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THE Canadian Agriculturist AND JOURNAL OF THE BOARD OF AGRICULTURE OF UPPER CANADA.

VOL. XV. TORONTO, MARCH, 1863. No. 3.

THE DESTRUCTION OF WEEDS.

That weeds constitute the greatest barrier to agricultural improvement, and the profitable employment of farm capital, must appear self-evident to every one having a practical acquaintance with the subject. Some of the best yielding wheat soils twenty years ago, both in Canada and the neighboring States, have, in consequence of over cropping and negligent culture, become so much exhausted and filled with the seeds of the different varieties of weeds, as to be wholly incapable of yielding a remunerative crop; and no inconsiderable portion of such lands may now be regarded, for all practical purposes, as in a state of wilderness; not occupied, unfortunately, with stately forest trees, but with various species of pestiferous weeds, the bane of all successful cultivation. Even on lands where weeds have not as yet obtained so complete an ascendency, their presence indicates a low and slovenly system of culture, entailing annual loss to the farmer, and through him to the public, of an aggregate amount, which, if it could be correctly ascertained, would appear really frightful. Every weed, it should be remembered, that is suffered to grow and mature, robs the cultivated crop of a certain amount of food, lowers the stamina of the soil, and operates most seriously against any improved and profitable system of cultivation.

In order to eradicate weeds effectually they should never be allowed to perfect their seeds. A strict adherence to this rule would, in a comparatively short time, rid the farm of all such as are annual or bi-ennial. Those which propagate themselves by roots must be removed by careful pulling, and deeply stirring the ground by exposing the rootlets to the action of heat and air, during the operation of summer fallowing. It is well known to vegetable physiologists that plants in general cannot live without leaves; and that to denude weeds of their leaves whenever they make their appearance, will so diminish their vigour as ultimately to cause them to perish. All kinds of thistles must sooner or later succumb to such treatment. Docks, mulleins, &c., may the most readily be got rid of by pulling them up by the roots, when the ground is in a moist state. The yellow dock is rapidly spreading in some localities by allowing it to run to seed, and great care should be taken to pull the young plants before they become matured. Bur-docks are often found occupying the best grounds, to the complete exulusion of everything beside: these can only be eradicated by completely up-rooting them. The destruction of this and other bur-bearing plants is a matter of great moment, not only to the productiveness of cultivated crops, whether grass or grain, but also to the comfort and thriftiness of sheep, which are always incommoded and injured thereby.

If farmers would make a point of cutting down bushes and weeds as soon as they attain to any considerable height, the appearance of their holdings would not only be greatly

improved but their crops would receive a proportionate increase. It is physically impossible for any field to bear two crops—one of weeds and the other of grain—at the same time; the former will be certain to obtain the mastery of the latter. The angles formed by our zig zag fences are, by neglecting to mow them in sufficient time, prolific sources of weeds, as though they were specially designed and set apart for the purpose. All such places should be carefully and periodically examined and kept clean; and the landsides and borders of woodlands ought not to escape a similar method of supervision, and no weed should any where be allowed to ripen its seed. By steadily following out such a course the annoyances and losses of the farmer would diminish as his crops and profits increase.

Few are aware how strangely prolific are these pests. Professor Buckman, by the most careful experiments, ascertained that a single plant of the common groundsel will produce 6,500 seeds in one summer. The graceful corn-cockle sheds 2,600 productive seeds; and the red poppy, which diversifies the corn fields of the chalk and limestones of England, produces 50,000 minute but vital seeds. The sow-thistle branches out into the wind its 20,000 flossy parachutes, bearing the germinating car-like speck, to undulate with every breath of air and take root far away. The common dock lets fall its 13,000 solid grains, each destined to shoot down an exhaustive top-root into the soil. Dandelion produces nearly 3,000 seeds, each furnished with an inimitable apparatus for a distant flight. The cow parsnip, if neglected, will produce 5,000 plants; the meadow scabious, 4,000; the May-weed, 45,000; the daisy 13,500. Nor is it sufficient to cut down their bearing plants, and leave them to dry on the dung heap or wither on the ground. The sap in the stem and leaves of the cut-down plants still mounts up to and nourishes the seed. Nor is their wondrous vitality less remarkable. If the ground be trenched three or four feet deep, there will appear upon the surface a dense crop of weeds, of a different kind from any observed before. They may have been hidden for ages, but when exposed to the air and rain and sun, the little speck of vitality within germinates, as if the seed had freshly fallen! No limits can be assigned to the vital durability of some kinds of seeds when buried deeply in the ground, and not stimulated by the action of heat, moisture, and atmospheric air.

It is intolerable that an indolent farmer should be permitted to poison his neighbor's fields. If he is lost to all sense of the injury he inflicts upon his own produce, he should be coerced to extirpate these enemies for the sake of others, whose property and labour are deteriorated by his carelessness. Alexander II. of Scotland denounced that man to be a traitor "who poisons the King's lands with weeds, and introduces thereby a host of enemies." And it is said that whoever was found to have three heads of the common stinkwort among his corn, was fined a sheep for each stalk. In Denmark the farmers are bound by law to destroy the corn-marigold; and in France a farmer may sue his neighbor who neglects to eradicate the thistles upon his land at the proper season. In Australia a similar regulation has been imposed by legislative authority, with, it is said, the most beneficial results. In Canada, we believe, enactments have been issued against allowing thistles to ripen on the road-sides and exposed public situations, both from the legislature and township corporations; and it is passing strange that such important and beneficial regulations on the proper observance of which both private and public wealth is so closely dependant should in many districts become practically inoperative. It is high time that some firm stand should be taken, not only against thistles, but pigeon weed, and the whole tribe of farm pests of this nature, forming as they do insuperable barriers to Agricultural progress, and consequently to the increase of wealth and national prosperity.

SKETCHES OF THE DIFFERENT BREEDS OF CATTLE.

Durhams or Shorthorns.

(*Concluded from page* 20.)

Besides the very eminent breeders referred to in a former paper, others of scarcely less note appeared in the field, and to the result of their labors the general elevation of the present race of Short-horns is owing; nor have they degenerated in the hands of their successors. The

ave never been wanting in England and else-here, a number of intelligent and persevering reeders, constantly increasing of late years, hose respective herds have gained great and eserved celebrity.

The Durham, or Teeswater breed, it has been ell remarked by a competent authority, differs early as much from the older cattle of the Tees, the Dishley breed of Long-horns from the lder race from which it was derived. The eight is less, but the trunk is more round and ep; the limbs are shorter in proportion to pth of body, and the chest, back, and loin, ore broad, so that with less apparent bulk of dy the weight is usually greater. The skin light-colored, and the hair reddish brown or hite, either separate or mixed. The muzzle is sh colored, and rarely black, the appearance which color on the skin indicates the revival a character of the older varieties, which odern breeders study to exclude. The horns shorter than in the former breed, light col-ed, blunt, and sometimes laterally flattened. e skin is soft to the touch, the general form uare and massive, the shoulder upright, and e hind quarter large. The uprightness of the oulder produces a hollowness behind, which es not exist in the same degree in the Devons, e Herefords, and other varieties allied to them. e uprightness of the shoulder is regarded as efect, but it would be more correct to say t it is a character in harmony with the square-ss of form distinctive of the breed. Although lling preferred cattle of a medium size, yet breed being derived from one of great bulk body, there is a constant tendency to the duction of large animals. The breed com-nicates its character readily to all others, the first progeny, even with races the most similar, is usually fine. The females retain, a considerable degree, the properties of the lstein race, in yielding a large quantity of k, in which respect they greatly excel the ng-horns, the Herefords and the Devons. In property of yidelding milk, however, the breed is inferior to the older and less culti-d one, shewing that refinement in breeding, the greater tendency to produce fat, are un-orable, as a general rule, to the secretion of k. Individual cows, indeed, are found to re-the milking properties of the older race, this is an exception to the common result. oxen are eminently distinguished by the property of arriving at early maturity of muscle and fatness. Great numbers of them are now disposed off at the age of about two years, in the highest perfection, and of a weight at which no other cattle in Europe arrive at the same age.

There is in the present improved Short-horns a union of many qualities, once deemed incompatible: early maturity, quick feeding, and that to a great weight, an abundance of inside fat, and meat of a fine grain, while the cows often prove plentiful and steady milkers, and fatten rapidly when dried; these are the characteristics of the breed. Many improvers, it is true, look rather to the grazing properties of these cattle, and forget their value for the dairy; they esteem them in proportion to their early arriving at maturity, and their aptitude to fatten; and selecting their breeding stock with such views, the milking properties of the cows often become in reality diminished. But this is to develope one excellency at the expense of another, and that without necessity; for in this breed, as has been abundantly found, both qualities can exist, not of course exactly at the same time, for the milking cow does not fatten until dried, but in subjection one to the other. If indeed the milk yielded by the improve Short-horns be somewhat less in quantity than that given by the old unimproved strain, it is generally of far richer quality, and returns more butter in proportion. We have it on good authority that four gallons of milk have been yielded, morning and evening, by the highest bred Short-horns, and some have even given more; and these very cattle have proved, after having been dried and fattened, admirable in the carcass. To the dairy farmer, therefore, many of the Shorthorns are as valuable as to the grazier; and indeed it is with cows of an improved Short-horn breed, from Yorkshire or Durham, that the great dairies for the supply of London with milk are stocked. The Yorkshire cow indeed has always been a favorite with the London dairymen; but formerly, when dry, she fattened slowly, consumed much food, and therefore sold to a disadvantage. But the improved breed fattens with surprising rapidity, and whether the dairyman keep his cows one year or three, and then sells them, or feeds them for the butcher, they annually return a handsome profit.

The Shorthorns of Holderness, and, indeed, of Yorkshire generally, owe their modern improve-

ment to judicious crossings, and especially to the influence of the Teeswater and Alloy strains. It must not, however, be supposed that the old breed is universally improved; on the contrary, many of the dairy farmers give the rough breed the preference, partly from prejudice, and partly because the milking properties of the improved breed have been more or less sacrificed to the development of a constitutional tendency to accumulate fat. Mr. Youatt, referring to this subject, well observes: "Experience has gradually established the fact, that it is prudent to sacrifice a *small* portion of the milk to assist in feeding, when the cow is too old to continue in the dairy, or when, as in the neighborhood of large towns, her services as a dairy cow are dispensed with at an early age. This cross being judiciously managed, the diminution of milk is so small, and the tendency to fatten so great, that the opinion of Mr. Sale is correct;—"I have alway found in my stock, that the best milkers, when dried for feeding, make the most fat in the least time."—This is a doctrine which will be best understood and universally acknowledged by and by, for many of the improvers of the Shorthorns have but half done justice to their excellent stock. He would deserve well of his country who, with skill and means sufficient, would devote himself to the illustration of this point."

It is a remarkable fact that the Shorthorn cow improves both in the quantity and quality of her milk as she grows older; that is, a cow six years of age is superior, as a milker, to one of three or four years of age; and her milk will yield more butter in proportion. This rule, while holding good in general of most other breeds, appears from the careful observations made by several breeders to apply in a more forcible manner to the Shorthorns.

This highly cultivated breed extended from the district of the Tees, as from a centre, as soon as its value became known. It quickly spread northward, all through Durham and Northumberland, into the valley of the Tweed, and in later years, it had extended northward, through the eastern lowlands of Scotland, to the Pentland Firth, and is now mingling with the native breeds. The Shorthorns can now be found existing in purity and large numbers in Aberdeenshire and other northern counties, and also in the Orkney Islands, where the Swedish turnip is raised in great abundan and perfection for the purposes of feedin This celebrated breed soon extended sout ward, through Yorkshire, where it was cul vated on the largest scale. The district Holderness, as we have already observe early obtained cows from Holland, and b came distinguished beyond any other part England, for the excellence of its dairy stoc Many cows of the Holderness variety are y to be found, but generally they have be more or less mixed with the Durham bloo The effect has been to improve their form, b in many instances to impair their milkin properties; nevertheless, the modern Hold ness still stands in the first rank of dai cows, and the great London dairies are larg ly supplied by them. The Durham breed e tended likewise across the Humber, and w largely mingled with the cattle of Lincol shire, and the neighboring districts. Indivi ual animals are still to be found in the fe with the clumsy forms, dark muzzle, ar dingy skin of the former race; but general speaking, the blood of the improved Te waters has been more or less infused into the cattle of this part of England. Furth the breed has extended westward throu Leicestershire and the midland counti where it is either cultivated in a state of pu ty, or has been so mingled with the form breed as to modify or efface the Longh characters. It has taken root in Lancashi Westmoreland, and other parts, where Long-horned breed had been the most firm established, and it has been carried to t counties bordering on Wales, and into Principality itself, where the breeds allied the Devon have been before cultivated. has passed into the drier counties of the ch in the south-east portion of England, thou perhaps, in smaller numbers than into central and western counties. It has b transported to Ireland, and, in an incredi short space of time, has effected a gr change in the cattle of the breeding distri of that country. Being made to cross the tive Longhorns, the first progeny is alw found to be good, and this effect natur leads the breeders to resort again to the perior race, so that after a time the trace the Longhorns become lost.

Further, the extension of the pure breed has reached America, and the extensive British Colonies in the Southern Hemisphere. Some of the finest animals, from the choicest English herds, have been purchased of late years at enormous prices for Australia, where the breed continues to maintain its high position. In many of the States of the adjoining Republic, it has become firmly established; for many years an importing company has existed in Kentucky, whose operations have been attended by the happiest results. The names of Vail, Morris, Thorne, Allen, &c., of the State of New York, are familiar to the reader; and very recently American bred Shorthorns have been exported to England, where they have attained to a high position. In Canada and other British American Colonies, this world renowned breed has been cultivated with complete success. Among the early importers was Mr. Wingfield, of Guelph, whose herd came afterwards into the hands of Mr. Howitt, and from it many really good animals have been diffused over the Province. The late Hon. Adam Fergusson, of Wentworth, was among the earlier importers and improvers of Shorthorns, a vocation which he continued to pursue up to the recent period of his lamented death. The Wades of Cobourg, Mr. Arnold, of St. Catharines, and others, successfully followed the example, while Mr. George Miller, of Markham, Mr. Snell, of Peel, and, within the last few years especially, Mr. Stone, of Guelph, have, in conjunction with others not perhaps so generally known, contributed much to the improvement and extension of Shorthorns in Canada. The distinguished position which this breed has of late years occupied in the Provincial Exhibitions, fully attests its suitability to the climate and wants of the country.

THE TURNIP CROP OF LAST YEAR.

EDITORS OF AGRICULTURIST:—I would like to learn from some of your readers their experience in regard to the turnip crop of past season. Owing to the drouth of last May much of the Carrot seed failed to vegetate, and the land had to be resown with turnips. Such was my own case with some six acres. The turnip seed came up finely, was pushed past the danger of the fly, and gave promise of a good crop. There were some in drill 18 or 20 inches apart, and thinned out to from 6 to 10 inches. The ground was well manured in the spring, plowed twice, cultivated and harrowed several times. The ground had been to spring wheat the year before. But the turnips never came to more than half the size they should have been, and had long necks and large roots, to which there was sometimes attached a tuber something like a small rough potato. This disease I believe is called "fingers and toes." They were very tough in the flesh and of a particularly strong turnip flavour. I do not think that the time of sowing had any thing to do with these malformations, as some were sown at the same time as the carrots, (to mark the rows), some from the 10th to the 15th of June, and a few in July, but they were all of the same character, not that every specimen was so but very many of the whole lot were.

My own case was not the only one in this Township, but the same complaint is made by my neighbours. The seed was imported, I was told by the person who sold it to me, from England, by Mr. Fleming, of Toronto. Of course Mr. Fleming is not to blame, even if it were the fault of the seed. He could only test its vitality, not its quality. But it may be possible that as the seed business with this country has assumed some magnitude, dishonest growers may have raised seed from inferior or diseased roots and thrown it into the market. But I would suggest that every care should be taken to ensure a true article, or, what perhaps would be better, that every one should buy only a small quantity of imported seed and from the produce of it raise seed for the ensuing year. I sowed quarter of an acre with a white Swede, the seed of which was raised by Dr. Beadle, of St. Catherines; but which though, sown in the same field, showed none of the peculiarities of the imported seed.

R. N. B.

Niagara, Feb. 14th, 1863.

THE POTATO DISEASE.

EDITOR AGRICULTURIST:—In your issue for January, you have an article on the "Potato Disease" copied from the *Evening Times* over the signature of "A FARMER." He thinks it is owing to exhaustion of vitality in the tuber, and that the plant needs renewing by raising new varieties from the seed, and that *they* will be free for a time from the rot. If A FARMER will only try this experiment he will soon be cured of any such ideas. I have tried it and the first year fully one half rotted. The white fleshed and white skinned varieties, that promised to be the most delicious, were the most affected and in consequence rejected. The dark skinned yellow fleshed ones were rather better, and for some twenty sorts that were obtained from the seed not more than one or two will be worth propagating. The seed was taken from a field planted with different kinds, the "Peach Blow" predominating.

The Chilis he speaks of were most likely the "Garnet Chilis," which are a valuable kind of

potato and deserving the praise he gives them, but they will be found not to be invulnerable. The potato disease is almost without doubt established to be caused by a fungus, although some attribute it to an insect. Some potatoes by reason of a strong constitution are less liable to its attacks or better able to resist them, yet all are more or less exposed to the danger, and none are entirely free from it.

R. N. B.

Niagara, Feb 14, 1863.

Written for the Canadian Agriculturist.

DOTTINGS FROM MY NOTE-BOOK.

Upon each of the following brief notes a large article might easily enough be written, but brevity in such cases is generally more acceptable than extended observations.

1.—CATTLE AND PUMPKIN SEED.

Pumpkin seed have the evil effect of rendering milch cows dry. I was once led to believe that they were good for feeding milch cows, and commenced to feed them out to a cow, at the rate of half a bushel per day. At that time she was giving eight quarts of milk per day, but instead of this increasing the quantity it diminished it. I increased the feed to a bushel per day; still there was a decrease in the quantity of milk until the pumpkins froze up, when she did not give but four quarts a day. The cow did not fatten, and the reason for the decrease in quantity of milk I could in no way account for. I then took out all the seeds, when lo, the change! —instead of five quarts of milk a day I got nearly nine in a short time.

2.—SALT FOR HOFSES FEET.

Common salt absorbs moisture from the atmosphere. Here it has been in some instances applied with great success, for keeping the hard bound hoofs of horses moist. The hoofs of some horses become dry and oftentimes crack, thereby rendering them lame, if the animals are driven on hard roads. By bathing the hoof and fetlock joint with a salt brine three times a day lameness from the above cause will be avoided. It is a common practice with some blacksmiths to rasp cracked hoofs in order to render them more tough, but salt brine is far superior to rasping for effecting this object.

3.—LOCKJAW IN HORSES.

Veterinary physicians pursue a method of treatment for this terrible malady which I never could commend, They can do nothing without blistering, clystering, &c., which rather aggravate than relieve the spasms that usually attend it. Death often ensues by this practice, and the disease has been held to be almost incurable. I have discovered a new system of managing this malady, and nearly all the cases in which I have applied it have resulted favourably. My plan consists of hot water packing similar to that pursued in the "Water Cure" for the *genus homo*. As soon as the horse is observed to be affected with tetanus it is wrapt from head to tail in 4 or 5 pairs of blankets, which have been wrung out of warm water at a temp. of 200° Fahr. Allow the horse perfect rest and quietness for 2 hours, when warm water of above temp. must be poured along its back outside of the blankets, and another like period of repose allowed, and so on until a cure is effected. A thin gruel of flour, oat, or Indian corn meal may be given, when the animal's jaws are capable of being opened. Any farmer can apply this simple method himself.

5.—HONEY BEES.

From horses to honey bees may be "a step from the sublime to the ridiculous," but never mind, I pick my notes as they come.

About honey bees I always recommend that they should be covered up in the winter, giving only a small vent for the air. I find they live on one-third less food by so doing, and are quite as good as when otherwise managed. I may one day give the readers of the *Agriculturist* my entire original method of managing bees.

5.—MILK.

From investigatsons lately made upon the normal changes in cow's milk, I found that the quantity of fat contained in milk increases (according to the hour it is drawn) from morning till evening, whilst the whole amount of protei substances remain constantly about the same; the quantity of sugar appears to reach a maximum at midday. The specific quantity was always nearly the same, and from that no conclusion can be drawn about the constitution of milk.

Mabrus' method of preserving milk is very good. It consists in putting milk into a metallic vessel, which terminates at the top in a tunnel-shaped leaden tube; above the milk (in the tunnel-shaped expansion) is poured a thin layer of oil, to prevent contact with the air; the milk in the vessel is then heated from 167° to 176° Fahr., during about an hour, to expel the air, and, after cooling, the leaden tube is pressed together air-tight, then cut off above the point of compression, and soldered together. I have used this method for some time and find it excellent.

6.—MANURING.

"The very worst way to apply manure is to spread it out on the field and have it exposed So I once heard a Professor of Agriculture Chemistry say. He argued that this exposure caused a loss of ammonia by evaporation. But from my own practical experience and that of my neighbours, who have adopted my plan, I believe this statement highly incorrect. No loss arises from spreading manure on the surface of a field; on the contrary, if spread and allowed to lie until it is washed with rains, it is more beneficial than to plow it in at once. We

pread out in a field fermentation is stopped, nd volatile matter ceases to escape. In the se of clay soils, I have no hesitation to say, hat the manure may be spread even six months efore it is plowed in, without losing any ap- reciable quantity of manuring matter.

7.—LIQUID MANURING.

I have practised this considerably on my farm, nd find the trial to result in marked success. collect the liquid manure of my farm in well overed tanks, puddled with clay, to prevent e loss or escape of the liquid. Each tank is rided by a wall into compartments, capable of lding each two or three months' supply. hen the first is full the stream is turned into e second, and, by the time this is full, the first fit for land. I always apply it in a ferment- g state.

The fresh urine of cattle, &c., ought to be xed with its own bulk of water, by which ans the loss of ammonia is prevented, as also e caustic effects of urine on the land. Sul- uric acid or burned gypsum may also be ad- l to fix the ammonia. One thousand pounds urine contains sixty-eight pounds of solid rich tilizing matter.

8.—MISCELLANEOUS.

Every farmer who can afford it should send sons to a course of chemistry, (agricultural possible) at a good college. Farmers should mbine in every village, and raise a "Farmers' eating Club," for mutual instruction in agri- ultural and other useful ideas. I started one miles from my farm a year ago, and we now e farmers coming to the meeting (twice a k, when not busy, and oftener) who live at distance of ten and twenty miles. We have bscription of $1 for those who can pay; is for *life* membership. However, every is admittod free and allowed to partake in discussion. The members write out their s, and altogether we find our "Farmers' So- y" benefiting every individual member who nds.

To be Continued.

Y DON'T THE FARMERS WRITE THEIR PAPER? STABLING COWS, SAWDUST FOR BEDDING, &C.

DITOR OF THE AGRICULTURIST.—It does strange while the U. S. Agricultural rs are so full of correspondence, that the Agricultural paper published in Upper da should have to make so many com- ts to Canadian Farmers for not writing for own paper. What is the reason? It has said that people do'nt like to write for no- and pay the postage too, but this surely e no reason with any of the long list of far- who are receiving every year a share of oney given by Government for the encour- ent of agriculture. What is the reason Is it laziness? If not let some one that knows the reason tell it with a view to a re- medy.

You ask for facts and experience, I will give you a little in that way, and if you think it worth puting in the Agriculturist you can do so. I have been in the habit of tieing my cows up in the winter. This year I did not take them in until December, they were fed in the yard, had a shed to go in when they chose, and water near by. After they were taken in and tied up they gave about one third more milk, fed the same as before, viz: hay in the morning, turnips at noon and straw at night,—except at the com mencement of foddering before I got any straw thrashed, they had hay both night and morning —and let out to water once a day and imme- diately taken in again.

This winter I have commenced to bed them with sawdust and find it much better than straw for keeping them clean. They stand on planks raised a little above the floor with a view to keep them dry and clean, but notwithstanding all my care in bedding them with straw they would always be dirty. This winter as I said, I bed them with sawdust and they are almost as clean as they are in summer at pasture. My wife says it is a pleasure to go in to milk them now, they are so clean, and look so comfortable.

I am, yours, &c.,

J. W.

THE POTATO DISEASE.

LONDON, C. W., Feb. 1863.

EDITOR OF THE AGRICULTURIST,—DEAR SIR, —May I take the liberty to submit to you a few remarks upon a subject that concerns all of us. I allude herein to the sanitary condition of the pot- ato and its treatment. I would beg it may be un- derstood that it is not my intention to enter into any controversy, not only from the fact of my being a mere novice, but also from a desire to avoid contention. Notwithstanding all that has been written by those whose endeavours have been lent to explain the first cause of the potato disease, as also the cure of the disease, unfortu- nately nothing in reality has been made conclu- sive. That the malady at the on-set established itself in an epidemical form, into the fair fields of Europe, there is no doubt, and thousands of poor creatures had then starvation staring them in the face, in consequence of the direful rava- ges made by the plague that fastened its blight- ing grasp upon the poor people's principal food. And did they not some of them die of starva- tion in consequence? We know they did, and that the same disease now prevails both in Eu- rope and in the greater part of this vast contin- ent there can be no room for denial. The study of this most essential and important article of food, is very interesting, and should *now* occupy more largely the attention of the farmers in general, than has been the case.

As to the history of the potato we need not refer to that, further than to point to the feasi-

bility of obtaining, if possible, from its original source, a small number of real natural tubers, merely to afford renewed experiments, in relation to the existing disease. And there should be efforts made, *in time*, by every one who cultivates the potato crop, in order to arrive at a system whereby to lessen and check the disease as much as possible. The utter destruction of this malady in any particular country, and during any one year or season, would lead only to the miraculous. The theory advanced by some writers, whereby to destroy the potato disease by the production of tubers from the seed apple, is indeed very questionable. That tubers of a new or different variety may be thus produced is apparent, but since it is conclusive that the visitation is still endemic to the whole vast family of the potato, it *must* follow that renewed seed propagated in this way, will enter into life open to the same influences that are now attached to the parent plant.

The impression as regards the production from the seed of the plant, with a view to introduce a pure and healthful race, when first made upon the mind, led me to think along with others in favour of the experiment—but apart from such experiments that have been made, and their results—there remains in my opinion but one conclusive consideration, which is, that it would be just as reasonable to suppose, that the new-born child—because it is a new-born child—will thereby escape all or any of the endemical diseases to which the human family is liable, as to imagine that the potato produced anew from the seed, can be free from a disease to which its whole race have been predisposed during a lapse of seventeen years. That the root may be renewed, and in a measure improved in quality by the process there is no doubt.

In the year one thousand eight hundred and sixty, I had planted with potatoes about half an acre of light land; they were of three different sorts, viz.: Pink Eyes, Ohios, and a new variety called "the Prince Albert;" these were planted, each sort by itself. The crop in progress of growth received every attention, the yield was abundant, and in other respects large in size, sound, and of good quality. That season (1860) my attention was drawn to the very unusual quantity of seed apples that formed and matured, and I was induced to collect a great number of the largest of the berries, for experimental culture. However, as ill luck willed it, they were, after remaining a long time in state of supposed decomposition, mistaken for some useless compound, and thrown out of doors. In 1861, the same piece of land was put into culture of the carrot crop; and from the great care taken to subdue all kinds of weeds and anything that might vegetate, save the carrot plants, there was not even a solitary potato permitted to live from any of the few that might have been left in the ground the preceeding year.

I have now to introduce a very interesting phenomenon—if I may be allowed the expression in respect to the seed of the potato. I have stated that an unusual quantity of seed apples were produced in 1860. I have also declared that nothing of the potato kind vegetated in 1861. In 1862, the identical piece of land was a second time put under the carrot culture. Some few days after the carrot seed had vegetated, in looking through the drills, it was observed that an abundant crop of very diminutive potato plants had sprung up; and more so on those parts of the land where the Albert, and Ohio potatoes grew in 1860, and although the seed apples were seen in abundance on the plants of the Pink Eyes, but very few seeds of that sort seemed to have vegetated in 1862.

The discovery of these young seed plants afforded a wide field for experimental culture. In due time I selected a quantity of the most healthy looking young plants, and some of them were removed and transplanted to a *particular spot*, whence potatoes of a disease character had been dug in the fall of 1861, this step was taken with a view to ascertain the contagion—if I may so term it—still lingered there. The other plants that were removed were transplanted into various parts in the garden—the whole of them received similar attention during the summer, with respect to culture—as did also a great many more that were left in favourable places amongst the carrots where they first vegetated.

When the produce of this seed crop was harvested I did not find the yield thereof as I had been led to anticipate, viz., "small potatoes the size of marbles," but on the contrary some of them were extremely large—indeed those generated of the Prince Albert sort measured, some of them, as much as five inches long—there was no discernible disparity of size in any of the tubers raised from the Prince Albert plants—but in shape there was seen a material change in a few, some of which were quite round, whereas the parent stock is that of a very long potato. In respect to the produce of the Ohio plants, not only was there a disparity of size observable but also an unmistakable new variety of oval and round formed potatoes, and the skin a clear white skin—the Ohio being natural pale purple. There is one thing I ought to remark, which is, the produce from the plants that were removed and transplanted was of superior description to that found under the plants that remained undisturbed, although the whole that were harvested received equal care in cultivation. This perhaps may be attributed to the death of some of the young tender roots caused in the act of transplanting them, which would naturally tend to strengthen those that remained uninjured; and although the potatoes were not so great in *number*, they were much larger, and more fully formed, than those found under the plants that were left

disturbed were much smaller though of greater number.

Reference must now be made to the plants that were removed and transplanted to that spot wherein "potatoes of a diseased character were found in 1861." The unfavourable fact must be declared, that not only the symptoms appeared, but in a great degree, and a number of these tubers were found in a highly diseased condition. The fatal truth of a failure both in the usually planted tuber, and also in that of the young plants, placed there in a perfectly healthy state, is an important matter for consideration, and which I shall endeavour to explain.

To be continued,

DECLINE OF SHEEP HUSBANDRY IN THE STATE OF NEW YORK.

It is satisfactory to find that warlike operations are not occupying the whole of the attention of the American people. Agriculture and pastoral occupations, which should be their mainstay, still crop up occasionally in discussions and the public journals. Let us hope that the sword may soon again be converted into the ploughshare, and the industrial harvest of the soil may be reaped instead of the bloody harvest of warfare. We have lately received at the hands of Mr. Johnson, the secretary of the New York State Agricultural Society, a copy of a very interesting paper on Fine Wool Sheep Husbandry, read before the society last year by Henry S. Randall, LL.D., of Cortland Village, New York. The subject is an important one, and very elaborately treated, as may be seen from the following digest of the points dealt with:—The origin of the Merino; its varieties; its introduction into the States; the circumstances which have affected its success; the comparative profitableness of its varieties; the expediency of crossing between varieties, and the effects of in-and-in breeding; the proper mode of selecting a flock; the art of breeding; the present course of breeding in the United States; and suggestions as to the future of the fine wool husbandry there. These subjects are much too voluminous to be treated of in a short digest, and we shall therefore content ourselves with directing attention to the last, which is indeed that in which our readers are most concerned. The observations it may be remarked, refer almost exclusively to the State of New York.

Dairying seems to be wholly driving out wool-growing in the grazing portion of the State, and grazing cattle preferred to sheep on probably a majority of the grain farms. The remarkable decrease of the latter in proportion to the population is apparent from the census returns. In 1840 there were 5,118,777 sheep in the State to 2,428,921 persons. In 1860 there were but 2,617,855 sheep to a population of 3,888,728. Cattle in the same interval had rather increased. The weight of wool obtained was, however, about the same from the lesser number of sheep as from the larger, the clip of 1860 being returned at about 9½ million pounds.

While the vastly higher priced lands of England carry nearly two sheep for every inhabitant and within a fraction of 590 sheep for every square mile of territory, it thus appears that the State of New York has now less than one sheep to every inhabitant and less than 56 sheep for every square mile; and it further appears that the sheep have steadily decreased for twenty years, and are still continuing to decrease.

The explanation offered for this decay is, that the great flocks of the State kept for wool growing purposes anterior to 1840 were mostly of Saxon blood, and when they were abandoned as unremunerative in 1846, no other wool-growing sheep proper was left to supply their places. For the few improved American Merinos left in the county in the hands of breeders, comparatively large prices were asked. But the farmers were wholly disinclined to venture on any new and costly experiments in fine-woolled-sheep. The destruction caused among sheep by dogs has also essentially contributed to the prostration of sheep husbandry. It not only has inflicted serious, and, in the aggregate, enormous losses on the people, but it has of late years, as population and cuns have increased, driven multitudes of persons out of sheep husbandry, and prevented still more from embarking in it.

Dairying took the place of wool-growing. It proved a steadily and highly remunerative department of industry. Dairying under the best circumstances is far more profitable than sheep husbandry with inferior or middling animals; but the best sheep are as productive as the best cows, and require far less labor. By means of the rapid increase of sheep, and the great facility of promptly improving inferior ones, they will stock a farm more expeditiously, and with far less outlay, than other animals. The ordinary processes and manipulations of sheep husbandry are also simple and readily acquired. On no other domestic animal is the hazard of loss by death so small. It is as healthy and hardy as other animals, and, unlike all others, if decently managed, a good sheep can never die in the debt of man. If it dies at birth, it has consumed nothing; if dies the first winter, its wool will pay for its consumption up to that period; if it lives to be sheared once. it brings its owner into debt to it; and if the ordinary and natural course of wool-production and breeding goes on, that indebtedness will increase uniformly, and with accelerating rapidity, until the day of its death. If the horse

or steer die at three or four years old, or the cow before breeding, the loss is almost a total one. If the cost of keeping sheep is fairly estimated, it will be seen that, with prime animals, no other branch of agriculture has yielded better or more uniform returns on the capital invested.

The following have been the average annual prices of New York State fleece wools for the past seven years, per pound, in cents.

Years.	Saxony.	Full blood.
1855-6	46 to 50	39 to 41
1856-7	53 to 56	46 to 49
1857-8	38 to 41	33 to 35
1858-9	45 to 50	40 to 42
1859-60	50 to 54	45 to 47
1860-1	48 to 51	43 to 45
1861-2	42 to 46	40 to 44

The examples of France, Germany, and England all show that vastly higher priced lands than any in New York carry sheep at a profit, and in the two-first named countries the wool-producing sheep are preferred to the mutton sheep, though the growers are exposed to the competition of the far cheaper wool-producing lands of Southern Russia and Hungary near by, and of the Cape Colony, South America, and Australia further off.

The production of mutton has been too much disregarded in America as a concomitant of the production of wool. Near large meat markets mutton is the prime consideration, and wool but the accessory; remote from such markets the converse of the proposition is true. But it does not follow in either case that the secondary object is to be unnecessarily neglected. The great body of Americans are neither accustomed to, nor do they choose, excessively fat fresh meats of any kind, particularly mutton. A portion of the population cook and eat mutton as soon as it is killed. Every experienced meat producer knows that a pound of well-fatted mutton can be raised more cheaply than a pound of any other well-fatted meat. The American consumers are discovering that it is as palatable and nutritious as any other kind of animal food, and wastes materially less in cooking than beef. Prime mutton now commands higher prices in the markets of the States than the choicest qualites of beef. Its consumption is rapidly increasing in American cities, and also in small inland local markets, and on farms, because prime lamb and mutton can always be supplied in the latter places, whereas meat from large fat cattle cannot be, unless in cold weather, as such animals make more meat than can be disposed of unsalted in such situations.

The increase in the numbers and in the early maturity of sheep enables England to support a vastly larger population than it possibly could have done 100 years ago. It is hardly too much to say that the continued sustenance of its people, and the fertility of its soil, depend upon these animals. England proper, with an area of 51,000 square miles, has upwards of thirty millions of sheep. Without these, its soils could not be maintained in their present productiveness, and its population of 17,000,000 supplied with animal and vegetable food. It is now conceded fact that an equivalent result could not even approximately be obtained by the substitution of any other animals.

The meat of the Merino, when well gathered and properly treated, is juicy, short-grained high colored, and well flavored In all these particulars American taste adjudges it superior to the meat of the English long-woolled sheep Professor Wilson states that the Merinos may be fed up to 110 to 120 pounds at two years old. The full-blood Merino produces as good mutton as the ordinary country and western Merino grades of the States, if killed as young and in as good condition It costs no more in proportion to weight of carcase to keep it. If wool is worth from a third to half more per load "Wherever, therefore," observes Dr. Randall "it is profitable to grow the common grade sheep, partly for mutton and partly for wool-producing purposes, it is more profitable to rear full-blooded Merinos. In the State of New York we could, by the substitution of fine, heavy fleeces for those now carried by our grade sheep profitably grow 200 per cent. more of mutton in the wool-growing districts than we now do." He also adds, that during the thirty years he has kept Merino sheep the fleeces of his flock have averaged more than 2 dollars a-head per annum and wethers produced fleeces worth about 3 dollars. As on the best lands of the State it now costs about 2 dollars a-head annually to keep Merino sheep, the lambs and manure may be looked to as the gain.

The only change which he considers necessary or desirable to make in the form of the Merino to improve it as a mutton sheep, is the same which it requires to improve it as a wool-bearing sheep, viz., to convert the flocks which now deviate from that standard into low, round, hardy, easily kept sheep. The wethers may, some future day be turned off at two years old under a system of feeding analagous to that pursued in England, but it is doubtful whether they will be found most profitable. Prime full-blood ewes will probaby in New York never be slaughtered before they are six or seven; indeed until their number is enormously increased they never will be turned off at any age to the butcher. They have twice or thrice the longevity of the improved English breeds, in which early maturity is indeed the precursor, if not the cause, of an equally early decline. Merino ewes not unfrequently raise good lambs at fourteen or fifteen years old, and Dr. Randall was informed that the dam of the once famous "Robinson ram" had a lamb in her twenty-second year.—*Maine Express.*

APPLICATION OF CHEMISTRY TO AGRICULTURE.

LECTURE BY BARON JUSTUS VON LIEBIG.

(*Concluded from Page* 63.)

In this manner science showed what was the real productive force of the soil, and fixed its laws of culture; it showed that the system of culture proposed by Thaer, would have had very different results if that eminent man had known the true productive force of the soil, and had been able to base upon it his doctrine of agricultural equilibrium, or if, whilst his doctrines developed themselves, agricultural instructions had fallen into the hands of men of science, instead of tradesmen.

It is true that in the schools of agriculture they had taken care to teach natural philosophy, chemistry, and other branches of natural history; but the knowledge that the pupils acquired in these sciences was not applied by the professor, completely ignorant of the sciences of practical culture, and skilful only in taking the land. Young men thought then that natural sciences only served as ornaments to trade, and that they were introduced into their studies merely to torment them.

In Germany the directors of these schools had succeeded in keeping them in the country, in some cloistered isolation, far from the scientific movement, which had then penetrated into all classes of the population, for in that way alone it was possible for them to ensure a certain duration to their system of instruction, and to their position.

In countries where, as in England and France, the *elite* of the better portion of the agricultural population were not poisoned by erroneous teaching, the development of the new doctrine followed its natural course. The principles in themselves were recognised as unimpeachable; only upon the manner of applying them, and how far their application might be extended, there were discussions which lasted several years. It was for the cultivators of England and France the time of study, in which they learned to know principles, and apply them judiciously.

On the contrary, in the eyes of teachers and upholders of the general system of culture followed in Germany, the new doctrine seemed to be unjust pretentions. Destitute of all knowledge of the natural sciences, they could not comprehend the connexion which existed between the innumerable analyses of soils, plants, and manure, and the sciences themselves; they could not see that the new theory was only the expression of the facts themselves. They had been accustomed to designate by the word *theory* what they had by chance observed, and what had been explained to them of the phenomena of culture, and they knew that the theory one man formed was of no use to another; it was further admitted in principle, that the practitioner ought not to be guided by these theories, but should conform himself to the circumstances in which he is placed, and to the evidences by which he is surrounded. They were not aware that these circumstances and evidences are natural laws, for they could not comprehend what science had to do with practice, and that its object was to throw light upon the facts and evidence which served for its rules.

Not only did the new doctrines appear to the school of agriculture in Germany as without foundation, but they considered it as a personal attack and an offence, because if the new doctrines were true, the old ones must be contrary to all reason, and those who taught them, far from promoting progress, prepared the future ruin of agriculture.

If, in fact, all operations of the cultivators are subject to imperious new laws, it was absurd of him to think that he possessed the least power over his land, or that his labor, experience, and ability had the power of obtaining a good crop from a plant that did not suit the composition of the soil which ought to produce it. It was not he, but the land that should choose the plant suited to it. He only put the plants into the ground, and his penetration consisted in interpreting what it told him. What depended upon will, and what constituted his art, reduced itself to finding out what was wanting in the land, in supplying it, and in removing the obstacles which hindered his fields from paying for the care that he bestowed on them.

All that certainly was in the new doctrines, and more than that; for in the transition to scientific practice, agriculture lost its ancient character. It could no longer be the innocent pastime of the country gentleman. The German cultivator had long misunderstood the source of the strength, well-being, and riches that flowed from it.

The idea of making artificially in all its constituent parts stable dung, for which a living organisation was necessary, appeared at first to cultivators an idea quite impossible to realize, and the first artificial manure caused a laughter amongst the farmers; and when the first trial of it failed, there was quite a jubilee amongst the learned agriculturists; the farmers rejoiced to see that that the means destined to diminish their labors, and aid them in future, were not successful.

It would be unjust to suppose that the false and erroneous opinions of cultivators, now and formerly, are peculiar to their profession; or that men of any other profession whatever had come into the world, abler or wiser. The history of natural sciences shows how little this is the case. At the time of Thaer, analytical chemistry was little known: the constituent parts of the ashes of plants, the alkalies, phosphoric acid, &c., had not been discovered in land, so that naturalists then believed them to

be the produce of animal life, analagous to iron in blood, or lime in the bones of animals.

A hundred years before, practical metallurgists thought that the extraction of metal from a mineral was the result of chemical operation; that the metal was not a distinct body, but the result of a chemical experiment. Then, again, they believed that everything depended upon the mode of procedure, or even the form of the furnace. Ability, or as they said again experience, determined the extraction of much or little of the metal. One obtained 30 per cent, of lead, and 0.2 of silver; another got 40 to 50 of lead, and 0.3 of silver, another, again, 60 per cent. of lead, and still more silver than the preceding ones. Then, as they could not comprehend that the ability of a man or his experience limited him, they went further, and ended by believing that not only all lead ore could be changed into lead itself, but that other substances which contained no lead could be changed into it.

The ideas of the cultivator were, as regarded his fields, precisely those of the metallurgist of the last century. He also thought his labor and ability produced the crops, and that it only depended upon possessing a good method of culture to produce fine crops upon any field whatever.

The metallurgists of our time know, by chemical analysis, what they themselves have learned to practise, that lead ore contains from 80 per cent. of lead, and not more; that the rest is sulpher, and that their ability consists in separating the sulphur from the lead without losing any of the metal.

The object of the metallurgist is still the same—obtaining lead, but in a different manner. That to which he directs his attention is, not the lead, but the sulpher, which retains the lead, and prevents it appearing what it is; and whilst his great care is to separate the sulpher, he obtains more lead at a smaller cost.

In the same manner chemical analysis proved to the cultivator that his soil, down to a certain depth, contains only a limited quantity of the conditions for the growth of plants; it showed him what forms of alimentary substances are necessary to serve for the nutrition of plants. It thus made him see that stable dung, though excellent in itself, is not sufficient to keep the land from diminishing in fertility; that the use of dung alone, produced upon a farm, will not increase the quantity of alimentary substances contained in the earth; that it only puts them in movement, and displaces them; that with dung they could only give to the surface of an exhausted wheat field what had been taken from it under the form of fodder plants; that it can give no more to a field than what was taken from it, to the impoverishing of another; that the revenue of one who uses nothing but stable dung is like a life interest, with which he exhausts his capital.

The term artificial manure is not altogether exact, for art cannot produce that manure: it only reunites the constituent parts of dung, and mixes them in a manner suitable to the wants of each plant.

The state of agriculture now can be described in a few words. What cultivators thirty years ago thought impossible is now not only possible but has come into general use; they thought it was impossible to manufacture anything that would take the place of stable dung. It will suffice, with reference to this, just to glance at what the Duke of Argyle said in his lecture at the opening of the Society of Naturalists in Glasgow; that in 1854 already 60,000 tons of artificial manure had been made in England, and that in the preceeding year the farmers of England, France, and Germany had used in their fields more than ten million metrical quintals of this manure. As one quintal of that manure increases upon an average the produce of a field three quintals of rye or its equivalent, so a field gives that quantity more than it would have yielded with stable-dung; it is easy to calculate what a mass of alimentary substances we have enriched ourselves with by the use of the manure.

A single chemical preparation, that of superphosphate of lime, has been known in England as of so much importance in the cultivation of turnips and fodder, that it is calculated the produce in meat and grain has increased since the introduction of this manure in the same proportion as if the extent of cultivable land had been increased one fifth. We can form an idea of the consumption of this article if we consider that it is prepared with sulphuric acid, and that the preparation of sulphuric acid in England, has been nearly doubled since the use of superphosphate of lime.

Still, the production of alimentary substances, and the wants of the populations in Europe, are far from being in a state to inspire confidence. The equilibrium between production and consumption resembles a balance, where a slight increase of weight occasions not oscillation, but complete fall of the scale. Thus the failure of one crop, that of potatoes in 1847, has made, in spite of a good grain harvest, enormous price in bread, and caused a famine in Ireland, Silesia, and Spessart. The importions of corn and flour from countries out of Europe have, until now, sufficed to maintain a sort of equilibrium; but it is certain that a maritime war which would not be of very long duration, but which would hinder the arrival of corn and flour, guano, and other manures, would extend over all England a famine in its most horrible form.

This rapid glance at modern agriculture serves to show how and in what manner science has made itself generally useful Recently the proposition was made and adopted by the Chamber of Deputies, Bavaria, of addressing to his majesty the king that he would give to the academy a direction more useful to the kingdom of Bavaria. That proposition is remarkable, because it shows how little extended a

right ideas of the mission of a learned corporation. Our academy certainly is not science itself; but each member in his sphere, and according to his strength, takes part in the solution of the scientific problems of the age, and exercises a certain influence over legislation, commerce, trade, and manufactures.

Those who profit by the discovery of science are rarely in a position to know in what manner science has increased their strength or fortune. If chemistry gave to the farmer good receipts for manure for every field, or a remedy for the potato disease, a means of destroying moles and mice, or prevent the laying or rotting of corn, the practical man would no longer be in ignorance of the sources of these ameliorations. But science does not occupy itself with things useful only to individuals; it seeks to discover what will be useful to all, and those ideas that rule and guide the actions of men. It seeks to discover whether these ideas are conformable to the laws of reason and nature; it rectifies false views, and puts the perfect in place of the imperfect.

Science is only useful so far as she rectifies the ideas of men. But all intellectual progress takes a long time to develop itself; and often many generations succeed each other before one old error generally believed gives place to a recently-discovered truth. As the roots of a plant only take just what is necessary for its nourishment from a large sheet of water, and as it is killed by too much nourishment; as it is necessary that the light and heat of the sun should give their aid to the germ before it can develop itself and become a vigorous tree, bearing fruit; so the development of men's ideas is governed by similar natural laws.

The abstract idea, though fruit in itself, is not the tree full of fruits; it is the germ of that tree, which needs heat, care, and nourishment extremely diluted, before it is able to bear fruit. There are some ideas which, for a time, disturb a whole population, and then disappear without leaving traces of their existence; they perish, as the branch of a tree from another climate, put into water, throws out leaves and flowers, but bears no fruit, because it has no roots. The fruits of progress which we of the present time enjoy had their roots in generations which have passed away; and the new discoveries which we make now will only be profitable to our children. Even the smallest improvement in a trade took a long time to work its way into the masses. The idea of using phosphorus in the manufacture of matches originated in the middle of the last century. More than fifteen years were necessary for obtaining useful results from the experiment of igniting powder in a closed space; and now to those very experiments we owe all the improvements in firearms.

A prevailing error—which is much more difficult to destroy than the majority of men believe—is not the sole cause of the long time which elapses before a scientific truth comes into general use; the routine, the want of being able to think deeply, the dislike men have to use their reason, are not the less obstacles. The most ignorant peasant knows that the rain which falls on his dung heap reduces it in value, and that it would be to his advantage if he could have upon his fields what infests the streets of the village and poisons his wells; but he sees it with an indifferent eye, just as his father did before him, because it has always been thus.

It is the same in large towns: the municipal authorities spend large sums in carrying away and putting out of reach of the cultivators the excrements of men and animals which amass themselves and which would be sufficient to reproduce bread and meat for hundreds of millions of men. This the farmers see with as much indifference as the citizen. They think it is of no importance to the public welfare, when they are obliged to bring from America, a distance of some thousands leagues, the very same matter. The way of seeing more justly and correctly, which raises the intellectual power of a man, requires a long time to develop and extend itself; intelligent application abridges the time, but the mass cannot perceive so readily.

If the populations are not prepared by education to receive the instructions of science, which tells them to try and adopt what will better them, then all efforts to render these instructions generally useful will be fruitless. If in such a country science went from house to house offering its services, those most in want of it would, in their senselessness, shut the door against it. He would say that he did not want its help, it was of no importance to him; that he had enough instruction, and that there were other things which he wanted. We have often seen the farmers refuse to try the experiment of using artificial manures upon their lands that the agricultural societies offered them at half the trade price. They wanted to get them for nothing, and then he thanked for taking it from them; and, in fact, when they got it for nothing, they would not make use of it. All these circumstances are only transient, for no population can for ever shut itself from progress, and renounce the power and riches that science procures. For these populations there is always one source of consolation left—that truth and goodness are indestructible, and that in a suitable time God will cause the seeds to ripen.

But, again, in the countries where scientific results have been favorably received, as a rule, those to whom they are the most useful are the men who know least the reason why they are so useful; for if after some years' struggling they have conquered, in fixing a scientific truth, all the obstacles which oppose themselves to its useful action upon life, the next generation, which has grown up in the new ideas, knows not that they are the fruits of immense intellectual labors. It knows as little as the young telegraphist of to-day knows

that the small apparatus with which he works, and which affords him a useful and comfortable position in society, is the fruit of the most painful labors of certain men during half a century, and that it is the result of a series of facts which had first to be sought and discovered before that apparatus could be invented. The young generation thinks that all these things have always existed; and it never enters into its thoughts that what is now recognised as reasonable and useful was formerly disputed and regarded as inconsistent, erroneous, and bad.

The greater proportion of men have no idea of the difficulties that attended the labors by which the domain of science has been enriched. It may even be said that that innate disposition in a man to search out truth would not be sufficient in itself to cause him to surmount the obstacles which oppose themselves to the obtaining of every great result, if that disposition did not become in a few a powerful passion, which expands and increases their powers. All these labors are entered into without regard to profit in the individuals, and without a claim to gratitude. Those who accomplish them seldom live long enough to see their discoveries usefully applied. What they have labored for they cannot convert into money in the great market of life: it is merchandise that fetches no price—that can neither be ordered nor bought.

The most powerful action of science upon the lives and minds of men is so slow, so void of all noise, and so little apparent to the eye, that it is altogether impossible for a superficial observer to see how it works, or even that it works at all; but those who see the groundwork of things know that in our time progress in the world without science is impossible, and that the reproach of their not being generally useful ought to be addressed to the populations, and not to scientific men, who each in his way follows his aim, suffering nothing to lead him astray from it, and without thinking of the future utility of his labor either to himself or to one country only, but to the whole human species.

CROSSING SHORT-HORNS.

The power of a cross in a pedigree is determined by its position. Numerically, it can never, of course, be more or less than one; but relatively to its circumstances it may denote a half (which amount it cannot possibly exceed), or signify a fourth, or dwindle to an eigth, or shrink to the proportion of a sixteenth, a thirty-second, or a sixty-fourth, and so on; until though as palpably present and as large as ever to the sense of sight, it has become, as regards potentiality, a fraction too minute to be noticed in a calculation. There was a time when each cross constituted the entire half of the pedigree, and was precisely equal to all the rest. But each cross has to give up a portion of its author ity as another comes before it. It represents th half of a pedigree only so long as it is the near est in order; and as it recedes by the superad dition of new crosses, the degree of its pow diminishes according to a necessary arithmeti cal ratio. This is very important to bear i mind; for if it be true, as it unquestionably i - -either a cross which was once objectionabl may really be so no longer; or a cross whic once possessed a commanding importance ma have little individual value left (its situatio being changed) beyond the association of consecrated name. A pedigree cannot be t exactly investigated and decompounded; bu the whole of the pedigree depends not upon th particular worth of each party, abstracted fro the rest, but upon the character of the whol as concrete. This character is ascertained by computation of quantities, of every one o which a separate and competent knowledge i supposed. In pursuance of a subject which h been frequently discussed, and in a variety o ways, in the columns of the *Messenger* durin the last fifteen months, and which, we ventur to conclude, is somewhat better understood b the majority of readers than it was fifte months ago, we copy out a bull's pedigree, to consideration of which, and directly in refe ence to the foregoing remarks, we invite atte tion The bull is nephew and half-brother t Mr. Langston's prize-winning bull Lord of th Harem (16,430), and is the property of a gentl man in the county of Westmoreland. Th sires in the pedigree stand in the followin order:

Duke of Buckingham (14,428);
Duke of Buckingham (14,428);
Grand Turk (12,969);
Fitz-Adolphus Fairfax (9124);
Sir Thomas Fairfax (5196);
Ambo (1636);
Memnon (2285);
Pilot (496);
Agamemnon (9);
Burrell's Bull of Burdon.

An eminent authority in short-horn matte alternately viewing this bull and his pedigre at length delivered himself of the followi oracular observation—"Those Fairfax cross spoil him." "Why?" was the reply. "B cause there's a *prejudice* against them." Wai ing any remarks upon the absurdly incons quential answer to that most searching a often pugnacious adverb, "Why," and admi ting, for the occasion (which we do not adm with the concurrence of our judgment) that t prejudice has a reasonable foundation, let inquire into the actual proportion borne by t two repudiated crosses in the pedigree of t animal alluded to. The pedigree consists ten crosses; seven of these crosses being Boo (for the earliest five crosses are now universal and not improperly accepted as such); one, h Booth and half Bates; the other two, Fairf blood The Fairfax crosses stand as prominen as ever, and count two as plainly as ever they d but they don't stand for what they once repr sented; they are no longer the signs they we

when the pedigree *began* with them; their altered situation is accompanied by an altered influence. To the *eye* they are as two to ten, or, in other words, seem to constitute one-fifth. But tested in another way—the whole pedigree being subjected to a careful dissection, and each component part, at least, of what composes the visible formula thoroughly analysed and examined the result is very different indeed. This result shows that the proportion of Fairfax blood is in reality only as 3 to 32; the other 29 parts consisting of Booth blood, with so much of Bates (in the Grand Turk crosses) as 2 is to 32. In fact, out of 32 parts 27 are pure Booth. So that, in this case, *the eye* is a deceiver to the extent of the difference between one-fifth and three thirty-seconds. And yet people go on, idly not thinking, and satisfied with conclusions that owe their existence to impressions, as we said a little time ago, *projected from the surface*. But, in point of fact the preponderance for Booth blood is even greater than has been expressed, and the Fairfax blood somewhat less; inasmuch as in the blood of Fitz-Adolphus Fairfax that of Warlaby is present, to the extent of one-sixteenth more than a quarter. So that, directly, Booth blood has 27 parts out of 32; and (obliquely, and in addition to the 27 parts) a proportion of the quantity just specified as present in the pedigree of Fitz-Adolphus Fairfax. Fitz-Adolphus Fairfax was, in truth, one of the most magnificently bred bulls in the Herd Book; and it has often been a matter of surprise to us that persons who form their judgments *altogether by pedigrees* should seem to overlook this circumstance. If our observations were designed to extend beyond *pedigree* on the present occasion, we might speak in very high terms of commendation respecting the personal character of the two cows whose sires were Sir Thomas and Fitz-Adolphus Fairfax. The former a noble short-horn, was bred by Mr. Fawkes, of Farnley, and passed into the hands of Mr. Cruickshank, of Sittyton; the latter, and equally admirable animal, was owned successively by Mr. Douglas, of Athelstaneford, and Mr. Ambler, and became, in the possession of Mr. Housman, the dam of the mother of Lord of the Harem and of several females not inferior to him. This, however, is not our purpose We designed to treat of pedigree, and pedigree alone; and if in doing so, we have seemed to some of the readers of the *Messenger* to utter commonplaces, we console ourselves by remembering the words of a master logician, who says, that when much ignorance prevails on a subject, to utter a commonplace may be equivalent to the announcement of a new truth. It is at any rate, even to the initiated, good exercise to investigate a pedigree with reference to its real contents, and to ascertain with precision the quantities or proportions of its constituent parts. We saw a catalogue the other day (it shall be nameless) in which, by the use of addition, instead of division and substraction, the most rediculous mistakes are prepetrated—to say nothing of the grammar.—*Bell's Messenger*.

ANNUAL PRODUCTION OF AMMONIA IN LAND.

That air and moisture undergo decomposition in the soil, and that nitrogen and hydrogen are liberated in the process, will really be granted; but the union of these latter two elements, so as to form ammonia, does not accord with our present state of science, no process having yet been discovered by which free nitrogen and hydrogen unite. In a large class of soils, however, when properly cultivated, the nitrogen and hydrogen may be in combination with other substances in such a way, as to obviate the objection thus raised against this highly interesting proposition. In point of fact, such compounds are liberated, and hence are present in the soil. This must be admitted by all who have pratically examined the matter, for the smell of them is sometimes as strong as to be felt by the ploughman when ploughing land between the wet and the dry Such, then, being the facts of the case, the natural production of ammonia in land, when properly cultivated, becomes one of those propositions that require practical investigation.

The production of ammonia in this manner has long been advocated by some agriculturists, in order to account for the great fertilization of land when properly cultivated, as compared with opposite results under bad tillage; and those who do so, are attributing no small part of the heavier crops produced under steam-culture to this fertilizing source. The more common region to which chemists flee for nitric acid and ammonia, is that of the clouds and electricity; but when brought to the test at the bar of experience, we must confess that this looks more "like building castles in the air" then solving the problem of how onefield is enriched by showers, while another is the reverse —results which would be otherwise were nitric acid and ammonia directly applied by artificial means. And, besides this, land has been, and being, fertilized through the instrumentality of air and water artificially applied, apart altogether from the clouds of electricity (we mean the electricity of the atmosphere). Those farmers, for example, who are now enriching their lands by means of the steam-plough at this season, do not leave *terra firma* for the upper world, there to catch the lightning and the clouds, or yet stretch wires across their fields and fly kites to bring down the igneous fluid to perform its wonder-working miracles in the soil. On the contrary, they simply smash up their tenacious clays between the wet and the dry, let in the atmosphere, and thus leave them, in nature s laboratory subject to chemical laws with which we are not as yet sufficiently acquainted practically to trace the effects produced to their respective causes, although the extra bushels of corn and tons of mangolds evidently speak for themselves.

Should the proposition which we have thus chosen to notice be eventually established, and adopted into applied science as a realized matter of daily experience, at the will of the far-

mer, it cannot fail to become the grand desideratum of the day.

The Society of Arts offers a premium " for the production of ammonia or nitric acid from their elements, by methods which would admit of practical application;" and some time ago a paper on "A new Method of Manufacturing Ammonia" was read by Alexander Williams Neath, before a weekly meeting of the society, bearing closely upon the pratical illustration of the subject before us; so that the progress of things is, at least, advancing in the direction of its ultimate solution.

In this work of scientific and practical inquiry, one of the chief difficulties experienced is the examination of those processes that take place below the surface of the soil. The facts of the case being imperceptible to the naked eye, the agriculturist and chemist are left to grop their way, as it were, in the dark, and to draw conclusions from scientific data, rather than practical Thus when either breaks a clod, his olfactory organs unmistakably inform him of the escape of the sulpurous gases ; and when he farther proceeds to examine from whence they are liberated, the question is all-but self-evident, that they must have been confined in the pores of the soil, along with air, while undergoing decomposition, and that in the process of cultivation fresh air is admitted and confined, along with the moisture, &c., the whole being subject to chemical laws not yet understood, as already stated. But inquiry cannot stop here; for the cracking clods, through the instrumentality of moisture absorbed and their own gravity, are seen bursting asunder into fragments, so that another question naturally arises, *How is the equilibrium of things affected by such means?* Are caloric, light, and electricity in any way distributed, so as to produce nascent nitrogen, and then ammonia, or sulphate of ammonia, or any ammoniacal compound, in the decomposition of the animal, vegetable, mineral, and gaseous matters thus pent up in the pores of the soil, or present in it, under the special circumstances of the case? The question here, it must be borne in mind, is not as to whether ammonical fertilizers are generated during the composition of animal and vegetable substances? that being a realized fact; but whether the presence of the other substances under consideration produces an increased supply, so as to account for the increased fertility of the soil experienced? an increased fertility which is proved by the heavier crops harvested. It is now an established fact that, under steam-culture, heavier crops are being produced, with less manure applied to the land than formerly; while the land itself continues to increase in fertility. Had the heavier crops been raised by exhaustion of manurial elements in the soil, the two sides of the balance-sheet would have tallied; but in practice it is otherwise. Hence the pratical question that demands solution.

There is, however, another way by which an exact balance may be effected, without the natural production of ammoniacal fertilizers, in accordance with the above proposition. Thus if, under horse culture, a waste of manurial elements takes place, then all that is necessary to render a perfect balance with the heavier crops now growing under steam culture, is a great economy of manurial elements in the natural laboratory of the soil at this season and during winter, as well as during spring and summer, when crops are growing. A greater amount of water is consumed in the growth of heavier crops, and a larger quantity of oxygen abstracted from the atmosphere or air in the soil, while the decomposition of water is less. Consequently, under steam culture, less hydrogen is liberated in the soil than under horse culture; but the amount of nitrogen disengaged from the pent-up air is much larger.

That this latter solution of the question is true to a very large extent, is amply borne out by fact, the greater waste of manurial substances under horse culture being so self-evident as hardly to require proof At the same time, there are innumerable cases of summer fallows and poor clay soils to which the solution is not applicable, so that farmers have no alternative left but too fall back either upon the old favourite theory of the clouds and electricity, or else have recourse to the more modern one under notice, of ammoniacal fertilizers being generated, by some unknown process, in the soil. Now, the readier will readily perceive that when an exception of this kind is once admitted, it must of necessity become the general rule; for, if ammoniacal fertilizers are generated in the exceptionary soils referred to they will be much more readily produced in the other cases where the process of formation is already in operation. Hence, the argument turns in favour of the proposition instead of against it.

Before discoveries in physical science are made, all inquiry in search of them must as a matter of course partake more or less of a speculative character; and in this light the few desultory observations just made on the natural production of ammoniacal fertilizers in land will it is hoped, be received. Whether such takes place in the soil in the manner stated or not, a clear case, besides, relative to the great economy of manurial element, has been made out in favour of the steam plough, more especially in early autumn tillage. And, if to this greater economy the progress of discovery shall eventually add that of the natural production of one of the most valuable fertilizers now in use, the total advantage gained will be inestimable. We have purposely avoided detailed calculations as to the amount of nitrogenous element on either side of the balance-sheet, as all such generally exemplify a great tendency to dogmatical empiricism than to practical usefulness. Some plants, it is said, exhale ammonia; and hence in all probability, have the function of generating it within their organism: and why should not the soil possess a similar function, either before the seed is sown, or else during the growth of plants—two distinct views of the question which ought not to be lost sight of in its investigation. When the steam plough enters the field, at this season

the farmer commences a work that is only concluded when he harvests the crop of the ensuing year, so that one subdivision of it cannot be examined apart from the rest, as regards the excretory products of plants, and the specific function of the soil under all the circumstances of the case. The success of "Tull's horse-hoe husbandry," of the modern systems of draining, subsoiling, scarifying, and of spade-husbandry, as also of the rotation of crops; have all been pointing in the direction of an affirmative answer being one day given to the question under consideration. A common doctrine has thus been pratically taught, that a chemical relation exists between earth, air, and water of a utilitarian character, like all Nature's works, that is not yet practically understood in all its details. With the extra produce grown, the agriculturist has long been familiar, and also with the general mechanical means by which such results are obtained; but when we come to the chemical data in the laboratory of the soil, the further prosecution of the subject must be left for discovery to pursue. All manurial topics are highly interesting, and the one to which we have drawn attention is doubly so, inasmuch as the supply is unlimited, and the gratuitous gift of Nature.

Since the above was written, a notice has appeared in the leading columns of the *Gardener's Chronicle*, stating that Schonbein has discovered a natural process whereby nitrate of ammonia is formed during the evaporation of water, thus experimentally solving our problem—a process which cannot fail to lead to farther discoveries in the same direction.—*Farmers' Magazine.*

AGRICULTURAL IMPORTANCE OF DEW.

Whilst the rain-cloud supplies the earth with its greatest amount of moisture, there are other means that Nature possesses for feeding vegetation with this necessary element. There are parts of the earth where rain never falls, and where a cloud is hardly ever seen; yet in such regions Nature displays in some instances all the luxuriance of more favoured localities. Moreover, during some portion of the year, in our own country, no raindrops fall; yet Nature does not fail, nor vegetation cease to thrive. The other source lies in the dews and fogs that rise into the atmosphere during the heat of the day, and at night get deposited on the leaves of plants and on the ground.

Let us for a moment look into the philosophy of the thing, and see how the beneficial results are brought about. The principles on which the formation of dew depends are, the radiation of heat and the condensation of the invisible vapour contained in the atmosphere by cold. Formerly it was thougnt that the cold observed on the formation of dew was *effected* by the dew, and not, as is really the case, the *cause* of the deposition itself; *before* dew can be formed, the body on which it becomes apparent must be colder than the surrounding air.

In considering, therefore, the beautiful phenomena of dew, we shall find that the laws of heat are intimately connected with it.

All bodies, whether existing in the form of primitive rocks and earths of creation, or of the green dress that a later age has thrown around the globe, or the compound materials that the industry of man has made for his comfort and use, has the property of radiating, or giving off into space, its heat; but all bodies do not possess this faculty in the same degree: hence the variety of the phenomena which the subject of dew presents for our consideration

Let us observe how these effects are produced in nature. On clear nights the ground—let us suppose it to be covered with herbage—becomes colder than the atmosphere; every blade of grass is continually giving off its heat into space, and receiving none in return from the sun, as is the case during the day. That this is the fact may be observed by placing a thermometer with its bulb on the grass, and another raised a moderate distance from it; the former will be found to indicate a lower temperature by several degrees than the latter.

When radiation has proceeded to such an extent as to produce the required degree of cold to precipitate the vapour existing in the air at the time, dew is the result: giving that beautiful appearance that we see in the early autumn mornings, when each blade of grass seems edged with shining diamonds, that reflect the rays of the morning sun in all directions. But its value does not consist merely of the pleasing effect on the eye: during many days in the summer and autumn, drops of vapour so supplied are the only ones that vegetation receives.

As we have said, different substances have different radiating powers, and consequently different aptitudes for exhibition of dew; even on some leaves more dew will be found than on others of another kind which radiate heat less readily. A sheet of polished metal and one of glass, if exposed to the sky during the night, will exhibit the phenomena in different degrees. The texture of substances also determines their capacity for radiation. Those that are loose, such as fine raw-silk, masses of unwrought cotton, wool, hair, and other similar materials, possess the power of radiating heat in a very eminent degree; whilst closer and more compact bodies do not show the same readiness in parting with their heat. This is why we often see the delicate fibres of the gossamer, which covers our hedges at some periods, covered with dew, when but little or none is observed on the surrounding foliage. Substances of the kind above enumerated are sometimes as much as from 5 to 15 degrees colder than the air, as is shown by the difference between a thermometer whose bulb is placed on such substances and one whose bulb is freely suspended in the atmosphere. In cold climates the difference is still more marked.

There is another circumstance that modifies the extent of radiation at different times, and that is the state of the sky with regard to the amount of cloud. When the sky is perfectly cloudless, radiation goes on with great rapidity, but is checked by the slightest covering even

of the slightest description. When the heavens are totally obscured, radiation is stopped all together, and consequently no dew is deposited; also if wind prevails no dew is found. The reason of this is, that the cold stratum in contact with the ground is constantly being replaced and driven away by others of a higher temperature.

As may be imagined, the moister the air is, the more abundant will be the dews; thus in arid deserts, notwithstanding the intensity of nocturnal radiation, there is no precipitation of moisture. Therefore, nights that give a large amount of dew in our climate may be taken as an indication of approaching wet, since they show that the atmosphere is abundantly supplied with aqueous vapour. In frosty weather the dew becomes frozen, and the name white frost is applied to such an appearance. The products of the kitchen are frequently killed when this takes place, and it becomes advisable to protect plants as much as possible against such a calamity, by covering them with straw or other light material, so as to oppose the process of radiation, and prevent excessive cooling. Trees offer a very good protection to vegetables in this manner. The ancient alchymists ascribed very peculiar properties to dew, and used to collect it carefully, believing that it came direct from the stars, and contained gold! Gold it does *indirectly* give, by the benefit that is conferred by it upon vegetation. On analyzing the water so obtained, it is found to be of great purity, but containing a little more carbonic acid than ordinary rain-water.

Honey-white or *miller* are terms sometimes applied to certain cases in which sugary secretions are found with the dew upon the leaves of plants; but these foreign substances have been shown to be due to certain insects which, at times, are found with it, and not, as was for a long time believed, to any property which descended with the dew. After dew has rested on the plant, it becomes charged with organic juices, and decomposition taking place produces a kind of sugary substance. This, and the foregoing remark, explains the cause of the occasional peculiarities that we have mentioned.

Dews are much more abundant in the open country than they are in cities. The reason of this is, that in the latter situation the houses conceal a portion of the sky, and, consequently, objects do not present so much radiating surface to the heavens. Dr. Wells demonstrated this by experiment on a piece of wool. He took two pieces, of the same size and quantity, and exposed them in the open air all night; but the one he enclosed in a cylinder, open at the top. On examining these locks of wool, the next morning, the one that had the cylinder round it was found to have much less dew deposited upon it than that which was quite free. The reason of this was that the cylinder prevented the wool placed in it from subtending an equally large portion of the sky.

The quantity of dew deposited each night is sometimes measured. The most simple and accurate way to do this is to adopt the plan pursued by Dr. Wells, viz., to expose to the open air spherical masses of wool, of similar dimensions, whose weights are accurately known, and then to weigh them again when covered with dew. The difference in the weight before and after exposure will then be the weight of the water that the wool has acquired during the night, in the shape of dew.

It was believed by the ancient philosophers that dew was only deposited in the evening and in the morning; but modern investigation has proved this to be a fallacy, and has shown that it is deposited equally throughout the entire night.

Agricultural Intelligence.

MEETING OF THE BOARD OF AGRICULTURE.

The Board met at the Agricultural Hall, Toronto, on Wednesday, Feb. 4th, 1863, at 2 p.m.

Present:—Messrs. E. W. Thomson, D. Christie, R. L. Denison, G. Alexander, Wm. Ferguson, Asa A. Burnham, Professor Buckland, Dr. Beatty, President of the Board of Arts.

It was moved by Hon. Mr. Christie, seconded by Hon. Mr. Alexander, That E. W. Thomson, Esq., be President of the Board for the ensuing year,—Carried.

Moved by Mr. Burnham, seconded by Mr. Denison, That Hon. Mr. Christie be Vice-President for the ensuing year,—Carried.

The following communications were then submitted by the Secretary:—

From Mr. Prince, Chief of Police, Toronto, presenting a bill for the payment of $20 for the services of Constables in keeping the peace on the grounds during the exhibition of last autumn, and also for the payment of $60 for meals furnished to such men on the grounds.

From the office of the Canada Company, acknowledging the receipt of samples of different kinds of prize grain from the late exhibition for the purpose of sending to their offices in England.

From the South Grenville, East Brant County, and Onondaga Township Agricultural Societies, all in reference to the proportions in which the Government Grant should be divided between County and Township Societies, a misunderstanding having arisen on this subject in the above two Counties, in each of which there is only one Township Society. The Secretary stated that he had replied non-officially to each of these societies, pointing out the provision of the statute that three-fifths of the public grant is subject to division among the Township Societies in each County, in proportion to the amount of their subscriptions deposited with the County Society, provided that no township society should be entitled to receive out of the Government grant more than three times the

amount of its deposit, and that the amount deposited should also be paid back to the Township Society.

From Evelyn Campbell, Esq., acting Secretary of the Bureau of Agriculture, dated Nov. 7th, in explanation of the deduction of 2½ per cent. from the grants to County Societies in 1862.

From C. Beadle, Esq., of St. Catharines, offering to give certain prizes in fruit trees for the best collections of Pears from the Counties east of the County of York, Upper Canada, at the next Provincial Exhibition at Kingston, with the view of developing the fruit-producing capabilities of that part of the country.

Copy of letter from the Secretary to the Hon. Jas. Patton, Vice-Chancellor of the Toronto University, requesting the Senate to make an arrangement for taking possession of the grounds and buildings occupied by the Board for agricultural purposes, in accordance with the terms of the original lease.

From Mr. Campbell, Bureau of Agriculture, with an extract from a letter from Mr. Wagner, late Canada Emigrant Agent to Germany, accompanying a sample of Bokhara Clover Seed, for trial in Canada.

From Wm. Ferguson, Esq., Kingston, stating that the Corporations of the City of Kingston, and of the united Counties of Frontenac, Lennox and Addington, had each voted $2000 in aid of the next exhibition, and submitting the names of certain gentlemen chosen at Kingston to form the Local Committee for making preparations for the Exhibition.

A statement of receipts and expenditure from the Local Committee of the Exhibition of 1862, showing that the expenditure had exceeded the receipts by the sum of $166 83, and requesting that that sum should be placed at the disposal of the Committee for the purpose of meeting their indebtedness.

From Messrs. Austin, Baldwin & Co, New York, Agents for an International Agricultural Exhibition, proposed to be held at Hamburg, Germany, in July next, soliciting the co-operating of Agricultural Societies in Canada towards that enterprise as far as practicable.

It was then ordered—That the claim of Mr. Prince for $20 for the services of the Police at the late Exhibition be paid.

Resolved,—That in the event of a Bill coming before Parliament for the amendment of the Agricultural Statute, it be a recommendation that in case of there being only one Township or Branch Society in a County or Electoral Division, the Government grant be divided between the County and the Township Societies in proportion to their respective subscriptions, but that the Township Society in any such case shall not be entitled to receive more than one-half of the public grant.

Ordered,—That the Secretary be instructed to apply to the Minister of Agriculture for the amount of the 2½ per cent. deducted by the Government from the grants to Agricultural Societies in Upper Canada for the past year, and that the said amount be applied towards the liquidation of the expenditure incurred in giving Agricultural instruction and information, by means of the Agricultural and Veterinary lectures delivered in connection with the Board, and through publication of the Journal.

Ordered,—That the resident executive committee be instructed to effect an arrangement with the Senate of the University in reference to the Experimental Farm Grounds and buildings as soon as possible.

Moved by Dr. Beatty, seconded by Hon. Mr. Alexander, and *Resolved*—That the balance presented as per account of the Local Committee of the Exhibition of 1362 be paid.

Resolved,—That the proposition of Mr. Beadle to offer a selection of fruit trees for competition at the next exhibition be assented to.

On motion the list of names received from Kingston to compose the Local Committee was agreed to.

Resolved,—That the days for holding the Provincial Exhibition at Kingston this year shall be the 22nd, 23rd, 24th, and 25th September next.

Ordered,—That a Committee be appointed to revise the Prize List for the current year, consisting of the President of the Board of Agriculture, the President of the Association, Professor Buckland, and Mr. Denison, for the Agricultural Department; and the President, Vice-President and Secretary of the Board of Arts for the Arts Department.

Moved by Mr. Ferguson, seconded by Dr. Beatty, that Mr. J. E. Pell be appointed Superintendent of the Arts Department this year,—Carried.

Ordered,—That the names of the Superintendents of Departments be published with the Prize List.

Ordered,—That the Secretary be instructed to procure estimates of the cost of printing a Herd Book, containing the Pedigrees of Canadian Short-Horned or Durham Cattle, and submit the same at next meeting of the Board.

The Board then adjourned.

INTERNATIONAL AGRICULTURAL EXHIBITION AT HAMBURGH.

The signs of the times tell plainly enough of an indication to grow more mutton and beef in Great Britain. The Central Farmers' Club, not content with arguing on the merits of stock as opposed to corn, have just given a broader reading to the question, and now we are to have the breeding and fattening of stock upon arable farms, as capable, no doubt, of much further development. It is, in fact, for horses, cattle, and sheep that we may still be world-famous, if we only take due care, that is, to preserve our

pre-eminence. The experience of Battersea-fields was alone sufficient to show how far we are before the Continent; while, should internal differences stay our trade with America, there is still the same steady demand from our own colonies and other distant climes. In a word, there is no more pushing business, if we but cultivate with proper attention; and Jonas Webb's career might be almost summed up in his commerce with other countries.

There was no other branch of his profession that from the very first he cherished more sedulously: with counts and barons as his best bidders at Babraham, and gold medals and royal bespeaks as the result of his increasing connection abroad. It certainly sounds somewhat strange that we have not more of his fellows ready to follow in his footsteps. The sale, to be sure, of a fat beast at Poissy might not, perhaps, warrant the trip, despite the honours pretty certain to be associated with the exhibition of any animal of excellence. The opportunity, however, to advertise in a new quarter a good breeding herd, a stud, or a flock should not be so easily passed over. It is not every foreign agriculturist that will come to England, just as every British yeoman cannot be induced to go abroad. But such as do manage to meet should do so with mutual advantage; the more especially if the one be in a position to supply that commodity which the other requires.

A more than usually excellent opportunity of this nature will occur during the ensuing summer, when an International Agricultural Exhibition will be held at Hamburg. As the first meeting of the kind ever held in Germany, the committee are making every effort to render it "memorable for its importance:" encouraged, as the direction already announce they are, by the warm interest evinced for the undertaking, "*especially* by the Royal Agricultural Society of Great Britain." The council, indeed, have thus early been applied to for the names of gentlemen duly qualified to act as judges in the several sections of stock and machinery; while the prize sheet would seem to have been carefully adapted to our different breeds of animals. Hamburg, as we are assured, is a very important market for horses and cattle, a matter of itself by no means to be overlooked, and English horses and English cattle may, if their owners so choose, occupy the post of honour at the Hamburgh show. For horses the programme is peculiarly attractive. There is, to begin with, an offer of £60 for the thorough-bred horse best calculated to improve and perpetuate the breed of the sound and the stout, and bred in any country, with £15 for the second to him. Then follow three classes of half-bred stallions and horses for riding and hunting, to be bred in Great Britain and Ireland; with three more divisions for carriage horses, also to be bred in Great Britain; and two classes for ponies over and under fourteen hands, either open, as it would seem, to all the world. Amongst the heavy draught horses there are prizes of £15 each for Suffolk Stallions and Suffolk mares, with similar encouragement to stallions and mares of any other English or Scotch breed, and equal amounts devoted to dray horses. Amongst the cattle are separate classes for short horns calved in Great Britain and Ireland, and distinguished as for bulls under and over two years old, and as cows in milk or in calf, or as heifers. The Ayrshires of Great Britain or Ireland are as handsomely recognized; but the other English or Scotch breeds—Herefords, Devons, Highlanders, polled, and so on—are all classified together, though with two equal prizes in each division, so that a best Hereford and a best Devon would have no advantage over the other in the judges' return. The sheep will include special places for Southdowns raised in Great Britain or Ireland, and Leicesters raised in Great Britain or Ireland; for other short-wools, such as Shropshires; and for other English varieties, such as Cotswolds and Lincolns. The pig premiums, the entries for which are all open to all comers, are allotted to large breeds, medium breeds, Berkshires, small white breeds, small black breeds, and "peculiar breeds of other kinds." The grand prize, however, will be one of 700 thalers—or, in plain English, just a hundred guineas—for the best steam-plough, with £45 for the second; and medals to be awarded at the direction of the judges for implements and machinery put to work in the show-yard. Premiums for poultry of every description and for agricultural produce of all kinds go to point an invitation that we believe it will be to the benefit to the English exhibitor that he should avail himself. No other man's interest is studied so much; although, of course, in an international meeting there are other classes—for Arabians, riding, carriage, and agricultural horses bred on the Continent; with yet more extended divisions for Moorish, Holland, Jutland, Swiss, Charolaise, Norman, Brittany, and other cattle; as well as for Merino, Moor, and foreign sorts of sheep. The visit, in fact, will be in every way an edifying one; although it will be better to start armed with so good an excuse as having something of your own in the entry.

Hamburgh is directly accessible from London in a forty hours' voyage, and is certainly one of the most convenient cities on the Continent for an international meeting of this kind. England, France, Holland, Belgium, Denmark, Sweden, and Russia, are all easily accessible; and further, as we are assured, "the numerous commercial relations with these countries and other parts of the globe, the total exemption from duty, and all and every customs regulation, have especially favoured the merchants of Hamburg in the interchange of agricultural produce and machinery." The conditions appear to be well drawn and the directions for the judges to be as soundly considered. It is, indeed, very clear that our own system has been carefully studied and imitated, so that an Englishman, whether he

present either as an exhibitor, as judge, or as a spectator. will be sure to find himself pretty much at home. The arrangements, so far as we can see, have in reality but one flaw, although this may be very fatal to the thorough success of the occasion. The time appointed for the meeting is from July the 14th to July 20th; that is, for the week immediately preceding our own Great National Exhibition in England, the last day at Hamburg being, in fact, the first at Worcester. Now, it is very clear that should this fixture be adhered to, many of our best animals will never see Hamburg this summer. They will be nearly all kept back for the royal honours—after all, the first in the world. Whereas, had or should the International Show be put off for two or three weeks longer, there would be every prospect of our stock going on. We have some doubt even whether judges will face the two, and it certainly appears extraordinary that the Hamburg committee has not been better advised by our own council. The two bodies have been in correspondence for some time, so that it is hard to account for such an oversight. Hamburgh cannot come as the immediate prologue to Worcester, though it might compete successfully against Scotland or Yorkshire. Even any such collision, however, is by no means a necessity.—*Mark-Lane Express.*

AGRICULTURAL ADDRESS.

[The following address, delivered before the South Grenville Agricultural Society at their Annual Exhibition held at Prescott, by JAMES CROIL, Esq., of Archerfield, will be found to contain much that will be useful and suggestive to our readers.—EDS.]

MR. PRESIDENT AND BROTHER FARMERS:—In attempting to discharge the very important and responsible duty which you have assigned to me on this interesting occasion, I feel that it would be quite out of place for me to present myself as an instructor before this vast assemblage of practical farmers, for, full well I know that in every practical detail of our profession, many of those before me are more competent to instruct me than I am to add to their stock of practical knowledge.

It would not serve any good purpose on this occasion to enter into a minute or scientific disquisition upon the abstract principles of Agriculture. Everybody knows already that agriculture is the most ancient, the most honourable, the most independent and useful pursuit that engages the attention of man. I should be unworthy the name of a practical farmer, did I attempt to pawn upon you the doctrine that the farmers' life is one of ease and affluence, and exempt from all the ills that fall to the lot of other folks. You know better than that! You know full well that as soon as our first parents sinned, the irrevocable sentence was pronounced. "Cursed is the ground for thy sake—in sorrow shalt thou eat of it all the days of thy life; thorns, also, and thistles shall it bring forth to thee: and thou shalt eat the herb of the field; in the sweat of thy face shalt thou eat bread until thou return unto the ground, for out of it wast thou taken: for dust thou art and unto dust shalt thou return." While then we may be disposed at times mentally, or audibly, to curse the thistle, whether a Scotch or a Canadian thistle, let us rather look upon it as much a lasting monument of retributive justice of the Almighty, as is the rainbow in the cloud, of his faithful promise that "While the earth remaineth—seed time and harvest, and cold and heat, and summer and winter, and day and night shall not cease."

Still less do I need to impress upon you that agriculture has, in our own day and in a variety of ways, made wonderful advances in all parts of the civilized world, or that Canada is not much behind in the march of improvement. We may accept all such allusions to the progress of agriculture as facts, and instead of idle boasting as to the advancement or the capabilities of "our great country," I think we may more profitably spend the time in reviewing a few of those *agencies* which have ministered to the growth of agriculture, the prosperity of Canada, and indeed to the happiness of the human race. In doing so I shall neither attempt to exhaust the catalogue, nor to enter very particularly into the details of any of them, but in as few words as possible simply bring them before your notice.

It will readily be conceded as an axiom, that improvement in agriculture or in anything else implies of necessity, a *comparison*—either with a previous effort of our own or with the efforts of others in a similar direction, and that these efforts and comparisons tend to one point —PERFECTION—which, though it be very certain that we shall not attain to, must never be lost sight of, if we *would* improve. That which may be called, under certain circumstances, exceedingly good, might, under altered circumstances, be esteemed paltry, and even intolerably bad. A creditable exhibition in the County of Grenville might be set down as a miserable failure did it profess to be an exposition of the industrial resources of the Province of Canada. A Provincial Exhibition may be justly styled "a great and decided success," as compared with former Provincial Exhibitions, and yet an Englishman might honestly qualify his approbation by saying that "it was admirable *for a young Colony.*" Hence it appears to be desirable and necessary that we should have ever before us a *standard* by which to measure our progress. It were, perhaps, unwise in a "Young Colony" to aspire to perfection in agriculture, but in view of the very intimate relationship in which we

stand to Great Britain, it would seem that the modern system of improved British husbandry may be very safely accepted by Canadians as a standard by which to measure our agricultural prosperity, and to which we may look up as worthy of our imitation. This much by way of explanation for the frequent reference to British husbandry rather than Canadian, which may occur in my remarks.

Up to the beginning of last century the agriculture of Britain remained in a most deplorable condition. Very little wheat was grown in Scotland at all before the beginning of this century, while it is recorded that in the year 1723 the average return of all grains in the District of East Lothian, now one of the best cultivated and productive portions of the Kingdom, did not exceed three bushels for one sown!

The first systematic attempt at improvement in Scotland appears to have been made by an association of land-holders, who, in 1723, formed themselves into a society under the title of "The Society of Improvers in the knowledge of Agriculture in Scotland." It was under the patronage of the Earl of Stair, who is said to have been the first to introduce the culture of turnips into Scotland. This Society was, however short-lived; it failed to attract the attention of the tenant-farmers, for whose benefit it had been established, and who were doomed to another half-century's servitude to ante-diluvian prejudices. Upheld for twenty years, with considerable spirit by the nobility and landed gentry, it was at the end of that time abandoned as a fruitless attempt.

The husbandry of England had never degenerated to so low a point as that of Scotland. This was attributable (at least so say Scotchmen) not to the superior intelligence or enterprise of the English farmer, but to the acknowledged superiority of the soil and climate of England as an agricultural country. Be that as it may, we know that the distinguished Agriculturist, Robert Bakewell, who was born in Leicestershire in 1725, and who died there in 1795, did much for the agriculture of England by his persevering efforts to improve the various breeds of live stock. To him we are indebted for bringing to perfection the well-known Leicester sheep, in which he was so successful that some of his rams were let for the season for the extraordinary sum of four hundred guineas.

The Highland and Agricultural Society of Scotland was instituted in 1784, and immediately began a career of usefulness. It proved, indeed, to be literally a model institution, for very soon after its establishment, numerous county societies sprang up all over the country. To this and kindred societies is due the credit of having led the way to the present improved system of agriculture; I therefore notice *agricultural societies* as the first of those agencies to which reference has been made.

The Highland Society has, by giving its attention to a course of improvement, maintained that place in the public estimation which, from the first, it had secured. Its growth has been, if not rapid, at least steady and uninterrupted. At the present time we find the names of nearly four thousand members on its roll, and its exchequer sustained by an annual income of £4000 sterling from its subscribers, in addition to the interest of its capital, which represents a sum of £47,000 sterling.

For somewhat more than half a century after the establishment of this Scottish Society, the great body of the farmers of England remained fast asleep, but when John Bull did awake, it was as the awaking of a giant from his slumbers. "The Royal Agricultural Society of England," sprang into existence in 1838, was incorporated by Royal charter, and took its place at once as the champion and exponent of improvement in England. Its membership includes the most influential men in the Kingdom. Its annual revenues have already reached £10,000 sterling. The most noticeable feature in its character is, that, within its pale, peer and peasant, landlord and tenant, meet together on terms of perfect equality, whilst its operations are conducted on a scale of magnificence, befitting its high position and its ample funds. That great and good man, whose untimely death has cast a gloom of sorrow over the whole British Empire, the late Prince Consort, was President of this Society at the time of his death. He had long been a useful member of it,—a frequent and successful competitor at its annual exhibitions.

The aims and guiding principles of these two great kindred societies are identical. Though each has regulations peculiar to itself, the revenues of both are chiefly expended in premiums. These are divided into two classes: First, for excellence and improvement in the various breeds of live stock, agricultural productions and implements, and secondly, for written reports upon subjects connected with the practice of agriculture.

That a higher motive than the annual distribution of a certain amount of money actuates the Directors of the Highland Society, may be inferred from the rules published for the guidance of competitors. Thus we find that "no money premiums will be paid unless at least *three lots* are exhibited in that class, and not more than one-half of the advertised premium, unless there are six lots at least, in competition." "An animal which has gained a first prize at any previous show is inadmissable in the same class except for a medal," and "any animal that has gained a second money prize can only compete thereafter in that class, for the first prize." Such regulations are evidently calculated to call forth competition, to do away with monopolies, to provoke improvement, and are therefore worthy of our imitation.

With respect to the prizes for reports referred to, for the present year the Highland Society

offers no fewer than sixty prizes for essays and reports upon agricultural subjects, varying in value from fifty sovereigns to five, in addition to a number of gold and silver medals. You might like to know upon what subjects so many prizes are offered. It would occupy too much time to enumerate them all. Some report upon the best and most economical management of a farm; others more particularly describe the most approved method, founded upon actual experiment, of the application of manures or the cultivation of the various kinds of crops, or of the rearing or feeding of stock. A large number of prizes are offered for reports detailing the most approved method of planting and bringing to maturity fruit and forest trees, while still others having reference to mechanics elicit reliable information as to the value of new agricultural implements as well as the method of using them. The amount of money offered for reports during 1862, is 695 sovereigns, equal to $3,375. What comes of all the reports that must in this way deluge the Secretary's Office? What result follows? Let me tell you: they are carefully examined by juries of scientific and practical men, many of them doubtless come to grief, while those of them that are adjudged worthy of a prize are printed in the Journal of the Society, and so distributed among its members. It may be stated that the journals of these two national societies, composed chiefly of prize essays, stand at the head of our present agricultural literature; the one published quarterly, the other semi-annually. Both are entirely made up of original contributions, and contain a mine of valuable information, which finds its way piecemeal into the columns of newspapers and magazines all over the civilized world.

Perhaps the time has not yet arrived in the history of our county societies when it would be either adviseable or practicable to devote much of their funds to the advancement of agricultural literature. I do think, however, that the Provincial Association of Upper Canada, liberally subsidized as it is by the Canadian Government, might do more in that way than it has hitherto done. I think, sir, that the Provincial Association might very safely entrust, if needs be, the encouragement due to quilts and counterpanes, wax-work and worsted work, and raised work, embroidery, fancy needle-work, tatting and tambooing, to the fostering care of county and township societies, where they are certainly very attractive, and will doubtless receive every encouragement, in order that a portion, small though it might be, of the funds of that great and useful association might be annually devoted to the improvement of the minds of our farmers by the diffusion of useful and reliable information, and the encouragement of agricultural literature.

If any one is disposed to question the propriety of such a procedure, it is likely that his objections are founded either upon that proverbial antipathy to book-farming, which has been erroneously, I think, laid at the door of the practical farmer, or from the conflicting evidence and imperfectly recorded evidence of a certain class of agricultural writers whose ignorance as to the simple, every-day practice of agriculture is surpassed only by their ambition to see themselves flourish conspicuously in print. To the reflecting mind, however, it will appear evident that the kind of writing to which reference has been made, must possess an intrinsic value of its own, ere it can find a place in a journal of acknowledged authority. The fact of fifty or twenty-five, or even five sovereigns being offered for an essay upon a given subject, will ensure competition, while the scrutiny and approval of the board by whom they are examined, afford the best guarantee possible that what you read in the prize report is reliable. A capital safe-guard are such reports when placed between the rash experimenter and the illiterate, yet enquiring practical farmer. Let me give you a simple, very homely illustration of this: Not long since I was conversing with a farmer who in most things displays a good deal of intelligence. Conversation turned upon the difficulty of growing apple trees, and the cause of their decay. I asked him if he had tried any remedy. "Tried anything?" said he, "Why neighbour, I have tried *every thing*, and now I am fairly discouraged. My last experiment was this: When at the store one day I met with neighbour A——, and he told me my young apple trees were all dying off; he said *his'n was, too!* but that he had just heard of a plan of saving their lives, in which he had great faith, especially so because it came from 'Mr. so-and so,' a man in which he had every confidence, and who knew *a great deal about apple trees.* It was simply this: to cut off the trees to the level of the ground, and in a short time the old blackened and shrivelled stem would be replaced by a vigorous, healthy young shoot from the old root. I had," he continued, "two hundred young apple trees,—they were not doing well, and, to cut a long story short, the first thing I did on coming home, was to cut off every one of their heads; there was not one that survived the operation. From that day to this I havn't seen the first shoot, so there was an end of my trees and my experiment." Now here is a subject which at this present time would be a very fitting one for an elaborate report, and if the Agricultural Association of Upper Canada would offer a liberal prize for the best essay on the cultivation and treatment of the apple tree, having special reference to the disease which is now devastating our orchards, and threatens soon to annihilate them, I think, sir, some more humane and probably successful treatment would be suggested, than that of chopping off their heads.

The purposes, then, to which these National Societies of Scotland and England apply their money, differs somewhat from the Canadian sys-

tem. In our Canadian exhibitions a great deal is done for effect, and much money is spent in decorations to please the eye, while in Scotland it would be considered *infra dig.* to embellish the ground otherwise than by a fine display of live stock, showing the nearest approach to perfection in breeding, and of agricultural products of extraordinary excellence. A Canadian visiting the show grounds of the Highland Society, might first very naturally enquire and look for the "Ladies' Department," but he would look in vain, and say, Mr. President, what would *your* show have been to-day without the ladies' department?

Well might his Excellency the Governor General say, on visiting the Upper Canada show, that there was little to choose between it and the great national show of Britain. Indeed to the casual observer the Canadian Provincial Exhibitions are more attractive, and while there are many points in which we fall short, there are minor points, to us important ones, in which we even excel. I have particular reference to dege tools and the smaller kinds of farming implements, many of which, as made in Canada, are decidedly better adapted to our use than the corresponding English implements.

But there is another point of difference between our Canadian agricultural societies and those of Britain, more remarkable than any that has been noticed. Not only the national societies of Scotland and England, but all the county and branch societies are SELF-SUPPORTING. They do not receive—they do not ask from Government one farthing for their support. How do they raise their funds? The Highland Society its $20,000 per annum; the English society, more than double that amount, by voluntary contributions. The benefits accruing to the country from their operations are so self-apparent that it needs no *bribe* to induce the farmers to become members; neither do they require, like some of our members, even with the bribe, to be dragged into the Society; on the contrary it is considered an honour to be admitted a member; so much so that a candidate for membership must be proposed and seconded, and thereafter elected by ballot at some one of the monthly meetings of the society. Does any one tell me that such a result, though attainable in "the old country," cannot be looked for in a new country like Canada? Let me point him to our neighbours across the St. Lawrence. I am not aware that the inhabitants of St. Lawrence county receive one cent from their StateGovernment in support of agricultural societies, and yet, from all I can learn, agricultural societies not only exist there, but are supported with a spirit worthy of our imitation. Looking at the matter in this light, I have often been led to doubt whether our local agricultural Societies are really standing upon the firmest foundation. The fact that we find an agricultural society in almost every township of Upper Canada, does evidence solicitude on the part of our government to advance agricultural interests, but does not afford evidence to my mind that as a people we are above all others interested in agricultural improvement. It *may* be so, as it *may* be that we are influenced by a much less worthy motive—to secure an equal distribution of the dollars and cents. Why, sir, I firmly believe that if the Canadian Government could be induced to sanction a still further—more infinitesimal sub-division of the public grants to agriculture, that we would, ere long, have an agricultural society in every school division of the Province. I do *not make the sweeping* assertion that improvement is incompatible with township societies. Some of them I am glad to know are doing good; I merely give it as my matured opinion that more good would result to the agriculture of Canada were a larger proportion of the public appropriation placed at the disposal of county societies.

All civilized nations have, in all ages, fostered agriculture as an honourable and indispensable employment of man, and the position which the Government of Canada has thus early assumed in relation to agriculture, is an indication that our rulers are alive to the vast benefits which an enlightened system of husbandry together with a general diffusion of sound agricultural knowledge, must confer upon the country; and it is a just matter of pride for Canadians that they can boast of such an organization as takes the oversight of the agricultural interests of the Province. In connection with the Government, Canada possesses a special bureau of agriculture, provides for a professor of agriculture in the Provincial University, and expends annually from the public chest, $111,00 in aid of agricultural societies.

In the United States, up to the present time the Agricultural Division of U. S. Patent Office has been the only visible or appreciable agency of this great and essential interest. This agency comprises as its personnel, a Superintendent, four Clerks, and a Curator or Gardener, and its average annual expense has been the paltry sum of $53,000. In other words, Canada gives to every man, woman and child of her population the annual sum of 4½ cents; the United States gives the sixth part of one cent to each individual of her population, towards developing the resources of that country.*

In justice to the Superintendent, however, it must be stated that he remonstrates loudly against the inconsiderate and miserly policy of his government, and urges them to liberality commensurate with the importance of the purpose aimed at. In respect to the *mode* in which the American Government encourages agriculture, "the report" tell us that "from the 31st of December, 1860, to the same date 1861 2,474,380 parcels of garden and flower seeds have been distributed of doubtful value; several varieties of flower seed were procured which have not been distributed, but destroyed because of their objectionable qualities, some of the

* There are also the separate State appropriations.—[E.

being noxious weeds. About 1000 bushels of wheat imported from Europe have been distributed, with what results not known. Oats and barley of a superior quality have also been distributed, *in what quantities not told.* The Osier Willow has been propagated most successfully, and 15,000 roots and cuttings will be distributed the present season."

England, it is true, has no special bureau of agriculture, but the spontaneous liberality of a wealthy aristocracy renders it less needful, and yet the government expenditures in favour of agricultural improvements are upon a magnificent scale. The respective Governments of Russia, Austria, Prussia, are fully alive to the importance of aiding agricultural literature, and arousing a spirit of emulation, generous rivalry, and *enquiry* in connection with the all-important branch of industry.

To be continued.

Horticulture.

FRUIT GROWERS' ASSOCIATION OF UPPER CANADA.

The Annual Meeting of the Fruit Growers' Association of Upper Canada, was held at the Mechanics' Institute, Hamilton, Wednesday, January 21st, 1863.

The President, Judge Logie, took the chair. The minutes of the last meeting were read and approved. The delegate from the Western N. Y. F. G. Society, Mr. E. Moody, of Lockport, was introduced by the President and requested to take part in the proceedings.

The report of the committee to which was referred the answers received to the questions issued by the Association was then read. The report embraces the substance of nearly seventy replies received from thirty different counties, containing a large amount of very valuable information in relation to the different varieties of fruit in the several parts of the Province. When finished it will make a pamphlet of about forty pages. The meeting listened to the reading of the report with much interest and ordered it to be printed as soon as the necessary funds can be procured.

The President then read the annual address, which was received with applause, a vote of thanks unanimously carried with the request that he will please furnish a copy for publication.

The meeting then proceeded to the election of officers for the ensuing year, with the following result:

President, Judge Logie of Hamilton,
1st Vice President, George Leslie, of Toronto,
2nd Vice President, Charles Arnold, of Paris,
Secretary and Treasurer, D. W. Beadle, St. Catharines.

FRUIT COMMITTEE.—J. C. Small, R. N. Ball, W. Holton, J. Freed, G. Laing.

PUBLICATION COMMITTEE.—D. W. Beadle, James Taylor, W. McGiverin.

On motion of Mr. McNab, seconded by Mr Laing, it was resolved that the meeting in July next be held at Toronto, and that the meeting in November next be held at St. Catharines.

On motion of Mr. Laing, seconded by Dr. Craigie, some changes in the present prize list of the Agricultural Association were approved, and the Secretary directed to transmit a copy to the Board of Agriculture with the request that they would be pleased to take them into consideration in making up the prize list for 1863.

The President, Vice Presidents, Secretary and Dr. Craigie were appointed a committee to take such steps as were necessary to place the Fruit Growers' Association on the same footing with agricultural societies

Messrs Laing, Leslie and Beadle were appointed delegates to the Western N. Y. Fruit Growers' Society.

The subjoined paper on grape culture by Mr. Arnold was read, a vote of thanks carried, with the request that he would continue the subject, and give the Secretary a copy for publication.

A continuation of Mr. Laing's paper on general culture and management was read, for which he received the thanks of the meeting and was requested to furnish a copy for publication. It was resolved to take up the subject of small summer fruits for discussion at the next meeting.

Mr. Johnston of Norval exhibited a sample of wine manufactured by the Hon. Peter Adamson, of "Toronto House," from the juice of a grape which he imported from the Peninsula. The name of the grape was unknown to Mr. Johnston, but as it had proved hardy and was thought likely to be a valuable variety, the association recommended that it be known provisionally as the "Adamson Imported Grape," until its true name can be ascertained.

Some colored drawings of fruit were exhibited by Mr. Moody, delegate from the Western N. Y. Fruit Growers' Society, very nicely executed by Mrs. E. Bennet, of Lockport, New York.

Very fine samples of the King of Tompkins County Apple were sent to the meeting from the Western N. Y. Fruit Growers' Society by Mr. E. C. Frost, of Havana, New York.

Mr. W. H. Mills, of Hamilton, exhibited six varieties of apple, including fine specimens of the Ribston Pippin, Northern Spy and Golden Russet.

Mr. A. Alexander, of Hamilton, sent several very nicely kept bunches of Isabella grapes.

Mr. C. Arnold of Paris, exhibited six varieties of winter pear, and a sample of wine from the Diana grape.

Mr. Craigie exhibited samples of the Ancaster seedling apple.

THE PRESIDENT'S ADDRESS.

GENTLEMEN,—I have to congratulate the Association on the progress made by it during

the past year. At the annual meeting in January, 1862 the Constitution and By-Laws were revised and adapted to the wants and condition of the Association; in the amended constitution provision was made for holding meetings in July and November, at such places as the members might determine at the annual meeting in January. The meetings last year were held at St. Catherines and Toronto, and I have no doubt but that by occasionally changing the places of meeting the interest felt in the Association will be increased. The meeting at St. Catherines in July last was a most interesting one, the attendance of members was larger than at any previous meeting, and the display of summer fruits (particularly of cherries,) the best probably ever exhibited at one time in Canada. The meeting in Toronto was also well attended, and the display of apples very good; at that meeting a paper was read by Mr. Laing, on the management of orchards, an important subject in connection with the cultivation of fruit.

Considerable progress has been made during the year in making up the list of fruits suitable for cultivation in Upper Canada; the different kinds of grape, cherry, gooseberry and plum have engaged the attention of members at the meetings, and those approved of have been added to the Society's list of fruits.

Last winter several members of the Association expressed a wish that there should be some representation of the fruits of Canada at the great International Exhibition in London. As perishable articles such as fruits were not admitted, a representation of our fruits could only be made by means of drawings colored after nature: a subscription to defray the expenses of such a collection was taken up, and the Secretary was authorised to procure such colored drawings. They were procured and sent home to the Exhibition, where they attracted a great deal of attention, so much so that a request was made by the Secretary of the Royal Horticultural Society to the Association through Dr. Hurlburt, that we should send a collection of our fruits for exhibition at a grand International Snow of fruits, to be held at London on the 10th of October last. The Association, however, felt that as only our late autumn and winter fruits would bear the lengthened journey, and at that season an exhibition of our winter fruits which would do justice to Canada could not be made, they should decline as a society to send specimens of fruit. A collection of fruit was, however, sent by the Hamilton Horticultural Society to a subsequent exhibition which attracted great attention and admiration, and was said to be the finest collection of fruit from any one country, ever exhibited at one time in England, and a medal was awarded by the Royal Horticultural Society for the collection, so that the efforts of this association followed by those of the Hamilton Horticultural Society have had the effect of directing attention in England to the climate of Canada, and must have led to more correct views of the climate and to the belief that a country which could produce such fruit could not be the cold, bleak, inhospitable waste of snow and ice which many Europeans supposed it to be.

Although we have a fair increase in the number of our members during the past year, that number ought to be greatly increased; much may be done by members in different localities bringing the claims of the Association under the notice of their acquaintances and neighbors, and inducing others to become members and take a part in our discussions. In order fully to carry out the objects of the association, our proceedings, particularly the reports of the Fruit and publication committee, and our list of fruits, should be published in pamphlet form for distribution. Our funds at present are not sufficient to enable us to do that, and I would suggest that an effort should be made to get this Association put upon the same footing as Horticultural Societies, in the Agricultural Bill to be brought before Parliament at its next session.

It only remains for us as a Society, and as individuals, to do all in our power to carry out the objects of the association, and thereby assist in developing the resources and increasing the prosperity of the country.

ON GRAPE CULTURE.

BY MR. C. ARNOLD, OF PARIS.

Mr. President and Gentlemen of the Upper Canada Fruit Growers' Association—

To sit under our own Vine with none to make afraid, is perhaps the most ancient idea on record of a life of security, contentment, and peace; and if any portion of the human family can at the present day lay claim to this species of comfort, so happily prized by our patriarchal forefathers,—if it is not the inhabitants of the south western portion of Western Canada, under the flag that has braved a thousand years, in the mild and virtuous reign of Queen Victoria, with our bright, warm, and salubrious summers—I think, Mr. President, if we are not that people it is a difficult matter to say where they can be found.

Thanking this society for the high compliment paid me, in their unanimous invitation to prepare a paper on the open air cultivation of the grape, I shall, in accepting the invitation, not bore the gentlemen present with a long, prosy article on preparing the ground, planting the vines, &c., but confine myself on the present occasion chiefly to the more pleasing toil of answering that oft repeated question, viz., Can Canada ever become a profitable Grape and Wine growing country?

If this question could not be truthfully answered in the affirmative, it would be useless occupying the time of this society, in discussing the subject at all; but after fifteen years experimenting in various ways, I do not hesitate to answer emphatically, yes; the grumblers and croakers from the sunny south to the contrary notwithstanding.

Allow me then to give a few facts and inferences that have enabled me to answer this important question, in a manner so satisfactory, at least to myself.

1st. The success of Canadian Grape growers, as compared with those much to the south of us. Especially will this comparison hold good in our favour when applied to the *foreign* varieties of the grape. I am fully borne out in this statement by private letters in my possession from some of the most eminent Horticulturists in the United States.

2nd. Humboldt, the great Naturist, gave it as his opinion, that the cultivation of the Vine would succeed if the annual mean temperature was as low as 48°, provided the summer heat rises to 68°.

Many arguments might be adduced to prove that the grape could be successfully grown in Canada, but I will give only one more at present, one that will, in my opinion, hold good in all countries, and with all species of fruit, viz.: In whatever part of the earth the original species of any fruit is indigenous, there that fruit can be raised to perfection, provided the inhabitants have sufficient intelligence to recognize the existence of the organs of fructification in the vegetable kingdom. And, surely Mr. President, no one who has ever taken a stroll along the banks, the hill-sides and valleys of some of our noble rivers, and has cast his eyes upwards, and seen in the tops of our tallest trees such large quantities of well-formed bunches of fruit, branching out from those long, strong, serpentine old trunks, that have for many, many winters bid defiance to 20° below zero, will ever attempt to deny that the grape is indigenous to Canada. Nor will any one, it is presumed, deny that the larger portion of Canadians at least possess this intelligence.

But I shall not now urge the necessity of going back to those noble old wildings in our woods, for parents to cross-breed from, for fortunately much has already been done by those gentlemen who have raised or introduced such varieties as Delaware, Rebecca, Concord, Hartford Prolific, and the now called Ontario or Union Village, not forgetting the good old Sweetwater, Black Hamburg and Black Prince.

From these varieties let us start, and let us dust the pollen of one variety that possesses the flavour that we desire, upon the pistil of the one that possess the earliness, hardiness, and size that we desire. And I assure every gentleman who has not experimented in these matters that he will be agreeably surprised at the result; and there is not, I insist, so many difficulties in the way of cross-breeding as many persons imagine. That it requires a rather delicate hand, and to be done exactly at the proper time, I freely admit, but that the two varieties to be crossed will require to be in flower exactly at the same time, is a question in my mind. I am very much inclined to believe that the pollen of the grape will retain its powers of vitality for a considerable length of time, if kept from the air. I do not assert this positively, but merely give it as my opinion, after having kept some pollen of the Black Hamburg and Syrian, for upwards of a year, and then placed it under a microscope, without being able to perceive any apparent differences.

There is also a singular instance recorded in Rhind's History of the Vegetable Kingdom, which goes to show that my opinion is entirely unfounded.

The Persians, it is said, had their country, in a war, overrun by their enemies, who cut down all the *male date trees* of a whole province; "but the inhabitants, apprehending such a result, had been careful previously to gather the pollen, which they preserved in close vessels, and thus they were enabled to impregnate their trees when the country was freed from the destroying army. It is said that the pollen had thus preserved its powers during 19 years."

But, Mr. President, I feel that I am upon a subject that has not been assigned to me. My mind, however, has been so long impressed with the great importance of cross-breeding, that I could not resist this opportunity of trying to impress it upon the minds of those gentlemen to whom the country very naturally looks for leaders in these matters.

In fact, Sir, I believe that Canada will never arrive at her full stature of manhood in fruit-growing until we shall cross-breed with our wildings, not only grapes, but raspberries, gooseberries, and perhaps many other fruits; and then, if this society shall continue its exertions, I feel persuaded that in less than 20 years we shall have grapes in size equal to those of Eschol, combined with the flavour of Delaware and Black Hamburg, and the hardiness and healthfulness of the frost grapes of our forests.

The essence of all that can be said on grape culture in Canada might perhaps be summed up in the following few brief sentences, viz.: That the grape vine should be protected from the north, well open to the south; that the soil should be deep and well drained, that it should be thoroughly pruned in the fall, and also summer-pruned, and covered during winter.

And there is not a farmer in Canada West, and scarcely a person who occupies a house in city, town, or village who has not a suitable place for grape vines; either on the southern side of a hill, or on the south side of some building or tight fence, and they will be sure

to meet with a measure of success, with such varieties as Delaware, Hartford Prolific, Ontario, Rebecca, Concord, Diana, and a few others.

And as a proof that wine can be made from grapes of Canadian growth, a sample is before you, gentlemen, of the pure juice, without any addition of sugar or alcohol.

When the foregoing was written it was not my intention to have entered into the minute details of grape culture, but, through the solicitations of several gentlemen, both Horticulturists and amateurs, whose opinion I very highly prize, and in view of the great losses and disappointments of the Canadian people, through procuring, in many instances, worthless plants, and also their lack of knowledge of the treatment that the vine requires, I have been induced to enter into such a detailed description of grape culture, as will enable every amateur to prepare his own grape border, and to know what, when, and how to plant, prune, &c. Therefore, let us begin by selecting

The Site.

Wherever the garden is bounded on the north by a tight fence, either of wood, stone, or brick, the south side of this fence would in most cases be the best place for grape vines; if a brick or stone wall be ten or twelve feet high, so much the better. A south-eastern or south western exposure will either of them answer, and will each of them have their advantages, arising partially from their local influences; if, for instance, it is in some elevated section of country, entirely exposed to prevalent cold westerly winds, they would no doubt be injurious to the tender shoots, and to the blossoms in the months of May and June; and they would also considerably retard the bursting of the buds, which, in case of severe frost late in the spring might secure to the owner a crop of grapes, whilst perhaps his neighbour, whose vines had been protected from the cold wind, and had received the genial influence of the early morning sun, would be two weeks earlier, and consequently all cut off by this untimely frost. But, on the other hand, if protected from the westerly wind and through the influence of a considerable body of water, (or any other influence) on the south or south-east, the frost is kept off, the south-easterly exposure would have decidedly the advantage. I am well aware that there is a prevailing notion amongst many intelligent people, that an easterly exposure is more subject to mildew and blight than any other; such may be the fact in some countries, but it is doubtful whether such is the case in the interior of Canada. It is not absolutely necessary that all grapes should be trained against a south wall or fence, for some varieties will succeed and ripen their fruit well on the open trellis. And there are many crescent-shaped openings in the south side of many of our lime stone gravelly ridges, with the horns so projecting as to break both the easterly and westerly winds; these openings, one would almost suppose, had been designed by nature for our Canadian vineyards.

Preparing the Soil.

When it is considered that the roots of the grape run within two inches of the surface of the ground, the necessity for preparing the ground thoroughly before planting the vines will be evident to every one. In the first place then, let the ground be well drained; if not so naturally, let it be made so artificially; if the subsoil is a light sand or a loose gravel it will need no other drainage, but if otherwise, let a drain be made, either of tile, brick, or of stone, for without thorough drainage it is impossible to get a good flavoured fruit. That some varieties can be made to grow for a time, in a half-drained swamp, and produce enormous growth both of wood and fruit, I shall not deny, but their permanent healthfulness is very doubtful, and the size of the fruit is always at the expense of the flavour. If the portion of ground allotted to grape vines shall of necessity be in a low portion of the garden, it will be advisable to raise the grape border a little above the adjoining ground. Let the border be at least 18 inches deep, if two feet so much the better. One-fourth rotten sod, one-eighth well rotted barn-yard manure, and, if there be no lime in the soil, a little air-slacked lime, and a good sprinkling of bone-dust, mixed well through the border; this, with ordinary soil and a quantity of old bones near the bottom, will make a good grape border; if the soil is naturally inclined to clay, let all the additions have as much sand as possible, and more lime. But of all things avoid stinking dead carcases. Some people seem to think that the more filth of this kind the better, and that the vine delights to live in something like a slaughter house. Thousands of newly-planted vines are no doubt killed annually by this kind of so-called manure; that there are carnivorous animals in America there is no doubt, but the existence of carnivorous plants is a question. The width of the border should not be less than 10 or 12 feet, but if it is not convenient to prepare it the whole width the first year, the half of it might be left until the next, or even the year follow; if, however, only half of the border is prepared at first, neither plants or flowers should occupy any portion, but the vines should have sole possession.

The right kind of Plants, when and how to Plant them.

There perhaps is more difference of opinion on these points than any other connected with grape culture. Some persons prefer three or four year old strong layers; and others plants started from single eyes, in a propagating house in the winter, regularly repotted so as to receive no check, and then, towards the last of June, finally planted out in the grape border. That the large layer will bear a few

miserable little bunches of fruit, there is but little doubt. And that the little four-months' old plant from the single eye will eventually make the finest and healthiest vine, and bear the best bunches of fruit, is, I think, equally certain; but the kind of plants to choose must depend very much upon the season of planting, and perhaps, on the whole, the plants most likely to general satisfaction, are those that have been started from single eyes in the spring, and then transplanted into the open nursery for one summer. These plants will now be in good condition for moving, either in the fall or following spring. If planted in the fall, October is the best time, and if persons who are transplanting in the fall will take the pains to mulch the border with stable manure, and towards the last of November cover the vines entirely over, fall planting for such vines is preferable; but if the vines are not thus cared for they had better be left in the hands of the nurserymen until spring. The months of April and May are best for spring planting of vines whose buds are not started; but whatever season is chosen let the ground be mulched at the time, to keep out the frost of early winter and the drought of summer. If the vines are planted under a wall or fence, a foot from the wall and from four to six feet from each other is a good distance. On the subject of pruning, a volume might be written; but the object aimed at in pruning is to get but few canes, and those to be strong new wood; therefore, encourage only one or two shoots the first year, and cut these down to within two or three buds of the ground in the fall. Allow no cane that is smaller than the little finger to bear fruit, and allow no fruit-bearing branch of the current year to bear more than one bunch of fruit the second or third year after planting, and not more than two or three bunches in any after year. Pinch off the fruit bearing branch at three or four leaves beyond the last bunch of fruit, and pinch off the summer shoots with the finger and thumb occasionally through the summer.

These few hints, it is hoped, will be of service to the amateur, and they are not intended to instruct any one else.

ON THE CULTURE AND PRUNING OF FRUIT TREES.

BY MR. GEO. LAING, OF HAMILTON.

Mr. President and Gentlemen.—In compliance with your request, and in fulfilment of my promise, I now continue my former paper on Fruit Culture, and bring before you, as briefly as I can, a few practical hints on pruning and training fruit trees. Believing the dwarf system to be the most productive and best, my remarks will more especially refer to that mode. The old adage "Every man his own gardener," is verily fulfilled in the pruning and training of trees; it is an operation on which practical men have differed much, and do still, as to the time and manner, but all agree on its necessity and importance. It cannot be learned by rote, but only by a strict observance of trees, their natures and habits of growth, &c. Fruit trees must in some measure be treated as they are naturally disposed to grow and produce their fruits. Some produce it on the first year's shoot, such as the vine; others oftenest on the former year's wood, as the peach and nectarine; apples, pears, plums, cherries, &c., upon spurs produced from wood of three, four, or five to fifteen and twenty years old. When fruit trees are well managed, provision is always made to have a regular supply of fruit-bearing wood, but taking care to have nothing superfluous to exhaust the strength and cause unfruitfulness and premature decay. The main object of pruning is to keep the trees in a strong and healthy state of productiveness, also rendering them more pleasing to the eye, and causing them to produce larger and finer fruits. When a tree is planted in a good soil and other favourable circumstances, it will produce luxuriant growths and push out vigorously in all directions, not more than the roots will feed, but many more than can have their foliage duly exposed to the light. One of the most important points in pruning is to regulate the trees, so that the foliage may have plenty of light and air. As the growth of all plants and trees depends upon the amount of foliage or leaves that is duly exposed to the light, it is evident that any reduction of the branches or shoots that bear the leaves must tend to diminish the increase in bulk of the tree, so that the effect produced by the removal of certain parts, is to give a greater share of sap and light to the parts left. The greater flow of sap and the more abundance of light that the tree will then receive will cause the shoots to be much stronger and better, the buds in the axils of the leaves to be full and plump, and more disposed to produce stronger spurs or fruit buds as the case may be.

Having thus so far noticed the tops of the trees, I will now turn attention to the roots, and endeavour to point out the way and means by which the trees may be kept in a regular bearing state. Many of our fruit trees, when favourably situated, are sometimes more apt to run to wood than to produce fruit. In such cases root pruning should be had recourse to, and likewise when trees are to be continued in a dwarf stature, or of fancy forms, for the garden, sides of walks or such like places. These kinds of trees are particularly well adapted for those who may have only a small piece of ground. If the trees have been worked, that is, grafted or budded, on proper stocks, and rightly attended to in top pinching and pruning, they will be very easily managed, either in the garden or orchard. In orchards under dwarf culture the trees are generally grown to a larger size than in the garden, and root pruning may not be so often required; but by many it is regularly practised and found

to be most beneficial. Many years ago it was only had recourse to to bring strong and barren growers into a bearing state, and when properly performed, rarely failed in producing the desired effect. When full-sized, grown-up trees, that have never been root pruned, require it, great care must be taken, and the operation performed by degrees, so much one year and so much the next, until the whole be completed. As I have already stated, root pruning in all cases must be carefully performed, and at the proper time, that is soon after the fruit is gathered. For young trees cut a trench, say eighteen inches or two feet from the stem of the tree, examine the roots carefully, and those inclined to perpendicular growths downwards cut them by the spade, making sure that none escape amputation; all the horizontal roots should be cut or shortened by a knife, eighteen inches or two feet from the stem, and the trench again filled up with a prepared compost of good turf and rotten dung, of equal parts, well tramped down, then mulch all over the space above the roots and around the tree with good stable yard manure. Some practice annual root pruning, others bi-ennial. Many prefer doing the one half of the root the one year and the other half the next: this I do, and am satisfied it will be found sufficient in most cases.

Training.—There are various forms in which the fruit tree is trained, on walls, espaliers, &c.; some horizontally, others wavy, or curvilinear, oblique, fan, stellate, and pendulous, also pyramid and bush form, for the open garden and orchard, to which my attention in the meantime is principally directed. It is necessary to remark that all varieties, either of the pear, the apple, or other kinds of fruit, are not all eligible alike for pyramids and bushes, as they are termed. Pears and all other kinds of fruit trees differ greatly in their habits and growth. Some incline to grow compact and neat, others horizontally or bushy, and some very thin and slender. Whatever the fancy may be as to the shape that the tree is to be trained, the varieties best suited should be selected; those of compact, erect habit are the best for pyramids; the horizontal growers, or those of a crooked nature, for bushes; the thin and slender growers, of whatever shape they are to be or may be made, require to be well attended to when young, as they are all with few exceptions apt to be furnished with dormant buds on the lower part of the branches; this, by early short pinching may be greatly obviated. It is very desirable to have all trees that are purposed to be of small stature on dwarf stocks—the pear on the quince, the apple on the English crab and Paradise stock, the plum on the sloe the morella and duke cherries on the mahaleb, the bigarreau and heart cherries on the common cherry stock. The pear, the apple, the cherry, and all of the other varieties mentioned, are well adapted for dwarf culture, which has been admitted, by all who have practised it extensively, to be the most interesting, the most profitable, and the best. The plum in a rich soil rapidly forms a pyramid; it can scarcely be managed by summer pinching, as it is of such a rapid growth. It is however a tree whose roots keep near the surface, and can easily be kept down by annual or bi-ennial root pruning, whichever may be adopted. Cut all the roots, as has already been directed, and as the tree advances and years roll on, every time the roots are pruned cut within a few inches of the former stump. Some cultivators approve of removing the trees annually, if the soil be rich; bi-ennially, and adding some rich composts, if it be poor. This is to be done without root pruning, commencing the second year after planting, performing the operation in the end of October or the beginning of November, as the tree may be found in condition. Lift them carefully, preserving all the roots unless any stragglers, then make the hole, from whence the tree was moved, a little deeper and of sufficient breadth to receive the roots at full length; place a little of a prepared compost of loam and rotten dung in the bottom, then place the tree in the centre and carefully spread out all the roots and cover them over with a little of the compost; when that is done fill in the common earth and tread it down firmly with the foot, then mulch all over as before directed.

Summer pinching, to which reference has been made in the previous remarks, is an essential operation, and, as it may not be understood by all, I shall here shortly notice the time and manner of performing it. It is done by the finger and thumb, and by a timely use of them the tree may in a great measure be summer pruned. In exemplifying this operation I shall endeavour to be as plain and clear as possible, using for my subject a young pear tree of one year from the bud or graft, say for a pyramid. A good, well rooted plant, with a single upright stem well furnished with buds, is selected. The first spring head it down to within eighteen inches of the ground; if the soil be rich it will produce five, six, or more shoots, one of which is to be made the leader, and if not quite erect it must be made so by fastening it to a stake, and as soon as the leading shoot is ten or eleven inches long stop it by pinching off its end; if it pushes forth again two or more shoots pinch all off but one to three leaves, leaving the topmost for a leader. The side shoots in general assume a regular form, should they not do so stake them into it, taking care not to have them too close; they may thus remain untill the end of August or the beginning of September, when they may be shortened to eight, ten or more buds, as may be found necessary to the formation of the tree. The second year the tree will make strong vigorous growth; the side shoots that were stopped last fall will push out three, four, or more shoots. In June, or as soon as they have made four or five leaves, pinch them off to three leaves, leaving the leading shoots of the side branches unpinched, to extract the superabundant sap till

the end of August. I would remark here that as fruit trees differ in their habits—some varieties making strong and vigorous shoots, others, under precisely the same treatment, weak and slender—this must be noticed in the final shortening in August, those that are vigorous must not be cut so short as those that are less so. The fact is every variety requires some little modification more or less, which experience alone can teach. Year after year continue on in this manner, taking care to keep your trees in a proper form, open and free for the circulation of air. Be careful in dressing back spurs, and in renewing branches where necessary. The apple, Plum, Cherry, &c., may all be treated in a similar manner for pyramids.

The bush tree, so called, is well adapted for all situations, if the climate be good. It is much to be commended for high, exposed places, not being much subjected to high winds. Some varieties of the pear, the apple, and other fruits are naturally inclined to be bushy and dwarfish: some of the other fruits are likewise so. The horizontal and crooked growing sorts are the best for this purpose and can very easily be brought into shape. The bush tree may be grown from four to six, ten, or twelve feet high, and of a proportionable breadth. Some prefer to have them broader than they are in height: it is as fancy may direct. The bush tree is treated similar to the pyramid in pinching and pruning, but with a difference in training; in this case no leaders are required, all the branches are naturally drawn out, pinched regularly, equally branched, but not crossed in any way. With the bush as with the pyramid sufficient openness must be kept in view.

When I commenced this paper I fully intended to have made a calculation on the produce of one acre, in apples or pears, under the dwarf system, and one under the common or general wide planted standard principle, and to have noticed the comparative value of their fruits; but this I must leave for the present, and conclude with a few remarks on the state of orchards in general throughout the country. I cannot help saying that their condition, with a few exceptions, is anything but creditable; in many cases the fences—imperfect as they are—have to take care of the orchard, and the orchard has to take care of itself. The trees are crowded with saplings, fruitless branches, extracting and exhausting their substance, excluding the light and air so essential for their health and the maturation of their fruits; the old trees full of dead and dying wood, suckers, &c., their trunks and limbs all covered with moss or decayed bark, excellent receptacles for the aphis and other pests;—such a state of affairs is enough to make one say hard things. All orchard owners would find it much to their advantage to keep their orchards clean, their trees free of dead wood and useless saplings; very little time need be spent in doing this, if judiciously gone about. Early in spring take a sharp draw hoe, or some like instrument, scrape and clean the trunks or stems and limbs of all the moss and dried bark, then wash them over with a thin solution of Gishursts' compound, say six to eight ounces to one gallon of water, or with soft soap, destroy all root suckers and mulch over the roots regularly. A little attention in this way will be amply rewarded.

Hamilton, 20th Jan., 1863.

AT THE DWARF APPLE TREES AGAIN.

To the Editor of the Agriculturist.—Well, Mr. Editor, I suppose brother Arnold has been looking very anxiously in every number of your valuable paper for a reply to his last remarks on dwarf apple trees, but the want of time, and not of matter, is my only excuse for not furnishing it before this time. But now, the plough-boy has laid by his plough, and the winter evenings are long,—therefore, Mr. Editor, through your indulgence, we will have another sociable chat with Mr. Arnold about dwarf apple trees.

He first says, he has not time or inclination to devote much more time to it, I suppose for the want of a better foundation to stand upon. He next says he will not defend those nurserymen that have humbugged Mr. Werden. This being admitted, that they have cheated me, this point is gained. Now, Mr. Editor, is it not evident that if they have humbugged me they would do so to others? Rather a grave charge, Mr. Arnold, against the nurserymen, but if so I have abundance of proof from my neighbors, whom I have influenced to get those so-called dwarf trees, but which are now growing large trees, just like mine, and without bearing fruit when small.

Let us turn to Mr. Arnold's defence of dwarf apple trees. I don't deny that the Horticulturists speak of dwarf trees. Rivers, Johnson, and Neill, LL. D., Secretary to the Royal Caledonian Horticultural Society, speak of three kinds of stocks, the French, the English, and the Dutch, and all differ in size. What does this amount to? Why that the more skilful the cultivation the smaller will be the trees. So says the *American Agriculturist*, and so I say. You may recollect that I suggested to Mr. Arnold that he had better get his dwarf trees a little smaller, or we could not call them dwarfs, which you see he has done, and the next time, I suppose, he will have them as small as Mr. Rivers, of England, who had dwarf cherry trees only one foot high bearing a quart of cherries, when a listener put him to the blush by saying that a neighbor had a cherry tree in full bearing which he carried about in his snuff box. Now, Mr. Editor, are we to believe all we read. I gave friend Arnold a hint in my last article how dwarf trees might be made, and how to throw

them into bearing, which plan he does not deny practising, and which, no doubt, was the cause of the trees bearing that he speaks of. For further proof that this is the way dwarf trees are made, turn to Downing's Fruit book, one of the best authors we have on the subject; page 32, and see what Mr. Rivers, an English nurseryman of much celebrity, says on the same point. Turn also to Mr. Coles' fruit book, page 63, where he says frequent transplanting tends to dwarf any tree by retarding its growth, and dwarfs may be made of any tree by root pruning, shortening of the branches, and giving only moderate culture. Those cultivators corroborating each other so fully is enough to satisfy any one how dwarf trees are made, and of the means adopted to throw them into early bearing. But if this is not sufficient we will give you the method of the Chinese, who boast much of their skill in dwarfing trees. We all know how they manage to dwarf the feet of their women and so manage to make them keepers at home; but how they contrive to dwarf not only their fruit trees, but the pines and oaks in flower-pots for half a century, has always been a secret to some. It is also done chiefly by root pruning, planting it in a shallow pot, pruning the top and roots, searing it with a hot iron, barely leaving it room to live; so the little tree finding itself headed on every side gives up the idea of strong growth, asking only for its life. Those dwarf trees all being make by artificial means, *i. e.* by the hands of the skilful cultivator. But if you wish to see natural dwarf trees go to Spitzbergen's cold shores, or to the limits of vegetation upon some snow capped mountain, and there you will see our lofty pines, birches, and willows all made into dwarfs by the cold breath of the frozen region.

The next thing we proceed to notice is Mr. Arnold's refusing to send me the dwarf trees before mentioned. Now, Mr. Editor, I have tried a great many times, and have been to much expense to get such dwarf trees as Mr. Arnold speaks of, but have always failed, which caused me to doubt their existence except by such means as above described. But if there were any genuine natural trees, such as I have not got, this plan I thought would enable me to succeed in getting them; but it fails also. Am I doomed forever to hear the praises of those charming little objects and never be able to get them, that I might add one more attraction to my experimental fruit and flower garden. I have applied to Mr. Arnold who boasts of having the genuine trees for some, but he turns away, and says, "No, I will not let you have the lovely little creatures to mutilate them, by cutting off their heads and feet." But stop, Mr. Arnold, did you not in your former article lay my want of success to my ignorance in not knowing how to treat them? You said I should have starved some by putting them in poor ground, and cut the heads off from others, and when I told you I had done so, and had followed the directions of the journals above mentioned, and yet failed in my object, no doubt from not being thorough enough, you now turn about and say, "they are like the rebels in the South, they only want to be let alone." Are you not like the Federals of the North, want it all your own way? Hence you see a drowning man will catch at a straw. Again, he says, he will place his trees in other hands to be tested. Now sir, if you are suspicious of my not giving your trees fair play, have I not the same grounds to object to your offer; for would it not be an easy matter for him to attend to their cultivation, and through artificial means keep them small and throw them into bearing? Hence you see he is determined to dodge every way to keep them out of my garden, as if they were as the Egyption said of the Lotus, too good and beautiful for any one to have, but must be held sacred for sacrificial offering. But sir, every case in law requires direct proof, and such I demand. Therefore, friend Arnold, don't be so afraid, but send along your trees, and if I dont make fine large trees of them, then I will pay the bill.

Again he says, let us come to the point; agreed to that, friend Arnold, you say you train your trees to bear in 2 or 3 years old—this is perhaps by using the means above described, and what is the use of your boasting about having such trees if we cant get them without so much trouble? Is it not enough to discourage any one? For who would try harder than I have, and yet, I have failed so far, but am not willing to give them up yet, as long as there is any hope or prospect of getting them. Last spring I got 25 from Mr. Smith, of Syracuse, who said he had the genuine dwarf trees—if they prove so I will report accordingly; but I have no faith in them, but what they will turn out like all the rest. For further proof that I have no faith in the reality of natural dwarf apple trees, I refer you again to Mr. Atkins' article in the *Agriculturist* of 1861, page 241, and see his experience. I might call plenty more of my neighbors as witnesses, who are growing these trees for the last 6 or 8 years, and without bearing fruit, but Mr. Arnold would only say they had all been cheated by the nurserymen like myself. Will the nurserymen admit this? Evidently there is a fault amongst them.

The last thing we proceed to notice is, Mr. Arnold's attack upon my Essay. I defined in my last article enough to satisfy any one how I came to overrate the dwarf apple tree, but for further particulars would say, I was led astray by not having as much experience as now, and depending too much upon the authority of others; but I am now willing to make that mistake right, as every honest man

should do, that others may not also be deceived. Mr. Arnold has only quoted a part of what I said in my essay about the profits of dwarf apples, the reply giving it a different meaning entirely. Will you turn to it, Mr. Editor, and fellow farmers, and read it for yourselves, and ask Mr. Arnold why he did not copy it as it reads? Does that say a garden of dwarf trees alone, as Mr. Arnold infers it does, or is it intermingled with currants, raspberries, and strawberries which would help to make the profits I spoke of? And I did not say how large that garden should be; but say an acre, which is not too large for an ordinary garden, and have you not seen reports often and again of strawberries alone producing from 6 to $800 worth from an acre, to say nothing about the currants, raspberries, and dwarf trees, which would produce as much more when they get old enough? Where will you find more profit from fifty acres devoted to agricultural purposes?

And now, Mr. Editor, in reply to your word of caution about the communications. I assure you there is nothing but the best of feeling on my part, although I may express my sentiments in a plain and off-handed manner, for what else could you expect from a rough bark farmer as I am but to say hard things, when I have been imposed upon by those so-called dwarf trees for the last 10 or 12 years, which are without bearing fruit; and are growing so large that they will soon crowd me out of the garden, and must be cut down to give room for things of smaller dimensions? Would not this try your patience, especially when the nurserymen still keep boasting of having genuine trees, yet won't let us have them? Therefore, my only object is to expose the deception, whether it be in the trees or the men. This, Mr. Editor, is my only excuse.

Yours, &c.,

R. B. WERDEN.

Picton, Jan. 28, 1863.

The Dairy.

MILK.

There are but a few of the natural productions of the animal kingdom more subject to diversity of quality than cow's milk. According to the old saying, "It's what goes in at the mouth that makes the cow;" but the truth of the adage depends upon many other conditions than the quantity and quality of the food consumed. Thus, different breeds are not more diversified than are individuals of every specific breed, and this is equally applicable to the quantity of the milk as to the quality. But singularly numerous as these diversities may be, they are all subject to certain chemical and physiological laws, although such as yet may not be properly understood.

The chemistry and physiology of milk are two important topics, and it is very desirable that a knowledge of both were much more extensively and generally cultivated. The motto of the Royal Agricultural Society, "*Practice with Science*," is a golden one; but when we begin to apply the will to the investigation of either the chemistry or physiology of this important secretion, the natural food of all young animals, we at once find ourselves in the dark, emerging, as it were, from under the canopy of night into a region where the rays of science are only beginning to shed their enlightening influence upon the face of things. No doubt, of late years, chemistry has done much in the analytical investigation of the subject, while physiology has been making equally laudable progress; but, as the old proverb, "a little knowledge is dangerous," here applies, this only renders our position at the present time all the more unsafe, and every step we take in advance in a higher degree dangerous.

An instance of this has just occurred at present, a continental chemist having made the discovery, in his laboratory, that the milk of the evening milking is richer than that of the morning. One of our medical journals lays claim to the priority of the discovery, such having been made by its analytical commissioner some ten or twelve years. Now, as regards the facts here discovered, most intelligent farmers have long been familiar with them, so that neither of our would-be chemical teachers have any right to lay claim to the discovery. We ourselves, for example, were thus taught when serving an apprenticeship some thirty years ago—not as a a secret, but a fact generally well known; although the contrary doctrine is often advocated by those who dispose of the morning milk, and reserve the evening for throwing up cream; and which, we aver, is highly credited by an unthinking public, who thus allow themselves to be imposed upon.

It is this exception and diversity in the degree of richness which renders the course of teaching pursued by the above chemists dangerous, and therefore highly objectionable, when received as a general rule of guidance. In short, granting that the milk of every individual cow in a large herd were analyzed with the utmost accuracy, as to the per-centage of butter and cheese, the experiment would only be applicable to that herd, and not to another. And even in this limited light the analytical investigation falls far short of complying with the demands of the golden motto, *Practice with Science*, already quoted. In other words, the practice performed by the chemist in his laboratory differs widely from the practice performed by the cow in the manufacture of milk; but the doctrine taught by the former is evidently the science of the latter practice, so that our objection, when reduced to its simplest form, is the appending to the tail of one practice, if we may so speak, the science of another.

The reader will readily perceive that the more commendable course advocated is for chemists to confine their labours to their laboratories, in the advancement of the practice and science of chemistry, and to let physiology and farming alone. Applied to milk, the churn and the cheese-vat tell us better than they can do the quantity of butter and cheese which our milch cows daily and yearly give. Two samples of milk may possess equal quantities of butter and cheese, and yet the value of the two, when sent to marke., may be very different in the estimation of competent judges. The difference is equally great in the rearing of calves at home. As to the butter and cheese, the difference of value in the market is often as great as three hundred per cent. Nothing can be more fallacious, practically speaking, than to judge of the quality of the milk exclusively by the quantity of butter and cheese which it contains. "Galen placed a newly-dropped kid near three vessels—one filled with milk, another with honey, and another with wine; after smelling at all three, it presently began to drink the milk" (Todd's Cyclopedia, article *Smell*) It was not the butter and the casein that led the kid to prefer the milk, but its odorous properties. Nature hath implanted in animals the organs of smell and taste, and these have their corresponding qualities in the odorous and sapid qualities of the food they consume. And milk is no exception from this natural law, its quality and value depending as much, if not more, upon its odorous and sapid properties than its butter and cheese; for however essentially necessary the latter may be, it is only when accompanied with the former that they possess their real value, giving richness of quality to this natural dietetic beverage. Now, what are these odorous and sapid propertities, chemically speaking, upon which the value of milk so much depends? Again, we are all familiar with the difference between the odorous and sapid properties of milk, when the cows are fed upon grass, turnips, hay, grains, or oil-cake and barley straw, &c.; but we do not know what those differences chemically are, although this is the kind of knowledge farmers stand most in need of from the labratory of the chemist.

The practice of the cow involves the conversion of the food she consumes into milk; and when we consider the diversity in the quality of the former, and the comparative uniformity in that of the latter, there must of necessity be a corresponding diversity in the process. But, as has been already shown, this uniformly is more apparent than real, there being a corresponding difference on the colour, smell, taste, and consistency of the milk to that of the food; and it is more than probable that this harmonises with the health of the cow and calf, and the normal quality of the milk, in all cases where the difference in the quality of the food is natural—the opposite being true when it is gnnatural. Now, we have here normal and abnormal food, processes, and milk; but as yet we are not sufficiently versed in physiology to distinguish the one from the other, so as to choose what is natural and shun unnatural food—unhealthy cows, calves, and bad milk.

Again, as to the richness of the evening milk, how is this accomplished? Can we by any artificial means so coax the cow as to make her give as rich milk in the morning as in the evening? One reason why the morning milk or that secreated during night is thinner may be traceable to the abstraction of more of the food to the reparation of the body. So far, this suggests an equilibrium of forces, or a more equitable distribution of the works of tear and wear, and reparation. But how is this to be effected? If the reparation is greater in poor cows than in fat ones, the milk of the former will be thinner. Query, is the case? Has Mr. Horsfall, who fattens his milch cows, done everything to the solution of the problem relative to an equilibrium of forces? What reply does his churn and his cheese-vat give?—*Farmer's Magazine.*

The Poultry Yard.

FOWLS.

Humanity demands that every precaution be taken to avoid submitting to preliminary tortures the unfortunate fowls devoted to death, not to tie them in bundles like vegetables that are sent to market, nor to allow them to be teased by children, &c.: finally, not to adopt the reasoning of cruel and ignorant idiots—*it is only to kill!* as if before killing one should torment.

Humanity demands besides, that the instruments destined to cause death should be even and sharpened, so as to act rapidly and certainly, and that the persons who kill should be instructed by competent teachers. We dare to hope that the day will come when such persons only who have studied under practised veterinaries will have a right to kill these beings that die by thousands every day to help to support our existence; and that we shall no longer see on the market place the horrible spectacle of an old woman killing an unfortunate fowl by inches with a knife which, having neither handle nor edge, refuses to cut the throat.

Let us listen to the precepts on this subject given by Messrs. Allibert and Mariott-Didieux, both veterinaries. M. Allibert writes thus:—

"Like cattle, fattened fowls should not be killed till they have fasted about twenty-four hours, which allows the crop and intestines to become empty. The extraction of the latter is easier in consequence. Lean, or half-fattened fowls, are killed by cutting the venous conduits near the head, and then holding the bird suspended by the feet; this facilitates the bleeding, and makes the flesh whiter. Choice

fowls, however, require more care, and killed with a sharp, pointed knife, or the fine blade of a pair of scissors, which is thrust through the palate to the brain; then the large vessels inside the throat are cut without injury to the skin; the animal is then suspended by the feet, in order that all the blood may run away, and its back is then washed.

"As soon as it is dead all the intestines should be drawn without making any opening, but drawn carefully out and cut off at their origin close to the gizzard. The liver and gizzard should remain in the abdomen. This operation is indispensible; for, if the intestines remained some time in the bird after death, the smell and even the taste of stercoral substances would invade the meat, would render it detestable, and facilitate its decomposition. The vacuum caused by withdrawing the intestines is filled up with balls of paper, which are put in at the natural opening, through which the intestines have been withdrawn; this keeps up the size and shape of the fowl.

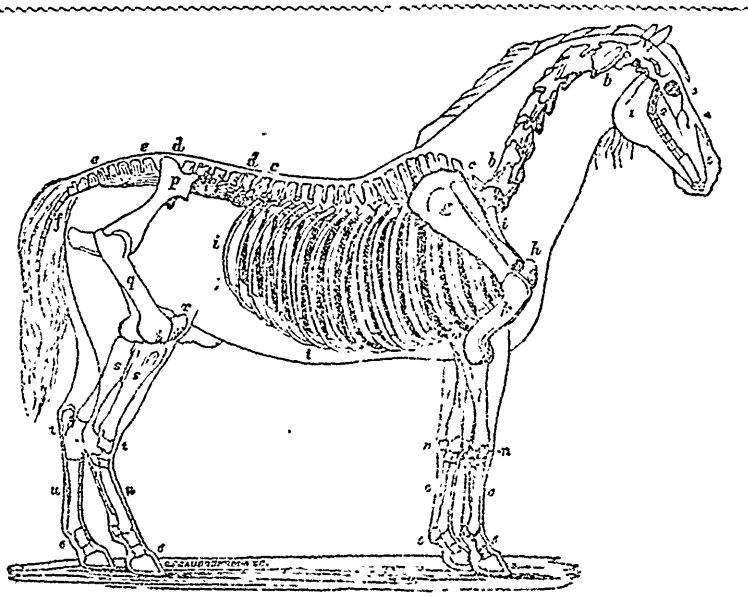
"Fowls should be picked while they are hot. In this operation the greatest care should be taken to avoid tearing the skin, which spoils the appearance and injures the sale; after being picked, the fowl is put in cold water if the weather is hot, in order to become thoroughly cold; if that be not necessary, it is washed, wiped, and wrapped in cloth. The poultry women of La Bresse sew up their choice fowls in a fine cloth, taking care to maintain the oval form; they then soak the linen in milk, in order to give more whiteness and softness to the skin.

"These choice products should not be packed up till they are thoroughly cold; each fowl should be wrapped in whity-brown paper, and they are generally packed in hampers."

We will now see what M. Mariot-Didieux says:

"BLEEDING TO DEATH.—"Much of the poultry brought into divers markets is killed a long way off. That killed by bleeding is cleaner, more saleable, and keeps longer than any other. The operation is generally performed with scissors which has two pointed blades, each *very* sharp. It is at the back of the mouth, behind the palate that the operator will sever the two carotid arteries. When all the blood has run away, the clots which may remain on the beak and at the back of the mouth should be removed and the parts where they have been washed with vinegar. This arterial bleeding empties the body of blood without any outward trace. Nearly all the fowls in the Paris market are killed in a different manner. Their throats are cut at the base of the head. The red wound, bloody and ill-looking, is not only a disagreeable object, but brought in contact with the air, putrefaction ensues; then it acquires a nasty smell, and often a buyer declines it for that reason alone. Killed as we advise, the animal is cleaner, more saleable, and it keeps longer. This is very important if it has to be sent far."—M. JAQUES' *Work on Poultry*

Veterinary Department.



THE HORSE.

Continued from January No.

The bones of the fore extremities are (G) the Scapula, or blade bone, which is situated on the anterior lateral part of the thorax or chest. It is triangular in shape with base upwards, continuous with the cartilage of pro-

longation. This bone has two surfaces and three borders; the external or dorsum surface is divided into two unequal portions by a ridge, called the spie of Scapula; the anterior division is the smallest, and is called the "*Fossa antea spinatus.*"—the other receives the name of the "*Fossa-Postea-spinatus.*" These cavities are filled by two large muscles, viz.: the *Antea Spinatus* and *Postea Spinatus.* These muscles are very liable to injury, especially in young horses when first put to work, and as a consequence the muscular fibre is wasted in some cases to a great extent, giving rise to a distinct hollow extending to the lower part of the scapula—the name applied to such an occurrence in this country is *Sweeny.*

The internal surface is slightly concave, and is roughened for the attachment of muscles, &c. The anterior border inferiorly terminates in a rough and somewhat hook-shaped process called the *corracoid* process.

The Apex of the Scapula presents upon the articulatory surface an oval shaped depression called the Gleanoid cavity, into which fits the head of the Humerus or bone of the shoulder. K, the Humerus or long bone, is situated betwixt the Scapula and the bones of the arm, placed in an oblique direction from above downwards and backwards. Long bones are divided anatomically into a body or shaft and two extremities, the shaft is cylindrical and has the appearance of being twisted upon itself. On the superior part of the shaft, is a large prominence called the external tuberosity, to which is attached several muscles; the internal surface is round, having near its middle a roughened eminence called the internal tuberosity. The superior or upper extremity of this bone is divided into two portions. One a large hemispherical portion called the head, which with the depression an the apex of the scapula forms the shoulder joint.

The second part of the superior extremity is formed by two eminences called the external and internal trochanter between, which are two cavities receiving the name of Bicipital grooves. Through these grooves passes a strong muscle called the Flexor Brecchi muscle, and it is injury to this muscle at that part situated within the groove, which generally gives rise to lameness in the shoulder. The external trochanter presents two prominences, the summit and convexity. The convexity is situated posteriorly, and serves to prevent dislocation of the joint. The inferior or lower extremity is divided into two by a channel or groove. The two divisions are called the external and internal condyles. Between the condyles posteriorly is a deep oval pit or fossa called the condyloid fossa, into which is received the beak of the Olecranon or point of the elbow; the inferior extremity of the humerus, with head of the radius and ulna forms the elbow joint.

The bones of the arm are two, and are named respectively (L) the radius, and (M) ulna. These bones correspond to the bones of the human arm betwixt the elbow and the wrist. The radius is situated in a vertical direction between the humerus and upper row of bones of the knee, the posterior surface of the body of the radius is concave and roughened, and to the upper part of this portion is attached the ulna (E) which is more distinctly represented in cut 2. The superior or upper part of the radius is divided into two by a prominence, the divisions are called Gleanoid cavities, and on them rest the condyles of the humerus.

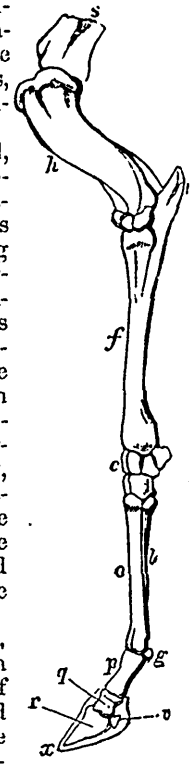


Figure 2.

E, the *Ulna*, or cubital, consists of a body and projecting part and articulatory surface. The body is triangular, the base being placed against the posterior part of the radius, extending about two thirds down, and is firmly attached by fibro cartilage in the young animal, which in the adult becomes ossified. The projecting portions terminate in an apex, called the beak of the Olecranon, or the point of the elbow. In the Ox the ulna is much longer, and extends down the whole length of radius.

(C) the carpus or knee, corresponds to the human wrist, and is composed of eight small bones arranged in two rows, four in the upper, the same in the lower. This joint in the horse is formed not only to allow of great freedom of action, but also to prevent concussion in galloping, as the union of the various bones overlap each other, and the whole are embedded in cartilage. The upper row perform the greatest amount of motion, and the bones forming it are named respectively [commencing at the inside] the *Scaphoid, Lunar, Cuneiform,* and *Trapezium.* The scaphoid is the largest bone of the upper row.

The bones of the lower row are the *Trapezoid* situated to the inner side, the *Os. Magnum* the largest bone of the knee, the *Unciform,* and *Pisiform,* which is an exceedingly small bone, and often overlooked in dissection. The whole of these bones are firmly held in their places by ligaments.

The bones immediately below the knee are the large and small metacarpal or shank bones. (O), the large metacarpal bone, belonging to the class of long bones,is slightly flattened from side to side,its shaft is about the strongest in the body, from its containing more compact tissue. The posterior surface is broad and flat, has along its upper two-thirds a roughened portion for the attachment of the small metacarpal, or as they are sometimes called the splint bones. On the superior extremity of the metacarpal bones rest the lower bones of the knee. The lower extremity presents a prominence and two hollows, and rests on the head of the large pastern bone, forming the fetlock joint.

The two small metacarpal or splint bones are in the young animal attached to the large bone by fibro cartilage, the union in the adult becoming ossined. They usually extend about two-thirds down the large bone. The splint bones receive the name of external and internal, the former is the larger of the two. It is betwixt the internal small and large metacarpal bone—When there is a deposit of bony matter, giving rise to an enlargement, such an enlargement is called *Splint*.

Besides the two small splint bones are situated behind the fetlock, two bones called the (G) Sessamoid bones, these bones act somewhat in the manner of pulleys.

(P,) the Oss. Suffraginis or large pastern bone, is situated in an oblique direction between the metacarpal and small pastern bone. Its posterior surface is flattened, presenting two elevated ridges forming a triangle. To this eminence is attached the Sessamoidean ligaments. The inferior extremity rests on the small pastern bone, the union of the two forming the pastern joint.

(Q) the Oss. Corion, or small pastern bone, is partly within and partly without the hoof. This is an exceedingly strong bone, being broader than long. Its superior surface is divided by a transverse eminence into two concavities, the lower extremity articulates with the coffin and navicular bone, forming the coffin joint.

To be continued.

NOTICES TO CORRESPONDENTS.

SPAVIN.

I have a well-bred horse five years old, lame for about six months from a spavin on the off hind leg. Not knowing anything about it myself, I had him treated by a person here who pretends to cure everything, but whose cure (in my case at least) was worse than the disease, for instead of curing it the strong blister used destroyed all the skin on the joint, which is now an ugly raw sore. I fear it will always be a blemish. He is far lamer now than before it was applied. It was put on several times within the last four months.

I don't know what he used, but it was a colored liquid which smoked when put on, and caused dreadful pain, the poor horse kicked about holding up the leg. In fact he has lost flesh ever since. Anything you reccommend will be most thankfully received

Your's truly,
A SUBSCRIBER.

The treatment of spavin by such severe measures is but too common in this country.—It is lamentable to see so many fine animals tortured and blemished by useless and violent blisters.

From your remarks we think that your case must have been treated by Butter of Antimony, or Muriatic Acid (Spirit of Salt) which powerful caustics are favorite remedies of Quacks in such cases, and often destroy skin, ligaments, blood-vessels, &c., and either render the animal useless or blemish him for life.

We would advise you to lay him up for a month or two, and dress the raw surface with a little simple ointment or oil till it heals up,—when if the lameness still continues, a mild blister may be useful, but the most effectual is a seton passed over the spavin. This, however, can only be done by a person well acquainted with the anatomy of the part, as there is considerable danger of wounding the synovial cavities.

Feed him well, and give him occasionally laxative medicine and bran mashes.

Editorial Notices, &c.

THE AMERICAN SHORT HORN HERD BOOK: Mr. Lewis F. Allen, of Black Rock, N. Y., well known as the publisher of this indispensable book of reference, and as a prominent agriculturist in other respects, has decided to publish a sixth volume early this summer, provided a sufficient number of pedigrees are offered, and a corresponding number of copies subscribed for, to warrant the undertaking. We have received a copy of his prospectus addressed to breeders, dated December last, of which we copy so much as contains the instructions to persons sending pedigrees, and the terms:

"If you wish the pedigrees of your Short Horn Cattle recorded, you will please forward them to my address as soon as you can prepare them—at all events by the first of March next.

The form of making out the pedigrees for publication is so generally understood by reference to the previous volumes of the Herd Book, that no farther instructions are now needed—so that they be plainly written in the usual form, on one side of the paper only, and the necessary references distinctly made out for publication.

For every pedigree recorded, the charge will be remitted with the pedigree.

The pedigree of every bull occurring by name in the lineage of the animals sent for record, if not recorded in either the American or English Herd books, must be sent for record, and for which the same charge of fifty cents will be made. Such bull will be recorded by number in this volume, so that the lineage of every recorded animal can be complete without further question.

State name, color, age, and sex of the animal; also the name of the breeder and owner, and his Post Office address.

State, with the list of the pedigree you send, the number of copies of the 6th volume you wish to subscribe for, the price of which will be as for the past volume—$5 each per copy.

I will *print* and *insert* well executed cuts of animals, (the cuts being furnished and sent to me without expense on my part, as usual) at $5 each for the whole number of copies printed of the book.

I will *bind* in the book furnished to me, as above, good lithograph portraits of animals, at $2 each.

I shall endeavor to have the book ready for delivery in the month of May next.

The Short-horns are the noblest, most valuable race of horned Cattle in existence, and will, ere long, be restored to the proud position in our agricultural productions which they maintained during our most prosperous times. As such, every Short-horn breeder owes in to his own interest to keep the blood and lineage of his herd on an indisputable record."

American Reprint of British Periodicals.—We beg to call the attention of our readers to a notice of the American reprint of the British Reviews and Blackwood's Magazine, in our advertising columns. We have so often spoken of the great merits of these Periodicals, and their adaptation to the wants of the thinking and business community, as well as to the mere scholar and man of science, that it is unnecessary to add any thing more. In all British Provinces, these inestimable publications ought to be universally disseminated. We are glad to see that notwithstanding their late disastrous fire the enterprising Publishers, Leonard Scott &Co.,—have been prompt in bringing out the current numbers only two or three weeks after the publication of the original edition in Britain. The price will continue as heretofore up, to the first of April, notwithstanding the late enormous advance in paper and other materials. The amount is *not one third that of the English Edition!* We would therefore advise new subscribers to commence *at once.*

The Scientific American.—Our readers will find a detailed Prospectus of this old and valuable Scientific Weekly in our advertising page. It is the only similar publication possessing high merit issued on this continent, and we should like to see it generally in the hands of our farmers as well as mechanics. They would find much in its columns relative to agricultural implements and machines and subjects belonging to rural life, while to the intelligent and improving artisan and manufacturer it seems an indispensable companion.

To Correspondents.—Several communications which have come to hand too late for the present number shall appear in our next.

TORONTO MARKET PRICES.

Toronto, February 28, 1863.

Fall Wheat, per bushel	$0	90	to $0	95
Spring Wheat, "		77	"	82
Barley, "		90	"	95
Peas, "		52	"	56
Oats, "		40	"	42
Rye, "		56	"	
Pork, per 100 lbs.,	3	00	"	4 25
Beef, "	4	00	"	5 00
Mutton, "	4	00	"	4 25
Potatos, per bushel,		55	"	60
Apples, per barrel,		75	"	1 25
Turnips, per bushel,		18	"	20
Onions, "	1	25	"	1 50
Fresh Butter, per lb.,		15	"	20
Tub Butter, "		12½	"	15
Eggs, per doz., packed 15c, fresh, 20c.				
Turkeys, each		55	"	80
Geese, each,		40	"	50
Ducks, per pair		40	"	50
Chickens, "		25	"	40
Hay, per ton,	10	00	"	20 00
Straw, "	8	00	"	12 00
Hides, per 100 lbs.	4	50	"	5 2[illegible]
Calf-skins, per lb.		9	"	
Sheep-skins, each	1	40	"	1 7[illegible]
Wool, per lb.		30	"	3[illegible]
Clover Seed, per bushel	3	75	"	4 0[illegible]
Timothy Seed "	2	00	"	2 5[illegible]
Plaster of Paris, per barrel		95	"	1 0[illegible]

Contents of this Number.