it has reached the extreme west, having travelled regularly from the east. It is to be hoped that it has left the eastern townships of Upper Canada. It is still to be found in every county along the lake shore, from Frontenac west to Essex, Lambton and Huron. The farmers to the north will probably have it next season, and they and all others should provide against its ravages, by sowing very early and having their land well drained and cultivated, so as to encourage early maturity, in order that the vegetable life may have the start of the animal life; or else, if need be, very late, so that the wheat may not blossom till the midge shall have assumed the grub state, say after the 24th of June.

To avoid rust, which has this year been nearly as destructive as the midge, the Fife or Glasgow spring wheat should be sown. About 60 of the returns state that no rust affected this sort of wheat, and no returns state that it did.

With regard to other crops, rye, barley, oats and peas appear to be full average crops, with very few exceptions. About ten report failure of the oat crop from rust and wet, and partial failure of the rye crop from the midge, which they assert has attacked that crop, and in some cases barley as well as the wheat, and the cause of rust is universally attributed to be want of proper drainage and of free circulation of air. Two returns from Essex, two from Kent, two from Frontenac, two from Middlesex, one from Northumberland, and one from Elgin report almost a total failure in the oat crop, in all cases attributed to rust. With these exceptions, the crop is reported nearly an average of about 30 bushels per acre.

With regard to Potatoes, the returns are by no means favorable as to quantity, although very much so as to quality. Almost all report a deficient crop from various causes. Twenty-nine attribute the deficiency to drought or to wet weather at the time of planting; seventeen to the common rot; forty-two state distinctly that there is no rot, and twelve have made no report. In parts of Northumberland, Durham, York, and Leeds the Grasshopper has done very serious injury to the Potato crop, as well as to Clover, Wheat, &c. The general average given in the returns is 112 bushels per acre. Taking the average at 150 bushels, of 56 lbs., the crop is about 33 1-3rd per cent. deficient in quantity, but the excellence of the quality will in some degree com-

pensate for that. In the new townships, on the Free Grant Roads, it is well worthy of remark that the rot has not affected the potatoes in the slightest degree, and the crop is generally excellent both in quantity and quality. The grain crops also in these localities bear the same character for excellence.

The inferences I would draw from these hundred returns are

1st. That the whole wheat crop of Canada for 1848, including both winter and spring wheat is about 25 per cent. below the general yearly average, allowing for the good quality of the spring wheat and winter wheat which have escaped the midge, and rust, the samples of both being excellent.

2d. That the crops of rye, barley and oats are about a fair average, notwithstanding the partial failure of the last named.

3d. That the pea crop is a little beyond the average, say ten per cent.

4th. That the potato crop is about 25 per cent. deficient, allowing for the excellent quality, which is above par.

5th. That the Indian corn crop has been much less cultivated than usual, owing to the planting season being extremely wet, and that there will be a very small surplus of this grain beyond what will be required for domestic purposes, forty-seven returns having reported that there is little or none grown this season.

If these deductions are correct there is a slight improvement upon last year's crop of wheat, which was 31 per cent. short of the general yearly average, this year's deficiency being calculated at 25 per cent. The potato crop also is better than that of last year, which is an item of considerable importance in the year's supply of food.

I am, Sir,

Your obedient servant,

WILLIAM HUTTON,

Secretary.

ARE CLEARED LANDS MORE SUBJECT TO DROUTH THAN OTHERS?

The writer has often read in articles which have appeared in the agricultural papers touching the bad effects of cutting away our native forests, that where so cut away, the land becomes more subject to drouth than before. We fancy such theory can only apply to the fact that clearing away the forests and opening the land to cultivation, gives a freer passage to the water, as it falls or collects in various bodies, as swales, swamps, springs, &c., and passes it off into the larger channels; for we do not see how the simple fact that trees, averaging not over eighty feet heigh, can attract larger bodies of water through the clouds thousands of feet above them, than the surface of the earth could do without trees. The face of the country has much more to do with it. Hilly and mountaneous countries in the temperate zones, are usually more showery than plains; and whether the hills be bare or forrested, appears to make no difference. The natural laws of atmosphere, climate, evaporation, winds, and the locality of bodies of water, we imagine to be controlling causes in the falling of rains, or the occurrence of drouths.

We are led to these observations by the immense rains of the present season, which have fallen all over our Western States, almost with the violence and continuance of a deluge, and the vast prairies, stretching for thousands of miles in extent, seem to have had, if anything, the worst of it. There are no mountains there—the Alleghanies being the most Western range, east of the Mississippi—and none more for a thousand miles beyond it. Nor is the country even hilly; but one immense champain of level and rolling timber and prairie faring about alike in each and every year with rain or drouth.

We have a good many weather wise acres in the land, and many meteorological tables have been kept; but we confess with all our investigations, we have as yet been unable to work out any conclusive problem to guide or regulate our judgment in atmospheric phenomena, other than the barometer and thermometer; the one giving us only a day or two's indication of what weather may come, and the other telling the fact as it is at the moment.

There is no sort of regularity, year by year, to our American climate, except in the revolution of the seasons.—*American Agriculturist.*

ADDRESS,

DELIVERED BY DR. LAWSON, AT THE AGRICULTURAL SHOW AT KINGSTON, ON THURSDAY, 28TH OCTOBER, IN THE CRYSTAL PALACE.

[We have much pleasure in laying before our readers Professor Lawson's admirable address, which they will peruse both with pleasure and profit. Dr. Lawson is an important acquisition not only to the University of Queen's College, but to the Province generally. We shall be happy to hear again from him on agricultural matters. The Exhibition was eminently successful, and reflected great credit on the agricultural societies of the County of Frontenac and the City of Kingston.—Ed. AGRICULTURIST.]

Presidents, Ladies and Gentlemen,—I have been requested by the Directors of this Society to take a part in the day's proceedings. I am not a farmer. I am scarcely yet a Canadian. I have therefore no special claim on your attention, no intimate acquaintance with your art, no personal experience of the capabilities of your soil. But I cheerfully comply with the request that has been made; for, although I have nothing special to communicate, I feel that it is the duty of every one to aid, to the extent of his power, however humble that may be, to forward the important objects of such an Institution as this. One great use of Exhibitions like this is to bring science and practice more closely together; and in proceeding to discharge the duty which has been assigned to me, I do not know that I can (in the present stage of Canadian farming) occupy your attention more profitably than by, briefly pointing out some of the results of science which bear upon rural improvement.

In the admirable address delivered by Mr. Ferguson at the late annual meeting of the Provincial Association at Toronto, we were told of the gigantic strides which this country had made within the memory of the present generation; how the old fashioned one-handled plough with wooden mould boards, and other implements equally rude, which were in common use, have vanished away before the improvements of our own time; and how, in all that relates to mechanical appliances, Canada is following closely at the heels of the most advanced nations of Europe. And especially pleasing is it to observe at these Exhibitions that the workshops of Canada are striving not merely to emulate the manufactures of Europe, but seek rather to provide our farmers here with implements and machinery better adapted than English models for Canadian work. In like manner, how marvellous the improvements that have been accomplished in our means of transit, both by land and water, over the slow, expensive, and insecure methods which alone were available not very long ago. And when, in addition to all these benefits, the farmer has all the results of modern science placed before him to guide his hand, and foster a spirit of improvement—is it not reasonable to expect that he shall not lag in the race, but shall make efforts greater than any that has yet been made to raise his art to the common platform of modern progress?

The genuine interest displayed in the promotion of agriculture in this Province, shows that the farmers are not indisposed to respond to the call that has been made upon them. When I see before me an assembly of Canadian farmers, and think of the past history of this great country, in which they have been playing so important a part; when I think of the results that have already been achieved, of the wide forests that have melted away before the strong arm of the woodman, like the morning mists before the rising sun; of the broad expanse of pasturelands and cornfields that are now spread before us, at once an earnest of the dominion of man and of the success of his labors; when I think of the noble institutions that we meet with on all hands in Canada, evidences of the rapid strides she is making in the march of civilization; when I think of these, and of triumphs of labor and thought such as these, which on Canadian soil meet us on every side; I say, when I think of these, a bright vision of progress and prosperity for the future rises before me. The noble forests that had for countless ages grown in all the wildness of nature presented a bold front, sufficient indeed to stem the tide of ordinary civilization. Like a strong enemy they would have scorned a puny hand. They called for great energy and perseverance. Great energy and perseverance were brought to bear upon them, and they began to fall; soon the sombre forest was lighted up by the tin-covered cupolas and church spires, which, glistening in the sunshine, shed their radiance around, indicating from afar the villages and cities which were to form the centres of future civilization. The same spirit of activity and deter-

mination which has made so glorious a victory in the past, is now actively at work among you—the Exhibition this day is one of the many evidences of it—and herein do we see the elements of Canada's future greatness. Where so much good work has already been done, we may reasonably hope that much good work will still be done. The hand that cleared away the forest has not lost its cunning. In this Society you have an important instrument for good. It is to Societies like this that Agriculture owes its advancement in Europe. The Royal Agricultural Society of England and the Highland Society of Scotland have for many years kept before agriculturists the importance of improvement and the means by which it was to be accomplished; they have directed the researches of scientific men on the one hand, and the experimental practices of the farmer on the other; and now we have in many parts of Britain an amount of success in farming which its most sanguine promoters could not have anticipated. But these leading Societies have not done *all* the good work. Valuable results have from time to time been obtained by farmers, and proprietors, and chemists, working apart and in seclusion. But it is to the County Societies in the old country—to Societies such as this, limited in their operations to a certain district—that we are to attribute much, very much, of the good that has been done, and of the genuine interest that has been awakened in improved cultivation. The discussions at *some* of these County Societies no doubt reach you through the press; but many more are actively at work unknown beyond their own circle, surely and unostentatiously evolving good fruits, year by year solving more and more fully the problem of increased production, of growing two blades of grass where only one grew before, a problem which acquires a new phase through every new discovery.

This Society has a noble work before it, and I trust that it will meet with that support which it deserves—the support of farmers and proprietors and amateur agriculturists on the one hand, and of the general public on the other. The cultivation of the soil is not a subject which affects only that class of persons who are actually engaged in its operations. On the contrary it forms the first stratum of civilization; more extensive than all others, it is the one upon which they all depend, the one upon which all our institutions are built up; it is the originator and the supporter of all the other arts of peace.

"The profit of the Earth is for all; the King himself is served by the field."

In all time, the farmer has been honored above all men, and the cultivation of the soil is held in all civilized nations to be the most honorable employment of man. Even the imperious senators and warriors of ancient Rome, amid all the excitement and glory of successful war, sought, in the culture of their lands, relaxtion from the dangers of the battle field, or the cares of the state; and according to a writer of that age, "the Earth delighted to be ploughed with a share adorned by laurels, and by a ploughman who had been honored with a triumph." And in our own day, the glory of our arms has not diminished the lustre of the ploughshare.

In England our noblemen and our merchant princes are now exchanging the turf for the cornfield, which they find as pleasant and as profitable; and while I am speaking to a people so loyal as the Canadians, can I omit to remind you that our Queen Victoria's husband—the Prince Consort—is an Aberdeenshire farmer, and grows very good turnips indeed.

When the hero of Kars set foot on Canadian soil, who was it that gave him a first welcome? who but the farmers of Hamilton. They showed their appreciation of the gallant soldier, and the soldier showed his appreciation of their peaceful pursuits. It requires a *strong* mind to make a man in war; it requires a *good* mind to make him great in peace; and when Sir William Fenwick Williams of Kars gave expression to his hopes and prayers that this country might go on prospering, that it might realize the hopes of its sons and of the British Empire, and that even in our day its vast wildernesses might be converted into smiling fields—he showed his claims to a new laurel which his Canadian friends know how to honor: one they will not soon let wither.

The good results brought about by this Society are visible in the improvements which we see around us on the farms of the district over which its influence extends; and their products are brought before you this day in forms which evidence more fully the good that has been accomplished. Let it then go on and prosper in its good work; let it be widely known that the Society expects every member to do his duty; and let every member, and every one connected with this Society, rejoice that he has it in his power to do something for the common good. And having done our part, let us seek the Divine blessing on our labors; let us remember that while Paul may plant and Apollos may water, it is God that giveth the increase.

What is the annual course of operations on a farm? In spring time the farmer ploughs his land, drops his seed, covers it up, and forthwith the young crop arises; day by day it increases in stature, and in autumn it realizes his just hopes by a golden harvest. Here is a mystery that may well arrest our attention. The seed grain, with its germ of life, has grown up into a living being, and it yields seed after its kind. Let us see how its growth is accomplished.

The first statement I wish to make is that plants are living beings like ourselves. I might illustrate this by pointing, as the physiologists of olden times did, to some remarkable instances of irritability and movements exhibited by certain plants, such as the moving plant of India, the sensitive plant, and many others. But I do not found my statement that plants are living beings upon the evidence afforded by such exceptional examples as these. We have far more satisfactory evidence in the minute structure of these plants, which, in its essential character, closely resembles that of animal bodies.

[Here the minute structure and cellular development of plants, and the chemical changes that take place in their tissues, were explained.]

Now, what are the sources of the plant's food which enable it to perform the phenomena of growth? which enable it to increase in size, and furnish food for man and beast? We find that all the elements of which the plant is composed are found in the inorganic world. It therefore creates nothing. When we partially burn a plant (or a piece of wood) we drive off water and other volatile matters and leave a black mass of charcoal, or *carbon;* if this carbon is burned in the air it disappears, leaving the ash behind, which does not volatilise. This is mineral inorganic matter, which, along with water, has been derived entirely from the soil; the carbon is derived from the atmosphere which the plant breathes.

[Here absorption and the mode of feeding in the plant were explained, and the stomata were described by which it abstracts from the carbonic acid of the atmosphere the carbon of which its tissues are in great part built up.]

We see then that plants are endowed with life, and exercise all the functions belonging to organized beings. Like animals they feed and breathe, and in our cultivation of them we must see that their wants are ministered to. But all plants are not alike in their choice of conditions of growth: some grow in the sea; some grow in hot water; some grow in cold fresh water; some grow on snow; some grow in wet soils; some grow in dry ground; some grow in arid sands; some grow on decaying matter; some grow on other plants, as parasites. All this teaches us that we must imitate the conditions necessary for the plant we cultivate. The atmosphere, which forms one source of the food of plants, is, to a great extent, beyond man's control, but not so the soil. It is in many respects capable of improvement.

[Here the chemical characters of soils were referred to in detail, and also their mechanical conditions.]

One of the most frequent difficulties with which the farmer has to deal is a superabundance of moisture. There are various ways of remedying this, but a few general principles are applicable to all. [These were explained.]

In regard to ordinary drainage there are many points that can only be considered fully on the spot. Much discussion has taken place as to the direction, and especially the depth, of drains. It seems to be well established that on light soils drains act more effectively the deeper they are placed; but it is necessarily very different on clays where the water cannot percolate. In such soils, while the actual depth must depend upon the depth of available soil, and other circumstances, it must never be carried too far, otherwise the clay will resist the passage of the water, and thus the drains will remain useless.

It is also a question of frequent discussion in England: what is the proper distance apart for drains? And here it is necessary to take into account the differences in regard to capillary attraction of soils, or that power by which they are enabled to suck up water from below.

[Here the effects of different modes of drainage were explained by diagrams.]

In a comparatively short time draining has completely changed the aspect of extensive tracts of country in Britain, converting the cold morass into fertile fields and greatly increasing the annual produce, even on soil which was before bearing crops sufficient to satisfy the most exacting expectations. One reason, I believe, why so little has been done in the way of draining in this country is that drain-tiles are expensive, and not readily attainable. The same objection existed in Britain not very many years ago; but the demand for the article soon led to its increased production, and

now our farmers in most parts of Scotland and England have no difficulty in obtaining drainage materials. There is no good reason why the same thing should not result here. There are ample deposits of clay in many parts of Canada well adapted for brick and tile-work. There are deposits in the immediate neighborhood of Kingston which may no doubt be worked to advantage, and which, in the nature of things, cannot possibly be idle after a permanent demand for drain tiles is established.

By growing in rich soil and supplying all the conditions necessary for luxuriant growth, many plants which in their wild state are unfit for any useful purpose, have been rendered subservient to the wants of man.

[Here the origin of many of our cultivated crops, such as wheat, turnips, cabbages, &c., was explained.]

When we think of such improvements in the common plants we rear, it affords much encouragement to those who would direct their efforts in this direction, with a view to the raising of new varieties. And here I would observe that much remains to be done in this way in Canada. We Scotchmen, and Englishmen and Irishmen, are prone to imitate the British institutions and British practices. Many of these have been introduced and have proved of great value, but some have been found unsuitable to the conditions of Canada.

In the choice of varieties of the leading crops in the kinds of wheat, and of barley, and of oats, and of turnips, the Canadian farmer has hitherto depended chiefly upon varieties obtained from Britain. But the climatal conditions of Britain are so different from those of Canada, that it is impossible to believe that the varieties best adapted to the former are likely to be the most useful to the latter.

The raising of new varieties better suited to the climate than those now in existence, is surely a matter of no small importance to Canadian agriculture, and I earnestly trust that it may receive the attention which it so well deserves. It is a slow process, however, and the farmer who undertakes it, must

"Learn to labor and to wait."

But I may naturally put the question, Have you already ascertained with any degree of accuracy that old varieties of wheat and of barley, of oats and of potatoes, of turnips and of other forage and pasture plants, are adapted to the circumstances of Canada? No doubt much useful information has been elicited. It is impossible for so many active farmers to have lived in Canada, stirring the soil from year to year, and watching the growth of the crops, without acquiring much experience on this point. Still, when I think of the many varieties known in Europe adapted to every kind of soil and situation, it is impossible to believe that there is not still room for well directed experimental inquiry on this subject in Canada.

It is now well known that the choice of suitable varieties is even more important than the choice of good soil, or the application of manure; for our scientific agriculturists no longer regard the plant as a mere machine acting a mechanical part, and guided by certain chemical changes. It is a far more subtle thing; it is guided in its development by the laws of life, which overrule all chemical action: thus chemistry is no longer the solitary guiding star of the scientific farmer. Physiology must go with it, hand in hand, in all that relates to improved cultivation.

When improved varieties are once obtained, high cultivation is necessary for the continuance of those properties that render them valuable.

When cultivated plants are neglected and allowed to grow in a poor soil, they soon revert to their wild condition. It therefore requires a continuance of suitable conditions to perpetuate those peculiarities which render them useful to man. In the *first* place, the soil must contain in sufficient abundance those elements required for building up the plant's structure. If they are not present naturally, they must be supplied in the form of manure, which may be of various kinds, according to the circumstances of the case. As Sprengel observes, "a soil is often neither too heavy nor too light, neither too wet nor too dry, neither too cold nor too warm, neither too fine nor too coarse; lies neither too high nor too low, is situated in a propitious climate, is found to consist of a well proportioned mixture of clayey and sandy particles, contains an average quantity of vegetable matter, and has the benefit of a warm aspect and favoring slope;" but although possessed of all these advantages, it is yet unproductive, because it wants some mineral constituent required for plant food.

The soil may be naturally unfertile, or originally fertile; it may have become barren through long cultivation. In a new country there is a strong tendency to carry off

annual crops from the land without giving anything back. We have seen that the plant cannot create anything, neither can matter grow in the soil; if we wish to retain its fertility, we must replace what we have taken away.

As regards manures of a general nature designed not so much to supply any special want of a soil whose barrenness arises from some such idiosyncracy, as that to which I have alluded, but to increase the general fertility of the land—long experience has shown that vegetable and animal matters are by far the most useful, and generally applicable; and by them we are enabled to restore to the soil precisely those substances that have been carried off from it by our farm crops: for different species have diverse preferences and capacities in this respect.

Let me urge you therefore to value such materials and not let them run to waste. It is by means of these that your soil may be enriched, your exhausted soil redeemed, and your annual produce increased. When you see a bone lying by the wayside, (and in this part of the world you cannot go far without seeing one), do not pass it by, do not despise it. Pick it up and throw it into your cart, for therein are the elements out of which your art makes a loaf of bread. Think of the care with which every grain of bone dust is gathered up like gold, in England; think of the crops which it realizes; of the ample fortunes which the very gathering of bones there have realized: and think of the turnip fly, which bone dust cheats out of its favorite morsel!

How much of the success of farming and of all other arts and manufactures depends upon the saving of material! upon imitating that beautiful law which chemistry teaches us, that in nature nothing is lost. In Edinburgh we have a distillery of great extent, where economy of heat and material is wonderfully carried out. The "dreg," a waste product, was produced in such quantities that all the cows in Edinburgh could not consume it, and there remained an enormous surplus which had to be discharged into the water of Leith. This nuisance the modern Athenians protested against as an outrage on their sweet smelling city. Something had to be done. Seed cake had been used by farmers, and it occurred to the proprietors that the "dreg," as well as oil refuse, might be pressed into a cake. Machinery was accordingly fitted up, dreg cake was prepared, and in going through the premises a few days before I left Scotland, I found that the proprietors were realizing £60 a week from this waste product, which, although so much despised in Edinburgh, is now sent to the farmers in all parts of Scotland, to be returned in the form of fat cattle and butter and cheese. With all your improvements and assiduity in cultivation, there is still a cankerworm to give you care. Even after you have drained and ploughed, and subsoil ploughed and manured, and sowed good seed, and tended with care, yet will thieves break through and steal, in form of *wheat flies*, which all the Acts of the Legislature, and all the Dicksons in Canada, cannot reform; turnip beetles which, tiny as they are, seem to eat up whole fields of young turnips at a mouthful; and other pests of the insect world, with which you are no doubt all too familiar. No, not *too* familiar, for their doings are only in part known; if their habits and their history were better known, we should, no doubt, be better able to cope with the evils which they bring.

But there is also in Canada, I am sorry to say, as in other parts of the world, another host in arms interrupting the peaceful tenor of the farmer's way. These are of vegetable origin—the mildews and moulds and blights and rusts and smuts, which you all know by experience, and which are interesting to the scientific observer from their inscrutable ways and the masks they so often put on to elude his prying eye;—at one time adopting one form of development, and anon changing the whole tenor of their life; at one time attacking a living plant, at another time living on decayed matter; the same species in one form spreading a film of mould on the contents of a long cherished pot of preserves, and in another form playing the alchemist in the cupboard, and transforming molasses into the best brown vinegar. And these, and such as these, are they all the enemies with which the farmer has to contend? They are sufficient indeed, but let us remember the weeds that are so abundant in many fields, that reap from the soil so much of its riches, and so frequently smother the growing crop.

One would imagine that in Canada, where so much trouble and labor have been expended in clearing the soil from its indigenous arboreous vegetation, that when once cleared it would be kept clean. But no sooner are the trees hewn down and the soil turned up, than the herbaceous weeds assert their place and power, and often defy the efforts that are made to keep them in check. These efforts must be increased. When you see a broad patch of crowfoot in your field, or a bed of thistles in your pasture, reflect that the ground they occupy is yielding no return, that it might as well not have

been cleared at all. In your march forward into the woods forget not that the enemy comes in behind; and forget not that it is less honorable to make the conquest of new territory than it is to hold and defend that which has been already won.

It is not alone the loss of the soil and necessarily increased expense of cultivation that field weeds involve. One thing is certain, that no better means can be devised for the encouragement of insects. In regard to the turnip fly, for example, it is well known that it feeds only upon plants belonging to the same natural order as the turnip. In early spring and summer time weeds belonging to this order are often abundant and form suitable pasturage, where the turnip flies congregate and increase to an amazing extent, so that when the young turnip crop appears they at once migrate to its more delicate leaf and blast the hopes of the farmer. Just before leaving Scotland this summer a remarkable instance occurred to me, illustrating what I have said. Two fields, in the same district, and both of clayey soil, were cropped with the same kind of turnips of apparently the same age. One field was isolated by corn fields and potatoes, and I could not detect in it a single fly. The other field was also isolated, but was in a perfect swarm. The reason was explained when I found in one corner of the field an extensive rubbish heap covered with wild mustard, which had been growing since the previous autumn, and thus had formed a winter's provision for the fly.

Another great evil resulting from the abundance of weeds is this, that their seeds become mixed with the grain, and thus we have a dirty sample. This deteriorates from the market value of the grain. At Toronto I saw a very ingenious machine designed for the purpose of cleaning dirty grain of this kind, and I must say it did its work well; but it would indicate a far more hopeful appreciation of the value of clean grain if we were to begin at the beginning, and not allow the weeds to ripen in our corn fields at all.

There is one branch of rural economy, so closely connected with agriculture, that it may without impropriety be noticed on an occasion of this kind. We know that the effect of colonization and civilization in all parts of the world has been to denude fertile land of its native forests. Throughout middle and southern Europe we only find here and there the remnants of the original arboreous vegetation. "Clearing" is in fact necessary to permit the industrial operations of man. But the clearance of forests is not an unmixed good. On the contrary, we find that a train of evils sometimes follows it, which all the exertions of man cannot repair. While there is a want of precise information as to the physical effects of the removal of forests, we have sufficient information to show that such operations should not be carried out indiscriminately, and trusted entirely to private interest, but should be regulated for the general good, and with a view to the permanent interests of a country. The researches of my friend, Professor Cleghorn, at Madras, have shown how injurious have been the neglect of needful precautions in the felling of timber in many parts of our Indian Empire. Humboldt tells us that "by felling trees which cover the tops and sides of mountains, men in every climate prepare at once two calamities for future generations—the want of fuel and the scarcity of water. Plants exhale fluid from their leaves, in the first place for their own benefit. But various important secondary effects follow from this process. One of these is maintaining a suitable portion of humidity in the air. Not only do they attract and condense the moisture suspended in the air and borne by the winds over the earth's surface, which, falling from their leaves, keeps the ground below moist and cool; but they can, by means of their roots, pump it up from a very considerable depth, and, raising it into the atmosphere, diffuse it over the face of the country. Trees, by the transpiration from their leaves, surround themselves with an atmosphere constantly cold and moist. They also shelter the soil from the direct action of the sun, and thus prevent evaporation of the water furnished by rains." Thus do the forests contribute to the copiousness of streams, and preserve during the hot season a certain amount of moisture in the atmosphere. But it is not on such grounds alone that I would argue the conservation of forests in Canada. Let us look to the position of other countries at the present time where timber is scarce, and contemplate the advantages that Canada enjoys at this moment in its glorious old woods, the source of half its riches. Let us reflect on the means that have gradually rendered other countries so poor in this respect, while we are so rich. And while we enjoy the riches, let us see that they are secured also for our successors; that in rendering Canada an agricultural country, we do not forget to provide for the permanent maintenance of those vast supplies of timber which are found so valuable in all the arts of life, and so necessary for the very existence of a people so ill provided with fossil fuel.

In various European states, and in Britain, great efforts are being made to improve

the management of forests. and much good has been done. One curious result brought out by the Scottish Arboricultural Society is this, and it may stagger the Canadian farmer, that while forests have through neglect been ruinous to many proprietors in Britain, still, when properly cared for by yearly pruning and thinning, they not only repay all the labor bestowed upon them, but yield, on good soils, as profiable a return as wheat or green crops.

Now, I do not expect that we can secure for many years to come the same amount of labor for the rearing of natural or artificial forests as is now bestowed in many parts of Scotland and England; but I do not see how this branch of industry should be neglected—how, for example, our Canadian forests, especially in the neighborhood of towns, should not be pruned and thinned, so as to secure a full and regular crop of good timber, instead of the trees being allowed to grow indiscriminately, forming a tangled wilderness, where the good trees, choked by useless undergrowth, scarcely afford a reward for the labor of felling. There is also to be found in Canada land not adapted for heavy corn crops, but admirably adapted for timber, which would undoubtedly yield a profitable return if planted with suitable trees.

These suggestions I offer as the first thoughts of a stranger on looking abroad upon the country. They may appear ill-adapted to the wants of the country at the present time. It may seem that I have formed an erroneous appreciation of Canada when I recommend the growing of timber, as well as the growing of corn. But both are necessary for the successful development and permanent success of a country like this. While in the midst of abundance we are apt to neglect provision for the future in regard to a crop like timber which requires half-a-life time for its development. But assuredly, if we do not anticipate and provide, the time will come when many districts of Canada, like all other civilized countries, will feel the want; year by year, as the agricultural resources of Canada are more fully developed, the natural supplies of timber will decrease. Need I further allude to the effective means of decorating our cities, which are so fully afforded by our native trees. In Kingston a custom prevails to some extent of lining the streets with trees, to overshadow the passer-by. In oriental countries it is a public duty. In Kingston I trust the taste will extend. But trees are not appreciated here as they are even in Britain. I know that if such natural avenues of gigantic cedars as you have not far from this city were found within the length and breath of Scotland, they would be all grubbed up by McGlashen's transplanters in the course of a week, and transferred to the pleasure grounds of Edinburgh Advocates. Why should we not have some of them in Kingston, that, in the oriental language of Emperor Akbar, "their sweet odors may reach every one, and that from those luxuries a voice may go forth to travellers calling them to rest in the cities where their every want will be supplied."

I have thus thrown out a few hints that may suggest inquiry or discussion or contradiction. It will be strange if I have talked so long without dropping some thought that may take root in some one's mind. One thing is certain, that I have not been sowing on a stony soil; and if perchance one seed shall grow up and bear goodly fruit, I shall know that it was not *all* chaff.

The lecture was illustrated throughout by reference to drawings, &c.

ABSORBENT POWER OF SOIL.

Absorption, defined by Webster as "the act or process of imbibing by substances which drink in and retain liquids," is a quality possessed by all soils in a greater or less degree. And of this difference in capacity, especially as regards absorbing and retaining manures, something has long been known, and has given rise to the application of the terms "hungry" and "quick," to loose and gravelly soils, because they do not long show the effect, and speedily manifest the action of manures, while clays are said to "hold" the fertilizing matters applied. The investigations of chemistry show that besides what would naturally result from the different mechanical action—the compactness or porosity of the soil—there are differences in their chemical affinities for acids, alkalies and gasses, which vary their powers of absorbing and retaining the elements of fertility derived from manures.

Loam and aluminous soils were found by Prof. Way to possess the power, when used as a leach or filter, of retaining the ammonia, phosphoric acid, potash, etc., contained in the drainage of a London sewer—the very elements most valuable for manure—and to

have the wonderful property, not only to select, but to retain these elements against every power naturally brought to bear upon them, save the growth of plants themselves. "A power," he remarks, "is here found to reside in soils, by virtue of which not only is rain unable to wash out of them those soluble ingredients forming a necessary condition of vegetation, but even these compounds, when introduced artificially by manures, are laid hold of and fixed in the soil to the absolute preclusion of any loss, either by rain or evaporation."

These conclusions seem to show that on most soils (one class of experiments was made with light loam) manure may be applied at any time in the season with equal good results—that there is no danger of loss when actually mixed with the soil, either by filtration or evaporation. Further experiments are needed to prove the absolute correctness of these conclusions to the general mind, but there are those who believe they may act upon them with safety. If established, much labor may be saved in the application of manures. They may be drawn in the fall and ploughed under, or left spread upon the surface, or may be distributed in winter, instead of immediately before planting and sowing, which is ever the most hurrying season of the year. For ourselves, on clays or heavy lands, we would not hesitate to act upon these suggestions.

Some experiments tried in England several years since by Mr. Thompson, to ascertain the power of the soil to retain unimpaired in value manure applied during winter, and also its power to hold in suspension the fixed ammonia of barn yard tanks and manure heaps, resulted in the following deductions:—1. That clay soils might be manured a considerable time before sowing without loss. 2. That light, shallow soils should not be manured heavily at one time; and the manure should be kept as near the surface as possible without leaving it uncovered. 3. That it is desirable to deepen the cultivated soil on all light lands, as it thus gives it a greater power of retaining manure.

That all soils possess considerable power of absorbing and retaining manure, is well known; but the great question of the most economical application of different fertilizers is, and will long remain an open one, and one upon which every farmer can do more or less to satisfy himself by practical experiment. Let those who can, throw light upon the subject, for it is one of large importance in agriculture.—*The Country Gentleman.*

IMPROVEMENT OF PASTURES.

As the subject of the grasses and its importance has been frequently treated of in many of the agricultural journals, a recurrence to it at any time it is hoped will lead the agriculturist to study his best interest. Our pasture grounds need greater attention than is generally paid them, to make them productive in quantity and quality, of the grasses for the grazing herd. Next to having good stock, is that of providing good pasturing. All lands are not adapted to this purpose. There is a vast difference in the quality of the grasses, and we consequently find that in some pastures in which there is a luxurient and well sustained crop of herbage the season through, the animals are famished and lean that are fed upon them. Other lands devoted to their use, while they appear short and dry, turn out their tenants in the fall in a condition obviously improved—they are fat, sleek, and show no signs of a lack of food, but the reverse. Low lands, which are generally saturated with water which becomes stagnant, seldom produce any but aquatic grasses, and can never be rendered good for pasture without draining. Although they produce an abundance of green, and apparently succulent herbage, the animals are invariably poor, afford but little milk, and come to the barn in autumn lean and enfeebled. High grounds, although they are more liable to be seriously affected by drouth, have the advantage of producing a more nutritious quality of food; the grasses are short, sweet, and highly nutritive, and animals pastured upon them gain rapidly in flesh, and produce not only a larger quantity of milk, but that of a superior quality. Yet the best pasture lands, like the grass and cultivated soils in general, will nevertheless in time become sterile; the more valuable kinds of grass will "run out," and be supplanted by others of a less desirable kind or entirely worthless class. Nature, in this, seems to corroborate the importance of a rotary system of cultivation, with respect to all the more valuable productions. After producing a certain class of plants, for a stated or definite period, the soil appears to weary of it and de-

mand a change. We see in our forests, that the oak succeeds the pine and the pine the oak. So the minor productions. Corn cannot be cultivated with success on the same soil more than three years in succession at most. Wheat never succeeds more than two, and clover and the other cultivated grasses deteriorate after yielding a few crops, and finally depreciate and disappear. By breaking up our pasture grounds, occasionally, applying manures and plaster, and stocking down with fresh seeds, we should find that the soil would be vastly benefitted and improved.

Where the surface is such as not to favour this kind of amelioration, the use of plaster, ashes, lime and other similar fertilizers, is of great benefit. I have seen poudrette, guano, bone-dust, &c., used with good success, especially on sandy soils for pasture. But as to guano, I cannot recommend it for this purpose, at the present high price.

My plan for the last named soil, is to turn under a good crop of grass in August or September, and sow half a bushel of timothy, and red and white clover equally mixed, and apply three bushels of plaster to the acre as early as the first to the tenth of September, and keep off the cattle until the middle of the ensuing May; this is all that will be needed for several years, until the grass plants begin to fail, then they may be manured with good barn-yard manure as a top-dressing in the fall, and sow three or four bushels of plaster in the spring, and you will find the results all that is desirable.

Another thing very desirable and important to having good pastures, is to know the quality of the soil, and its chemical constituents, and then the kind of grass that will produce the most nutrition to the animals to be fed, whether for milk or flesh; for the great fundamental doctrine from whence all our reasoning on the subject of animal nutrition, is the identity or almost identity, of the principle of vegetable and animal body. The conclusion founded upon this identity is, that with slight modifications, the vegetable principles are assimilated by the animal frame—the albuminous being converted into flesh and muscle, the oily ingredients into fat, and the mineral salts into bone and other solid parts. In the dairy, next to a good cow, is the importance of good food to the production of a good article of butter or cheese. Many dairymen are disappointed in not having a good article, and frequently lay the blame on the dairymaid, when the real truth is, the fault is in not providing good feed and pure water for the cows.—*Country Gentleman.*

A COUNTRY HOME.

Oh! give me a home in the country wide,
And a seat by the farmer's wood fire-side,
Where the fire burns bright,
On a frosty night,
Where the jest, the song, and the laugh are free,
Oh! the farmer's home is the home for me.

Oh! give me a home in the country wide,
When the earth comes out as a blushing bride,
When her buds and flowers,
In the bright spring hours,
Her bridal song ringing from fresh leaved trees,
And Melody floats on the perfumed breeze.

In summer a seat in a shady nook,
And close by the side of a purling brook,
Where the violet grows,
Or the pale swamp rose,
Fainting, sick, 'neath the sun's scorching beam,
Dips her pale petals in the cooling stream.

Oh! give me a home in the country wide,
In the golden days of a farmer's pride,
When his barns are filled,
From the fields he's tilled,
And he feels that his yearly task is done,
And smiling at winter, he beckons him on.