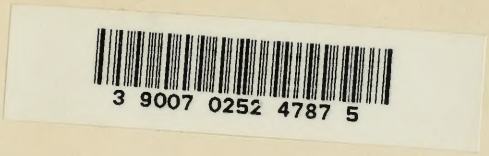

John H. McLachlan

Parkdale

Ontario

ONTARIO

AGRICULTURAL COMMISSION.

APPENDICES C TO S

INCLUSIVE,

CONTAINING EVIDENCE TAKEN BY THE COMMISSIONERS, SPECIAL REPORTS, ETC.,

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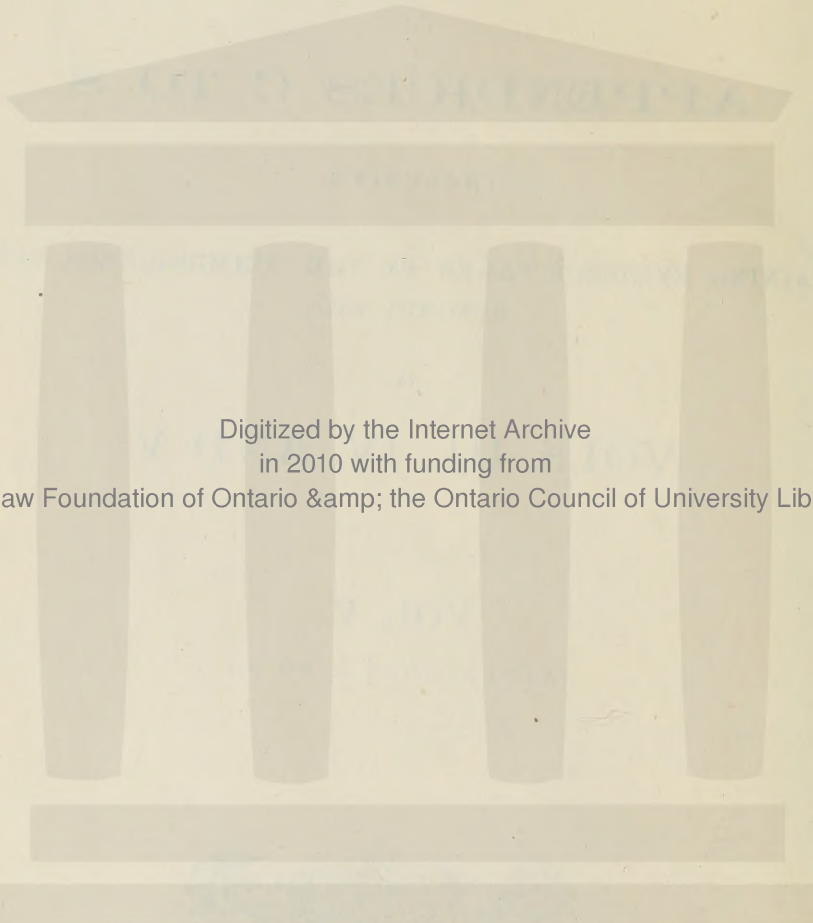

ONTARIO AGRICULTURAL COMMISSION.

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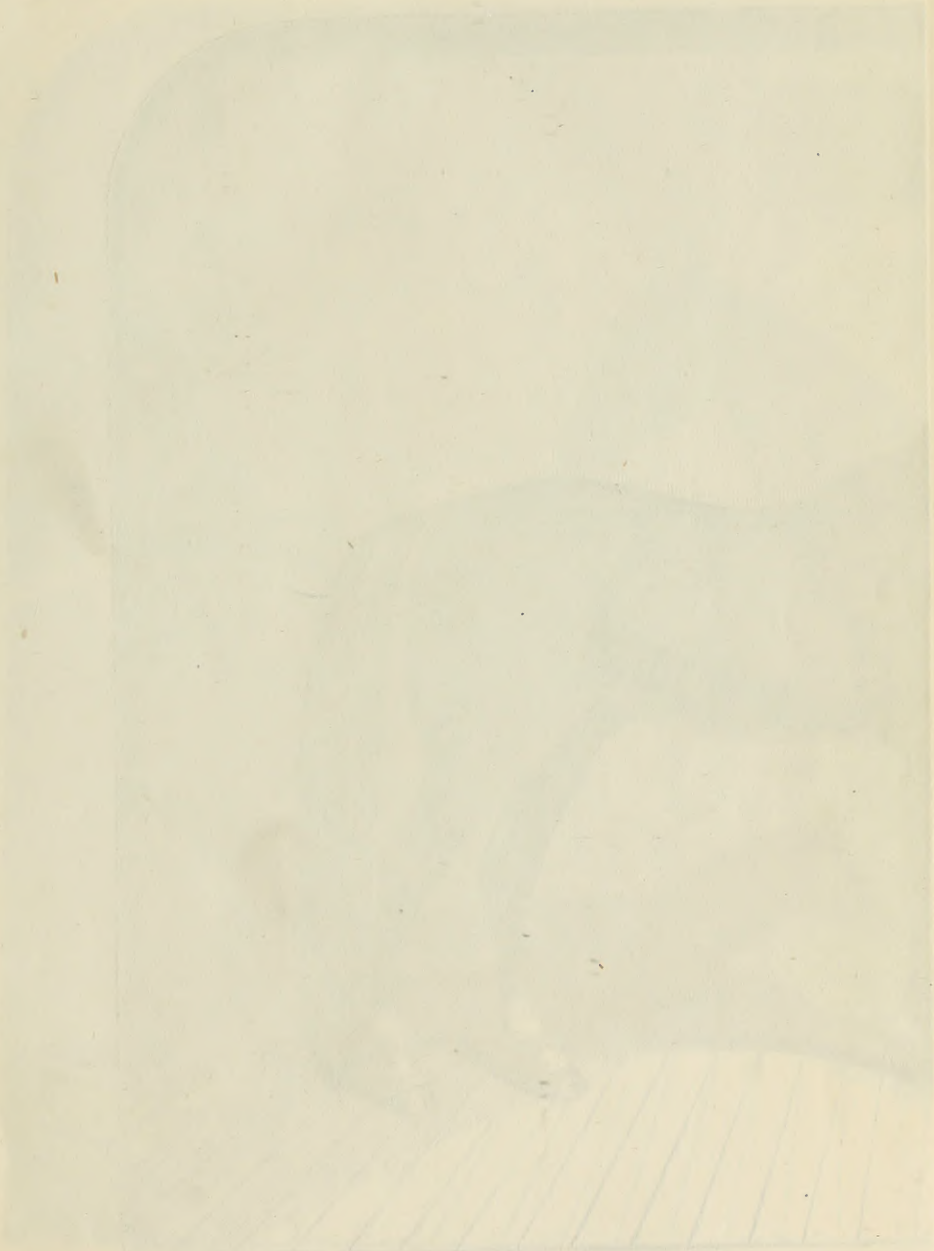
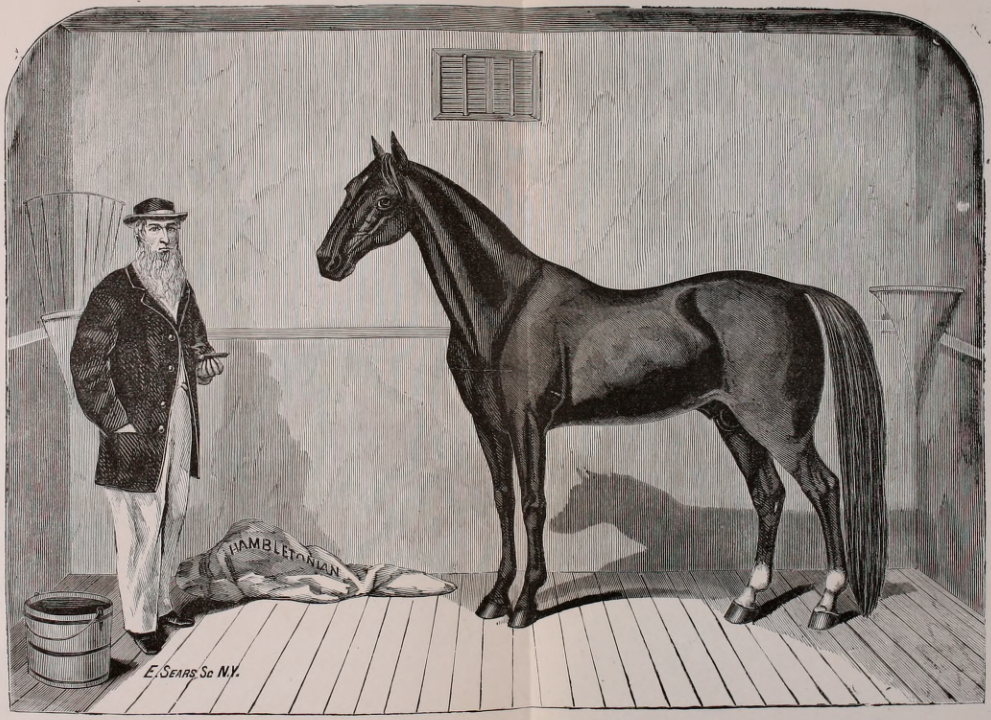
RELATING TO

HORSE BREEDING.





RYSDYK'S HAMBLETONIAN.

ONTARIO AGRICULTURAL COMMISSION.

APPENDIX K.

EVIDENCE

RELATING TO

HORSE BREEDING.

Sitting to take oral evidence, held at Toronto, June 23rd, 1880. *Present*—Mr. Dryden, M.P.P. (Chairman), Hon. S. C. Wood, and Messrs. J. P. Wiser, M.P., A. H. Dymond, F. Malcolm, T. Ballantyne, M.P.P., R. Gibson, W. Whitelaw, E. Byrne, Thos. Stock, A. Wilson, and J. P. McMillan.

DR. McMONAGLE'S EVIDENCE.

P. R. McMonagle, M.D., was called and examined.

To Mr. Wiser.—My attention in regard to breeding has been particularly paid to roadsters and thoroughbred horses. I would like to say first a few words on the subject of breeding generally, as I have heard a good deal in previous evidence about coupling animals of similar types and characteristics, and coupling those of different types and characteristics.

THE THEORY OF BREEDING.

There is no mystery about breeding. I think scientific men at the present day thoroughly understand the theory of generation, and how crosses are produced in the coupling of different breeds. All embryos are produced by the contact of a sperm cell with a germ cell. The uterus and its appendages always produce germ cells, which are like a quantity of eggs floating about in mucilaginous matter. If the germ cells of a cross-bred animal are examined under the microscope, they will be found to be a number of eggs of different sizes, possessing a vitality and outline distinct from each other. It is the contact of these germ cells with the spermatazoa of the male that produces conception and life. If a thoroughbred animal comes in congress with another of its own type or character, the germ cells and the sperm cells will have an affinity for each other, and will produce nothing but what is similar to the ancestral line previous to the production. But if the breeds are crossed, they will produce something new.

EFFECT OF CROSSING WITH A PURE-BRED MALE.

If the sperm cells of a thoroughbred are brought into contact with the germ cells of an inferior grade or mongrel animal, the impressive power of the male will enable his

spermatazoa (for they possess vitality, activity, independence in motion, and an appearance analagous to tadpoles) to select among the eggs those with which they have most affinity, and in that way there will be produced a type almost entirely similar in form and outline to the thoroughbred. I think Mr. Clay has shown to the Commission that he could not get as certain a type of breed in the second or third as in the first cross. That result agrees with the principles of breeding. In the breeding of horses I have just carried these principles out, and got what I expected.

HOW TO UTILIZE NATIVE HORSES.

I presume the object of the Commission is, more to inquire how best to utilize the type of horses we have in Ontario at the present day—how to cross them with particular breeds in order to develope a new type, which will supply the demand of the farmer, the market, and the merchant—which will, in fact, be a good general purpose horse.

THE CLYDESDALES—NATIVES.

With regard to draught horses, I have some acquaintance with the Clydesdales. They are produced in the eastern section of the Province, to the second or third remove; the original having come from Mr. Clark's stud in Ottawa. I am well acquainted with the native horses of the eastern section of the Province. They mostly came from the produce of imported running stallions, crossed and re-crossed to the second and third remove, and they are a most useless, weedy class of horses—simply a disgrace to the community in which they circulate. They are used extensively for agricultural purposes. The Americans frequently come over to buy the best.

THE ROYAL GEORGES.

The class of horses in Ontario particularly, that have a type of their own, that are firm in their characteristics, that are undying in their habits, and that have always held their ancestral heredity in spite of all opposition, are the Royal Georges. They originated in the Tippoos, coming through Black Warrior, and contain within themselves characteristics that cannot be destroyed. They have size, form, velocity, longevity, and a type that leads to permanency in the family, a type that makes good carriage horses, and has of late produced some valuable trotters that trot close to twenty—campaigners, and winners. I have thought it possible that they could be the basis of a class of horses strictly Canadian, which, coupled with appropriately selected thoroughbreds, would produce the essential desideratum of the present day—the Park or Coach horse. The Canadian Royal Georges stand well on their limbs, they are large, muscular, have good, sound constitutions, and doubtless originally, in ancestral distance, had a pacing root.

VARIOUS BREEDS.

I see your compilation of queries embraces Canadians (Pacers), Pilots, Columbuses, Copperbottoms, Hiatogas, Tippoos, Warriors. To tell how they originated and came to the eastern section of the country would be to relate the history of the Narragansett pacers.

THE NARRAGANSETT PACERS.

There was a family of horses on the Atlantic coast in the United States—in Virginia and Rhode Island—long before the thoroughbred began to be appreciated in England—horses that were fast at the pacing or racking gait, and that were also useful for domestic purposes. They were known as the Narragansett pacers. According to Wallace (an authority on such matters) Polydore Virgil, an Italian ecclesiastic, wrote a history of the British Isles in Latin, which was published about 1509, and among other things, in

describing the horses of that date, mentions "a great company of their horses do not trot, but amble and pace," and he draws the distinction between pacers and trotters with unmistakable precision in sentences written 370 years ago. Another writer, Samuel Purchas, in 1625 indirectly verifies the historical conclusion that pacers were numerous in England at that date. After quoting many authorities, Mr. Wallace says: "It is fully established that pacing horses were numerous at these early periods, and as the blood of the eastern horses did not begin to impress itself upon the native English stock till after the appearance of the Narragansett in this country, there is no violence in the conclusion that pacers continued to abound at the period of the settlement of the colonies." No doubt Narragansett pacers were imported from England by the colonists, their new name being applied from the locality in which they were most numerous or prominent. From the luxury of wheels and the improved agricultural tracts of the Atlantic states they have been driven to the border—to the more primeval forests where saddlers are in constant demand—until to-day their home is only in that segment of a continental circle that commences in Maine and sweeps through Canada, Ohio, Indiana, Kentucky, and Tennessee.

HIGH RATE OF SPEED.

The Narragansett pacers had a line of heredity that gave them certainty of speed and a certainty of type as long ago as 1690. Their history in Virginia and Rhode Island shows that they were in-bred, and that they attained a rate of speed of less than 2:30 to the mile. It is known from the Rev. James McSparran, D.D., "America Dissected," published in Dublin in 1753, that they were introduced into all parts of English America as long ago as 1730.

THE CANADIAN PACERS.

The combination of these with French stock imported from France to Quebec in 1665 produced the Canadian pacers. Out of that combination we have the Pilots, which were taken to Kentucky and proved to be producers of some of the best trotting horses there. From the same stock we have the Columbuses, which were taken to Vermont, where they produced trotters, of which the fastest went at 2:19¾—a daughter of Phil Sheridan, the most potent sire of the family. Copperbottom was taken from Canada to Kentucky, I think, in 1810. His blood permeates the veins of the famous "Rosalind," 2:21¾. The Hiatogas belong to the same family of Canadian pacers, with a representation of 2:23. It is said the Tippoos and Warriors also embody the pacing element, but there is not a certainty they do so.

THE TIPPOOS AND ROYAL GEORGES.

The Tippoos and Royal Georges are, however, emphatically a Canadian stock. They originated with Isaac Morden, of Prince Edward County, near Belleville or Napanee, in 1816 or 1818. The original founder was Tippoo, styled "Old Black Tippoo." He was the produce of a mare that was brought to Canada, it is said, from the United States by a preacher, Mr. Howard. She was in foal when Mr. Morden obtained her from Mr. Howard, and she produced this black colt in the spring of 1817. The sire of Tippoo was never known, though it has been claimed, without proof, that he also belonged to the United States.

WARRIOR'S DESCENT.

From Tippoo we had Warrior. Warrior was a direct descendant of Tippoo. Warrior's mother was an English-bred mare belonging to an officer of the army in the 1st Royals. She was of the Warrior lineage, and was brown, although the Tippoo family were black, and from her we have a brown horse, which is known as "Black Warrior." His owner, Mr. Johnson, in 1840, intended to take the horse to Michigan, but on his way he got lame and was traded to a Mr. Barnes, living twenty miles south of London, who kept him until he died. Many of his get were pacers.

[*Dr. McMonagle.*]

ROYAL GEORGE AND HIS DESCENDANTS.

From the reins of Warrior we have Royal George, and from the loins of Royal George we have the best breed of horses that ever lived in Canada. He produced Lady Byron, 2:28, Lady Hamilton, 2:30, Tartar, 2:28½, and Toronto Chief, 2:24½ (saddle); also Royal Revenge, and others that have produced trotters going as low as 2:20½, and selling in the market at as high as $10,000. His family also include Caledonia Chief, 2:29½; Byron, 2:25½; Fred Hooper, 2:23; J. Ellis, 2:29; Lucy, 2:20¼; Belle of Toronto, 2:30; Neli, 2:27; John S. Clark, 2:30; Mike Jefferson, 2:29½; Fanny Jefferson, 2:28½; Thomas Jefferson, 2:23; Commodore Nut, 2:29; Ben Flagler, 2:26½; Geo. F. Smith, 2:28; and many others not included in the 2:30 lists. The greatly dreaded old-time trotter Tacony, with a mile record of 2:26, and a two-mile one of 5:02—the winner of more than twenty hotly contested events—the conqueror of Flora Temple in two set races, was Canadian bred, by Sportsman, a son of old Tippoo. Another son of Tippoo, the Sager horse, got the fast mare Crazy Jane, 2:27; another, a grandson of old Tippoo, got J. H. Burke 2:27½.

ROADSTER HORSES.

The roadster horses catalogued among your questions are the Hambletonians, Norman Canadians, Mambrinos, Grey Eagles, Andrew Jacksons, Morgans, and St. Lawrences. Among all these the strongest in inheritance are, emphatically, the Hambletonians. I don't know of many in Canada, although there are some.

HAMBLETONIANS—MESSENGER.

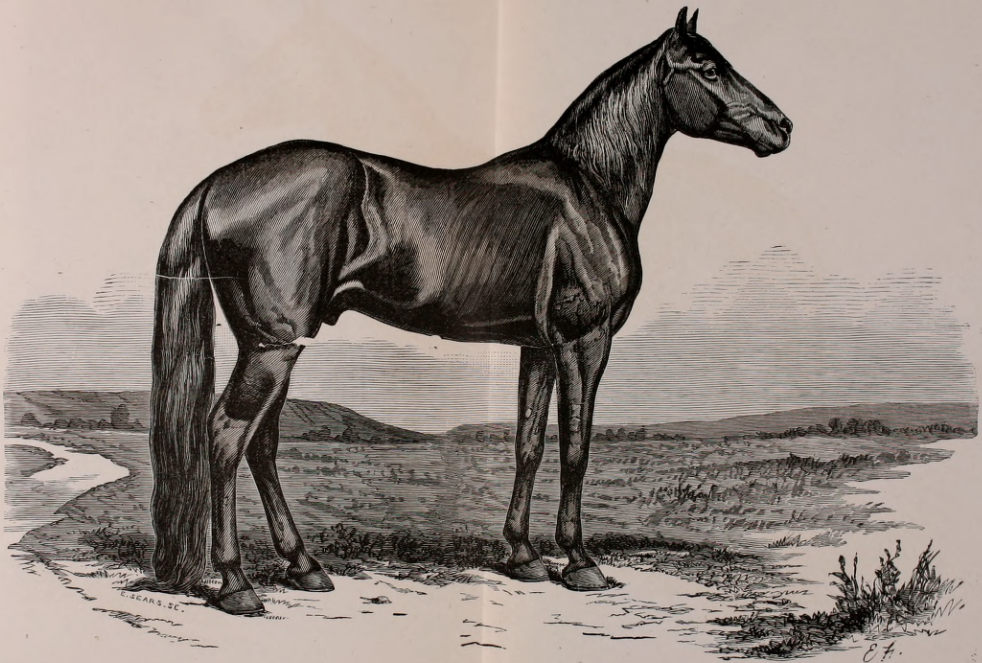
The Hambletonians are directly descended from the English thoroughbreds. The progenitor of the Hambletonian stock was Messenger. He was imported to Philadelphia in 1788. From his loins we have Mambrino, who produced a stock of roadsters almost invaluable in the United States, from Mambrino we have Abdallah, the sire of Hambletonian, the "Hero of Chester," who has given us some of the most valuable, fastest and most reliable trotters in the world Hambletonian was in-bred, his dam being direct from Messenger—in-bred with the exception of one cross with Imported Bellfounder, who was himself imported from England, which emphatically makes Hambletonian an English-bred horse

HISTORY OF ENGLISH THOROUGHBREDS.

The history of English thoroughbreds might well be touched upon here. England paid but little attention to the pedigrees or breed of horses until probably 180 years ago. The introduction of three horses into England—the Byerly Turk, the Darley, and Godolphin Arabian—which were crossed and recrossed on about twenty native mares, produced the grand thoroughbred, the pride of the British. The contests of this production in running races eliminated the weakest and resulted in the survival of the strongest.

THE RACING CALENDAR AND ITS SUCCESSORS.

The record of their performances for a series of years grew into a book called the Racing Calendar, the publication of which commenced in 1751, and has been kept up ever since. In 1783 Mr. Wm. Pick commenced "The Sportsman's and Breeder's *Vade Mecum*"—"a careful collection of all the pedigrees it was then possible to obtain," as he generally expressed it. In 1803 he enlarged and republished it under the title of "The Turf Register, and Sportsman's and Breeder's Stud Book." The first volume of that work came down to and included 1765. He afterwards published the second volume, but died before the third volume was issued, and it was not published till 1822 by a Mr. Johnson. The first edition of Mr. Pick's Turf Register of 1786 is the earliest published record of pedi-



THOMAS JEFFERSON, A "ROYAL GEORGE" HORSE. RECORD, 2.23.

grees that we have any knowledge of. In 1803 Mr. Weatherby enlarged and published the first volume of the English Stud Book, which has been continued in the Weatherby family ever since, and is now embraced in thirteen volumes.

THE ENGLISH STUD BOOK.

For accurcy and completeness the English Stud Book is the most remarkable compilation extaut. The first volume is the basis on which the whole series rest, and from 1765 to the present time I believe the only addition to the English Stud Book has been one horse. The commingling of this blood at that time, for racing purposes, produced the English thoroughbred.

MESSENGER'S ANCESTRY—MAMBRINO.

From the Darley Arabian we had Flying Childers; from Childers, Blaze; from Blaze, Sampson, who produced Engineer; and from Engineer, English Mambrino, who produced Messenger, who came to America in 1788, and became the progenitor of the most valuable horses on earth, the Hambletonians. Some eighteen or twenty of them have attained 2:20, or better, to the mile at the trotting post. The Mambrinos are of the same class, only differently removed from Messenger.

THE ANDREW JACKSONS—GREY EAGLES—MORGANS—ST. LAWRENCES.

The Andrew Jacksons, of York State, are of French pacing descent, and are prominent in Northern New York and Eastern Canada. The Andrew Jacksons that came from Young Bashaw are not the same stock. The Grey Eagles are positively Canadian, and doubtless originated from the pacing element near Quebec. They were held in high esteem by breeders in eastern Ontario, from 1845 to 1856, but the race is now quite extinct there. Their best produce was Irene, 2:24, and Dutch Girl, 2:29½, which last sold for $10,000. The Morgans are a type of their own, descended from Justin Morgan, and not now held in very high esteem. The St. Lawrences are Canadians. I wish to refer to these hereafter.

A RACE OF PONIES.

There is a family of ponies called the Chincoteague ponies. Their origin is beyond the present knowledge of man. There are two islands in the Atlantic, off the coasts of Maryland and Virginia, the larger being called Chincoteague and the other Assoteague. The ponies were found upon these islands when they were originally discovered. Tradition has it that the first of the ponies swam in from the sea. They have been there more than two hundred years, running at large winter and summer. The owners, once a year, drive them into a pen, and mark them, so as to distinguish their own. They are about thirteen hands high; are even in size and height; in colour are gray, bay, brown, black, and pale sorrel; have no white markings; their manes and tails are full, they have no fetlock hair; their fore legs are straight at the knees; their hind legs are crooked, the hocks converging and he toes pointing outward; their legs are clean and hard, and their feet round, with open heels. In 1670 the island was first prospected. It was subsequently granted by James II. to one person, and eventually subdivided. At present Kendal Jester holds 600 acres, and others have large holdings. In 1838 it began to be settled, and now there are about twenty-six houses on the island. These ponies are the essential pony of the United States. They are larger than the Shetland pony, and are used for children to drive, and for light draught purposes. As a family of ponies, they are better than any I know. They are docile. They never kick. I have known them for about twenty years. A writer, named Howard Pyle, had an article about them in *Scribner's Monthly*, of April, 1879. Stephen A. Douglass obtained a span of them years ago, and took them to Illinois. There are none of them in Canada. I don't know anything about Shetland ponies in Canada.

[*Dr. McMonagle.*]

HAMBLETONIANS AND THOROUGHBREDS.

With regard to the Hambletonians, I am perhaps prejudiced in their favour, from a knowledge of their wonderful performances as trotters. I cannot consent to breed them on a horse unless he is so well blooded that he is almost a thoroughbred in that type. I was not favourably impressed with the thoroughbred running horse, because I did not think he could be adapted to the wants of the American people, or made useful to Canada, except in a psychical sense as a cross with the pacing element. I would have gone into breeding Hambletonians before I did—I have only been breeding them since 1872—but that my means were limited; and I am indebted to Mr. Wiser for being able to breed them.

RYSDYK

He was the first who introduced the pure Hambletonian horse into Canada—his Rysdyk, for which I understand he paid $10,000, for breeding purposes alone. I bred from him. The demand for horses in our section is created by American buyers, who come over and take what they can get.

AMERICAN DEMAND FOR PARK HORSES.

The American demand is for drivers—park horses—which are not numerous in the United States, nor known there as a family, but sometimes obtainable in Canada. One of the largest buyers for the New York market is H. N. Hawkins, of Delta, N.Y., and his great desire is to get a stylish coach horse standing 15 hands or higher.

WHAT THE COACH OR PARK HORSE SHOULD BE.

A park horse should have a great deal of blood, and be able to trot a mile in 3½ or 4 minutes. He should be a stylish bay, standing 16 hands or over, and weighing 1,200 pounds. He should stand erect on his four legs, hold his head and tail high, and be perfect in symmetry and form. He must be large and broad in his hind quarters. He should be proud of himself, and dignified and elegant in his bearing, firm of flesh, sound in bone, not liable to spavin, straight in limb, and standing squarely on his feet. Horses poorly bred generally wear the outside of the shoe first. Unless a horse stands square on his four feet, and wears his shoes evenly, he cannot maintain strength and durability.

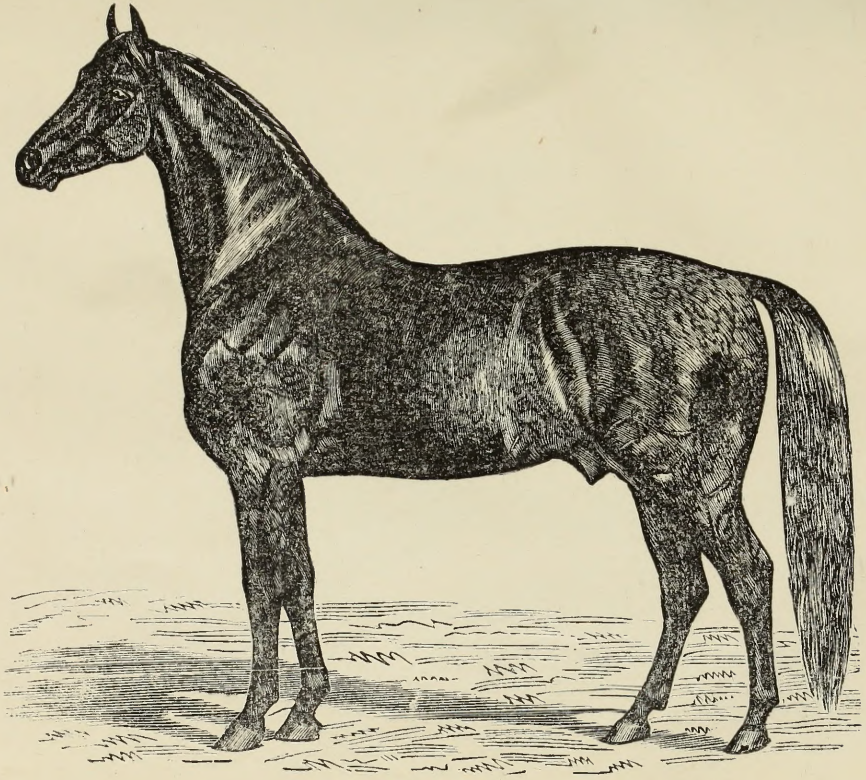
CLEVELAND BAYS.

There was once a park horse family in England, called the Cleveland Bays. There is some one in Illinois who pretends that he has been to England, and bought there a class of horses that he calls the Cleveland Bays. But my conviction is that they are extinct. They were in England as long ago as 1818 or 1820. But, with the introduction of railways, stage coaches were superseded, and the Cleveland Bays were bred with thoroughbreds to produce hunters, and they have been bred out in that way. It would be easy to reproduce in Canada a family of coach or park horses, but it is not easy to produce park horses, on the basis we have in Canada at the present day.

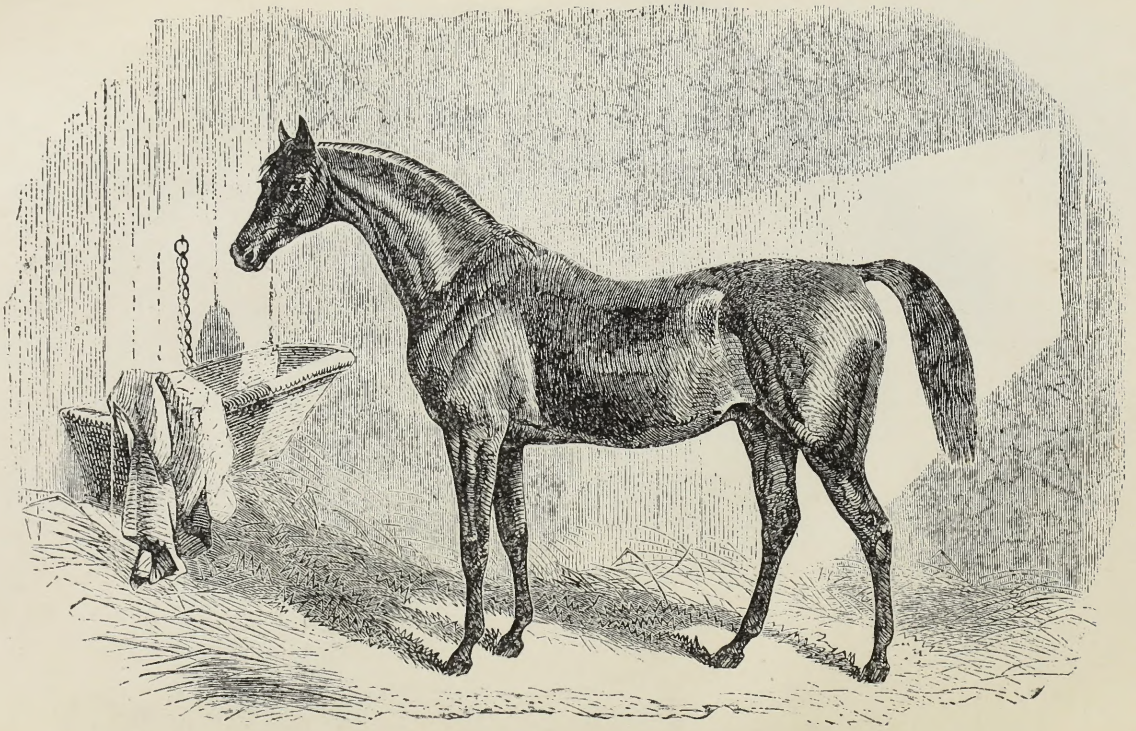
THE CLYDES AS WORKERS.

The Clydes are born to drudgery and work, and are only fitted for that. Their vital temperament is not the right material to commingle kindly with the thoroughbred stock of the country, and we cannot produce from them an element suitable for a park horse. When you breed two antagonistic, but strongly composite elements together, such as the thoroughbred and the Clydesdale, the characteristics being so entirely distinct, you have a failure, though the type produced would probably more resemble the thoroughbred. I don't know what the second cross would produce—probably a pony or a Goliath.

[*Dr. McMonagle.*]



CLEVELAND BAY.



COACH OR PARK HORSE.

HOW TO BREED THE PARK OR COACH HORSE.

I think there is a way, however, in which we can breed a park horse. The Hambletonian being in-bred for such a series of generations, and being so strong in his type and character, impresses on his progeny what he receives from his ancestors. He would not fully impress his own characteristics upon them unless he had an affinity for their dam. In this country we have a great many thoroughbred horses crossed even to the tenth remove from the thoroughbred runners, and the way to utilize them is to unite them with the type we have got most akin to them. That type is the Hambletonian, which has been bred from the thoroughbred. To utilize the native stock we possess, we should unite them with either Royal Georges or Hambletonians, because we expect to have the same types meeting in their generation, and I found that result follow.

THE FASTEST COLT IN CANADA.

I selected a Royal George mare, by Field's Royal George, and had her served by Rysdyk. From that combination I produced what I believe to-day to be the fastest colt in Canada. He is now four years old, and he can speed better than 2:30 easily. I have bred on the philosophy of breeding, and succeeded after bringing the same types, the same instincts, the same proclivities together, although distant four or five generations. I think I could not but produce what I wanted from the first congress.

INCONGRUOUS ELEMENTS AND FAILURE.

I selected a mare of the Morgan type and bred her with a Hambletonian, North Star by Jay Gould, 2.21½, a son of Rysdyk's Hambletonian, and the result was a failure. The elements did not agree.

A SUCCESS.

I took a common mare that was known to be part thoroughbred, and from her by Rysdyk, I got three colts of a good type, as I expected. I selected a thoroughbred mare and bred her to Rysdyk. The produce, "Baxter," is a success. I have noticed that the Hambletonian stock and that class of dam produce horses 16 and 16½ hands high, the majority of which have been park horses.

HOW TO PRODUCE A FAST AND STYLISH HORSE.

I would strongly recommend the farmers of Canada to utilize the horse element they have of the thoroughbred stamp with well bred trotting males, and they will produce a good horse for the general purposes of the farm, and a stylish horse which they can sell as a coach horse whenever they want to part with him. That is the class of horses in demand with buyers from the United States. The small, crooked-legged, weedy, diseased horses which are commonly raised in the eastern section of the Province bring about $40, $50 or $60, whereas buyers will pay $200 for the class of horses I speak of.

BRITISH BUYERS.

I don't know whether the same class would serve for Great Britain as for the United States. I know that some who buy for the British market shun us altogether. They want only the produce of the Clydesdales—heavy horses—and they will give satisfactory prices for the horses that suit them. They want them for heavy agricultural purposes, but I could not understand that they were the produce of the Clydesdales on the native mares. I have not heard English buyers demand horses for street car or omnibus purposes.

[*Dr. McMonagle.*]

A GOOD GENERAL PURPOSE HORSE.

The best horse to cross with a native mare for the production of an animal for general purposes is the Hambletonian. Such a horse is not only the horse for the fashionable carriage and for the saddle, but he is a good active horse for the work of the farm, and if a farmer span two such horses together, he will have a good stylish team to take his family to town or to church. In considering whether raising horses on the farm is profitable, you have to find out what kind of a mare the breeder has. If he has a mare that is only fit to breed to a jackass, he will get a mule which will perhaps sell pretty well. But there are many mares in Canada that have a thoroughbred affinity in their egg cells, and if you get a stallion of the same type to breed with one of these, you will get a horse of a good type. For instance, if you use a Hambletonian horse so strong as Rysdyk, his sperm cells would have affinity for nothing but the thoroughbred germ cells of the females, and you would produce nothing but the park horse.

DANGERS TO BE AVOIDED.

Spavins and ringbones, and especially curbs, are easily put upon a horse when he is being trained. There is nothing worse than to have a man bear down on a horse that is rearing or capering. I have seen many neighbours have horses ruined by the carelessness of what might be called a good groom. You can get no synovial enlargements, thoroughpins, jackspavins, and cocked ankles, on a well bred Rysdyk colt; nature is true to her anticipations, and when she puts a wealth of muscle in the posterior propelling powers she dictates a corresponding size and texture of bone adapted to its use. Very many of our most valuable roadsters become injured in the fore feet; and that reminds me of a word about shoeing horses.

HOW TO SHOE A HORSE.

The smith to make level a bed for the shoe, invariably pares the base of the foot at the expense of the toe, leaving the heel high, almost unpared, probably uncut at all; having already cut thin the toe, all it can suffer, he argues, that, "now pare away the heel and in levelling the centre, the bed line becomes so thin that it impinges upon the quick." Reverse all this custom. Don't pare the toe at all. Do all the paring and levelling at the expense of cuttings at the heel and slight shavings along the line of the intended bed for the shoe. Fit your shoe regardless of the projection of the toe over the shoe, and drive your nails. Don't rasp the enamel off the horse's hoof. Don't groove under the twisted off nail points to make an indentation to receive the clinched nail. Turn down your clinches and imbed them as lightly and as slightly as possible in the enamel of the hoof, and only simply rasp off the roughness of the clinches. I repeat, don't rasp the enamel at all. Simply rasp the toe margin so as to make it flush with the toe edge of the shoe. Let the advocates of rasping apply a proportionate see-sawing to the enamel of their own finger nails as often as they do to the horse's hoof and in a year they'll "know how it is themselves." Don't cut the frog, nature's cushion adapted to modify the concussion inherent upon locomotion, but see that the heel is sufficiently pared to yield laterally when superincumbent pressure is laid upon the elastic cushiony frog. A proper attention to shoeing, with a liberty, when unheated, of a daily half hour's bath of the fore feet in a two inch depth of cistern water and there will be little danger of our roadsters suffering from laminitis or navicular disease, founder or contracted heels.

USE OF INFERIOR STALLIONS.

The class of stallions in use in our section is a very poor native class. The farmers appear willing to take up with almost any stallion so long as the groom will insure for ten dollars. Generally, the cheapest horse is the best in their estimation, entirely regardless of pedigree or history.

[*Dr. McMonagle.*]

THE AMERICAN HERD BOOK.

To Mr. Gibson.—The American Herd Book is held in preference to the Canadian. When Allen alone was at the head of the American Herd Book, it was palpable that breeders had little confidence in it, and a change became necessary. A board of censors was then appointed and continues to exist, and, although Allen is the authority, it has complete control over everything in the book, and people have confidence in this board, although they have little in him alone. A thoughtful writer, in 1875, says :—"Twenty-nine years ago our esteemed friend, Lewis F. Allen, of Buffalo, New York, brought out the first volume of the American Shorthorn Herd Book, and it has been continued by him until now it numbers more than a dozen large volumes. Through all these years I am sure Mr. Allen has carried forward his great work, not only as a very able but a strictly conscientious man. It has been under his own personal control, and any assistance he has received has been such only as his correspondents afforded him. In the last few years this work has been attacked, from many quarters, with great bitterness, and oftentimes with great injustice. The feeling engendered by these criticisms has at last resulted in the organization of a National Association of Shorthorn breeders in order to exercise some control of what shall be admitted to the Herd Book and what shall be rejected. At this point there is very great diversity of opinion, and meantime the character and influence of the work, as an authority, has suffered in the public estimation. Now if this National Association had been organized twenty years ago, there would have been a weight of influence and authority about it that would have kept its authority for good unimpaired. More than that, it would have saved the community from the scandals brought upon the breeding public by inconsiderate and ill-informed writers, etc."

THE ENGLISH SHORTHORN HERD BOOK.

Coates' English Shorthorn Herd Book has been published many years, and there have been many discussions among breeders as to what it should admit and what reject, but fortunately it has been under the supervision and control of a "Board of Appeals," and the intelligence and high standing of the committee have given their deliberations and conclusions the weight and authority of law, and it would be difficult to find a man in the realm who would dispute the wisdom and justice of their decisions. Breeders have no confidence in the Canadian Herd Book, because it is not under proper control.

WALLACE'S TROTTING REGISTER.

So it is with Wallace's Trotting Register of the United States. When Wallace issued his first and second volumes the pedigrees were found there all right. But there was dissatisfaction with it, as many argued want of faith in any single individual, and others insisted that pedigrees of their stock should be received as sworn to by them, and they should have them inserted. The National Breeders' Association saw the evil that was to result from this system, and they obtained control of the volumes. It then came out under the direction of a board of censors. but substantially edited by Mr. Wallace as before, and the result is that everybody has confidence in it.

A BOARD OF CENSORS REQUIRED IN CANADA—CERTIFICATES.

Our Canadian Herd-Book requires, then, a board of censors. There is no horse register in Canada, and no means to register a horse and to distinguish one from another, as there ought to be. Mr. Wiser sends some of his stallions through Canada for stud purposes and issues with them a certificate, giving the history of the particular stallion, and stating that "this mare was served by this stallion" at such and such a place. The groom signs this certificate, and leaves it with the owner of the mare that the horse had served.

[*Dr. McMonagle.*]

The result is that the stallions with these certificates have more than they can do, because people have faith in the correctness of the certificates.

A REGISTER OF BLOOD STOCK.

Out of this practice Mr. Wiser has evolved a theory, which I think is a good one. I do not approve of the licensing system, as it would be pretty expensive. I agree with Mr. Wiser that it would probably be better if this Commission could get an Act passed through the Legislature to provide for the registration of all the blood stock in Canada in some bureau or with some official, that registration should be under the control of a board of censors, and that no one should be allowed to travel a stallion for pay unless he had a certificate of registration. The registration fee might be nominal, say two dollars; and if the board of censors gradually eliminated everything that was not thoroughbred, and if a horse that was not registered could not collect anything for his services, you would gradually come to the exclusive use of thoroughbred stock. That would be a system that would lie easily on the community, and about which there would be no complaint. It might be the means of centering the knowledge of all the thoroughbred stock of the Province—bulls, boars, rams, and horses—in one place, in Toronto. The board of censors should be independent of the government, appointed from the best breeders in the Province. I would have them appointed by the Government, but appointed for their superior intelligence and breeding ability. I think the Government is capable of making a selection of that kind without incurring the imputation of political motives.

WANT OF CONFIDENCE IN THE CANADIAN HERD BOOK.

To Mr. Dymond.—I have no reason to doubt the accuracy of the Canadian Herd Book, but I know that people have not confidence in it. I think so well of Canadian registration that I would not register my horses in the American Registry, but must soon of necessity do so unless we have one in Canada. There is no reason why the Canadian Herd Book should not be made an authoritative record under the control of the gentlemen who at present direct it. The "Live Stock Record" has been giving breeders "hail Columbia" for admitting four crosses. I have confidence in four crosses in horses producing a good result; but I have not confidence in any herd book that is not controlled by an impartially selected board of censors. The gentlemen at present controlling the book are just the gentlemen the Government ought to select for the purpose, associated with men of acknowledged learning in the breeding problem. The whole to be a "board of censors" for registration, with power to reject or admit. I cannot see any way in which the Government could exercise undue influence over the board. They ought te be high-toned, honourable men.

AGE FOR BREEDING FROM MARES—TREATMENT OF COLTS.

The age at which a mare intended to be a breeder should be put to the horse is four years—not less than four. A colt should be weaned at five months. The first winter it should be fed with all the hay and oats it can eat, and kept perfectly warm. It is a mistake not to feed colts plenty of oats; it is nitrogenous food, and gives them plenty of flesh. Old cut hay is not so good as hay that is cut while it is green and new. Corn and soft feed, such as turnips and carrots are not nearly so good for nourishing them, and giving them endurance and vim, as hay and oats, and they will grow thirty per cent. more on the one kind than on the other. Probably once a week I would give them about a teaspoonful of saltpetre with a little wheat bran mash. There is no greater mistake than to water a horse directly after he eats his feed. His stomach is small, and any feed that he eats before you give him his drink will be washed through undigested. The proper way is to water him an hour or so before you feed him his grain. Colts do a great deal better with ground oats than with unground; the agitation of the mouth produces a certain amount of saliva that aids digestion. I have always kept my colts tied in their boxes.

[*Dr. McMonagle.*]

"SERVICES" IN ONE SEASON.

I think eighty mares in the season are abundant for one horse to serve, the season beginning early in the spring and ending late in the fall. I have known of four or five services a day, but I think two a day should be the most.

NO CONTAGIOUS DISEASES—RINGBONE.

Since the epizootic in 1872 I don't know of any contagious diseases having been among the horses in my district. Bone spavin is not hereditary; joint or bog spavin is hereditary. Exostosis, I think, is not hereditary. Blisters may take it off. The thoroughbred Punch, sired some horses, and they were almost all ringboned, although he was not ringboned himself; ringbone was ancestral in his case. Bog spavin is a disease of the joints. It is analagous to white swelling of the knee in man, and depends on a scrofulous or broken down constitution. Curbs are curable by counter irritation or absorption

HAMBLETONIANS FREE FROM DEFECTS.

To Mr. McMillan.—The Hambletonians, being watchfully bred for years and years, are not at all liable to ringbones and spavins. They may, like all running horses, sometimes throw themselves so suddenly and so far as to strain a muscle and produce a curb, but they are not likely to have them; they are muscular, large, and broad in their hind quarters. Clydesdale horses crossed with the common mares of the country, would not get park horses which are in such great demand. In my section you can get $1,000 for a span of these horses, whose elegance of form and style especially fit them for the wants of aristocratic society. You cannot supply them in Canada from anything but the Royal Georges or the Hambletonians. If you do breed Clydesdales on the native mares you will produce a good horse for the general purposes of the farm; but what could you sell it for when ou wanted to part with it?

WORKING BREEDING MARES.

To Mr. Wiser.—I have seen mares that worked to within a few days both before and after they dropped their colts, and have known them to produce good colts afterwards, but I don't think it is good policy to work a breeding mare much. Clydesdales, I should think, could be worked while their colts are suckling.

HOLSTEIN CATTLE.

My knowledge of the Holstein cattle is historical and theoretical. I do not own any. They have only within a short time been introduced into America. About ten years ago a Boston gentleman imported a bull and two cows, but they were carried off by disease. Since then there have been other importations. Holstein cattle come from Holland, where they have been bred for hundreds of years for milking purposes. They are nearly as large as the Polled Angus or the Shorthorns, are invariably jet black, with clear white large spots, and as milk producers are far superior to anything I have any knowledge of, as respects both quantity and quality When a cow is fed with slops to make her give more milk it is simply mixing water with it. The essential portion of the milk is the oil in it which is in the form of globules, and that being lighter than the rest rises to the top in the form of cream. But if you give a cow slops you will not increase the quantity of cream. The Holstein has more solid butter and cream constituents in her milk than any breed I know of except the Jersey. The bulls of the breed are large, and make good oxen.

PLEURO-PNEUMONIA.

To Mr. Dymond.—I do not know that the Holstein cattle introduced pleuro-pneumonia

[*Dr. McMonagle.*]

into the American continent. I know that pleuro-pneumonia prevails in Holland, where they come from. I do not believe they are more liable to be diseased than other cattle; but the cattle districts of Holland being low, marshy and miasmatic, I should infer they would be more subject to lung diseases there than elsewhere. I don't think the disease is caused by inbreeding. I don't imagine that if we imported healthy Holstein cattle, we should be liable to pleuro-pneumonia any more than we are at present. That disease has never yet been traced to its origin.

REGISTRATION OF CLYDESDALES

On the importance of registration, so as to distinguish one stock from the other, and to keep each stock pure and free from the other, and to keep each stock pure and free from contamination, it was thought that the Clydesdales might deteriorate, owing to the want of proper protection by classification, and no less a man than the Earl of Dunmore has of late years originated a society in Scotland for the protection of the Clydesdales. Three years ago the Earl of Dunmore was elected president; 97 noblemen and gentlemen joined as life governors, paying ten guineas each; 57 life members paid five guineas each; and there were 44 annual members—altogether 198 members, producing an income for the Society of £1,112 for the first year. Their first volume, for a register of stallions only, had 1,400 entries, and the Earl of Dunmore generously paid the expenses of its printing, and gave each member a copy. The second volume appeared only a few months ago, and the same attention to detail which characterized the first volume has been maintained throughout. This volume contains a record of the colour, the dates of foaling, and all the marks.

OTHER REGISTRATION SOCIETIES.

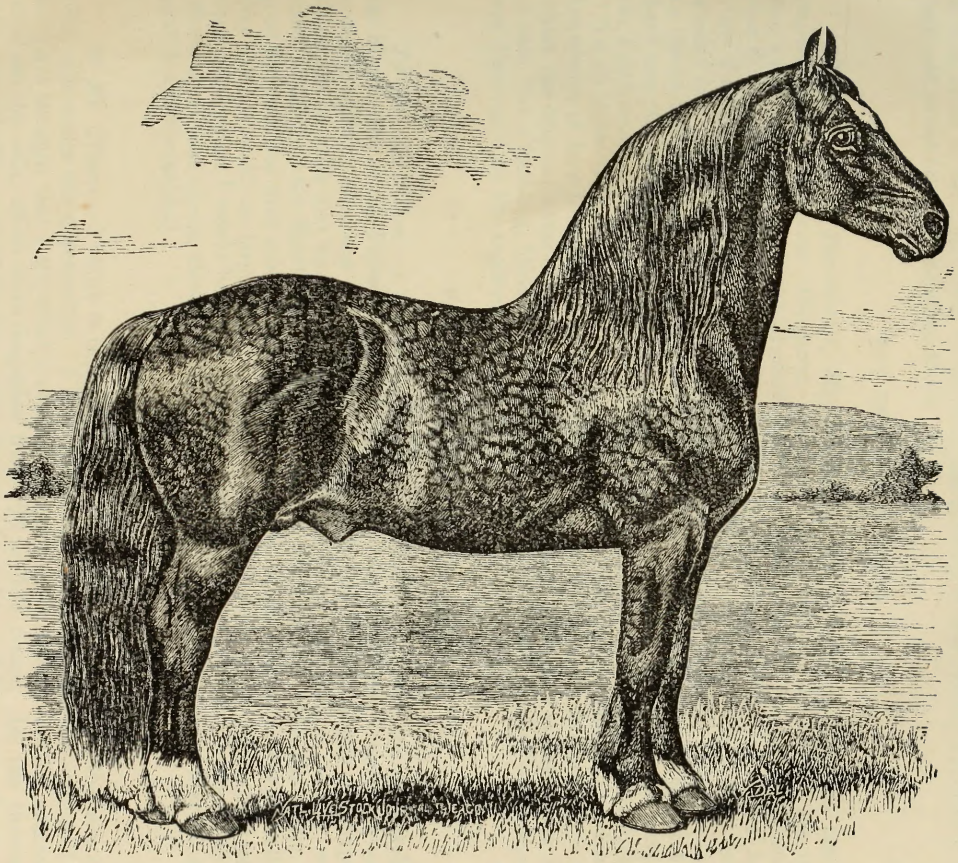
The establishment of this society was followed by the formation of the Suffolk Horse Society, for registration purposes, the Hereford Herd Book Society, the Welsh Cattle Society and the Galloway Cattle Society, which, I think, has recently issued a herd book of its own; and there has just been started a Shire horse society, for the protection of the original old cart horse of England. Mr. G. M. Sexton, in an address at the horse show at Downham Market in the County of Norfolk a few weeks ago stated that there had just been started a stud-book for trotting horses. The second volume of the Ohio Shorthorn Record is just issued by its editor, L. D. Hagerty. It contains nearly all the herds of Shorthorns in the State, together with the constitution and by-laws of the Association, its board of censors, and rules regulating public Shorthorn sales, and for weighing cattle at public exhibitions. Of the 2,200 pedigrees within its covers, 1,300 are inserted as reference sires, embracing nearly all the imported animals.

ENCOURAGEMENT TO STOCK IMPROVEMENT IN TENNESSEE.

Tennessee takes first rank in assisting the poor man in his endeavours towards pure blooded stock-raising. To encourage the raising of sheep in that State the last Legislature passed a law allowing every farmer to own fifty sheep, exempt from levy, attachment or execution for debt.

SHEEP FARMING IN TENNESSEE.

J. B. Killebrew, Commissioner of Agriculture, argues quite earnestly in favour of sheep husbandry in Tennessee. He has prepared a volume on the subject which is filled with valuable information. He emphasizes the fact that in the fertile valleys of East Tennessee big crops can be produced to feed enormous flocks summered on the slopes of the surrounding mountains. A plateau fifty miles wide, rich in all the native grasses, spreads over the tops of the Cumberland mountains and extends from Kentucky diagonally to Georgia and Alabama. In addition to this there are the foot hills, the great rim of Middle Tennessee and the plateau of West Tennessee. If these vast areas of rich pasture were



CLYDESDALE HORSE.

stocked with sheep the wealth of the state would be incalculably increased. The mountain slopes are best adapted to sheep husbandry, because the grass is sweet, and the wool-bearing animals will not thrive on low wet lands. The climate of Tennessee is neither too hot nor too cold ; therefore Mr. Killebrew does not step beyond the bounds of reason when he urges the farmers to turn their attention to sheep-husbandry. He has a practical knowledge of his subject, consequently he states his case tersely and clearly. The work will convince wavering minds and have a good influence. I only mention these things to the Commission in order to stimulate them to use their efforts towards establishing a system of registration and protection for Canadian stock.

THE PERCHERON HORSE.

With regard to Percherons, Mr. Harris, of Moorestown, N. J., was the first to import one into America—Diligence, purchased in Normandy in 1839. He imported two mares at the same time, and after several years of breeding, he came to the conclusion that they were not a success, that they would not commingle with the native horses of New Jersey, and all along the Atlantic coast from there to Florida they have been weeded out. Now there are many Percherons in Western Canada, Illinois, and Ohio. In themselves they may be a useful horse, but they are useless to cross with others. Last year the Russian Government appointed a commission to make an investigation of the Percherons, and Professor Von Meddendorf, in his report, comes to this conclusion :— " We all know that most of the secret how to raise and train good horses consists in the knowledge of how to use the feed-bag from their most tender age ; and when it is inquired where the original home of the Percheron is to be found, no vestige of any particular stock or race, but a feed-bag, filled half with oats and the other half with chaff and green fodder, was discovered by the explorers."

THE HOLSTEINS AS BEEF CATTLE.

To Mr. McMillan.—I think the Holsteins, as beef cattle, are not comparable with the Shorthorns or the Polled Angus ; but they excel the Ayrshires, Jerseys, or any other cows for milking purposes. In my opinion, probably the Polled Angus are superior to all others for milk and beef combined. The Polled Angus will mingle kindlier with any other blood than the Shorthorn. I do not mean to say that the Holstein cattle are not good for beef, for they are. They make large oxen, large cows, and large bulls. But they are not nearly so large as the Durhams. Still I would breed for a purpose. If I were a dairyman I would breed for abundance of milk, and I would concentrate all my efforts upon that object, though in doing so, I should expect to deteriorate from the beef qualities of the animal.

THE MISCROSCOPE.

To Mr. Gibson.—I think it is possible to distinguish the grade from the thoroughbred germ cells under the miscroscope. I have introduced my hand into the vagina of a mare, and have thought that I got what contained the germ cells, and under the miscroscope I could see the cells, which were magnified from 300 to 500 times. In the thoroughbred they were all alike—all of the same type, form, and vitality. I have done the same with a cross, and I could distinguish the thoroughbred cells from the others. The impression imparted from the fœtus to the mare is very great, and when she is once impregnated by a poor article, it will require three or four pure impregnations to bring her back to the original standard. The impression is made on the whole nervous system of the mare ; the glandular secretions become affected ; the carrying of the fœtus for several months changes the secretions. I bred one mare to a poor horse, and the bad effects did not leave her till the fifth breeding. From the first you should be careful to breed with a pure horse.

To Mr. Malcolm.—If a mare were bred to a Clydesdale she would be impressed with the Clydesdale influence, and it would afterwards be difficult successfully to turn to another breed.

[*Dr. McMonagle.*]

A SCALE OF POINTS IN A HORSE—THE PARK HORSE.

It must be notorious to the Commission that very frequently the four or five gentlemen who are appointed to judge horses at fairs do not always decide correctly as to the merits of the horses. They look from this to that horse, and decide according to their individual preferences. I thought to myself, therefore, that if a scale of points could be adopted for judging horses at fairs, it would be a good thing for everybody. In the New England fairs they have lately got a set of rules, and out of them has been evolved what I consider would be a complete standard to apply to my favourite horse, the park horse. It is as follows :—

SCALE OF POINTS FOR JUDGING HORSES. APPLIED TO THE PARK HORSE.

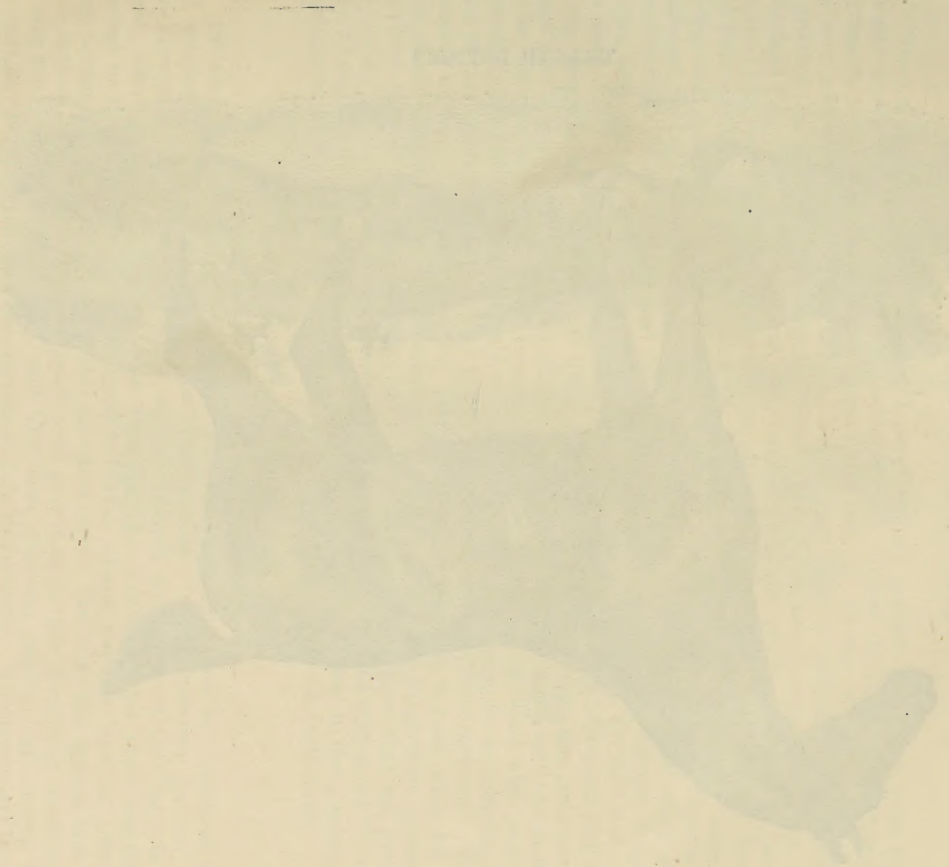
1.	Size, 16 hands being the standard	8
2.	Proportions, general symmetry and perfection of form	10
3.	Elegance and loftiness of style and carriage	10
4.	Colour dark, free from bad markings on the face or feet	5
5.	Head clean, broad, expressive, and not too large	5
6.	Eye and ear bright, cheerful, and expressive of docility	5
7.	Neck, length, shape, and quality, with character of shoulders	5
8.	Back and loins	6
9.	Hip and whirlbone, and setting on of tail	5
10.	Quality of limbs and feet	10
11.	Action lofty, free and bold, knee well bent at speed	6
12.	Speed equal to a mile in 3.30 to road waggon	5
13.	Docility and kindness of temper	5
14.	Pedigree, showing an inheritance of the quality desired, and the consequent ability to transmit it	15
		100

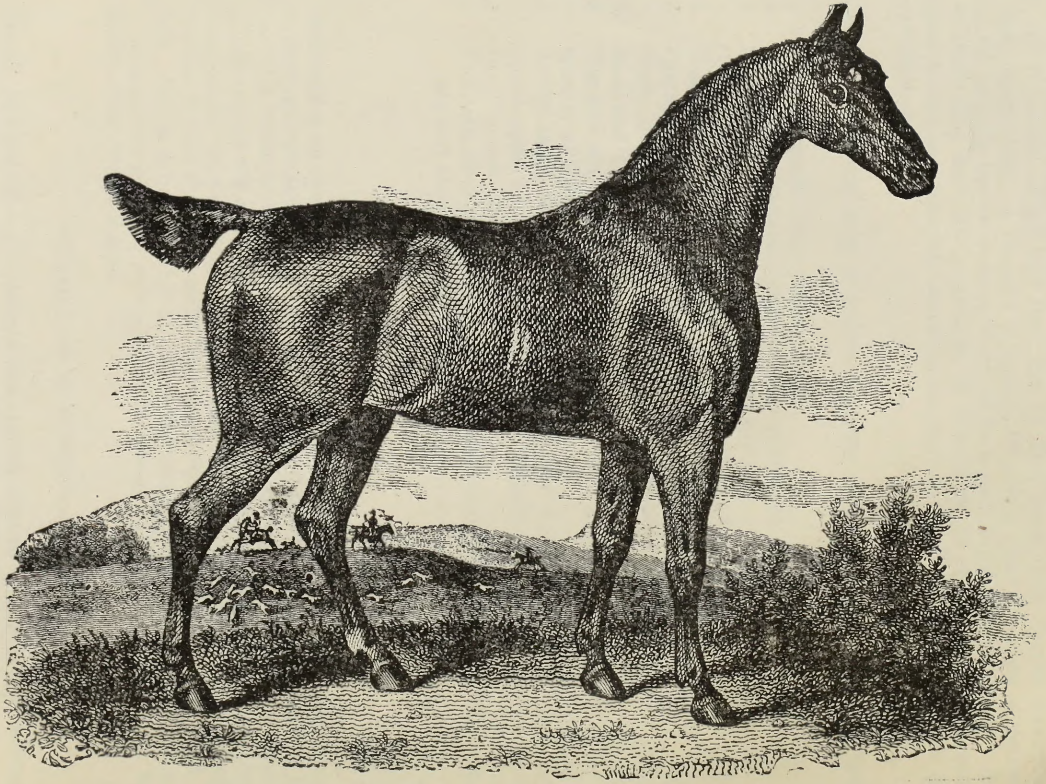
That makes up the 100 points. I would like an exhibitor when he comes into the ring, to authenticate the pedigree of his horse, and the nearer a horse came to this number the nearer he would be to perfection. My ideas are that if an animal is bred to a particular line or type for a particular purpose for a series of generations, the characteristics of this particular type are imparted to it, and then it becomes hard to eradicate them. An Ayrshire is bred for milk, and a Shorthorn for beef. They are both good in quality and grain ; but to bring together two such differently positive forces like these to breed a type is inconsistent with the principles of breeding. If I had a greyhound, and bred it to a terrier, what would I get ?

AFFINITY IN SUCCESSFUL BREEDING.

To Mr. Ballantyne.—To produce the highest type of any class of animal, whether horses, cattle, sheep or swine, in my estimation they would each have to be bred to their own characteristics, types, and proclivities. It is possible to improve quickly on cattle and swine. It is possible to improve on horses ; by training and continuous breeding in the same family for generations, in crosses you might produce new types and characteristics. I would expect to originate almost any animal I wanted if I lived long enough. If I did venture to breed two distinct classes together, I would have to examine what I obtained, and probably breed for five or six or seven or eight times to see what I would get. In the fourth or fifth generation I might get a nonpareil—something that was never got before. If I bred a pure Berkshire boar with a Berkshire sow, I would know what I would get ; but if I bred animals with three or four out crosses together I

[*Dr. McMonagle.*]





ENGLISH HUNTER.

would not know what I would get. I believe it would be a risk to breed Ayrshire bulls with Shorthorn cows. I would breed in the same family if I were looking for the highest results. I would sooner breed a native to an Ayrshire than an Ayrshire to a Shorthorn, because the characteristics of the two latter are so strongly marked that it would be doubtful what we would get. We know that from the Shorthorns and the native stock we can get a good steer; and that is what I claim for the Hambletonian stock in horses—that if you breed our own native horses, which have some thoroughbred blood in them, with a Hambletonian, we would in the first cross produce a good stock.

IMPROVED CLEVELAND BAYS.

When speaking of Cleveland Bays I gave it as my opinion that they were extinct, but said that a breeder in Illinois claimed otherwise. I think this Commission should have the benefit of what is said on the subject. Mr. Geo. E. Brown, of Aurora, Illinois, is the only American importer and breeder of Cleveland Bays so called. In endeavouring to produce the park horse he explains himself thus: "Having some knowledge of the Cleveland Bays, we were confident they would meet the requirements. We went to England and thoroughly investigated them, as well as the different breeds in Scotland and France. We also consulted with the best breeders, managers of large stage companies, and others largely interested in different horses. Our first conclusions were confirmed, and we commenced importing in 1875. We are well aware that many writers (some of them English), claim that Cleveland Bays are extinct. In a certain sense this is true, and by the same reasoning Clyde and Norman are in the same fix, that is to say not the same they were one hundred years ago. As originally bred the Cleveland Bay was a strong, coarse horse, weighing over 1,600 pounds, and used to haul the ponderous old stages over long routes. With the advent of steam those old stages were displaced by lighter vehicles, requiring lighter horses; consequently, during the past fifty years, the Cleveland Bay has been considerably reduced in size; in some cases by an infusion of the blood of the race horse, and in others by judicious selections of the finer families." Youatt, speaking of the improved Cleveland, says: "Now we have an animal with far more strength and treble the speed." Professor Low says: "It is the progressive mixture of the blood of horses of higher breeding, with those of the common race, that has produced the variety of coach horse usually termed the Cleveland Bay." The district of Cleveland owes its superiority in the production of this beautiful race of horses, to the possession of a definite breed, formed not by accidental mixture, but by continued cultivation.

WEIGHT-CARRYING HUNTERS.

Of late years the demand for hunters has been very great, and as Cleveland mares and thoroughbred stallions produce the most popular "weight-carrying hunter," they have been extensively bred in this way, and to-day even the improved Cleveland is very scarce, which has led to the assertion that they are extinct. But there are reliable breeders in Yorkshire, having mares descended from old and popular families, who take pains to secure the service of stallions of the same class. But even this cannot last long, for agents of the Russian, German and French governments are constantly scouring the country for large and strong "nags" and Cleveland stallions, paying high prices, which accounts for their not being sooner introduced into this country. The improved Cleveland stands from 16½ to 16¾ hands high, and weighs from 1,350 to 1,450 pounds.

It has been my good fortune to personally inspect some of the most popular stallions that have been acknowledged and patronized as Cleveland Bays by the most reliable breeders in Yorkshire, during the past fifteen or twenty years. Among them are "Barnaby," "Lucks-All," "Champion," "Brilliant," "Emperor," "Wonderful Lad," "General Benefit," and many others. Some of the above are owned there and doing service still, with many of their descendants.

Stallions called "Cleveland Bays" have no doubt been imported and failed of good results; but genuine Cleveland Bays have to my certain knowledge been imported and

been eminently successful in producing just the "model horses," "bay, 16 hands, weighing 1,200 pounds, with plenty of bone, symmetrical all over, 'action high and trappy,'" yet he is at home on the reaper or threshing machine.

THE HORSE THAT SUITS THE FARMER.

Commenting on Mr. Brown's remarks, the great American horseologist, under date of January, 1880, says: "We will not undertake to pass upon the question of the purity of the blood of Mr. Brown's Cleveland Bays, but, considering the qualities and capabilities of the horse for the farmer, Mr. Brown is right. Having lived twenty-five years on the prairies, and all that time actively engaged in agricultural affairs, we have a right to know what kind of a horse best suits the average farmer. He is a big bay horse, sixteen hands high, weighing 1,200 pounds, with plenty of bone, symmetrical all over, elegant and stylish, and with a natural trotting gait equal to a mile in three and a half or four minutes. Now, of all the varieties of horses that have been imported into this country, first and last, what is still called the Cleveland Bay comes the nearest filling this description. He has the size, the colour, the bone, and the general form of the ideal farmer's horse, with some reasonable indications of action. In other words he approaches so nearly to the qualifications of the "park horse" that a single step further might enable us to reach that most desirable of all the horse tribe. He is somewhat over size, and he lacks trotting action, while much of our general stock are under size and have abundance of trotting action. In these particulars he is most happily suited to our general stock, and we are left only to look after elegance and style.

POWER OF TRANSMISSION.

On the all important consideration of his power to transmit his own characteristics, we are not prepared to offer any opinion. Very much depends upon his lines of inheritance, and much also depends upon the power of the individual animal. Of the latter element we can arrive at no certain knowledge until we examine his progeny. From a very general knowledge of the way breeding has been carried on in Yorkshire we are disposed to think that the element of size has been propagated with far more uniformity than in this country, and this being the case we may expect horses from that district to transmit that element with more uniformity than American horses of the same general qualifications.

The great point is, THE QUALITY OF THE INDIVIDUAL HORSE.

FRENCH HORSES.

In comparing the horse we have here called the Cleveland Bay, weighing from 1,200 to 1,350 pounds, with the great French Mastodon weighing a ton, any reasonable man can see just what to do. If he wants to breed an animal for heavy draft and nothing else let him go to the Frenchman, but if he wants to breed a horse to meet the general wants of the farmer, let him go to the Cleveland. If he has the right type of mare he may be able to reach the ideal horse the very first cross. There is a fixedness of type in substantially all French-bred horses that specially fits them for lives of drudgery, suited to their weight; but this very fixedness is one of the most serious objections to the whole race, if we want to breed elegance and style as well as size for the farm and park. If we start with the Percheron as a basis, and seek to breed elegance and style connected with size, it will require several generations before we reach the present status of the Cleveland Bay. We have unbounded faith in the value of the French horses for the purposes for which they are suited, but when you talk about a horse that weighs 1,800 or 2,000 pounds being suited to the employments of the average farmer it is worse than nonsense."

[*Dr. McMonagle.*]

INVESTIGATION DESIRABLE.

The Cleveland Bay problem is a subject that should be thoroughly investigated for the interests of Ontario horse breeders, as sires of this type to cross with the Hambletonians and Royal Georges would be a short cut in the production of the park horse.

BREEDING WITH A DISTINCT PURPOSE.

If there is any one admonition more pertinent to Canadian farmers than another, and which needs to be repeated over and over again, it is to breed for a purpose. There are a good many who breed intelligently, but who have not much idea of what the results will be. Some people are greatly carried away with the name of thoroughbred, when in reality it may be a delusion. All extreme crosses fail to produce satisfactory results, and the more violent the cross, the more uncertainty there is in approximating what will be the character of the offspring. Never attempt to contradict nature by violent and unnatural crosses. The subject of ancestral influence is generally ranked under the heading of atavism. Ancestors increase in a geometrical ratio. The progeny is found with the type of its immediate parents, but with a portion of the characteristics of the animal's ancestry, and it possibly may represent some inferior ancestor far down the line. In order to arrest this tendency, select those that have concentrated their blood by close breeding. It is said the stream cannot rise higher than its source. One exception to that is found in the cultivation and training of animals to produce a new influence. With regard to the true rule of inheritance there has been a great difference of opinion. One author says that every animal brought into the world inherits in its natural state just what it possesses, it has no more and no less than what it derives from its parents. If the inheritance is strong and rich in the special requirements for which the foal is bred, he is bound to meet those requirements. There are other conditions, however, in which the contrast is not so broad, nor the truth so palpable. The moral I draw on breeding for speed is, that habits of speed, as well as habits of action in general, may be created and established at either or any gait, by training and use, and these habits become instinctive in the descendants.

ANCESTRAL INFLUENCES.

A good deal has been said about the influences of the parent on the offspring. In 1825 and since, prizes for essays on this subject were given by the Highland Agricultural Society of Scotland, and they resulted in this conclusion:—"Any hypothesis which would assign a superiority or set a limit to the influence of either sex in the product of generation, is unsound and inadmissable." Another writer asserts that "the greatest modifying influence is possessed by the male." I think at present there is only one known law bearing upon the subject which is generally admitted, namely, that like produces like, or the likeness of an ancestor, the continued action of which results in a fixity of character, and therefore creates controlling power. I have no faith at all in any theories for producing animals of one sex or the other at will. My philosophy on the theory of generation leads me to believe that there can be no external influence to produce any such result.

COST OF RAISING A GOOD HORSE AND A POOR ONE.

Some gentleman asked me about the relative cost of feeding a good horse and a poor one. I buy everything in raising my horses, and I have kept accurate accounts of the expense incurred in raising different colts. The following is an estimate of the cost of raising a three year old colt:—In February it costs $50 to get the mare with foal; $28 to keep her until the next spring when she foals; $20 for the pasture of the mare and the colt until the 19th of October, when I generally put them in, when the colt is ready to be weaned; $17 to keep the colt until the next spring, when it is a yearling;

[*Dr. McMonagle.*]

and $34 a year for the next two years. That makes a total of $183 to bring the colt to the age of three years, and he which I referred to by Rysdyk dam by Royal George, I believe, with proper handling, is worth $10,000 for speed purposes alone. One year I raised five, and two of them were sent to Kentucky to be bred to Strathmore. I have never parted with any of these colts out of the family. I have refused very high money for them. I advocate the Royal George blood. Well bred Hambletonian stock could be sold readily for from $3,000 to $8,000. There is no reason why horses of this quality should not be largely multiplied. The beauty of these horses is that they stand 16 and 16.3 hands high. I have a colt only four years old, from Rysdyk, that stands 16-2.

PROFIT ON RAISING GOOD HORSES.

To Mr. Byrne.—If the ordinary farmer would breed farm horses of the very highest type, he would breed to the Hambletonian, and get a park horse; and if he bred such a horse as this he could get from $300 to $500 for it. It is a large horse; it is fine tempered—docile—never hurts anybody; and if our farmers could raise such horses and sell them for that money, it would be a tremendous improvement. The Hambletonian family out of 20 performers trotting in 2:18, or better, is credited with one-half, and out of a total of 54 performers with records of 2:20 or better, have 18, one-third of the whole number; they have the best record of 2:12¾, with 1653 heats, and 184 performers having records of 2:30, or better; and, tested by that record, stand first in all the classes in 2:30 or better. Their progenitor, "Rysdyk's Hambletonian," himself produced the incomparable number of 32 within the 2:30 standard—having 43 sons sires of 2:30 trotters; 17 grandsons sires of 2:30 trotters; and 4 great-grandsons sires of 2:30 trotters, a prepotency guaranteeing breeders that his male descendants can impart with uniformity to their produce the best characteristics of their family and transmit those characteristics for successive generations, and, while remaining true to their original type, they not only effect an improvement in others, but an improvement in themselves.

THE SHORTHORN OF CREATION.

Along with the native type they will produce something dissimilar and superior from anything any other sire could produce. The Hambletonian is the Shorthorn of creation.

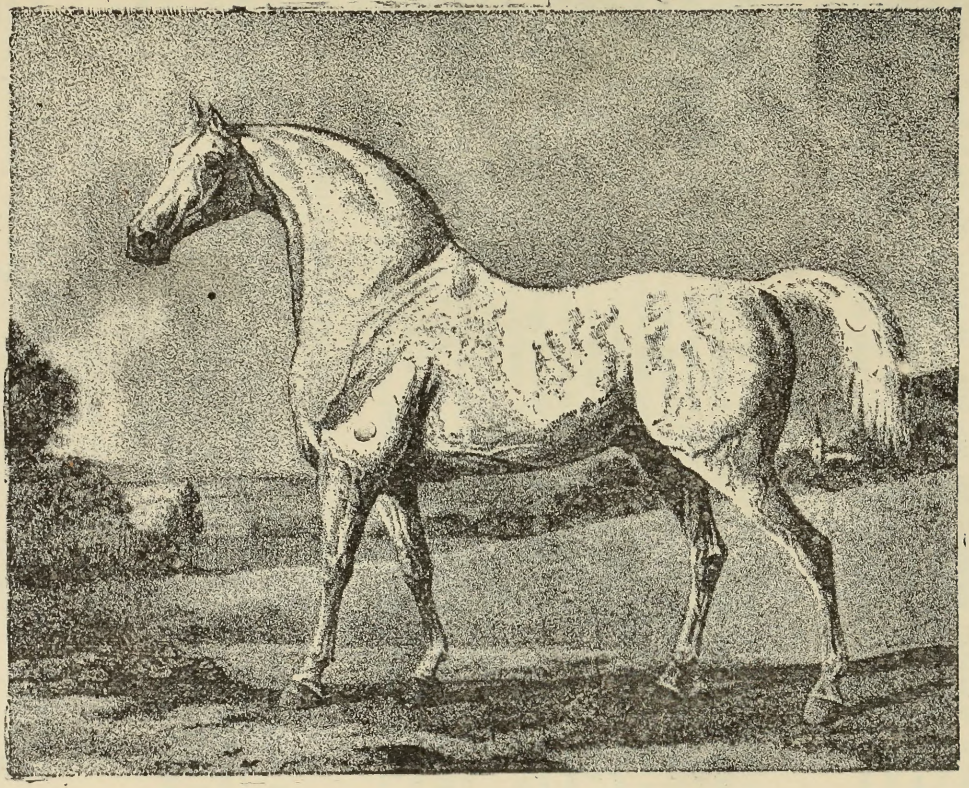
HISTORY OF MESSENGER.

To Mr. Dymond.—Messenger was imported into this country in 1788, and he first arrived at Philadelphia. He served for twenty years, during seventeen of which the exact places where he stood, and at what prices, are known to posterity, as well as what mares he served during the last few years of his life. Wallace reprints a stud poster of March 1st, 1802, signed by Isaiah Burr and Benjamin R. Cooper, in which the second paragraph of the announcement reads as follows:—"Messenger proved himself a noted sire and foal getter when he stood in Pennsylvania, New Jersey, Long Island, and Goshen. His stock, some of which is selling from $500 to $2,000 each, are equal, or perhaps superior, to any other horse in the States."

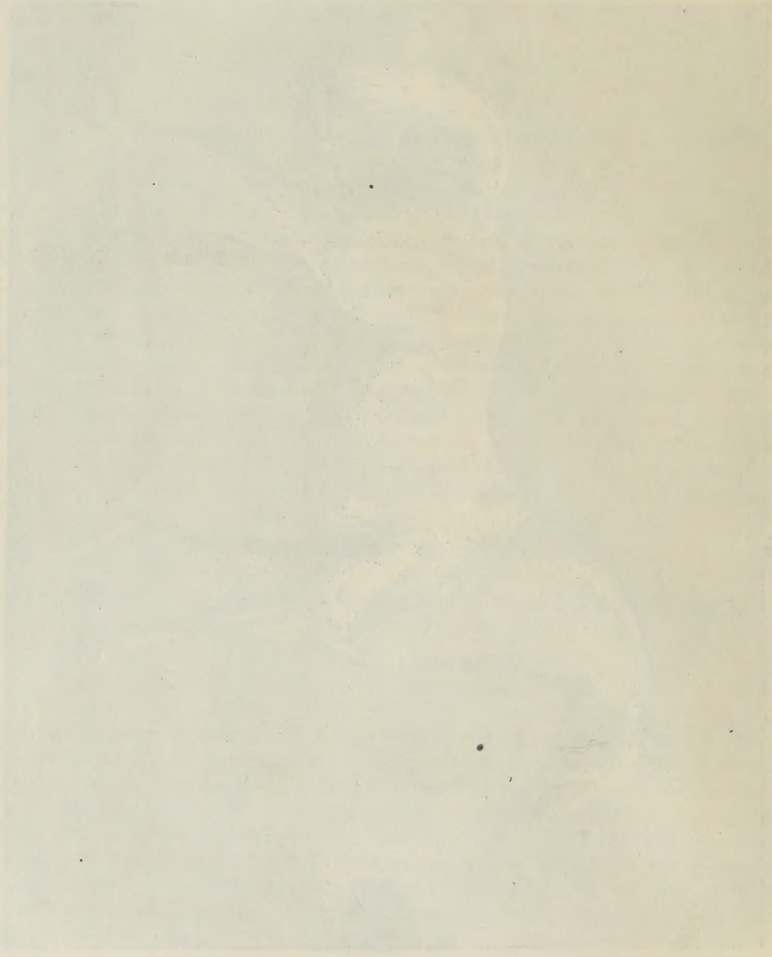
ESTIMATE OF HIS VALUE.

Mr. Van Ranst, his owner, put it on record forty-five years ago that for a number of years, perhaps eight or ten, he leased his services for an annual rental, free of all expenses to him, of $1,000 per annum. If we bear in mind that this was three-quarters of a century ago, that he was located each season in some section of the country that was essentially agricultural, and that the average farmer could not then command one dollar as easily as he can ten now, we can begin to realize something of the magnitude of a net annual rental of $1,000 for the services of a stallion in that day.

[*Dr. McMonagle.*]



"MAMBRINO," SIRE OF "MESSENGER."



HIS PREPOTENCY.

It became noted shortly after his arrival here, that he was a horse of real innate superiority, of peculiar prepotency, or a determination to convey to posterity not only what had been conferred upon himself, but an additional characteristic. He originated a type of horses almost entirely different from the family from which he came, unless the combination that produced Mambrino, the sire of Messenger, was an exception. He embodied "all the blood of all the Howards," and was the "noblest Roman of them all." One of Messenger's ancestors, it is said, had the faculty of straddling when on the run, and he conveyed that peculiar habit to his family. Messengers were all large, stylish horses, and although derived from a variety of sources on the dam's side, they generally followed the sire, and produced trotters that were not celebrated for speed particularly, but as roadsters.

THE MESSENGER STOCK.

In Rhode Island, in New York, and in New Jersey, there grew up a stock of horses known as the Messenger stock, and they were all sought at very high prices. The sons of Messenger were gathered up during the last few years of his life, and taken in all directions. Some were taken to Maine, and produced the Bush Messenger family. Ogden's Messenger was sired by imported Messenger, and stood for many years on the banks of the River St. Lawrence, across from Morrisburg. It is claimed that Ogden's Messenger produced Tippoo, but that has not been proved to my satisfaction. Messenger had very many other sons, which went in different directions, and wherever they went they all seemed to impart an influence that produced strong, able drivers, and fine coach horses. The greatest of Messenger's second decendants was probably Tippoo Saib, jr. It was demonstrated that if a Messenger's grandson and a Messenger's granddaughter were bred together, as in the case of Dutchman by the above sire out of Nettle by Black Messenger, they would produce trotters which would go three miles in 7:32½, an actual performance, standing unequalled for 33 years, when on September 21st, 1872, the great mare, Huntress, in-bred in the same line by Volunteer by Rysdyk's Hambletonian, reduced the three mile feat to 7:21¾, which stands unequalled yet.

ABDALLAH—RYSDYK'S HAMBLETONIAN.

This class of horses were improved on until we have the third generation of horses, which is the Abdallah stock, Abdallah himself being sire of the great progenitor, "Rysdyk's Hambletonian." What benefit has been derived from the importation of Messenger? you ask. Many seem to think it amounts to untold millions. Messenger stood twenty years for service, and he has produced a family of trotters extending from Michigan to Maine, from which are derived the Hambletonians.

DESCENT OF ROYAL GEORGE ON THE DAM SIDE.

An early descendant of Messenger, Harris' Hambletonian, sometimes known as Bristol Hambletonian, produced two daughters, which Mr. Billington, of Middlebury, Vt., was taking to Detroit, and while travelling near London, Ont., the off one permanently injured herself by getting her foot through a corduroy bridge, and became crippled for life. She was sold to Mr. Barnes, the then owner of Black Warrior, who lived twenty miles south of London, and became the dam of Royal George.

DESCRIPTION OF ROYAL GEORGE.

This was a dark bay, or almost brown horse, fully sixteen hands high and well proportioned. His head and neck were good, his body deep and round, joints large and strong, and legs and feet without fault or blemish. When Royal George was three or four years

old Mr. Barnes sold him to James Forshee, hence the "Forshee horse." During this period he was looked upon as a large, strong, handsome business horse, and a remarkably fine traveller, but nobody dreamed that anything fast would ever spring from him, or that he would found a Canadian family. Mr. Munger bought him from Mr. Forshee and sold him to Mr. Dougherty, of St. Catharines, for $400. It was Mr. Dougherty that gave him the name of Royal George. In 1858, W. H. Ashford, of Lewiston, N.Y., bought him and kept him there and at Buffalo two or three years. I think he was again repurchased by Mr. Dougherty, and died at St. Catharines in 1861. There is no tradition of his ever being in a race but once, and that at Hamilton on the ice in 1852, in a contest for a very considerable wager with the famous "State of Maine." Royal George won easily, and was not extended beyond a 2:50 clip.

MAMBRINO CHIEF.

Of the Mambrino stock, only one solitary horse went to Kentucky, that was Mambrino Chief by Mambrino Paymaster by Mambrino by Messenger. Mambrino Chief was the great bonanza to the trotting breeders of Kentucky, and his daughters to this day are sold at fabulous prices. He sired many performers, but the fastest trotter he produced was Lady Thorne, 2:18¼. I understand there is some Mambrino stock in Western Ontario, but I have never seen them. The good results of old pacer Pilot, that was taken to Kentucky from Canada and crossed with the Mambrinos, have been best conveyed through their produce, Mambrino Pilot, the sire of Haunis, (2:18¼). An unusually promising fast trotting four year old stallion of this stock is owned by S. I. Boyd, of Prescott, the only one of that lineage I know of in Eastern Ontario. By the mandate of his owner he is isolated from stud service, but if allowed such privileges he would certainly be a great boon to Ontario horse breeders. We can trace Messenger stock as far as California and Oregon. All the horses that sprung from the Mambrino stock came from Messenger. In the Hambletonian we have the concentration of Messenger united with the English Norfolk trotter, Imported Bellfounder.

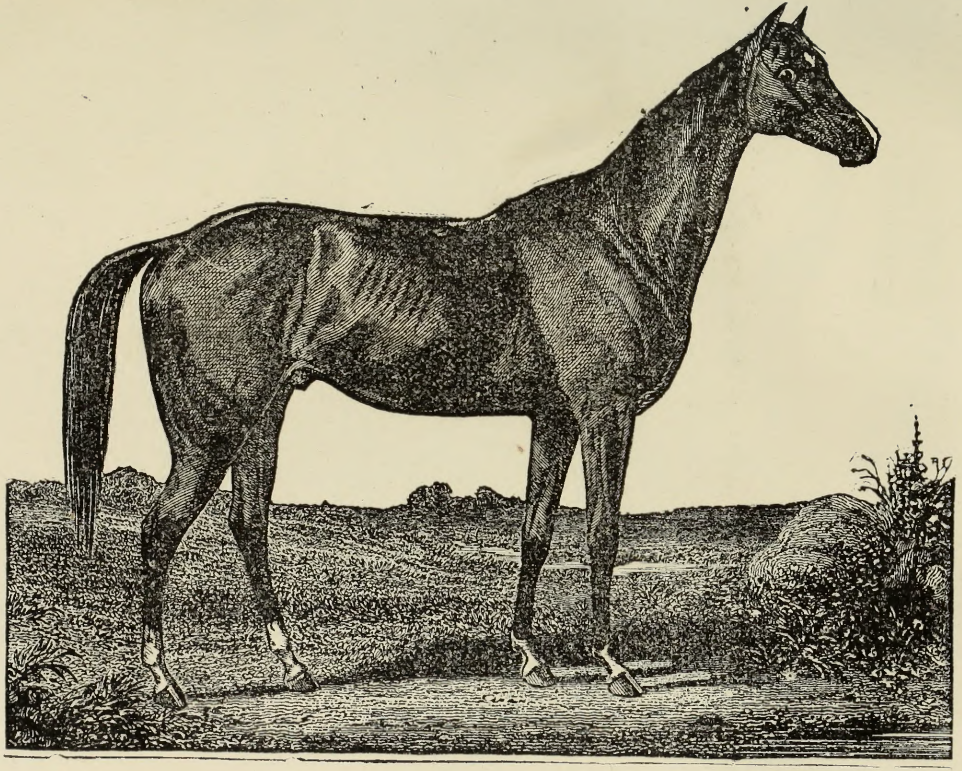
HAMBLETONIAN IN-BRED FROM MESSENGER.

Hambletonian is descended from Messenger both through his mother and his father. He overshadowed everything he touched, and made it purely Messenger. He was the only one horse that was originated in that way. I think him the greatest sire that ever stood for service. He is the great progenitor of the Hambletonian family—the great family, and in the use of the word great I mean not merely great in number, but great in the power to meet and overcome all varieties and combinations of blood, indeed to make trotters without the assistance of any known blood whatever. In the capacity to master whatever is discordant and antagonistic, the family has shown itself eminently powerful. An examination of the tables of 2:30 horses, with their sires, prepared and published by Wallace yearly in his monthly, (a preparation peculiar to this author), is the summing up of all argument as to the merits of this family, and the conclusion they reach, as a demonstration of the truth of the laws of heredity, is beyond the power of the human mind to controvert. The only horse that can be bred in the way Mr. Wiser's horse was bred, is Rysdyk himself.

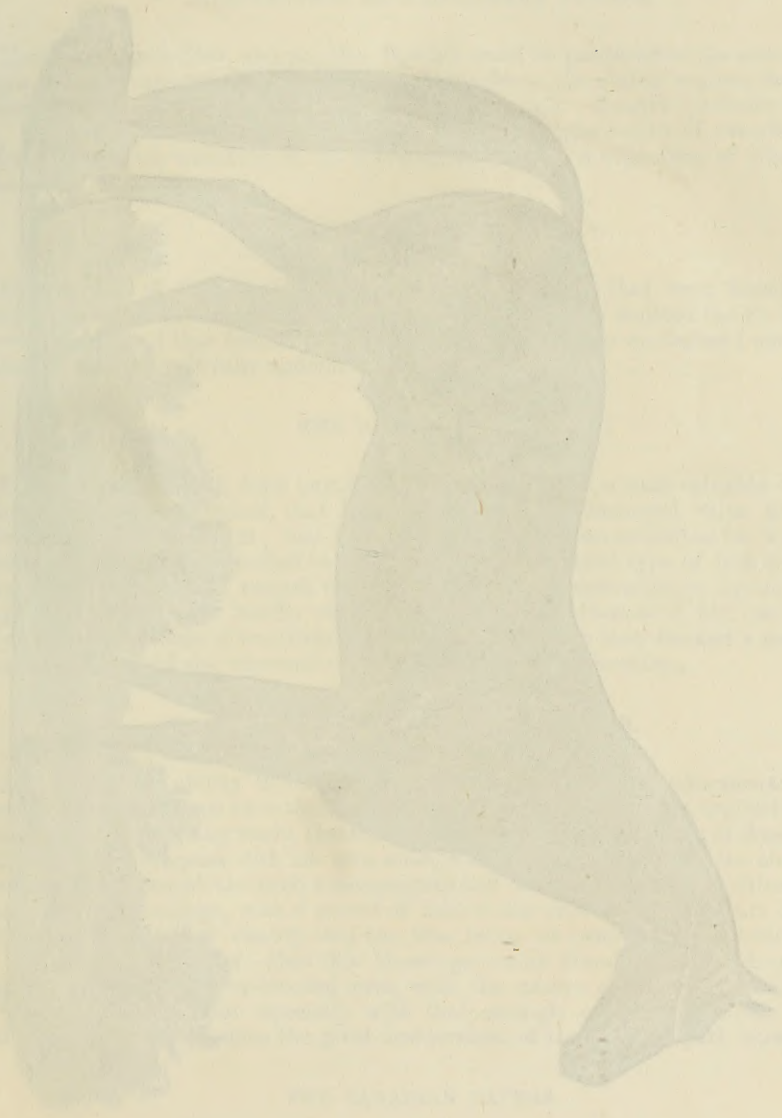
LEXINGTON—THE MOTHER OF RYSDYK.

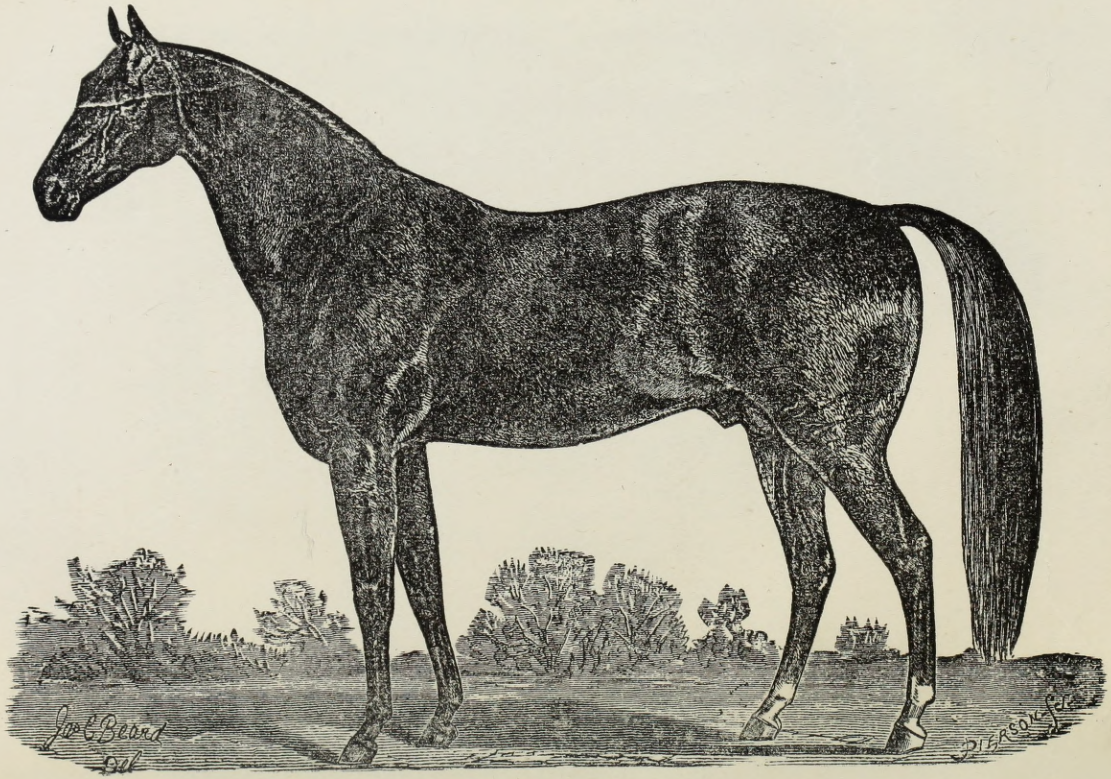
Lexington has produced more winners at the running gait in this country than any other stallion. Lexington's daughter, Lady Duke, from the result of a congress with Rysdyk's Hambletonian, produced Mr. Wiser's Rysdyk. Aristides Welch, of Chestnut Hill, Philadelphia, is probably the most astute breeder of blooded horse stock in the United States, except Alexander, of Kentucky. He goes into the examination of pedigrees systematically and philosophically, and he will breed from nothing but what is pure and has a perceptible line of inheritance. He raised Lady Duke, who was by Lexington, and her pedigree shows that she came directly through Medoc, by American Eclipse, who was out

[*Dr. McMonagle.*]



"LEXINGTON."





"RYSDYK."

of Miller's Damsel, by Messenger. Mr. Welch conceived the idea that if he could incorporate Messenger blood with thoroughbred blood, and further concentrate it with Hambletonian, which was in-bred Messenger, (and when I say in-bred I refer only to sires), he would produce a model horse to breed from. He produced Rysdyk.

RYSDYK—HIS EXTRAORDINARY POWERS.

Hambletonian is dead, and no other Rysdyk could be produced in the same way. This Rysdyk is extraordinary. He has a wealth of muscles in the gluteal regions that is simply immense. He has buttocks on him like a Shorthorn bull. Rysdyk produces true to his type. To a learned man, and a man who studies the philosophy of breeding, he is a wonder. He breeds truthfully to his ancestral inheritance independent of what he meets on the dam's side.

THE PACING ELEMENT.

In speaking of the engrafted Canadian pacing element that were taken from this country, and became prominent in their new homes, I purposely omitted the St. Lawrences, reserving mention of that branch for another paragraph. Allow me before I speak of them in detail to make myself fully understood on

THE PACING PROBLEM.

I have explained that, from imported Messenger in 1788, a most valuable class of fast trotting horses had originated, that had added millions in moneyed value to the horse-breeders of the United States; that their in-breeding had been continued for four, five and six generations, and had resulted in the production of a fixed type of fast trotting turf horses, whose accumulated records of performances when contemplated are so conclusive of superiority that one is hardly willing to believe the evidences of his own senses—a family producing a class of roadsters and gentleman's drivers that demand a market value immeasurably beyond the expectations of the most sanguine breeders.

GOLDSMITH'S MAID A HAMBLETONIAN.

Add to that the ability to train on, and improve in speed and endurance to the bitter end, and to old age, and you have the improved descendants of Messenger, typified in the great phenomenon of the trotting world, Goldsmith's Maid, the progeny of a son of Rysdyk's Hambletonian, from a congress with his own aunt, a daughter of Abdallah, the sire of Hambletonian; the queen of the turf, a campaigner and winner under all conditions, circumstances, and surroundings, with a record of 2:14 to her credit, and 332 heats below 2:30; an animal so tenacious of vitality that she was better at twenty than at twelve years of age. I expressed the belief—that this Messenger—this Hambletonian element properly utilized by the union of pure-blooded sires, with the native element of mixed thoroughbred running descent, and especially with that strongly outlined Canadian breed, the Royal Georges, would produce the great desideratum of the day, the park horse.

THE CANADIAN PACERS.

Besides all these, Ontario has another element of great worth, the pacing element, and an explanation should be gone into of how can it be remuneratively utilized for the benefit of the breeder. Wallace says: "However much the popular impression may have over-estimated the numerical strength of the pacer in Canada it must be conceded it abounds there in considerable force."

[*Dr. McMonagle.*]

TRADITION OF THEIR ORIGIN.

Some very intelligent correspondent a few years ago, gave as a tradition that had been preserved in his family, to the effect that before the Revolution, and perhaps after it, there was an active trade between Canada and Rhode Island, and in the trade the Canadians carried back large numbers of the Narragansett pacers, in exchange for their commodities, and this trade was kept up for years." "The Narragansett was very fast and very famous at the beginning of the eighteenth century, and during the early part of this century was spread through all the English colonies." "They could pace a mile in a little more than two minutes, and a good deal less than three." "Theirs is an inheritance that has come down from a greater antiquity than that of the running horse, and has not perished." Another logical writer says:—"The pacers seem to have come from highly bred families (by high, the writer evidently means continuity of instinct for generations of previous ancestral inheritance) in almost every instance, and from such parent stock have inherited a brain and nerve organism which commands a physical or muscular conformation, adapted to, and capable of executing in a high degree, the dictates of the will that directs it. The same formula of expression will apply to the fast trotter, and thus goes to prove the identity of each in all that relates to physiological or psychological conformation."

PACING AND TROTTING MOVEMENTS INTERCHANGEABLE.

"The trotting motion may be called the diagonal, the pacing the lateral movement, and these two movements are interchangeable. In scores of instances the fast pacer has been changed into the fast trotter. The converted pacer develops into the trotter with little education; the will and consciousness of the horse are already educated, and all that remains to be done, is to give him the same readiness and confidence in the diagonal motion that he had in the lateral motion." The fast pacing sire transmits his quality of speed just as certainly as any other quality; like begets like, "speed begets speed." The law is, therefore, that speed is a quality inherited by the progeny of the fast pacing horse, and whether that progeny pace or trot, speed is their common inheritance.

OLD PILOT'S PERFORMANCES.

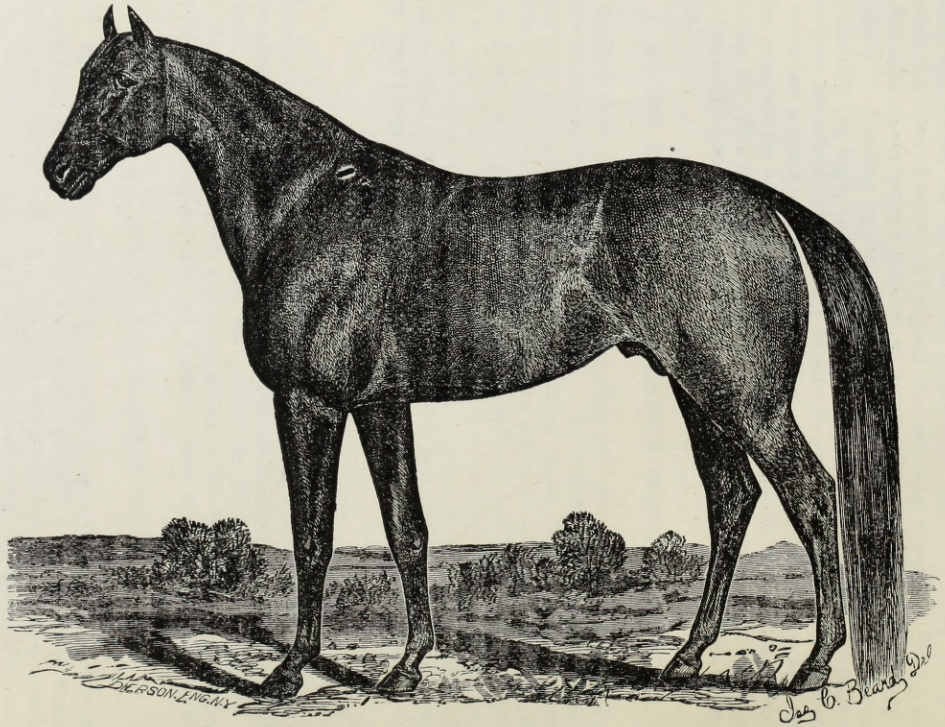
In reference to Canadian pacers the facts are, old Pilot left Canada in a peddling cart and was afterwards developed at both gaits, and showed a purchaser 2:26 with 165 lbs. on his back. He founded a family, and out of the high-bred mare, Nancy Pope, produced Pilot Junior, with his seven representatives in the 2:30 list, his grandson, Tattler, producing two stallions, Indianapolis and Voltaire, each with 2:21 to his credit.

MAUD S., "PILOT," AND HAMBLETONIAN BLOOD.

Maud S., the sensational trotter of this season, a mare that in her four year old form cost America's railway king, W. H. Vanderbilt, $21,000; a mare that trotted a third heat at Chicago, her second race, in 2:13½, and the next week an exhibition trial of a half mile in 1:04½—an achievement simply marvellous—belongs to this family, her dam Miss Russell, being by Pilot Junior. It is worthy of remark that her sire, Harold, is an in-bred Hambletonian; his dam, Enchantress, and his sire, Rysdyk's Hambletonian, being both by Abdallah.

BONESETTER—COPPERBOTTOM, AND OTHERS.

Bonesetter, 2:19, belongs to the same family. Again, the original Copperbottom was taken from Canada as early as 1810 or 1812, and "was the first horse of his type taken to the blue grass region to improve the saddle gait." Mr. Wallace says:—"He left a race of very valuable descendants, going all gaits." Then again, a Canadian, Corbean,



"PHIL SHERIDAN."

sired Corbean, that produced the fast pacer Billy Boyce, 2:14, that did his quarters in thirty-two seconds. Still again, St. Clair, a pacer, 2:35, went from Canada, and through his son, Doc., produced the horse that cost ex-Governor Stanford, of California, $5,000 to purchase, Occident, 2:16¾, the sensational trotter of 1873. The Yellow Jackets, that produced Thos. L. Young, 2:19, and Davy Crocketts, that produced Red Cloud, 2:18, carried with them from Canada the pacing inheritance.

THE COLUMBUSES.

The Columbuses were essentially Canadian, their trotting prepotency greatly intensified through Black Maria, a daughter of Harris' Hambletonian, being the dam of young Columbus, a stallion with six performers in the 2:30 list, and the sire of

PHIL SHERIDAN,

2:26½, with three performers in the 2:30 list; Phil himself, a legally naturalized Canadian, his dam Black Fly, bred at Irish Creek, Ont., being a lineal descendant of old Tippoo, (Phil Sheridan, the sire of Adelaide, 2:19¾, has done stud service in Eastern Ontario, in connection with the Rysdyk Stock Farm, for the last three years, and must in the near future have a perceptibly beneficial effect upon the trotting stock of that section.)

THE BULLOCK HORSE AND HIS PROGENY.

But unquestionably the most valuable of this element that left Canada, was the Bullock horse, a descendant of the Moscow tribe, indigenous sixty miles below Montreal, a horse that was taken from Laprairie to Rouse's Point, thence to Whitehall, where he sired North American, whose trotting inheritance became greatly intensified through his dam being by Harris' Hambletonian, a little gray mare with an injured hip; and doubly intensified in the pacing element, this little gray mare's dam being herself a pacer. The Bullock horse sired the Dalton horse, a chestnut gelding that stood sixteen hands high, pin hipped, and first showed trotting speed in the hands of Mr. Kipp, who sold him to Mr. Tilliston, who nicked his tail. He sold him to Jake Adams for $225, who in turn sold him to Andrew Dalton, who trotted him in races. He was bred at St. Hyacinthe, and looked very much like Old Moscow. He could trot on ice close to twenty, and was driven in a race by D. M. Jenkins in 2:36.

JOE BROWN.

(Allow me the digression to say that Mr. Jenkins is the driver, owner and developer of Joe Brown, a flea-bitten gray stallion of inbred Messenger descent, with forty heats below 2:30 and a record of 2:22 to his credit, a horse that has done extensive stud service in Canada in connection with Rysdyk Stock Farm, and whose potent influence for speed must have an immediate discernable effect on the trotting stock of Eastern Ontario.)

NORTH AMERICAN.

North American was a dark brown horse, strong, 15:3 high, short back, standing erect, firm, straight and with equal pressure on four heavy-boned limbs, and when at ease placed proportionately apart, with mathematical parallelogram precision, coarse head, long full tail, square buttocks, immensely muscled, with a sweeping, wide, open-gaited stride; when at speed, a trotter that did his mile to waggon at Island Park in 2:38, and so tenacious of his gait as to suffer extreme flagellations without leaving his feet. Bay York, a daughter bred by Sam Brady, was sent to Kentucky, and at Woodburn produced Bayard, 2:31¼, at five years old, who in turned sired Emma B., 2:23. Whitehall, a son of North American, produced Rhode Island, 2.23½, whose congress with Belle Brandon by Rys-

[*Dr. McMonagle.*]

dyk's Hambletonian, produced Gov. Sprague, 2:20½ at five years old, the centennial sensational trotter. A daughter of Sebastopol, son of North American, produced Maggie Briggs, 2:27 at five years old. America, by Whitehall, generated Nellie Holcomb, 2:28. Old Lady Rice, by Whitehall, begat Scott's Thomas, 2:21, and Scott's Chief, 2:23. Fanny Jackson, out of Betty Condon uniformly threw trotters to Daniel Lambert, of which the fastest is Aristos, 2:27¾. Ivanhoe *alias* Yankee, that won the twenty mile race against Empire State at Worcester, Mass., was by North American. It is through Lady Waltermire, a trotting daughter of North American, that this Canadian Bullock family has achieved such prominence and importance.

ORIGIN OF CHESTNUT HILL.

Before giving his whole attention to the breeding of the fastest American running winners of the day, that perceptive, keen-minded, astute breeder, stock naturalist, physiologist and psychologist once above referred to as the breeder of Rysdyk, Aristides Welch, bred one other trotting stallion by Rysdyk's Hambletonian, selecting as dam for his purpose this Lady Waltermire, and embodying in their union the two potent elements of trotting speed—the Messenger and the pacing element to the exclusion of the thoroughbred runner—creating a colt that had a natural pacing speed of better than 2:30 to the halter, a representative sire, the *matchless Strathmore;* the sire of Wiser's Chestnut Hill, 2:22, (sold), Steinway two year old, 2:31½, and three year old, 2:25¾, a horse that sold last fall for $13,000, and is doing stud service in California at $300 each for the season; the sire also of Santa Claus with the best five year old record 2:18, also standing for stud service in the State with a large patronage at $500 each for his season's service.

CANADIAN PACING STOCK.

I have thus gone into the subject of the pacing problem at the risk of being irksome, to show to this Commission, that Canada had in abundance, a horse element of centuries of inheritance—probably the only certain element for producing trotters of early maturity at a high rate of speed—an inheritance picked up by our cousin-germans, and utilized in a marked remunerative degree peculiarly, utilized to such prominence in the Bullock family, that $24,999 would not buy Strathmore—an element that if properly husbanded, coupled and crossed by Canadian breeders, cannot help but be immensely productive in profits to the horse-breeding interest of Ontario. Reversing the picture, leads to the inquiry: what have Canadians done heretofore, in cultivating this element? and its consideration brings me to the St. Lawrences.

ST. LAWRENCE.

The origin of this branch of pacing-trotting proclivity was bred near Montreal, taken to New York State in 1848 by W. Prendergrast and sold to Joseph Hall, of Rochester, in 1853, was sold to Mr. January and taken to St. Louis, and there stood for $200 the season, re-sold for $3,500 and taken back to New York State; in 1857 was taken to Michigan and died at Kalamazoo in 1858. St. Lawrence was one of the earliest and most prominent of the Canadian breed brought over, says Wallace, winning very many hotly contested races, and trotting well down in the thirties. It cannot be said he founded a family, but he is certainly very nearly entitled to that distinction. He was a trotter himself and left trotters behind him.

HIS DESCENDANTS.

A noted instance of his ability to transmit his inheritance, was through his son, Kinkead's St. Lawrence, whose daughter Fanny, from the result of a congress with Pilot, jr., produced that famous brood mare at Woodburn Farm, Waterwitch, the dam of Mambrino Gift, 2:20, and Scotland, 2:22½; the double pacing and Canadian element from old

Pilot triply intensified originating the former, and the psychical influence of the thoroughbred runner, imported Bonnie Scotland, on the pacing element, creating the latter. Another son, the Washburn horse, owned until death in Central Ontario, also proved his power of transmitting this inheritance, his progeny, Lady Suffolk, Balmy Bill, St. Lawrence Maid and Lady Jane doing actual campaign turf and ice service low down in the thirties, the latter winning the great five mile race at Mutchmor Park, near Ottawa, in 1873, and St. Lawrence Maid trotting her mile on ice in 2:26.

MOOSE.

It is through the bay gelding Moose, the sensational circuit trotter of 1879, that the Washburn horse transmitted his strongest potency for speed. This great campaigner and winner was a fast trotter from his first debut on the turf, and at the present has obtained a record of 2:20¼, the fastest ever secured by a Canadian-bred horse, and now only equalled by the Royal George mare, Lucy, another wholly Canadian bred, obtained this season. Moose is owned by Robert Young, of Ottawa, and was bred by Mr. McGarr, at present of Smith's Falls. The mother of Moose was a mare brought from New York, formerly owned by John Morrissey, was used for turf purposes, said to be a Trustee mare, and was reputed to be able to show trials of speed as good as 2:34. On her way by the Fall River route by boat from Boston, she was injured in the hip and sent for treatment to Mr. McGarr's brother, a blacksmith and veterinary of New York city. She proved to be permanently injured and was forfeited to Mr. McGarr, who sent her by canal to Oswego, thence to Brockville to his brother near that place, as a gift. Some years ago I went purposely to see the old mare, and thus obtained her history from Mr. McGarr. She, the mother of Moose, 2:20¼; Flora Temple, 2:19¾; and Old Kate, the dam of Wiser's Orient 2:24, were a counterpart, an extra duplicate of each other, as to size, colour, docked tail, make up, appearance, and contour. Old Kate certainly was a pacer, and I felt satisfied they all three were lineal descendants of the long despised, plebeian Narragansett tribe.

CLIPPING HORSES.

Thinking of Moose and his great flight of speed in 1874, in a series of ice races, with various competitors that winter, reminds me of the custom of clipping horses so much in vogue at that time, and even now favourably considered by some. I own to a sense of shame of having denuded my own horses in 1870 and '71. To deprive a horse of his hair, "nature's wise and kind provision," and in winter expose him to "Canada's keen and eager air," is inhuman, barbarous and positively injurious. I have known roadsters never to recuperate from its uncivilized, unfeeling, cruel, savage effects. Nature adapts the coat to the climate and season. Twice in the year the hair of the body of the horse is changed, that of the mane and tail only remaining, the autumn renewal being coarser, thicker, and not so glossy as the spring growth. As moulting is a process, extending over the whole of the skin, and requiring a very considerable expenditure of vital power, the health of the animal is generally affected at these times, especially at the spring shedding. The energy, and nervous vital influence, that should support the whole of the frame is, to a great degree determined to the skin, the animal becomes languid, and unequal to much hard work, prespires greatly, with the least unusual exertion, and if pressed beyond its strength becomes seriously ill.

CLIPPING HORSES IN SPRING USEFUL.

George May, of St. Catharines has the most approved mechanical machinery that I have ever seen in Canada for clipping horses. I learned the lesson of Mr. May in regard to clipping horses in the moulting season. I was at his place in the spring and he was engaged in clipping then. He claimed, argued and logically convinced me that clipping in the moulting season in spring had a beneficial effect. Acting on his advise I have

practised it since, clipping my stud in this latitude about the middle of March, and am fully convinced of its helpful influence to the horse for the next three months.

SISTER TO MOOSE.

But as to Moose, no stock influence can be expected from his loins as he is gelded, but there are however two other channels with almost a similiar inheritance that should be made profitable. From Moose's full sister, "Sister to Moose," owned by D. S. Booth and stabled at the barn of W. H. Comstock, Esq., Mayor of Brockville, great expectations should be realized. These gentlemen are wealthy—a surplus in abundance—and their minds meet in unison in the appreciation of a good horse. Why not utilize for posterity this potent trotting characteristic? What an element to breed to Rysdyk or Volunteer or Strathmore! What a boon a sire of such a lineage would be to horse breeders of central Ontario! One cow accidentally obtained by the perceptive Colling was the basis of the Duchess variety of Shorthorns that has electrified the breeding world for more than eighty years. Why not a family of Booth St. Lawrences? The other channel is yet another combination from a Canadian basis. Was its acquisition accidental, or providential?

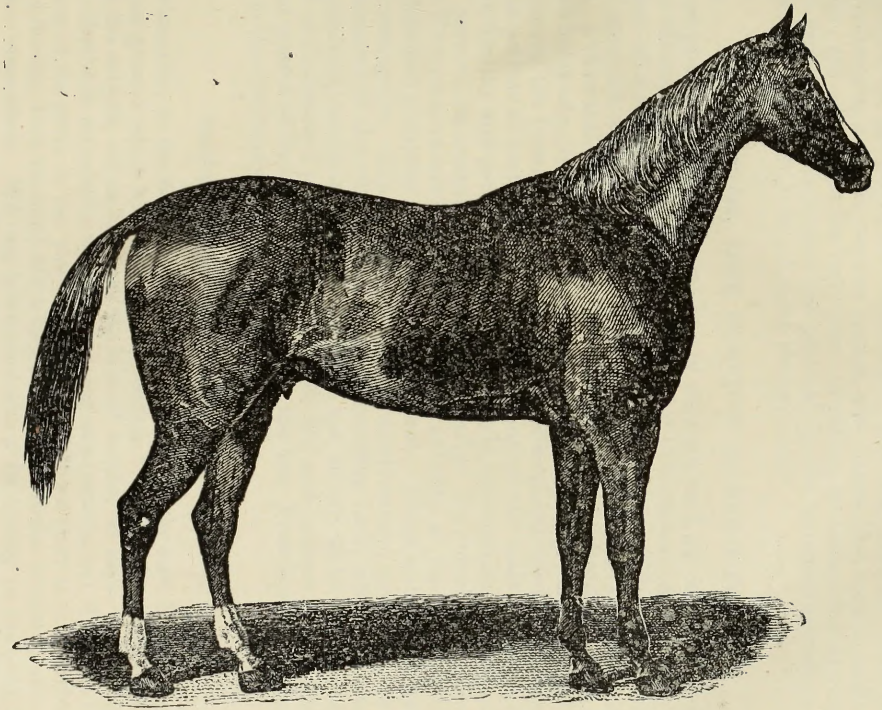
THE ST. LAWRENCE BREED TO BE ENCOURAGED.

St. Lawrence went to Rochester and there produced Ottawa, a trotter, whose daughter Bonny Kate, a trotter, out of a congress with Field's Royal George, produced Geo. Effner, a sire that by a peculiar train of circumstances was taken to Smith's Falls and became the sire of the mother of Moose's last produce, owned by Wood & Loucks, now a four-year old stallion that from his lineage should not be overlooked by the breeders of that section. He cannot help but be an impressive sire. A daughter of Geo. Effner from a congress with Rysdyk produced Royal Rysdyk, owned by Samuel Hollingsworth of Prescott, now two years old, standing 15 2 high, typical in his breeding and representative in his lineage. I should expect him to be a sire of the Park Horse. As an element of speed at the trotting gait the St. Lawrences should be cultivated and encouraged, and the Ontario producer that breeds them to a purpose for speed, cannot help but be financially remunerated.

UTILIZING THE THOROUGHBRED STOCK.

At this juncture I crave the especial attention of the Commission. Almost all, if not all, I have said previously on the subject of breeding is recognized and received by all attentive thinkers on that subject, but I now approach a point at which I might say there is a divergence, two sets of philosophers or theorists, two opinions as to the necessity or non-necessity of a close purely running bred cross to improve the stamina and speed of the trotters. When I said, "I was not favourably impressed with the thoroughbred running horse, because I did not think it could be adapted to the wants of the American people, or made useful to Canada except in a psychical sense as a cross with the pacing element for the production of speed at the trotting gait," I did not wish to be understood as denying the benefits that might, would and could accrue from the use of the English thoroughbred runner, as a sire coupled with his own inheritance. I meant the cultivation of that class of stock was not profitable for the Canadian farmer (considering the market of demand) but only useful, if useful at all, in a psychical sense as a cross in bringing to the fore the latent Canadian pacing inheritance. I address myself to this subject, because its proper understanding and practical utilization is of paramount importance in perfecting the pacing element so as to meet the demand of the present American market, as well as our own Canadian, and ere long probably the English market. The Hambletonian, the Royal George, and the Clear Grit sires can successfully utilize this element and fill the bill, but as Canada has few of this stock and has a supply of the pure thoroughbred English running sires, can the latter be coupled with the pacing element so as to produce good roadsters, fair sized carriage horses and casually fast turf performing trotters?

[*Dr. McMonagle.*]



"BOSTON."

PHYSICAL AND MENTAL CHARACTERISTICS OF THE HORSE.

In considering this horse breeding question we must eliminate the mechanical idea of locomotion. A horse is just as much above a machine as a man is above a machine. He may or he may not have a moral nature, but he has a mental nature, and it is that which wins. The horse has three natural methods of progression— the walk, which is the slowest; the trot or pace, which is the intermediate gait, and may be considered practically the same; and the gallop, which is the fastest of all his methods of movement. These three gifts are natural and common to all horses, whether in a state of domesticity or wild on the plains and pampas of the wilderness. His bony skeleton with its vitalized muscular attachments, and the various organs and tissues that tend to make up a harmonious whole, are adapted at the trot, pace, or gallop, to locomotion at a high rate of speed. This formation I denominate the physical in the contradistinction to his brain, nerve or mental composition, which I name the psychical.

THE HORSE, FROM INCEPTION TO MATURITY.

For a complete and clear understanding of this subject I am constrained to partially impose upon the heretofore kind indulgence of this Commission, and present a synopsis of the creation of a horse from its inception to its maturity; including conception, embryonic life, expulsion, nutrition, assimilation and division into its physical and psychical construction. I have said, that nature in her provision for the reproduction of the species seems to have followed a general law which involves the use of two sets of organs, and that from the organs of the female, an ovum or egg is produced and when fully matured, which occurs only at periods of heat, passes out. The organs of the male produce a fluid which contains (in a healthy and perfect animal) a sperm cell, spermatazoa, or spermule. When the ovum is mature, its contact with even the smallest individual spermule will cause pregnancy. I might have added, in some classes of animals, as the pig and dog, the ova or eggs are detached in masses and a litter is produced. Twins and triplets have each an independent conception. Leaving out of special consideration, *prepotency* or the power to fix the character of the offspring, *reversion* or breeding back, effect of *previous impregna ion*, *imagination*, *accident*, *disease;* and here not strictly to be considered, the effect of *soil*, *food* and *climate*, I pass on to *embryonic life*, and extract from a lecture on the structure and growth of domesticated animals, by the late Professor Louis Agassiz, what is pertinent in this testimony. He says :—

PROFESSOR AGASSIZ ON EMBRYONIC LIFE.

"Unfortunately, in the field upon which I intend to enter now I am only a pioneer; a pioneer upon ground which has hardly been touched." After deploring the absence of authority on the subject, excusable from the lack of means, he says: "We may examine the embryos of rabbits repeatedly without draining our pockets, but if we would study the early condition of the germ in our more valuable animals we meet at once with this almost insuperable difficulty, that we must kill a large number in order to have specimens enough to carry on our researches. We can, however, make a beginning in applying the science of embryology in its present condition to the improvement of our breeds. This has become a matter of importance, not only to the farmers, but to scientific men. The information demanded on the farm must first be worked out, and institutions must be founded and organized in which this work can be done. This is the plain fact; and it is a want which can only be met by gradual and slow degrees. You will see the importance of this investigation if you consider what is at stake, and the advantage you farmers would derive, if you could bring up heifers or bulls, for instance, at your will, or if you could adapt your farming to the kind of soil you have about you. It would change your fortunes and would not only make a material difference to you, but would entirely re-model the conditions of stock raising. It is therefore unquestionably worth your while to remember that the means of making the necessary experiments by which any modifications in the pro-

ducts of our breeding may be brought about, are not at hand. On a former occasion I have already stated before this board that all animals, even the highest—mankind not excepted—are reproduced through eggs, and that those eggs have the same structure throughout the animal kingdom." The learned lecturer then enters lucidly into the subject of eggs, hen's eggs, snapping turtle's eggs, strings of eggs laid by toads in pools of water, fish's eggs, etc., etc., and says: "It is a marvellous process, that of the inner life of the yolk, leading to a result so extraordinary as the formation of a new living being. It is easy to watch the growth of an egg and to bring this process in its successive phases before the eye. You need only place your egg in a breeding-machine, marking the hour at which you put in each egg. You may then know exactly how old the germ is, how long the transformations have been going on, and, as the chronology of this growth is well ascertained, being familiar to embryologists, you can take out of your machine an egg at any stage and examine its condition, knowing beforehand, from the record made of all these facts, in what period of development you will find the germ."

NECESSITY FOR THE STUDY OF EMBRYOLOGY.

"Here is something wonderful! Not only the simplicity of the process by which these changes are brought about, attracts our notice, but still more marvellous is the fact that all this goes on from within. There is a principle acting by the aid of the substance which holds it, never deviating from its course, and always leading to reproduction of a being like the parent. How that influence from the parent is transmitted, there and then, how and what the nature of that transmission or that impression is, stamping, as it were, the new being so indelibly with the character of its parents, sometimes with their idiosyncrasies, with those family features, in short, or those features of breed, etc., belonging to the individual—these are matters about which we know nothing whatever These are the questions we must now study, by attempting more refined investigations than those which we have been able to carry on to this day We must try to seize the moment when these peculiarities are imparted to the new being, in order to know how to influence reproduction at that time; for unless it be done then, it can never be done. It is by a knowledge of what takes place there and then, under those circumstances alone, that we can hope to have any influence upon the reproduction of our domesticated animals.

I think I have shown you plainly enough that our farmers must study embryology; at least, those of them who mean to influence and improve the raising of stock, and impart their knowledge to their fellow workers. Of course it is not expected that every farmer should be able to analyze the products of the farm chemically, but let there be in the agricultural college one who can do it well. It is not expected that every farmer should learn the use of the microscope, and to make physiological experiments; but let there be in the land, in some institution at least, one man who knows how these things should be done, and who is placed in a position to do them. This is not the case now. When we have that man, we shall be prepared to talk of improvements in stock-breeding, not before."

MUSCULAR CONFORMATION.

Expulsion, parturition, needs no description. Taking the digestive process in its highest degree of complexity in the mammalia, we find there is provision, first for the *prehension* of food; secondly, for its mechanical division and comminution, *mastication,* and for its admixture with a peculiar fluid, *insalivation;* thirdly, for the conveyance of the food into that portion of the alimentary canal in which its principal chemical changes are to take place, *deglutition;* fourthly for the solution and reduction of the food preparatory to its being brought into a condition favourable to absorption, *chymification;* fifthly, for the separation of a material which shall contain in a condensed form the chief nutritive principles of the food and which is easily absorbed into the blood, *chylification.* The assimilation of this lacteal-like production by the various tissues of the body as it is conveyed to them through the arteries and veins constitutes growth; thus we produce a mature horse. I shall not consider the bony, cartilagenous, muscular, physical conformation but proceed to the *psychical.*

[*Dr. McMonagle.*]

THE PSYCHICAL CONFORMATION.

In the vertebrate or backbone animals, an osseous or cartilagenous column, composed of several pieces, united by amphiarthrosis, forms the principal support or bond of connexion for the other parts of the trunk. This column encloses a canal within which is placed that portion of the nervous centre called the *spinal cord*, or *marrow* with some few nerves. At its anterior or upper extremity, the component pieces of the column are so modified as to form a dilated cavity, the *cranium* or head in which another portion of the central nervous system, *the brain*, with part of the nerves connected with it, is contained. The brain and spinal cord, then, in the vertebrate classes, form a central axis, with which all the other parts are connected, and this cerebro-spinal axis, with the nerves pertaining to it, constitute the greatest portion of the nervous system. The spinal cord sends out nerves, or telegraph wires, which supply the muscles and integuments of at least nine-tenths of the whole body, viz.: the neck, the trunk and the extremities. All these parts of the body are endowed with two very remarkable properties, the exercise of which depends directly or indirectly upon the integrity and activity of the spinal cord, the power of sensation and the power of motion, and both these properties are said to reside in the nervous system. The peculiar animal nerve matter through the agency of which psychical phenomena take place, is found in two forms, and when these two kinds of nerve matter are united together in a mass of variable size, the body so formed is called a *nervous centre*, and the threads or telegraph wires of fibrous matter which pass to and from it are called *nerves*. Nerves are said to *arise*, or have their *origin* in the nervous centre, to which they are on the one hand attached, and to *terminate* or *be distributed* among the elements of the various textures, on the other hand. We call a nerve *cerebral*, if it be connected at its origin with some part of the nervous mass within the cranium, and *spinal* if its apparent origin be from the spinal cord. The *sympathetic* nervous system is made up of smaller nerve centres called *ganglions*, and possesses many peculiarities, both in its composition, in its arrangements, and in its connection with the organs among which its nerves ramify.

THE NERVOUS SYSTEM.

The nervous system then, in the vertebrate series, consists of the brain, spinal cord, and the nerves or telegraph wires associated therewith, the cerebro-spinal system, and that double chain of ganglia, the sympathetic or ganglionic system. The function of *innervation* or electricity is effected through the medium of the nervous system, which, ramified throughout the body and connected with and passing between the various organs, serves them as a bond of union with each other, as well as with the sentient or mental principle of the animal. The mind influences corporeal organs through the instrumentality of this system, and certain changes in the organs of textures of the body affect the mind through the same channel. In this way the nervous system becomes the main agent in what has been called the life of relation. For every ordinary voluntary action, the first step is a mental change, in which consists the act of volition. If the mind directs its influence on certain muscles the contraction of those muscles immediately ensues, in a combined and regular manner, so as to produce the predetermined voluntary action, but this influence cannot be brought to bear upon the muscles save through the intervention of the nerves. Mental change produces bodily action; an impression upon some part of the body precedes and gives rise to an affection of the mind. Nervous power is called forth and acts in the direction from mind to body, and from body to mind. The muscles may be sound, the will may be vigorous, but without perfect nerves the latter cannot impart its mandates to the former. I have compared nervous force to electricity, and referred only to its conveying results, to and from, using the word telegraph wires as an illustration only, understanding however enough of its mode of operation to know that it is not identical with the forces of chemical affinity, of mechanical action, or of electricity. Such is the psychical, the brain, the nerve, the mental force, in contradistinction to the physical or muscular power.

[*Dr. McMonagle.*]

EFFECTS OF COUPLING THE THOROUGHBRED WITH THE PACING ELEMENT.

In applying the efforts I have just advanced, I do not wish to be understood as having reference to the converted pacers proper, performers that have a fleet recognizable inheritance of a family characteristic, and that through their ancestors have a remote cross of the thoroughbred runner two or three or more removes back. That they often prove individually valuable turf performers, and susceptible of conversion is granted, of which Lula, 2:15; Smuggler, 2:15¼; Amy B., 2:19½; Etta Jones, 2:20; and Blue Bell as a sire, might be considered typical. I refer to antagonistic elements, types, and characteristics, to the English thoroughbred runner as contrasted with the pacer,—the terrier as contrasted with the greyhound. To Mr. Ballantyne I have said "never attempt to contradict nature by violent and unnatural crosses. All extreme crosses fail to produce satisfactory results, and the more violent the cross the more uncertainty there is in approximating what will be the character of the offspring." Now I want to introduce to your notice the sequence of some violent and extreme crosses, resulting from the coupling of the thoroughbred runner, with the pacing element. Perhaps the exceptions strengthen the rule.

THE DIFFERENCES PSYCHICAL NOT PHYSICAL.

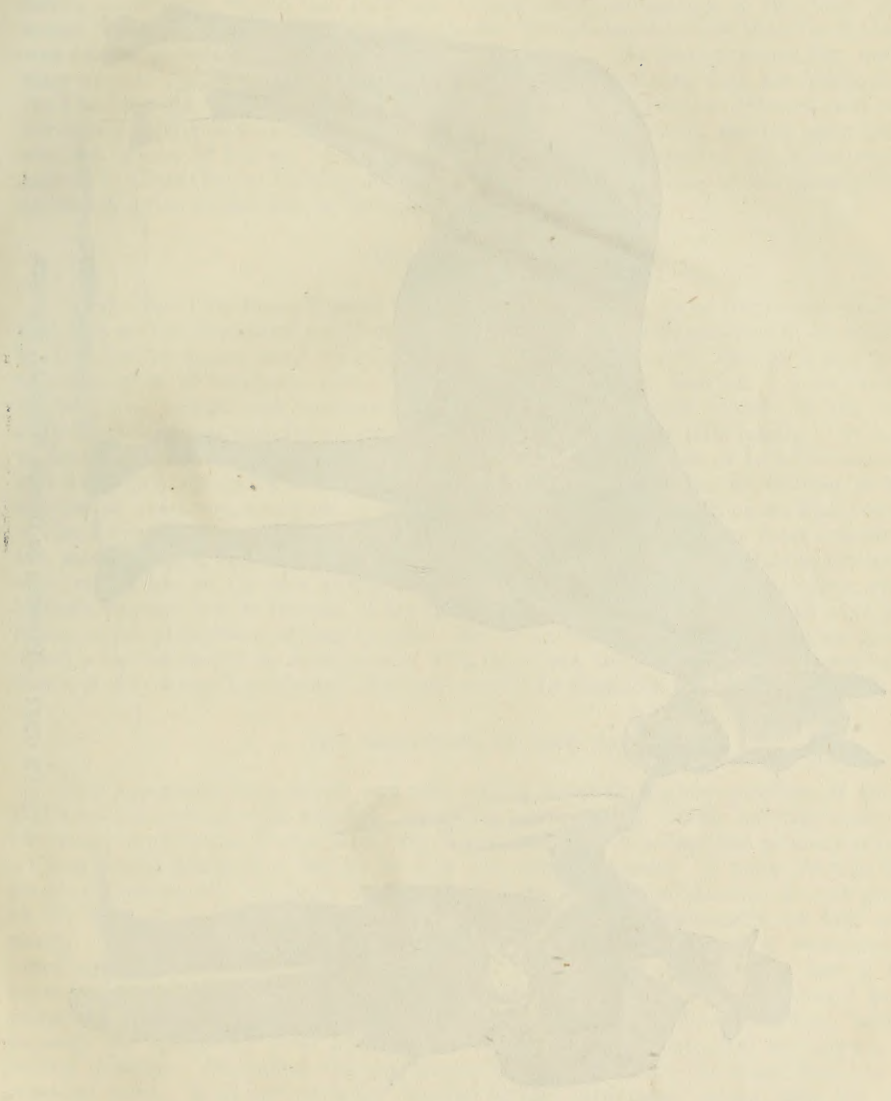
Habits of action may be created and established by training and use, and these habits become an instinct in the descendants, and the changes thus wrought are psychical not physical. The English thoroughbred runner has been bred for the purpose of speed at the gallop for a series of generations until his habits, types and characteristic have become instinctive. "Instinct is the sum of inherited habits." This type of horse has been so long bred as a runner that in his colthood, when danger approaches, he instinctively springs into the gallop as his fastest means of escape. Psychically, this is his mental means of generating locomotion for safety, and he instinctively seeks it when he wishes to attain his highest rate of speed. It has been truthfully said, "in all the world there is no evidence that the thoroughbred running horse ever was able to trot a mile in less than three minutes." The pacer has an inheritance that has come down from a greater antiquity than that of the running horse; they could pace a mile in a little more than two minutes and a good deal less than three. For self preservation they instinctively fly from danger at the lateral movement. Psychically this is their mental means of generating locomotion for safety, and they instinctively seek it when they wish to attain their highest rate of speed. It is safe to say, if pacers could be made run, they could not cover a mile in less than three minutes.

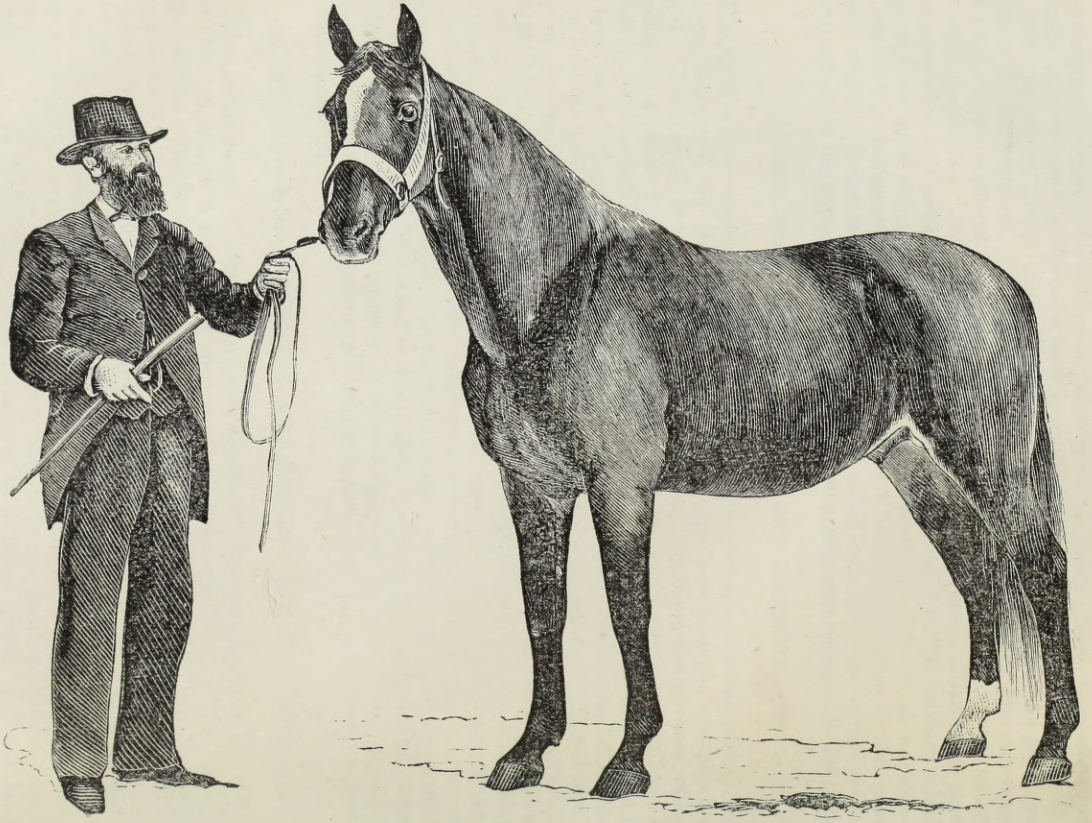
COMMINGLING OF THE PACING AND RUNNING ELEMENTS—RESULTS

What is the result of commingling such elements? The running bred horse Rifleman, son of Glencoe, out of a congress with a mare of unknown blood, produced Col. Lewis, 2:18¾. When being broken to harness he showed a disposition to pace, and afterwards performed at that gait in 2:24. The owner of his dam, Truckee John, says Col. Lewis was a very fast natural pacer, that he got that from his dam, although she was not a confirmed pacer but simply double-gaited. Scotland, 2:22½, was sired by Imported Bonnie Scotland, his dam being the famous blood mare Waterwich, that I have before shown possessed the double Canadian pacing element through Pilot, jr., and St. Lawrence. The thoroughbred Exchequer, out of a congress with a pacing mare, produced Lucille, 2:21. Commodore, a son of Boston, out of a congress with Dairy Maid, by Black Hawk, produced Tennessee; 2:27, but in this case the grand dam was an inbred Messenger. Roscoe produced Wizz, 2:24, and imported Lapidist sired Clear Grit, about 2:35, who in turn sired Amber, 2:25¾.

THE CLEAR GRITS.

It is safe to assert that the above are all the thoroughbred running horses that ever sired trotting horses in this broad America. I do not recall to mind now an instance that the





"CLEAR GRIT"—Property of George Whiteley, Seaforth.

produce of the union of these two extreme elements ever conveyed or transmitted any inheritance worthy of record, except this new family—this Canadian family—the Clear Grits (significant); and so far as records go to show, the preponderance of evidence as to Amber's speed rests with the dam, which was by Royal Revenge, a sire that has stereotyped his family escutcheon within the 2:30 list. I am under obligation to Mr. Geo. Tumlin, a dealer in horses, of 56 George St., Toronto, for the information that the dam of Clear Grit was double gaited, ambled, racked, paced and trotted. He had examined her, and at one time went to purchase the old mare, when he became acquainted with her habits of action. As I understand it, she was bred by Mr William Thompson or Johnson, not far from Toronto (fighting Bill Thompson if I recollect the verbiage used), and the same gentleman was the breeder of her son by Lapidist. The historical sequel of the inheritance transmitted by Clear Grit to his progeny fully corroborates Mr. Tumlin in his description of the habits of action of the dam of his stallion.

CLEAR GRIT A PACER.

That Clear Grit himself paced is a matter of notoriety, as he frequently exercised in that gait on the Brantford track when owned by Mr. Mitchell, and had to be weighted on his fore feet to square away his gait to a trot. The groom of St. Patrick is my informant as to the mode of weighting both Clear Grit and his son St. Patrick. I am indebted to the very able special turf correspondent of the Toronto "Daily Globe" in the issues of July 12 and 14 last past for an extended history of the Clear Grit family. It is useless to deny—nobody denies—every Canadian rejoices—that this son of Lapidist conveys (he still lives) to his progeny a valuable inheritance of speed that can be utilized in the production of roadsters, gentlemen's drivers and turf performers. When we find two strains of blood combined in a trotting horse, in about equal proportions, we must consider these two strains singly, and determine what each has done of itself in producing trotters. If each strain has in its own strength and without the assistance of the other, produced trotters, we are then at the end of the investigation, and conclude that both were positive forces in the production of that trotter. But if we find that one of the strains never produced a trotter except in combination with the other, then we may justly conclude that strain is only a negative element and may as well be displaced for something else.

THE SEQUENCE OF THE FACTS.

This appears to be a sound and safe rule in determining any question of this class. Did Lapidist ever produce another horse that trotted fast? After carefully studying all the racing experiences of over a century, I am compelled to accept the primary truth that a horse cannot transmit a faculty he does not himself possess. I have learned to quit framing theories till we have first studied facts, and if the theories do not grow out of the facts, it is bad for the theories. Like begets like psychically as well as physically. This axiom is the life and soul of all pedigrees, and if it were not true, breeding in every instance would be merely the result of chance. The law of inheritance is as true as the law of gravitation. Sometimes a sire may transmit his own physical likeness in great strength, and other times his psychical likeness, habits, or capacity for speed, but it is not true that the psychical and physical are always transmitted together. Sometimes the one predominates, sometimes the other from the same identical mare. It is not probably doubted by any intelligent person, that the mental habits and employments of the mother has a strong influence in shaping the mental aptitude of the fœtus in her womb. The tastes, inclinations, and tendencies are just as surely transmitted as the physical resemblances. The pacer has an inheritance that has come down from a greater antiquity than the running horse, and it cannot be logically maintained to the contrary, but that Mr. Thompson's old mare overshadowed Lapidist, and psychically, independently, transmitted her Narragansett inheritance to her son Clear Grit, Lapidist arousing her previous ancestral inheritance and securing a fixity and firmness of type.

[*Dr. McMonagle.*]

HEAVY WEIGHTED SHOES.

The *Globe* correspondent referred to says:—"In the summer of 1876, St. Patrick, a five-year-old son of Clear Grit, trotted in remarkably good form at Woodbine Park, and in 1877 shows a trial over Cleveland track in 2:22. He subsequently went wrong temporarily, and has not since distinguished himself on the turf." (My education in regard to weighting pacers intentionally for speed and conversion of their gait, is to discard the too prevalent use of twenty-four ounce shoes, with twelve ounces of packed sheet lead on each fore foot; a common sized shoe with six, eight, or ten ounce toe weight, having all the weight simply at the toe, results eventually in squaring a pacer to a trot. Give him time and training with that properly adjusted weight, or less, and you will be rewarded for your patience. Smuggler was said to have been ruined for turf purposes by the continuous application of the heavy weight theory).

ST PATRICK.

St. Patrick was gifted with a fast flight of trotting speed, as is shown by the record; when at Buffalo, in a field of eleven starters, in the third and fourth heats, he was a good second in 2:25½ and 2:27¼. I understand his dam was the mare once before referred to, St. Lawrence Maid, by the Washburn horse. Amber, another son of Clear Grit, has a record of 2:25¾, and is a reliable peformer. His dam was of Royal George lineage, being by Royal Revenge, a sire with three performers in the 2:30 list.

THE CLEAR GRITS AS TROTTERS.

The correspondent of the *Globe* enumerated a large company of the get of Clear Grit in Western Ontario, that are worthy of distinction as trotting performers, and closes a very able resumé thus:—

"So much for the Clear Grits in Brantford and vicinity, but they are scattered over Western Ontario in great numbers, and many of them are very promising. The Hamilton pacer, Dan, shows a strong inclination to trot, and exhibits a splendid gait in that way of going. All the descendants of Clear Grit have nearly the same way of going. With the exception of a few pacers they are wonderfully pure gaited, and travel wide behind like Amber. They are all long, open striders, nearly all of them are blood-like and stylish in appearance, all that have done anything on the turf have proved themselves stayers of the staunchest type, and in short it appears to me that they are just what is required to cross with the descendants of Old Messenger." This correspondent affirms whereof he knows, and he speaks positively as to some of Clear Grit's progeny being pacers. There can be no truth in the law of heredity if the dam of Clear Grit had not a pacing inheritance.

"HITS" IN BREEDING.

That association of ideas implied in the term "hit," in common parlance among breeders, occur to me at this moment, and I think reference should be made to it. A "hit" in breeding is understood to be an instance of success. There is no marvel or mystery about it, as I understand it.

SIX AXIOMS—RECAPITULATION.

Walsh in his epitome of the laws which govern the generation of mammalia, promulgated his conclusions in sixteen axioms, the first six of which I quote. In substance I have explained them before, and it may seem recapitulatory; but as a correct knowledge of the very first beginnings of the facts of generation is absolutely essential to the

comprehension of the principles of breeding, I hope this further consideration as applied to a "hit" will not be uninteresting.

1. The union of the sexes is, in all the higher animals, necessary for reproduction; the male and female each taking their respective share.

2. The office of the male is to secrete the *semen* in the *testes*, and emit it into the *uterus* of the female (in or near which organ), it comes in contact with the *ovum* of the female—which remains sterile without it.

3. The Female forms the *ovum* in the *ovary*, and at regular times, varying in different animals, this descends into the *uterus*, for the purpose of fructification on receiving the stimulus and addition of the *sperm cell* of the semen.

5. The Semen consists of two portions—the *spermatozoa*, which have an automatic power of moving from place to place, by which quality it is believed that the semen is carried to the ovum; and the *sperm cells* which are intended to co-operate with the *germ cell* of the ovum in forming the embryo.

5. The Ovum consists of the *germ cell*, intended to form part of the embryo—and of the *yolk*, which nourishes both, until the vessels of the mother take upon themselves the task; or, in oviparous animals, till hatching takes place, and external food is to be obtained. The ovum is carried down by the contractile power of the fallopian tubes from the ovary to the uterus, and hence it does not require automatic particles like the semen.

6. The Embryo, or young animal, is the result of the contact of the *semen* with the *ovum*, immediately after which the *sperm cell* of the former is absorbed into the *germ cell* of the latter. Upon this a tendency to increase or "grow" is established, supported at first, by the nutriment contained in the yolk of the ovum, until the embryo has attached itself to the walls of the uterus, from which it afterwards absorbs its nourishment by the intervention of the *placenta*.

The eggs are supplied by the female from the interior of certain organs situated in the abdominal cavity, called the ovaries. The egg is simply an organized body, growing in the ovary, like a tooth in its follicle, and forming a constituent part of the body of the female. It is destined to be finally separated from its attachments and thrown off.

1st. Eggs exist originally in the ovaries of all animals as part of their natural structure.

2nd. These eggs become more fully developed at a certain age, when the generative function is about to be established.

3rd. Successive crops of eggs in the adult female, ripen and discharge independently of sexual intercourse.

4th. The ripening and discharge of the egg are accompanied by a peculiar condition of the entire system, known as the "rutting" or "œstruation."

It is a remarkable fact in this connection, that the female will allow the approaches of the male only during or immediately after the œstrual period; that is, just when the egg is recently discharged and ready for impregnation. At other times, when sexual intercourse would be necessarily fruitless, the instinct of the animal leads her to avoid it, and the concourse of the sexes is accordingly made to correspond in time, with the maturity of the egg and its aptitude for fecundation.

5th. The spermatozoa are produced in certain glandular-looking organs, the *testicles*, which are characteristic of the male, as the ovaries are characteristic of the female. The name spermatozoa has been given to these bodies, on account of their exhibiting under the microscope a very active and continuous movement, and this movement in many species of animals resembles that of the tadpole; the tail-like filament keeps up a constant lateral or vibratory movement by which the spermatozoon is driven from place to place in the spermatic fluid, just as the fish or tadpole is propelled through the water, the propulsion, according to Henle, being at the rate of one inch in seven minutes and a half. In the quadrupeds, accordingly, and in the human species, the contact of the sperm with the egg, and the fecundation of the latter take place in the generative passages of the female.

To make myself correctly understood at this point I wish to illustrate the anatomy

of the parts by comparing the female organs to a fort, surrounded on all sides, so as to be impregnable or enterable only through one small opening, gateway, or passage, and densely filled inside with eggs or ova. On the outside of this fort or parade ground or *vagina* you will in imagination place a numerous company of spermatozoa. The immediate function of the spermatozoa is to wiggle or press themselves through the small opening, gateway, or *os uteri*, to meet the ova within the fort or *fundis uteri*. The successful self-propulsion of one spermatozoon up to and through the cervix or gateway, and its permeating contact with an ovum produces fecundation, and a new being results.

The impressive, generative or sperm power of a sire is made up of a variety of numerous individual separations, or parts or spermules, each having an independent mission of its own, and each possessing a renewal power delegated to it from its ancestors, conveyed to and impressed upon it by a line of heredity of untold preceding generations; a mission of its own, that confines it to a truthful reproduction of its ancestry in transmitting the instincts, the habits, the customs, the psychical and physical properties, propensities, constituents and abilities, not of a combined effort of its ancestry, but each isolated spermule, representing and reproducing the sympathies, proclivities and idiosyncracies of its individual ancestor for countless preceding generations. The same formula of expression applied to the female germ cell, or ovum, or egg, is indicative of the mission and potency of the dam in her allotted department in propagating the species.

In the germ cell and sperm cell, I have explained to your Commission, nature's means to an end, "but there is a principle acting by the aid of the substance which holds it, and an influence from the parentage is transmitted, then and there, but how and what the nature of that transmission or impression is, stamping as it were the new being so indelibly with the character of its ancestry, sometimes with their idiosyncracies, with their family features in short, or those features, etc., belonging to the individual—these are matters about which we know nothing whatever."

By rejection, elimination, and selection, it is within the power of man to purify and bring to a given degree of oneness, and similarity, the germ cell and the sperm cell of the animal economy. By elimination for many previous generations, the thoroughbred runner has been brought to his present high form and oneness of power in his sperm proclivities, until it is a matter of certainty that its contact with the germ cell of equal like potency, purified in the dam in as many previous generations, will result in the reproduction of a progeny with habits, customs and instincts, so exact as to be computed with accuracy as to its psychical (pronounced sigh-kick-el, dwelling on the sigh) or physical power.

PREFERENTIAL AFFINITY.

You will be fully prepared now to understand my definition of the term "hit." When the progeny of a given ancestry, say a son and daughter of Messenger, are separated into two branches, diverging from each other for five or six, or even ten generations, and the sperm cells and the germ cells of the two radiating lines after this separation for a series of years, are brought in contact by coition—although in the numerous company of the germ and sperm cells there may be only a few that have retained and preserved a direct lineage from the first given ancestry—their kindred cells have a preferential affinity or desire for each other, and unite, to the exclusion of all other cells, generating in pristine force a reproduction of the first given ancestry, producing in action or power, a result not observable in the five or six intermediate generations, and only taken notice of because of its superiority to its immediate ancestors, an instance of success, a "hit." It is neither marvellous, mysterious nor miraculous, but simply philosophical and physiological.

My attention, in the first part of this delivery, was in a great measure applied to the origination of the Park Horse, endeavouring to show how he could be best produced by the utilization of the elements contained in Canada, aiming to infiltrate through the whole discourse the principles of breeding, and explaining logically upon what physiological basis these principles rested. In the consideration of these primordial tenets, I was necessarily drawn into the pacing element, in the explanation of which the psychical in contradi-

[*Dr. McMonagle.*]

tinction to physical force had to be elucidated, an element, whose study, historically, it must readily be observed, can only be utilized in the production of fast trotting horses, fast roadsters and very fast gentlemen's drivers.

CONCLUSIONS—THE SUM OF THE WHOLE MATTER.

I come to the following conclusions :—

1st. That Canada has an abundance of the pacing element. (I know of localities where every third horse is a pacer.)

2nd. That the pacing or lateral movement is substantially the trotting or diagonal motion, and that the two movements are interchangeable.

3rd. That in the use of a brood mare of this element, it is not necessary she should be a fast pacing performer, but simply, double gaited, an ambler, pacer, racker, or single footer, sufficient to positively indicate her line of inheritance.

4th. That of Canadian horses considered in the aggregate, this pacing element furnishes the maximum basis for success in producing uniformity when coupled with the Hambletonian, the Royal George, and Clear Grit sires, the greatest number of roadsters and gentlemen's drivers.

5th. That very fast profitable turf performers and campaigners are only obtainable from the Messenger—the Hambletonian element—either inbred or coupled with the Royal Georges and the Clear Grits.

6th. That the Royal Georges are purely Canadian, have attained a high rate of speed, have size, form, velocity, longevity, and a type that leads to permanency in the family, are firm in their characteristics, undying in their habits, and have continuously held their ancestral heredity in spite of all opposition, in fact without any concentrated efforts to purify them as a family.

7th. That the Clear Grit is a new family, positively Canadian, with a trotting potency derived from the pacing element, and for its continuation and retention it should be at once crossed with the Royal Georges and the Hambletonians. (Clear Grit is doing stud service yet, and to make use of his power and inheritance, he should be coupled with such a brood mare as Wiser's Jennie Rysdyk, whose sire and dam are both by the great trotting sire, Rysdyk's Hambletonian. One, or two, or three male progeny of such a lineage would confer incomputable benefits upon future Canadians.)

8th. That when breeders possess the pacing element, which is abundant, and cannot secure the services of Hambletonian, Royal George, or Clear Grit sires, which are scarce, the thoroughbred English running sire could be crossed with such pacing brood mares with an expectation of probable success in producing roadsters and drivers.

FINAL ADVICE.

Allow me in concluding to urge upon all *to breed for a specific purpose.* If you have the Clydesdale or the Percheron, don't seek to convert him into a race horse. If you have the race horse go to the richest inheritance of racing blood. If you have the trotter and you are breeding for trotting speed, seek to combine in him the best and fastest trotting crosses, and if you would produce the elegant park and coach horse, look neither to the puller, the racer, nor the pacer, but only to the horse that possesses the qualities you seek to propagate. It is a point of the utmost practical importance, to breed such a tpye of horses that if he fails to be a flyer, he will command a good round price for his action, style, and symmetry. To secure these in their most perfect development we must have recourse to large, sound, and highly-finished thoroughbred sires.

Shakespeare says :—

"Look what a horse should have :—
Round hoof'd, short jointed, fetlocks shag and long.
Broad breast, full eyes, small head, and nostril wide.
High crest, short ears, straight legs, and passing strong.
Thin mane, thick tail, broad buttock, tender hide.
In shape, in courage, colour, pace and bone.
So did this horse excel a common one."

[*Dr. McMonagle.*]

In commenting on the production of the fast turf trotting performer, I have frequently quoted, without credit, from a new thinker on the subject, "My Father's Son," a meditator who shunts himself clear from the old graded track of preconceived ideas, and boldly asserts the subjoined axiom :—"Early matured trotting habits, and trotting action, at a high rate of speed, alone, have their origin and propagation in the pacing element, of which the most potent is that which uniformly and continuously coalesces with the thoroughbred runner, best (probably only can be.—McM.) exemplified as shown by Messenger and his descendants, utilizing for successive generations with increasing speed-ratio this convertible element, *amalgamating by coition the physical* instincts of the new union with the speed power of their own progenitors, resulting in a combined transformation of a lateral to a diagonal motion, the progeny of which through the retention of the fittest will create a new *genus*, from whose inbred produce the near future may confidently anticipate the new-born, early-maturing, swift-footed thoroughbred trotter."

SUGGESTION FOR AN ONTARIO STOCK REGISTER.

It will be readily observed by this Commission, that, to impart confidence in the matter of blooded stock of any kind a system of registration must be presented founded on a basis of authority and knowledge. As I have in this testimony frequently referred to various systems of registration promulgated by as many variety of interests, and as Ontario has hitherto never enjoyed any mode of distinct record of all classes of blooded animals, I would request a further privilege to summarize my views in reference to its interests for the protection, distinction, and recognition of its distinguished stock. For a series of years I have enjoyed frequent conversations with one of the most perceptive stock breeders in my section, intuitive in the ability to comprehend all that tends to make up a representative animal, a gentleman who for forty years has made the subject a lesson of private study, and evolved from his knowledge of purchase and improvement, at a yearly handling of not less than a thousand beeves for the English market—a financial success,—a gentleman as proprietor of the Rysdyk Stock Farm, emphatically the trotting horse breeder of the Dominion; I refer to one of your Commissioners, J. P. Wiser, M.P. ; I say I have been edified in discussions with that gentlemen on breeding and registration ; our minds harmonize on the subject, and I believe our views are in unison on the following summary :—

ENLARGE THE CANADIAN HERD BOOK.

Recognizing fully the freedom of the citizen, "'tis liberty alone that gives to life its lustre and perfume," I say breed as you choose. If you desire to breed impurely to mongrels and to grades, "go in;" but I wish to instruct you how to leave a better legacy to posterity. I would utilize the present Canadian Herd Book, and call for an addition to it of all sires at present in use in the Dominion, horses, cattle, sheep and swine, stallions, bulls, rams and boars, to be registered at an expense of not more than four dollars for each registration, viz.. two dollars for registration, and two dollars for an official recognition by a return certificate to the owner of the stock. I would denominate that a basis for commencement. The *Country Gentleman* of a late date says: "We have received Volume Fourth (Part I—Bulls) of the Canadian Short-Horn Herd Book, edited by the Secretary of the Agricultural and Arts Association of Ontario. It is a volume of 500 pages, containing 2,050 pedigrees, which is somewhat more than its immediate predecessors, and carries the total number up to 6,559. It contains no preface or introductory remarks of any kind, but we suppose the second part of the volume, devoted to cows, will soon be issued separately—being the first time it has been found desirable to divide the work in this way. The execution of the book is in all respects creditable, mechanically, and we do not doubt the editorial labour devoted to its contents has been carefully performed."

A BOARD OF CENSORS.

Out of that basis eventually I would originate an Ontario Stock Register, Vol I.—[*Dr. McMonagle.*]

That I would have absolutely under the control of gentlemen called a board of Censors, appointed by the authority of the land, vacancies to be filled by power delegated to the said Board from the same authority.

DIVISION OF THE REGISTER.

I would recommend to the Board of Censors, that the Ontario Stock Register be divided into two compartments, standa d and appendix or non-standard. Under the head of standard nothing should be admitted but what would fully come up to and fill all requisites demanded by the board of Censors for registration in each and every class of stock.

STANDARD AND NON-STANDARD.

In the appendix under the head of non-standard—there are thousands of well-bred and meritorious animals that lack some requisite of being technically standard, and this department would be intended for all such—I would announce that no animals be admitted to this department, unless they are well related to standard blood. When animals reach standard rank according to the number of crosses made essential, they could be placed under the head of standard. I would urge that the Legislature make a law embodying all the necessary power, and appoin by name the guardians of the Ontario Stock Register, and further nominate its primary acting official, Secretary and Treasurer, delegating to the full board the power of subsequently electing their working officials. The board of Censors would soon learn that much depended on their Secretary. Pedigrees of stock are not formulated haphazardly, carelessly, loosely, and indifferently, but to the eye of the expert are as demonstrative from previous history and record, as the 47th preposition of the first book of Euclid is to the mind of the mathematician.

AFFIDAVITS NOT RELIABLE.

The Board would soon learn to attach little reliance on affidavits accompanying pedigrees. Owners swear to what they believe, according to their knowledge; to them it is true, when, in fact, it may be a tissue of error, the primary roots being incorrect.

ENCOURAGEMENT TO THOROUGHBRED BREEDERS.

Recognizing the importance to breeders of thoroughbred sires, for the produce of superior stock, I would urge on the government to stimulate its production by exempting from taxation, levy, or attachment, all approved stock of standard qualities, doing service as sires in their immediate section, at a reasonable rate for the benefit of the general breeder; and not only exempt them thus, as an inducement to the poor man to own the breed, but enact that assessors should deduct the certified value by the board of Censors, from the taxable property to their owner in the district in which they do stud or breeding service; and still further to educate the masses in distinction of stock, it should be enacted that agricultural societies receiving provincial money for competitive purposes, should not award premiums to any but stock recorded in the Ontario Stock Register It should be further enacted that services for unregistered males could not be sued for and collected in a court of law, and the use of none but registered animals should or could be recovered in courts of competent jurisdiction.

P. R. McMONAGLE.

[*Dr. McMonagle.*]

MR. G. C. TUMLIN'S EVIDENCE.

G. C. Tumlin was called and examined.

To the Chairman.—I am an extensive dealer in horses, and have been in the trade for sixteen years.

AMERICAN MARKET FOR DRAUGHT HORSES.

My business is to buy draught and general purpose horses—mostly the former. For the class of horses in which I deal the American market stands higher than others. The American draught horses grow too rapidly on the prairies, and, feeding on corn, are too soft; while our Canadian horses grow more slowly, and are better footed and better limbed.

CLYDESDALES—THE NORMAN HORSE.

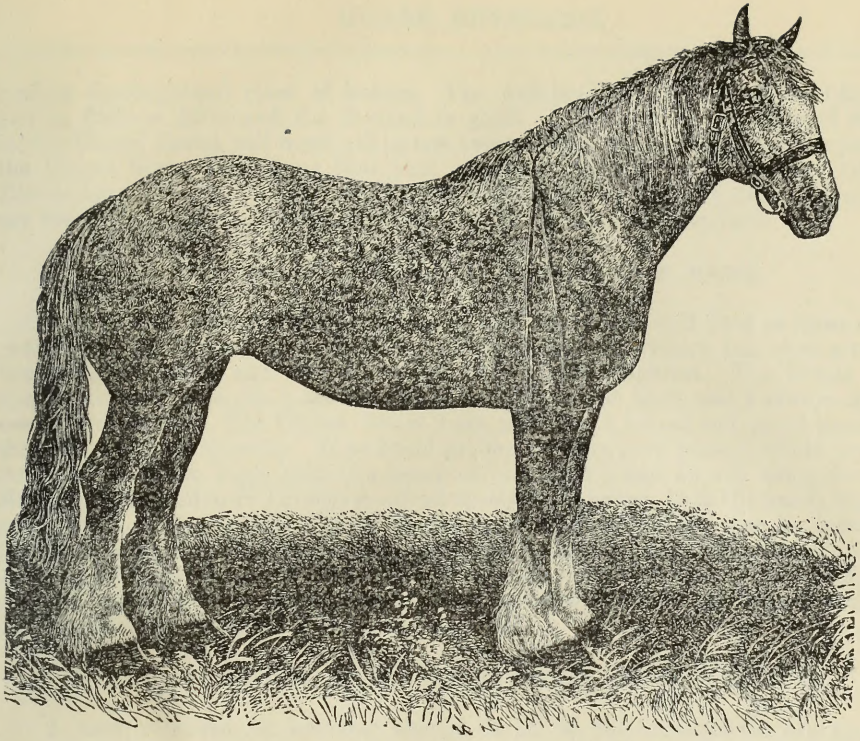
The Clyde is the best horse to cross upon the mares of this country. There is a horse which, I think, would cross well with our mares, and that is the Norman horse. Our Clydesdale breed are getting too low-headed—they are breedng back. We had a class of Netherbys, and Comets, and Wallaces, but they are running out, owing to the Americans having bought them up. Our Clydes have bone enough to cross with the Normans. I have never sent any horses to the English market, though many which I buy go to Pennsylvania and New York, and ultimately find their way to England. I am informed that our draught horses here are not large enough for the English market.

AGE AND DESTINATION OF HORSES.

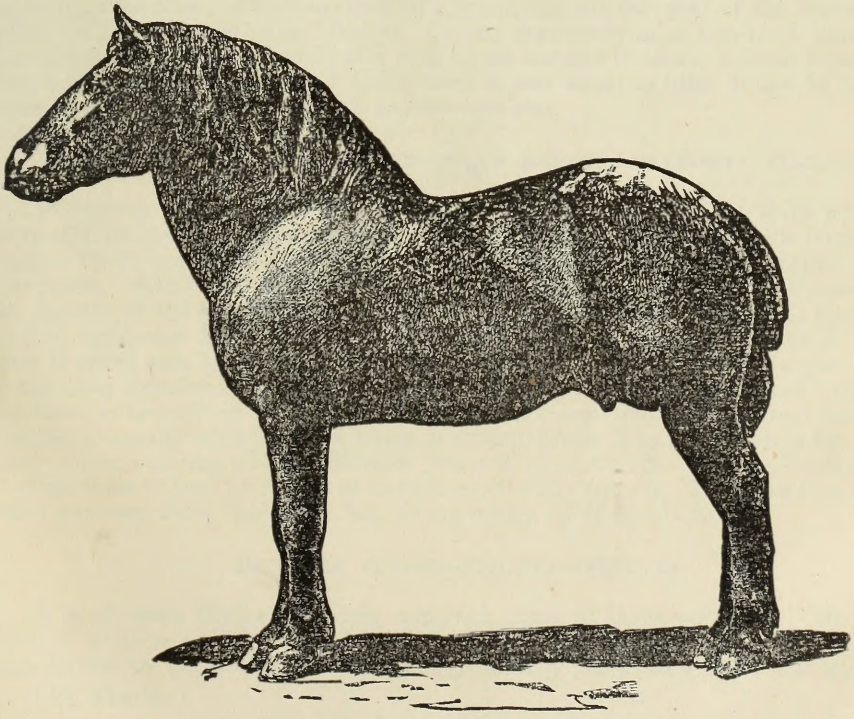
I am now buying horses of three, four, and five years old. They are sent to different counties of Pennsylvania among the farmers, each farmer taking so many to feed at so much a day. They feed them thirty or forty days and then they go to New York. I don't know any reason why we should not keep the profit of feeding them among our own farmers, but what I have stated is the practice. These horses are for farm and truck use. The farmers of Pennsylvania will feed them forty days at thirty cents a day, besides keeping everything on the farm. Including the duty, commission, and other expenses, it costs about $10 a head to take the horses to Pennsylvania. I pay for these horses from $150 to $225, the average would be about $175. These horses must be sold in New York for about $250 or $300, by the Pennsylvania feeders. They feed them much heavier there than we do here—they will feed them up from 1,350 to 1,500 lbs.

POINTS OF A HORSE—PRICES FOR GOOD HORSES.

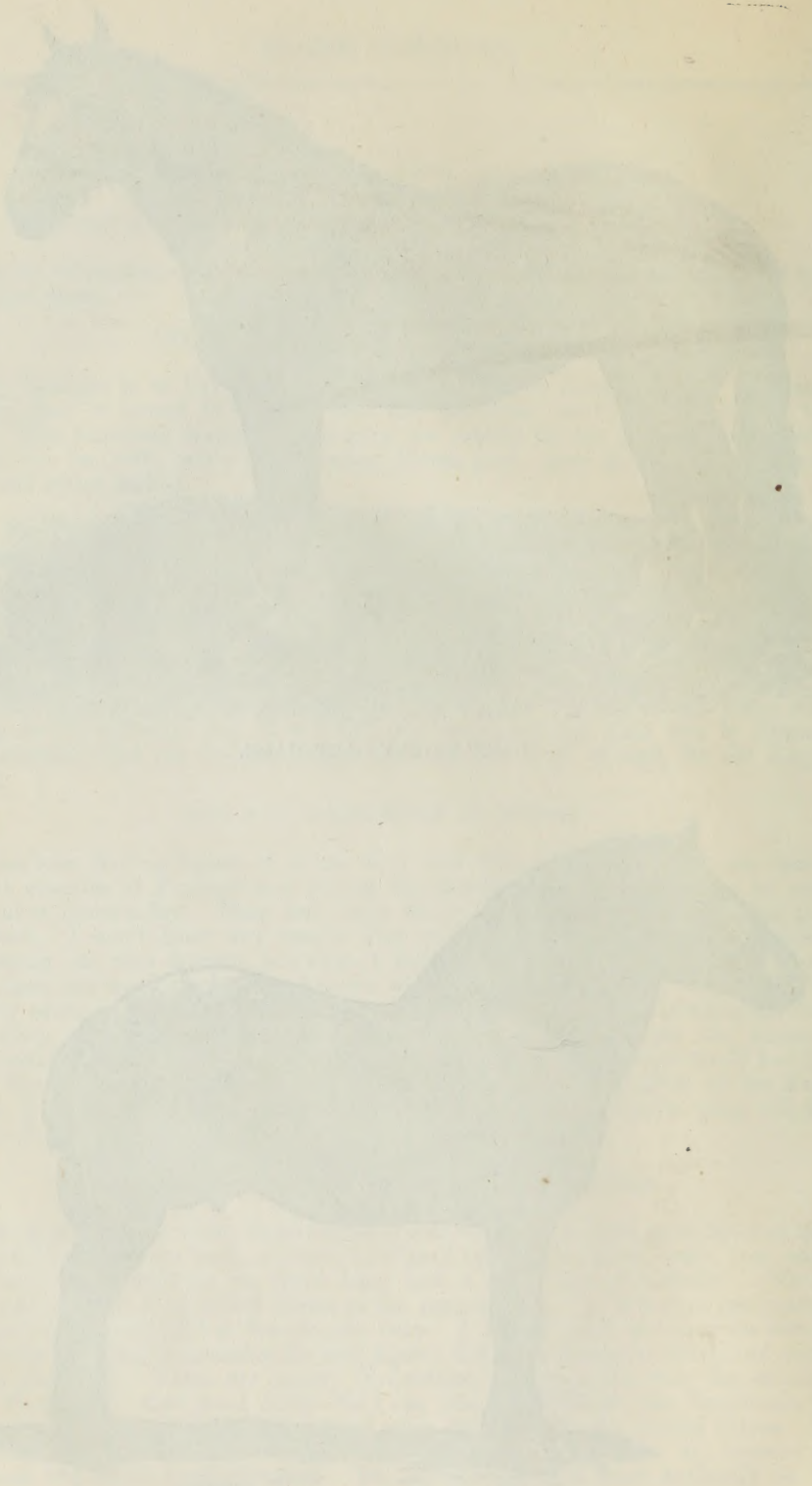
The first requisite about these horses is that they should have good feet and legs; they should have a clean head, a bright intelligent eye, a good thick heart, deep chest, broad back, broad between the front legs, and a good pair of buttocks. We are pretty well run out of well-bred horses at the present time. A first class two-year-old would be worth about $250 at the present time. I deliver them on board the cars for the Indiana Breeding Association for that figure; breeding mares for $300, and young stallions for $400. These are mostly Clydesdales, and we could trace the crossings back. These fillies were good stock—they ran into the Wallaces, the Nonpareils, the Netherbys, etc. They had to be registered when they went to the United States. We had another class of horses but there was no profit in them for us, because the Americans had so many themselves. Dr. McMonagle is a good authority on the



DAPPLE-GREY CART MARE.



BELGIAN DRAUGHT HORSE.



road or thoroughbred class of horses. For well-bred Clydes there is no difficulty in getting $250 or $300, and the demand is good. I don't think the demand for them in the United States will wear out in ten years. This country is better adapted than the United States for raising that kind of horses. The horses of Indiana, Ohio, and Illinois are apt to be affected in their eyes by being fed too much on corn. Blind horses are very rare in Canada, unless such as have become blind by accident.

INFERIOR STALLIONS—THE GENUINE PARK HORSE.

The class of stallions which are being used are not so well bred as those of a few years ago. The farmers are importing inferior stallions. There has been a tendency toward deterioration, and that is a danger to be guarded against. The breeds I mentioned—the Wallaces, etc.—are capable of breeding right back, and I always try to get crosses from them The United States have more road horses and speed horses than they know what to do with. If we could get the genuine park horse it would pay us well for export. When I get hold of a horse of that kind I find he will bring as much in New York as London or Liverpool—good up-standing horses, 15 to 16½ hands high, with good action, with a speed of eight to ten miles an hour, which may be increased to twelve miles an hour if necessary. When I said that the United States market for speed or trotting horses was glutted, I did not mean these at all. Horses of the class I speak of would bring $150 to $200, and if bred in the way I have mentioned would be as profitable as the Clydesdales.

AGE OF BREEDING MARES—GENTLE WORK WHILE WITH FOAL.

A mare intended for breeding should be put to the horse for the first time when from four to six years of age. If they were large ones I would commence to breed them at four years old. If the mare can be kept from working while she is with foal so much the better, but it will not hurt her to work moderately—such as ploughing or light teaming. Anything that will encourage the full play of the muscles just before foaling is better than idleness. In my experience as a breeder I have found that mares which are completely idle raise about one colt in three, whereas those which work a little hardly miss one. I think there is just about as little danger in having a horse brought forth in the open air as anywhere else.

NUMBER OF "SERVICES"—DISEASES OF HORSES—DRAUGHTY STABLES.

It depends a good deal on the constitution and temperament of a stallion whether he should be restricted to a certain number of mares—they vary in this respect very much. There are not many horse diseases prevalent in this country, except colds and distempers. Stable and farm arrangements are not, as a rule, good for horses among the farmers of the country, especially in regard to ventilation. Generally they put a window right over the horse's head, and when he comes in warm they open it, and the horse is pretty sure to be sick. They should always be kept out of the draught. Some of the most objectionable blemishes to horses are soft and hard spavins and "roaring." The latter is brought on by colds and influenza, and sometimes horses breed back to it. You can generally tell whether a horse is suffering from it by giving him a run of 200 yards; if you run him a longer distance you will not notice it. There are some breeds of which three or four horses out of every five will suffer from it. There were two breeds which were especially liable to it, but we are nearly rid of them now.

IMPORTED CLYDES—COLOUR—FEEDING.

A good many Clydes are being imported, some of them very good. We do not object to white on the hind legs, but we do not like it on the fore feet. Nearly all our large buyers in the United States are Jews, and they don't like a horse with white fore

[*Mr. Tumlin.*]

feet, or short ribs. If the farmers here were to fit up their horses on their own farms, instead of our having to send them to the United States farmers for that purpose, we could afford to pay them what we now pay to the Americans; we could perhaps pay $20 or $25 more. These men who feed them up on the other side feed them pretty much on soft feed and corn, oats, bran, etc. They have no peas or barley. The bran is more used as a laxative than anything else. Oats are about the best food for them. The gain in grinding the oats is that the horses are able to feed faster. The horses are kept indoors all the time, except when they go out for exercise. Sometimes the horses are worked all the time they are there. There is one man who has over 500 horses feeding for these New York men. These horses are used for truck work of various kinds. The lager beer business gives a great demand for our horses, owing to its having grown to such dimensions. The proprietors of the breweries will have only the very best horses and harness, and the horses are nearly all Canadian. I would prefer seeing the feeding done by our Canadian farmers than by others.

NUMBERS SHIPPED—SOURCES OF SUPPLY.

Since the 1st of January I have shipped between 400 and 500 horses. We get the best horses from Markham, Scarboro', Whitby, Pickering, Gwillimbury, Gore of Toronto, and all through that part of the country. We can sell as many as we can collect. The prospects of Canadian farmers with regard to horses are good. The supply is falling off; but if farmers would only raise the right kind we can get good prices.

ADVICE TO FARMERS.

I would advise farmers to keep their good young mares for breeding purposes. Except the small cost of keeping them on the farm, the price they realize is all profit to the farmer. The cost of service by imported Clydes runs from $10 to $14. Too many farmers are tempted to use inferior horses on account of the lower price of service. I believe in keeping on breeding from thoroughbreds all the time. I like a broad flat-boned horse without much hair. When I find a horse with a spavin of any kind, I will not buy him at any price. I don't believe in breeding from mares that have such blemishes.

CANADIAN HORSES PREFERRED.

The Americans tried to do the breeding themselves, they brought those soft animals from the prairies, but they could not get along at all, they found they had to go back to the Canadian horses. The feet of the latter are better,—they are strong-boned, and they do their work better; besides, a great many of the western horses die the first year they are brought to the east, they do not become acclimatized as easily as ours. I am a native of the United States. It might be a good thing to have horse fairs started in different places.

GEO. C. TUMLIN.

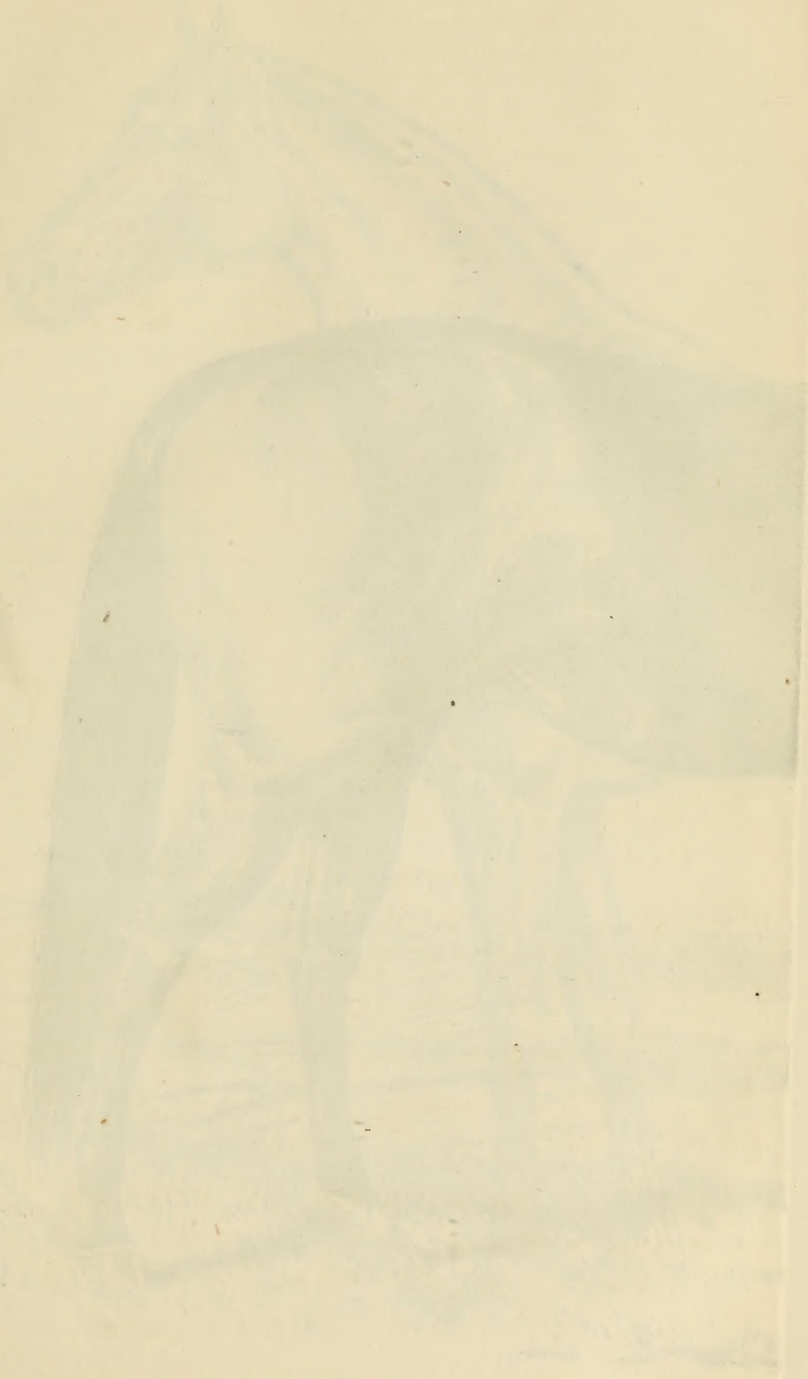
MR. J. P. WISER, M.P.'s EVIDENCE.

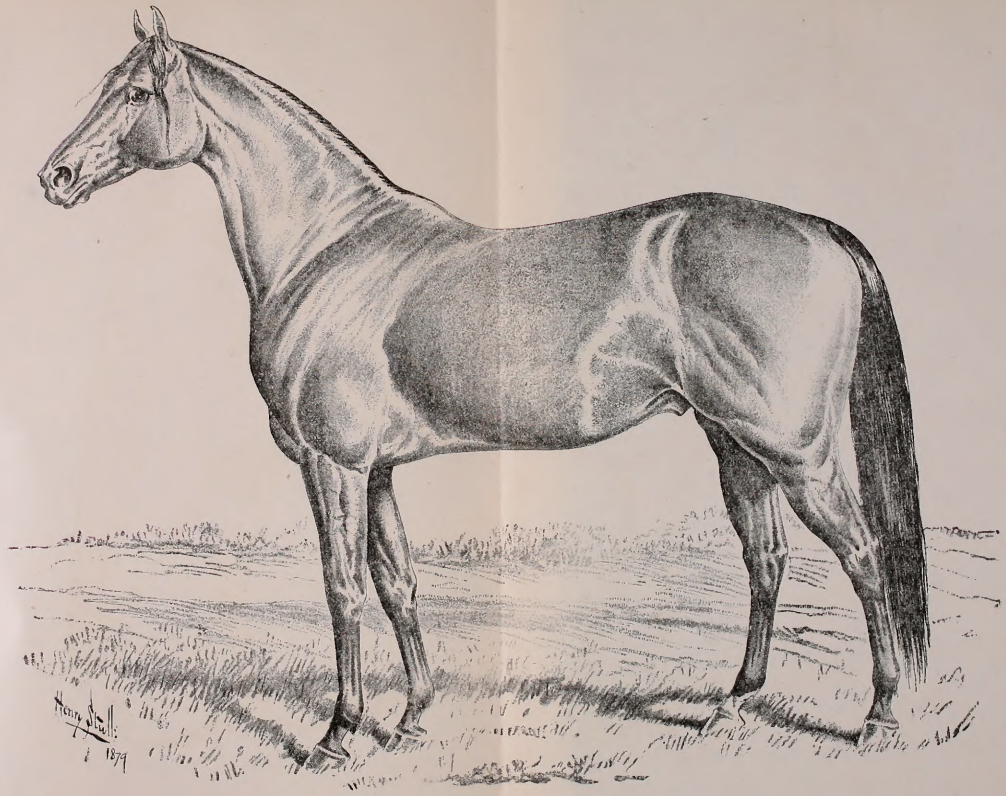
Mr. Malcolm, Chairman.

J. P. Wiser, Esq., M.P., of Prescott, was called and examined.

DEMAND FOR DRAUGHT HORSES.

To the Chairman.—I have bred a good many horses. As to the merits of the different breeds the Clydesdales are a heavy class of horses, and more suitable for draught purposes. For roadsters an entirely different stock is required. We cannot raise enough





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draught horses in Canada to supply the demand. I could myself sell ten times as many draught horses as I do, if we had them suitable for the American market. For the general run of our horses the United States is the best market, and it takes from us the class of horses that would not be suitable for the English market at all. Our best draught horses would sell well in England, but not at much higher prices than in the United States.

FOR DRAUGHT HORSES A BETTER DEMAND IN THE STATES.

There is a demand in the United States for all that we can raise, and more. The country is full of buyers who are not able to get such horses as they want. If we had the right kind of roadsters, we could sell all we could produce.

MARKET FOR ROADSTERS—PRICES.

Our best roadsters go to the American market. Canadians sell a large number in Montreal for that market. They are small horses. Purchasers are using them because they cannot get better. Some of these horses are used upon the street railways at Boston and the Eastern States, and they are said to be the best for that purpose. The prices for this kind of stock are small, from $85 to $90, but if we had better horses we could get a great deal more money for them. At localities in Ontario where we have larger horses, they bring from $100 to $150, and sometimes $200. I am now speaking of our draught horses in comparison with the small animals. I think our farmers should pay a great deal more attention than they do to getting the right kind of horses to sell.

USE OF PURE BRED CLYDESDALES.

Clydesdales are, I think, altogether the best strain to use upon our native mares to improve our draught horses. I should certainly stick very closely to them for that purpose. Of this stock I would strongly advise the use of imported or thorough bred sires. A second cross makes a good general purpose horse. I would first breed to our good native mares, then I would breed to their progeny again, and would expect a general purpose horse which would not be so much of a cross as the first one. Until we have more well-bred dams I would advise breeding in that way.

HOW TO GET FASTER HORSES.

For a horse which is not required for very heavy farm work, there should be a better plan of breeding. I would breed to some recognized trotting family strong in prepotency, and capable of producing its like. If you breed properly you will get a horse 15½ or 16 hands high, good for the road, and heavy enough for ordinary agricultural work. I am not speaking, of course, of heavy work.

THE REAL "GENERAL PURPOSE" HORSE.

You would get a horse that would do for ploughing and such work as that, and would be able to go on the road and drive at the rate of twelve or even fourteen miles an hour if the roads were good. They would not only do for farm work but they would always command a ready market at good prices. It would not do for such a purpose to cross thoroughbreds with the Clyde, as the Clyde is too heavy for road purposes. About six miles an hour is about as fast as you should drive Clydesdales; but if you want to go hastily to church, or to the mill, or to town, you require a horse that would be able to go at least ten or twelve miles an hour. For such a horse I would breed our native mares with some well-bred trotting sire, taking such natives as we can get and improve on them by using their progeny as dams for future breeding.

[*Mr. Wiser.*]

EFFECTS OF VIOLENT CROSSES.

To Mr. Dymond.—A cross between a thoroughbred runner and a Clydesdale mare would be too violent in my estimation. I am now speaking more of the roadsters than of the thoroughbred racer. My impression is that violent crossings of that kind are liable to turn out unsound horses, but by taking what we call our trotting sires and breeding from them we may not always get fast trotters, but we get good roadsters, agricultural, and general purpose horses.

UNLIMITED DEMAND IN THE STATES.

To the Chairman—We have an unlimited market for all that we can raise of such horses, I mean in the United States. The great trouble is that if we happen to get good horses in Canada, buyers come from the other side and pick them up, leaving us only the poorer ones. Most of our Eastern native stock have originated from crosses with thoroughbred running sires, and from these you get some degree of blood in nearly all of them. If you have a good horse you are always sure of a market, and the result has been to drain our country of its best horses.

To Mr. Ballantyne.—If I wanted a draught horse I would use a Clydesdale, and if a roadster, some recognized trotting stock. I would follow the breed up with a pure mare as closely as I considered advisable. I certainly would not cross a trotter with a grade draught horse.

STALLIONS ADAPTED TO THE STOCK WANTED.

To the Chairman.—As to the general improvement of our stock I can only recommend the use of good stallions of the different classes, according to what kind of stock you desire to breed. I could not improve on Dr. McMonagle's evidence in that respect. I fully agree with him in his views. The class of horses which we could sell in the United States would not sell in Great Britain at all. Heavy draught horses would sell in England, and driving horses about 16 hands high.

DEMAND FOR STYLISH HIGH STEPPERS.

For stylish, high-stepping horses the demand is unlimited. English people use a very much slower class of driving horses than the Americans, although Americans will buy a horse which it would not pay to ship to England In England they will only take the heaviest and best horses, but in the United States they will buy the smaller ones. As to the class of horses for which there is the greatest demand in England at the present time I would say that they are heavy draught horses and driving horses 16 hands high. There is an unlimited demand for both kinds.

PRICES REALIZED FOR COMMON GRADE HORSES.

Our common grade horses if taken to England are only fit for tramways and such work. I notice in the Montreal *Herald* of last week or the week before, that 116 horses sold for the gross figure of $10,032, or an average of $86.48 apiece. The week following 207 horses sold for $20,000, or an average of $96.61. The market is improving in price as the demand from the other side is increasing. The horses to which I refer were all sold to the United States market. These are about the prices we can realize, but I think it is a pity we cannot raise a better class of horses. I do not think the breeding of horses has been profitable in the way they have been produced in some portions of Canada, though the raising of horses is becoming more profitable in this vicinity and in some other portions of Canada.

[*Mr. Wiser.*]

PRICES FOR WELL BRED YOUNG STALLIONS.

In the vicinity of Toronto horses are being sold at a profitable rate; I mean horses of a certain class, as they are selling at about $300 for two year olds, and I know of quite a number of young stallions which have been sold at from $300 to $400 apiece. These are heavy horses, and I think they are being raised at a paying profit. But the prices for small horses which are being generally produced throughout the country I do not think pay very well. Farmers in general raise a few colts because they do not cost much and nobody keeps an account of what they really do cost.

COMPARATIVE COST OF RAISING COLTS AND STEERS.

Q. What is the difference between the cost of raising a colt and a steer three years of age? A. If you speak of the common way in which most farmers raise them it will make considerable difference from my figures of cost. I first figure on the steer and then I have estimated the cost of raising a colt in a pretty good kind of way. I should make the difference $45 or $46. I should put the raising of an ordinary steer from the time it was calved until it was sold in the fall, rising three years old, at $26. I should put the sale price of him at that age at $40, leaving an apparent profit at $14.

COST OF A GOOD COLT AT THREE YEARS.

As to the colt I make the estimate upon a little different basis than that which most farmers would adopt in raising a horse. I make the cost of raising a good colt for general purposes, or agriculture, or as a roadster, or trotter $71.90, when it is three years old. I first put in the service of the horse, $10; keeping the colt till one year old, 20 bushels of oats, hay, say $10. It is supposed to be running with its mother till it is five months old, and up to that time I make no charge for its keeping, but I think $10 would be a fair figure. At two years old I would add 30 bushels of oats at 33 cents, which would be $9.90, pasture $6.50, $1\frac{1}{4}$ tons of hay at $6, $7.50. At three years old the hay would be $1\frac{1}{2}$ tons, pasture would be $7.50, and 35 bushels of oats, $11.50, in all $71.90.

CHANCES OF FANCY PRICES—GRADE STEERS.

That colt should sell for $100 with the chance that it may be worth $500 or $1,000, and sometimes you will strike one that is worth from $4,000 to $10,000 if bred in this manner.

To Mr. Dymond.—I mean a good grade colt. When I speak about the steer I mean to take it in the fall when about $2\frac{1}{2}$ years old, which is its real age. I have been in the business between thirty and forty years.

To Mr. Whitelaw.—In speaking of the steer I mean a grade steer. I put in no estimate for feeding him grain. I could not estimate the cost of feeding him till he was three years old and selling him to a butcher.

RISK OF RAISING A COLT AND STEER.

To the Chairman.—The risk of raising a colt is not very much greater than the risk of raising a steer, though there may be a trifling difference. I would as soon raise a colt as a steer. A colt is certainly more liable to injury and when injured, the result is apt to prove more serious. I do not think there is any more danger at birth in having a colt die than a calf. I have lost one or two colts in six years. I have lost more cows and calves in that time, and I have not had one cow to calve where I have had twenty colts foaled. In my experience colts are not more subject to diseases than calves, though perhaps as a general rule they are; they are not more liable however if properly cared for.

[*Mr. Wiser.*]

INFERIOR STALLIONS.

I regret to say that of the stallions used in our part of the country, nineteen out of twenty are very ordinary. They are mostly of no particular breed. Any farmer that thinks he has a pretty good colt, raises it for a stallion and travels him among his neighbours. The usual price charged for service is $2 to $2.50 per mare. There are exceptions, but this is the case with the general run of farmers. They will breed to a horse which they can get at that figure to the exclusion of better stock, and that is the reason that we are propagating such a race of horses as we are.

PLENTY OF GOOD STALLIONS—LOW CHARGES.

This state of things does not arise from a lack of good stallions. I have put good stallions on the road at $10 a mare to insure a foal, just for the purpose of trying to induce our farmers to raise a better class of horses. In the United States these same stallions would realize me $25 or $30 for service. I never did so until this year. I started out with the idea that I had good stock and that if farmers wanted the benefit of it they would come to me. I put one on the road this year at $10, and that is the one that I made the estimate upon, about which I have been speaking. I am happy to say that the farmers are taking considerably more interest in the raising of good stock.

WM. B. SMITH.

The horse I speak of is a descendant of Royal George out of an imported mare. His name is Wm. B. Smith, and he was sired by Thos. Jefferson, a trotter with a record of 2:23, who in turn was sired by Toronto Chief, and he by Royal George. On the side of his dam he is out of imported Heather Bloom by Tallyho. He is one of the kind of trotting stock from which I propose to breed our farm horses, those for lighter agricultural work. He is also of the kind to cross with the Messenger stock so as to get the Park horse if ever we are to get it. He stands 16 hands high, and is a bright chestnut colour. On my own track he has showed me a mile in 2:35 and a half mile in 1:16.

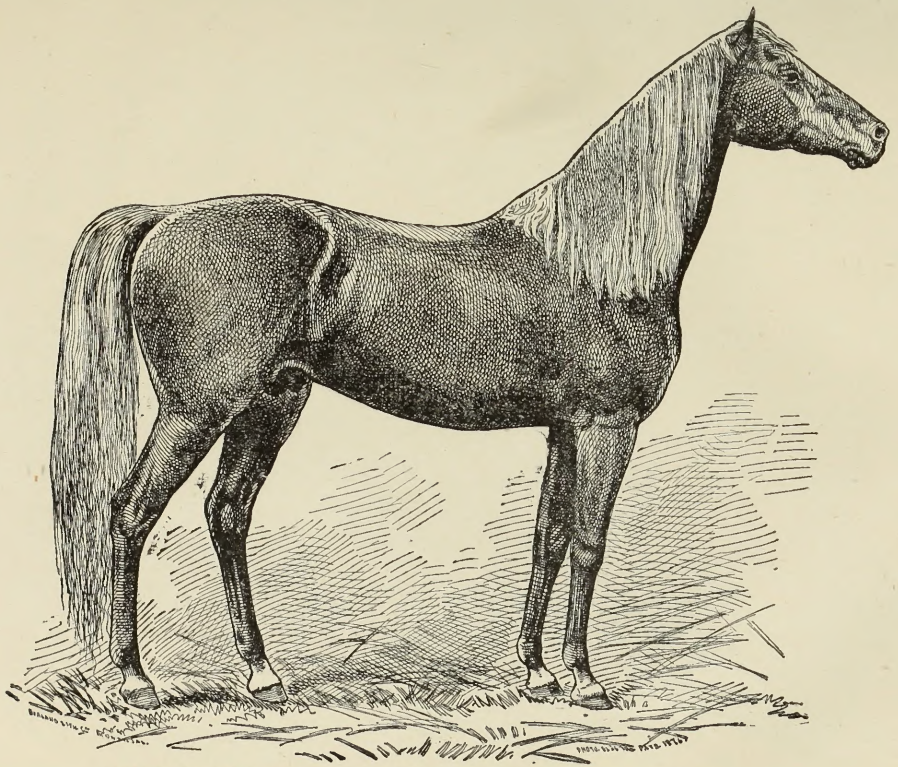
THE HAMBLETONIAN.

There is another class of sires, by the use of which you can arrive at similar and probably better average results, but the cost of stud service with these would be much more expensive, say from $30 to $50 a mare by the season. I mean the Hambletonians. I am a breeder of that class of stock and can speak authoritatively on this subject. A cross of that stock with our average native Eastern mares produces a good coloured, stylish, high-stepping, fashionable, handsome horse, that commands the highest price in the market. A greater result in a breeding sense would be attained by the use of Hambletonian sires in the production of a class of horse colts that would be adapted for stud service so as to insure a certainty of inheritance in succeeding generations. You would get at once the horse I speak of as a horse that would answer for ploughing and general farm work, and would drive on the road when necessary twelve or fourteen miles an hour.

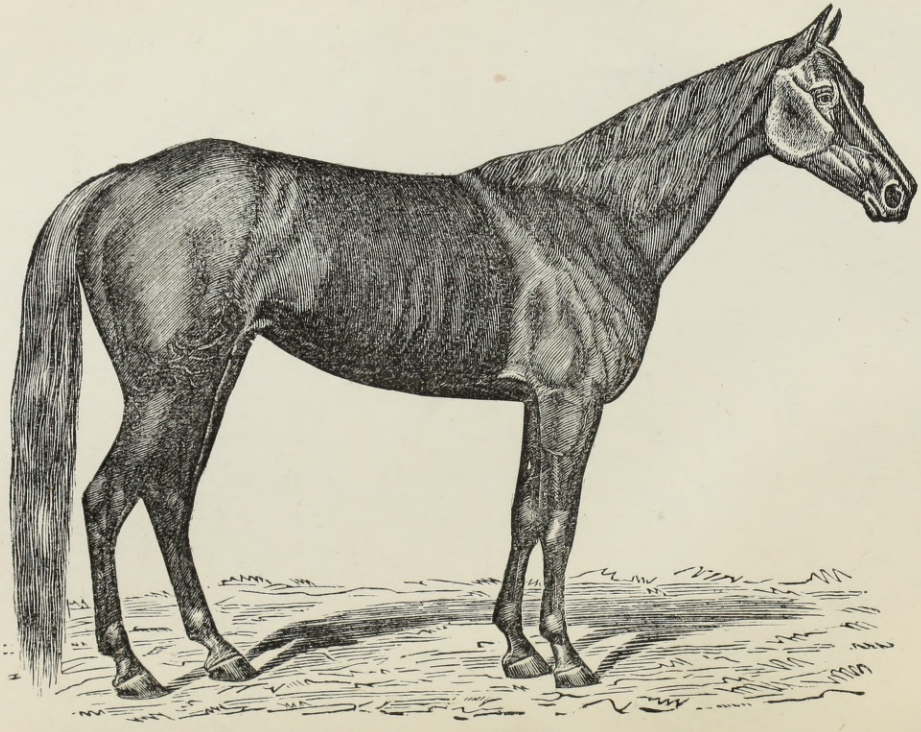
UTILITY AND SPEED COMBINED.

My experience has been that we should also get in this way of breeding a horse standing 15½ to 16 hands high, and all being so strongly of the same Messenger element, could be easily matched for teams and for sale purposes. A great thing to be desired in this class of stock is that they are seldom diseased or blemished, but are well formed and strong in all their points. A great incentive to breeders to cultivate this stock is the fact that, once in a while, a trotting flyer appears from among their produce, even among the crosses I am now speaking about, that commands a price of eight, or ten, or twelve, or even twenty thousand dollars

[*Mr. Wiser.*]



"WM. B. SMITH"—(Royal George)—Owned by J. P. Wiser, M.P.



"MAUD S."—Record 2:10¾.

THE MESSENGER ELEMENT.

Of this stock Goldsmith's Maid, record 2:14, brought	$20,000
Dexter, record 2:17¼, brought	33,000
Jay Gould, record 2:20½, brought	30,000
Judge Fullerton, record 2:18, br't	15,000
George Wilkes, record 2:22, br't	16,000
Gazelle, record 2:21, br't	10,000
Rosalind, record 2:21¾, br't	20,000
Chas. Blackman, 4 months old, br't	5,000
Prospero, record 2:20, br't	25,000
Dame Trot, record 2:22, br't	10,000
Joe Elliott, no record, br't	10,000
Bruno, record 2:29½, br't	15,000
Startle, no record, br't	25,000
Robert Bonner, no record, br't	16,000
Dauntless, no record, br't	10,000
Happy Medium, no record, br't	24,000
Socrates, no record, br't	21,000
Edward Everett, no record, br't	20,000
Wallkill Chief, no record, br't	10,000
Maud S., record, 2:11¾, br't	21,000
Steinway, 2 yr. old, record 2:31½, and 3 yr. old record 2:25¾, br't	13,000
Dick Swiveller, record 2:18, br't	16,000
Trinkett, 4 yr. old, record 2:19¾, br't	11,000

I paid $10,000 for Rysdyk with no record. These are only a few of the many tha brought such large prices. It is the trotters of this family that make such performers on the American turf. As a family they have the best records, with the greatest number of performers, and the greatest number of heats within the 2:30 standard adopted by the National Association of Trotting Horse Breeders.

HOW TO DISCOURAGE MONGREL STALLIONS.

Q. Have you any remedy for the purpose of diminishing the use of these mongrel horses? A. I think the instituting of a stud book would be one remedy, and I would be in favour of charging a license for registering horses. I know, however, that we would meet with a great deal of opposition. I do not know that it would be entirely fair to the poorer class of the community to make such a charge If we had a stud book I think we would have to allow all the stallions to be registered whose owners desired that they should be, to begin with Say that the sum of $2 should go to the Government in each case to pay for the expenses of conducting the registration, after that I would be in favour of having a board of censors appointed for the purpose of investigating pedigrees, and thereafter only allowing those to be inserted in the stud book which were worthy of registration I would then by some means have it made an inducement to men to keep such horses as would be worthy of registration I would exempt such stock from taxation, and also a certain amount of property from taxation for each of such animals. I would apply the same rule for thoroughbred bulls or rams.

EXEMPTIONS IN TENNESSEE.

In the State of Tennessee they go further, and not only exempt from taxation but from execution, but I do not think we are prepared to go so far at the present moment, though personally I might agree to such an arangement. In certain States of the Union they exempt 50 sheep of certain improved breeds from taxation and execution for the

purpose of inducing their introduction into the country. Any inducement that we can offer for the purpose of raising the grade of our domestic animals I think would be a great benefit.

PUBLIC OPINION NOT YET RIPE.

I think the country is prepared to adopt such a remedy as I suggest, though perhaps, not altogether so far as charging a license fee for stallions. I would advocate such a fee personally, but not on general principles, because I do not think it would be accepted yet I would be in favour of making the owner of every stallion pay a fee of at least $10, but I would not approve of the introduction of such a measure now, and not until we had a better standard variety of sires. The burden of such a fee would certainly fall upon those using the horses by their having to pay a higher fee, but they would receive the benefit in obtaining a better grade of horses, which would be a very desirable result.

AGE FOR BREEDING MARES.

As a general thing I think it would be better that a mare intended for breeding purposes should be kept from the horse until she was four years old, though we breed at three or even two. I breed a good many two years old and so do others. A good deal would depend on how the mare had been treated. If she was a good, strong, well-developed mare at two years old I should have no hesitation in putting her to the horse. I do not think it would injure her as a breeder, and I have seen as good colts from three year olds as from any other age.

EFFECT OF THE FIRST CONCEPTION.

Q. Would it injure a mare that you intended for thoroughbred breeding to put her first to a Clydesdale? A. Yes; most decidedly. The reason is that a habit is formed, and they derive a certain type from the breeding with a certain kind of horses. And this I think would affect at least a generation or two. I do not know that I could explain this on scientific principles though breeders know it to be a fact. For instance I would not take one of my mares that I am breeding to my Hambletonian horse, the Royal George, or any other horse for road or trotting purposes and put her to a Clydesdale horse and then go back to the others. In the latter I would not expect a very good cross. It would be a general purpose horse. A breeding mare would be good enough if the cross were not too violent. It would not do to breed a high-bred stallion with a Clydesdale mare. In breeding in one type you should keep as close to the line as possible.

MANAGEMENT OF MARES AND COLTS.

I think the milk of a mare when she is heated is injurious to the colt. I do not think a mare should be sweated when she is suckling her colt. If they are worked at all it should not be enough to heat the milk. Clydesdales can be worked up to the time of foaling, lay up a week and then go back into harness and work without injury. The colt should be weaned at five months old, or earlier if the mare does not give milk enough to keep it well. In weaning I think the best course is to take them from the mare and give them open stalls putting three or four together in appropriate boxes. If you want to raise them well, you should give them plenty of cow's milk, and from two to four quarts of oats a day, ground oats occasionally. As they get older a handful of corn put in their food is good.

COMMON MISTAKES AS TO TREATMENT OF COLTS.

There is no greater mistake that our farmers have fallen into than their ideas about raising colts. They take them from the mare, turn them into the barn-yard or around the straw stack, giving them a little hay perhaps, allowing them to run out of doors.

[*Mr. Wiser.*]

Many farmers say that the colt should never eat a grain of oats till it is three years old. A colt raised in that way will stand perhaps 12 or 13 hands high at one year old and weigh 500 pounds, whereas if you raise him in the proper way he will be 14 or 15 hands high and weigh about 900 pounds. It is a great mistake to suppose that oats are an injury to a colt. It is very seldom that a colt gets tired of oats in their natural state, but they relish a change of food. I would give them carrots occasionally, though I do not think much of them. Some give colts bran, but I do not think it is much good if they have plenty of oats.

FEEDING THE FIRST WINTER.

The treatment I speak of would apply throughout the first winter. They should eat the first winter at least four quarts of oats a day, two quarts in the morning and two at night. When they get a little older they should have a couple of quarts at noon. They should have all the hay they can eat, but they should not be tied up in stalls. You will never get good horses by breeding colts in the old fashioned way of turning them out into the barn-yard or sheds in the cold winter weather. I would not tie up colts the first winter at all. They need all the exercise they can get, and it is unnatural to tie them. The longer you can keep a horse from tying him the better, and it would be best of all, if horses were always kept in roomy boxes. They would rest better, move around easily, and roll over when they wished, but of course it is not always practicable to give them such boxes.

ENTIRE HORSES TO BE RESTRICTED.

Entire horses should be restricted to a certain number of mares. I would not want to put a high bred horse to more than 50 or 60, but cold blooded horses might serve perhaps 100. The evil of giving them too many would be that some mares would not get in foal, and it would also be injurious to the horse. Old Hambletonian covered 205 mares one year, and I never heard but that the colts were good, though they did not get very many. Next year he did not stand for any. He was not permanently injured but came back all right. I think after that that his terms were raised to $300, and then to $500 for service. I do not think that horses have any prevailing diseases in our part of the country.

THOROUGHBREDS AND RECOGNIZED FAMILIES.

To Mr. Wilson.—A thoroughbred horse is a horse we find recorded in the English Stud Book; but we generally speak of an imported horse as a thoroughbred. Out of this race of horses sprang the Hunters. The thoroughbreds are principally intended for running purposes. Our trotting stock, while it mostly originated from a thoroughbred—Imported Messenger—has been bred on such stock as we have here—Royal Georges, Canadian Pacers, Pilots, Columbuses, Copperbottoms, Hiatogas, Tippoos and Warriors—all recognized families in themselves, but not strictly thoroughbred. We bred from generation to generation, and produced a distinct type of horse in the Hambletonians, which are as distinct as the Clydesdales, only they are not strictly thoroughbred.

REGISTRATION OF STALLIONS.

To Mr. McMillan.—I don't think the registration of stallions would increase the price of service. The licensing system might be a hardship in some parts of the country; but I think a system of registration, such as that proposed, would soon eliminate poor breeds from the country. I break all my colts at two years old, and at three years old they can do a good deal of work. The heavy draught and the thoroughbred crosses earn their living at about the same age.

GENERAL PURPOSE HORSES—COLTS.

To Mr. Whitelaw.—To get a good general purpose horse for farmers, if you have the

right kind of male, it does not matter whether the mare has a pedigree or not. If you bred the right kind of horse to our 16 hands mares, and kept on till about the second or third generation, you would get the English coach or park horse we want. I think colts should be out of doors during the day. I don't think they should be tied, even at night, nor until they begin to work them; they want to be halter broke, but not tied.

PEDIGREES—A BOARD OF CENSORS.

To Mr. Byrne.—The duty of a board of censors would be to pass upon the pedigrees of all horses, to decide whether they were correct, or worthy of a place in the stud book. In the United States the book corresponding to the one I propose is called the Trotting Register; it is not, strictly speaking, a stud book, which is only for thoroughbreds; but the horses registered in it are considered to be of good lineage, and of good trotting family, because any horse that is passed by the board of censors and allowed to be entered in that book is regarded as having a good pedigree. There may be mistakes, but they are easily rectified. The book I propose would stand in the same relation to horses as the Herd Book does to cattle.

THE BREEDING ASSOCIATION.

I am a member of the Breeders' Association of the United States. Each year we have races, for which horses bred by the members of this association, or horses bred from the stallions of the association, are eligible. In the annual trials of speed, the entrance fee ranges from $250 down to $50, and any horse whose owners are desirous to compete for these stakes may be entered. These trials produce a rivalry among the breeders, and by means of them we find which are our best horses, and those most capable of enduring. We take these horses and breed from them, and the result is that we are breeding from the very best stock of the time. There are also stallion races and colt races held by this association. This association is more particularly for trotting horses, but from our trotting horses originate the very class of horses we want—road and farm horses, that can travel twelve miles an hour on the road as easily as our common horses now travel six, and can do our farm work as well, and out of which we could hope to breed eventually park and coach horses, and casually a fast and very valuable trotter.

ANNUAL EXHIBITIONS OF TROTTING HORSES.

To Mr. Dryden.—I believe it would be for the benefit of this country to have an annual exhibition of this kind. It would stimulate breeders and farmers to bring out their very best horses to compete in these trials of speed. It would be undoubtedly one of the best things that could happen to benefit the horse breeders of this country.

THE STUD BOOK.

To Mr. Dymond.—The stud book I propose I should not regard so much a register of thoroughbred horses as one of horses of a recognized character. The association to which I refer admits Canadians and Canadian horses, and it would, of course, be cheaper for Canadian breeders to join that association and give it a Continental rather than an American character, than to have a separate organization of their own. There is no doubt that the knowledge that our horses were registered in a book recognized on the other side of the line would induce a more active demand and better price for our horses among United States buyers. For the right kind of horses for export to the English market I think we could obtain $250 or $300.

A CANADIAN REGISTER NEEDED.

To Mr. Gibson.—I want a trotting register of our own in Canada, but I would found

it on the same principle as the American. I think it should take in the whole of our horses, and not our trotting horses alone; I would have a department for Clydesdales, one for trotting horses, and another for thoroughbreds. That might do to start with. When a man finds a horse entered in the American register, he knows that it is exactly what it is there represented to be. It adds much to the value of an animal to have it registered in the American Trotting Register, as many of our horses are sold in the United States.

The Shorthorn Model.

To Mr. Dymond.—With reference to cattle, that which we want, in order to meet the demands of the English market, is an animal as nearly as possible to the thoroughbred Shorthorn. There is no other class worth talking about. There are other good cattle, such as the Polled Angus; but I don't think we could get the difference in price between the Polled Angus and the Durham to compensate for the difference in weight. There is no doubt the Polled Angus is much desired in England; but for the demand generally, the Shorthorn Durham is the thing.

Decline of the United States and Rise of the British Demand.

When I left off shipping cattle from the United States, I was getting 9 and 10 cents a pound for them, live weight In Boston the very best cattle are worth only 5 or 5½ cents a pound now, while for the English market, buyers can pay 6 cents a pound, live weight, for them here, and ship them at a profit. The shippers are making money this year. Suppose we had to ship these cattle to the United States, and pay 20 per cent. duty on them, and then sell them there at 5 cents a pound, we would not have anything left. But when the American market failed, the English market stepped in, to the great advantage of the cattle growers and farmers of Canada.

The Polled Angus Worthy of Experiment.

If I were in the stock-raising business, I should try the Polled Angus as an experiment, because they perhaps bring a little higher price than the Durhams A good shipping animal of this class weighs about 1,200 pounds; they are round and compact, so that very good cuts and roasts could be got from them. But to these things there is an offset in the mode of shipping, as it costs as much to ship an animal weighing 1,200 as one weighing 1,800 pounds, consequently you pay just 50 per cent. more freight on the lesser weight.

Too Many Poor Cattle.

We ship too many poor cattle, because we cannot always get good cattle, and the result has been a great lessening of profits. First-class meat is what must be sent across the Atlantic to pay. I agree with Mr. Gibson on that subject.

Prizes at Shows.

To Mr. Malcolm.—I think the prizes given at exhibitions for the encouragement of Herefords, Devons, and such classes of cattle should be very small. We have to consider what class of cattle is the best for meat and milk combined, and what will sell best in the English market, and for these purposes there is nothing like the Durham. I think it is a waste of time to pay attention to anything else.

Durhams Good Milkers.

I think there is a class of Durhams which are very good milkers. I just keep a few cows for my own use. Commencing with half or three-fourths Durham blood, I have bred them for twenty years to good thoroughbred bulls, and I have obtained cows giving me

from forty to sixty-five pounds of milk a day. That, I think, is as much as has been got from Ayrshires or any other cows. I think a thoroughbred Durham bull crossed on our native cows will produce very good milkers, and by continuing to breed in that way, you will soon eliminate the common grades, and arrive at nothing but first-class stock. I would not pretend to go and select a bull that would produce good milkers, but I think, with a little attention, the best milking type could pretty soon be discovered.

Farm Management.

As I have a farm and endeavour to keep it in a high state of cultivation, it might be considered proper that I should give this Commission my mode of working a farm. In one particular I shall be pleased to do this, and it cannot help but be useful to show how an excessive amount of manure leads to the most abundant crops.

The Rysdyk Stock Farm.

I have a distillery and fatten annually over a thousand beeves, and have an excess of manure to spread on the land yearly. In the spring of 1868 I bought the first concession of the farm that I have since turned into a breeding establishment for the produce of Hambletonian horses, the Rysdyk Stock Farm. It is situated on the River St. Lawrence, about 110 rods, or a third of a mile, from the town of Prescott, and about directly opposite the city of Ogdensburg, in the State of New York. It contains nearly 600 acres, and in front is crossed by the main road running from Prescott to Brockville. On the eastern side is a nine mile road.

Barns and Stabling.

On it I have two horse barns; one is a new brick building, and the other is built of stone. The brick barn faces the River St. Lawrence. The object in view in having it face in this way was to have benefit from the sun in winter, and to break off the winds from the north. It is 100 x 44 feet. There is a wing at either end running southward, each of which is 50 x 16, and the two wings enclose a court facing the sun which affords warmth for the young stock. About one-third of this space is covered with a continuous shed. Each of these L's or wings is divided into four separate box stalls, with doors facing courtwards, and with windows to the west and east. The main body of the building is divided into stalls, and contains an office, harness room, six box stalls, and sixteen open stalls. The six of the box stalls are 14 x 16, the open stalls are seven feet wide. The drive way through the barn is eighteen feet wide. There is an elevator running up through the centre of the building. The hay is kept up stairs in the loft. This barn is made of brick manufactured on the farm of Mr. N. Ward. The barn was erected at an expense of about $6,000.

Plenty of Good Water Indispensable.

I am very particular that stock should have plenty of water, and, to have it handy, had a well dug fifty feet deep in the court or southern side, and another one at the west end of the main building. The latter well is 100 feet deep, and both are sunk through the solid rock. The cost of boring in my section is about $1.50 a foot.

Care of Stallions.

I demand extra caution in caring for the stallions on the farm, and especially so when teasing mares. In furtherance of this object I have had at each barn an appropriate œstrum made. The mare is enclosed in a small œstrum stall, and separated from the horse by a height of three feet and a half of movable planking, arranged so that it can be adjusted and removed at pleasure, and just sufficiently high to prevent the mare from kicking the stallion. This insures perfect safety to the male stock in ascertaining the mares œstrual heat.

[*Mr. Wiser.*]

Temperature of the Brick Barn.

There is no fire kept in this barn, except in the office, where one is lit occasionally; nevertheless, with the thermometer at thirty degrees below zero, there has never been known to be a particle of ice on any water standing in the barn, in fact it never even chills. I think stock in this country, and in this climate, should be kept in stables where the water won't chill, in other words, that stock should have just as much warmth as we should have ourselves. I think one-half the grain will keep stock in better condition in this building than double the quantity would, running at large, or where the winds were whistling through. I think currying, grooming and cleanliness are equal to four quarts of oats a day. Although this is a brick barn, it is strapped and lined inside with matched lumber. There is a vacuum left between the lining and the brick of about an inch and a half. In my experience a building built in this way is the least conductive of cold and frost, and most comfortable. There is just one thing in favour of a stone barn—in an exceedingly hot day in summer, it is the coolest.

A Stone Barn.

My other horse barn is a stone building that was formerly used for a wood-shed. The main building is 30 x 40, with a projection on the easterly side 30 x 20. The walls are twenty inches thick, and are strapped and lined with matched lumber inside with a similar vacuum of an inch and a half. In this there are eight box stalls. It is necessary to keep a coal fire in this barn in the winter, but, notwithstanding there is a stove kept in it, it is not so uniformly warm and comfortable as the brick barn without any heating apparatus in it. This I attribute to the fact that stone is a conductor, while brick is a less conductor, and especially so where there is a vacuum between the brick and the lining.

Interior Fittings.

You want all the light and ventilation you can get; the nearer you can come to nature, admitting sunlight, but keeping it from shining on your stock, the better. The doors to all the box stalls are so adjusted on moveable tracks that they roll backwards and forwards so as to occupy as little space as possible. There is a large open space in the door for light and ventilation, the space being grid-ironed with iron bars.

The Box Stalls.

Great care should be exercised in making box-stalls to have the edges of the upright sides of the place of entrance and exit rounded so that an animal will not be liable to strike his hip bones and injure himself, and that it be of sufficient height to prevent his striking the top with his head if he makes a sudden jerk back.

No Racks.

There is not a rack upon my premises where a horse is fed from a hay-loft down. The stock is all fed from off the floor, and all dust and hay-seed are kept from them as much as possible. My method of feeding grain has always been out of an iron box placed in one corner of the stall, adjusted about three feet six inches from the floor. The box is made with such an edge on the inside as will prevent a horse from rooting out his oats and scattering them over the floor. With such iron concave rimmed boxes, it is utterly impossible to throw oats out of the box in eating.

Protection Against Mares Kicking.

I am thoroughly particular with mares coming to my barns with the intention of using some one of my stallions, in having them securely fastened with couples, and for that

purpose I adjust a leather arrangement similar to a collar around the neck of the mare, and run two straps between her fore legs, buckling one to either hind ankle, and while this simple arrangement does not injure the mare in the slightest regard, it perfectly secures her from kicking, so that it is not possible for her to injure the stallion.

Breeding Arrangements.

In connection with this barn I have the œstrum on the outside. I find that I have to be particular in order to make it certain that mares get in foal, to watch them closely from the seventh to the ninth day after foaling, and unless they are served with the horse at least two or three times between the seventh and ninth day after foaling, I find that it is not certain that they will get in foal again. As a rule mares suckling colts through the summer are not so liable to get in foal as when they are not giving milk, and unless properly watched and attended to between the seventh and ninth day after foaling are liable to become barren. Mares under my care are tried regularly every week. I recommend that in serving a mare by a stallion these requisites should be observed to ensure celerity and cleanliness. When it is found that the mare is in her œstrual heat, plait the hairs of her tail firmly and compactly so as to occupy as little loose space as possible. At once after coition have the groom, who should have a bucket of tepid water and sponge in readiness, wash the male organs thoroughly and efficiently, and dry them well with appropriate toweling.

On the north-eastern end of the stone barn is a covered enclosure 18x20, arranged to have plenty of air and free ventilation, which serves as a place to turn any of the stallions out in stormy weather to get exercise. Opening from this shed is a large door, three feet from the ground, directly connected with the œstrum before spoken of. This insures perfect safety for the stallion, and the mare cannot be injured even if she is not in heat

Exercise for Young Colts.

My custom is to give young colts exercise when they are not in training, and for this purpose I have a number of paddocks made, inclosed with board fences 5½ feet high, connected continuously with each other and the main drive ways, with gates. My custom has been in the fore part of the day when the sun is not excessively hot in the summer to turn my two and three year olds out there for exercise. In the heat of the day I put them up, and in the evening turn them out again, and when the nights are not severe I leave them out all night.

Pasture in Summer.

There is a portion of the time during the summer that I do not feed the animals not in training any grain. While the grass is good and succulent I don't approve of feeding them oats. There is a good well contiguous to the stone barn which affords abundance of water. I refer to this again to be expressive in my determination to have abundance of fresh wholesome water for my stock.

Blacksmithing on the Farm.

I find it a great source of profit to me where I have so many horses on my farm, and so many work horses to attend to, to do my own shoeing. I have a blacksmith shop on the farm and do all my own shoeing. If a shoe falls off it can be readily replaced at a very little expense, and for this purpose I have my own private blacksmith who works in the shop at necessary times, and at other times looks after my colts and broodmares.

Beneficial Effects of Manure.

To show to what an extent an excessive amount of manure will benefit land I have four small fields adjoining my paddocks that in the aggregate foot up twenty-eight acres

[*Mr. Wiser.*]

and a third. I literally covered these fields with manure from the distillery in the winter of 1877-8, and the following season I cut one hundred and sixty-five tons seventeen hundred and some odd pounds of hay at a single cutting. The land was in average good condition when I put the manure on it, and had been in sod for two or three years previous. This was only top dressing.

Six Tons of Hay to an Acre.

That year the hay was so abundant as to be difficult to cure on the ground. A quantity of this hay when dry had to be pitched on the load without any raking at all; the balance was cured by driving a tedder through it, and having very pleasant weather at the time, by turning it and using the tedder repeatedly, we succeeded in curing and getting it in, in very fine condition. So abundant was it, that much of the first growth lodged down and then there was yet another crop of grass grew up through this lodged grass. It was cut with a mowing machine, and besides the yield before spoken of there was a quantity that we were unable to cut. I invited some of our best farm neighbours, and drove them over the ground, and the residue wasn't placed by any of them at less than a half or a quarter of a ton left on each acre on the ground. In making up the aggregate of the yield of those 28 acres I concluded that there was a cutting of not less than six tons to the acre. This was arrived at by actual weighing, without any speculation or doubt about it, the hay being weighed when it was put in the barn, since which time I have had the ground accurately measured by a surveyor.

Importance of Shade Trees.

I am strongly impressed with the importance of shade trees on my farm and for that purpose I set out over a thousand young maples at different times these last four or five years. I cannot say that I have had good success in always getting them to grow. I set them out invariably in the spring and it has been my experience that they do not always take root, probably not over half of them live. I am going to try horse chestnut in future. My present impressions are that I can make the horse chestnut grow. I am going to try them another spring, as I am led to believe that when planted and properly protected until the tree is of a certain growth, it will succeed.

A Brick-yard.

At the south-west corner of the Rysdyk Stock Farm, and within one hundred feet of a cove of the river St. Lawrence, I rent to N. Ward a brick-yard at a royalty of forty cents per thousand. It is bounded on the front by the main road and the St. Lawrence river, and on the west by a small stream running through the farm. The enbankment of clay so far has proved inexhaustible. This brick-yard has been in active operation over sixty years. I have questioned Mr. Ward in regard to the mode of manufacturing brick, and the quality of clay, and he gives me the following statement:

Mode of Making Bricks.

"I have had control and occupied the yard for twenty-one years this last spring, and supply the wants of all the surrounding neighbourhood with brick. There is about twelve feet of red clay on the top which I use for manufacturing red brick. Immediately below that is a very dark, blue clay from which white brick is made. I have bored down into this clay forty-two feet in endeavouring to open a well, and find the same kind of clay. In boring for the well I failed to find water, and come to the conclusion that the bed of clay is practically inexhaustible. I sell a great many bricks to United States citizens. My largest order at one time was to the United States Government, to which over a million of these brick have been sold. They were used in the custom house and post office at Ogdensburg."

[*Mr. Wiser.*]

A Brick Machine.

"I use a machine manufactured by Joseph Close, of Woodstock, Ont., which is capable of turning out twelve thousand bricks a day of ten hours. The clay is first put into the machine, and the horse does the pressing and hauling the moulds out, and then the bricks are piled into the hecks for the purpose of drying, and left there for about ten days, and from the heck they are hauled into the kiln. They are generally burned four days and five nights. I use wood of all kinds for fuel. The capacity of the yard is sufficiently large to make a million of bricks a year. I generally run from about seven to eight hundred thousand bricks a year. The quality of clay is first class and cannot be surpassed anywhere. The clay requires to be drawn out in winter and frozen. This is done so as to pulverize it." Besides being a brick maker Mr. Ward is a master builder and has been since 1850, and says, "brick made this way has lasting qualities and is equal to any brick that has ever been manufactured. There is just one process in making brick, the only difference being mostly in the machinery used. There is no difference in manufacturing except in the pressing. If the unburnt bricks get wet they are spoiled and fit for nothing."

The Brick-yard.

Mr. Ward does not approve of a brick-yard being altogether covered. He is of the opinion that the sun must necessarily shine upon the brick in the process of drying; and the proper way to make brick is to give them all the wind and sun you can, simply covering the heck with enough boards to protect the brick from the rain. He never saw but one brick-yard that was completely covered up and that was a failure.

Cost of Bricks.

He says, "I cannot supply red bricks here at less than $5 per thousand. The white bricks which are manufactured under the pressing process, have been sold readily at $14 per thousand, but a good white brick can be manufactured and sold for $8 per thousand."

Advice as to Brick Buildings.

A word in regard to how brick should be used in building. He says:—"Take a three-story building, the wall in the first story should be 16 inches, the second story should be made 14 inches, and the top story 9 inches thick." Thinking the Commission would be pleased with something relating to clays, and soil for brick making, I purposely sent for Mr. Ward to explain as above and had a stenographer take down his ideas, even the expressions used by Mr. Ward.

Crops of Oats.

The only grain I had this last year was a forty-acre field. I had this field manured three years ago, and thus enriched that season's crop of grass, but I only cut 2½ tons to the acre off it, which was so light that I broke it up and successively raised two crops of oats on the same ground. This field the first year yielded 2,244 bushels of oats off the green sward. Last fall it was ploughed over three times, cultivated, dragged, and ploughed again. This spring I had it ploughed, cultivated and dragged again, and sowed with oats, and seeded down. I had a yield this year of 74½ bushels to the acre, and a little over four tons of straw to the acre, arrived at, not by approximation, but by actual measurement and weighing. This forty acre field is a light, sandy loam, faces the north, and has a slight declivity for drainage towards the glen and rivulet that diagonally cross the front concession.

Operation of Manure.

I have reflected in this manner as to this field: the distillery manure, although spread excessively thick on it, was fresh and not well rotted and fermented, which I think

resulted in less yield the first season; the second season necessitated a term of decomposition to fully rot all the manure and upturned sod, and this year I had the full benefits of all my manure, and as it is now seeded I expect a bountiful crop of grass and hay from it yearly for the next five or six years. In seeding I used a mixture of four pecks of timothy seed and one peck of clover seed, and of this I distributed about one peck to the acre.

Arrangement of the Fields—Fences.

My farm, which contains about 600 acres, runs back nearly to the end of the second concession, two miles and a half. The first concession is divided in the centre by a system of paddocks and board fences. The pasturage is connected, on the west side with a 72 feet lane from the rear to the glen, so as to admit stock at pleasure to water, and return them to the pasture. In connection with these paddocks I have another œstrum made for the trial of mares, with the same careful attention from danger as I have before described. I am very particular about my fences, to have them made of sufficient height to prevent any possibility of the stock getting out or others getting in. The board fences are 5½, and the rail fences 6 feet high. The worm rail fences are made of cedar with iron caps. The caps on which the rider rests are so arranged as to prevent the perpendicular stakes from separating.

Stone Fences—Gates.

At the end of the first concession and about two-thirds of the distance of the same concession, directly across the farm, I have made two stone fences. First there are posts set in the ground, and the stone is built up to the post, so as to be four feet across at the bottom, and tapering gradually to three feet wide at the top, and from the stones upward I nail on the upright posts narrow boards and a top, making a total height of 6 feet. The other stone fence is 2½ feet high, 4 feet wide at the bottom and 3 at the top, with centre posts, boards, and likewise capped on top. For admission into the different compartments of my farm I am opposed to the old-fashioned way of posts and bars. I invariably use ordinary gates, attached to posts firmly sunk into the ground and fastened with padlocks, staples and hasps.

Salting Stock—Water Supply.

I think stock should have all the salt they desire within their immediate reach at all times. For that purpose I have in every field a long trough, and a man to see to it once a week that a sufficient supply of salt is kept in all the troughs. There is a never-failing stream running diagonally across the farm. To utilize it, there is a dam thrown across a small ravine, which makes a pond that is always kept full of clear, pure water, six or seven feet deep, in which the stock can go and stand and drink, and cool themselves. The pond is fifteen or twenty rods long and about fifty feet wide. The water is kept pure by allowing it to run out and over the dam as fast as it runs and oozes in.

Division of Stock.

I am particular in having all my stock divided in the different fields according to their age and sex. One field is for brood mares with their sucklings, one for the geldings, one for two-year olds, one for fillies, and one for mares that are sent to my stallions to be bred. There is one field alongside the nine-mile road that I use for geldings, which is deficient in running water, it not being practicable to make a lane from that field to the rivulet. In that field I have a well 26 feet deep, which furnishes an unfailing supply of water. I have it regularly pumped into large troughs. I have a windmill to put in there when I get to it. Sometimes this is used in the spring of the year for brood mares, and I have there the necessary paddock and safety œstrum that I have before described.

[*Mr. Wiser.*]

Improvement of Land.

When I purchased this farm it was so impoverished that it did not produce anything in comparison to its present yield. By the manure which has been put on the farm the 28 acres previously spoken of, would produce more than the original farm which was 333 acres, but has since been added to, until I have what is now enclosed.

Blue Grass.

I have a glen lot, as we call it, that has run into blue grass, that is just about as good a field of blue grass as is to be found anywhere. It will compare favourably with the blue grass of Bourbon County, Kentucky. Within the last year I have been twice to Kentucky and looked over the blue grass there, and I am satisfied that my fields can produce as good blue grass as they can there. I would say that, as a general thing, our land here is too dry for blue grass. A dry season has a tendency to kill it out. My experience is that where there is an excessive amount of manure used, the drought does not have the same effect. I get good grass off this farm in dry seasons, when farms that are poorly manured yield poor crops. I never fail now in obtaining good crops.

Burning the Stumps—Weeds.

There is one thing that farmers very much overdo, and that is setting fire to stumps in pasture fields. I would never burn stumps off my farm, but let them rot in the pastures, as the *debris* enriches the earth. In the meadows they have to be taken out of course. You ask if I am troubled with weeds on my farm, and if so, can I eradicate them, and how? When I purchased the farm it had been neglected very much in that particular. I commenced a thorough work of elimination, and when the Canada thistle and white daisy, or bull's eye, made their appearance I had men detailed on purpose to dig them up by the roots and carry them off and destroy them. This proved a work of great labour at first, but yearly it became less and less, and I have but few now, comparatively none at all. When a few do appear I follow the same plan. I can say I have by this means got them eradicated. I can make no headway against the mustard nuisance. The buttercup or mustard has beaten my every effort.

Can we Compete in Cattle and Horse Raising

Q. Have you come to any conclusion as to whether cattle and horses can be raised and produced cheaper and better in our climate and on our grasses, in comparison with that of a more southern soil and climate, or the contrary? A. I have given that subject a great deal of attention and thought. When I first began to buy cattle for feeding for beef purposes, I bought in Illinois, Indiana and Ohio, and drove them by easy stages all the way north to the St. Lawrence. I then bought good steers, well developed and thrifty, but they did not take on fat and grow from being stall fed as well as our class of stock. I bought them very cheap compared to what I pay now, but that was many years ago and times have changed greatly since. The markets now are very different. Then I had the advantage of the United States markets, and there was no British market available to us. I buy now altogether in Ontario.

Quality *v.* Cheapness.

Upon the whole I think the Western States can raise a three-year-old steer, seemingly fat and fair, cheaper then we can. I think if our farmers would confine their cows to Durham sires they could produce a thirty months' old steer that I would sooner have, and pay much more for, for my purpose, to feed, than those of the same age from the western ranches. They certainly can be raised much cheaper in Texes, Arkansas aud Colorado

[*Mr. Wiser.*]

than with us, and thus sell cheaper, but in my opinion their meat is less substantial and marbled, and I conclude that we can raise them of much better quality but cannot raise them so cheaply. However, I know the Americans can lay down beef in the British market from the western prairies cheaper than we can with our mode of production, but our beef will always be better, have the first call in market, and demand higher figures.

Freights to Europe.

Our greatest trouble now is cheap trans-Atlantic freight. If we had more steamship competition, and freight as low as American bottoms carry live stock, there would be a large profit for breeder, feeder and trader Taking into consideration the size of beef stock mostly raised in Canada at present, I think if steamship companies would carry live stock by the ton instead of by the head, it would privilege us in exporting a much larger quantity of beef than we now do. It would not be as heavy beef probably, but it would enable our farmers to sell a smaller class of beef cattle and more of what they have to spare, even if they sold at less prices. Freight charges could be so adjusted as to be none the less profitable to steamship lines, and this would enable buyers to purchase equally as fat but a lighter class of beeves—of which the supply is abundant.

Advantage for Producing Horses.

In regard to producing mature average priced horses, I think our soil and climate excel. Our seasons in Ontario are just what is required to mature and educate a good roadster. After weaning, the first winter of his coltage brings him all the time for his feed and care in contact with man, his future master. These surroundings tend to his docility and tameness The next six months of summer give him the very best grazing and pasture, with a temperate atmosphere and plenty of palatable unstenched water for drink. Alternating with his freedom in summer, to his contact with his keeper in winter, the first three years of his life, if gently handled, make him docile, tractable, and free from vice. Our winter seasons of snow and ice make it a pleasure to break him to harness and labour, and give him his first lessons with but little fatigue and exertion to himself. My life-long experience has been that horses matured and brought up as is our custom in Ontario, make more docile, less vicious, hardier, tougher, more endurable, and more valuable animals than those reared in a southern climate.

J. P. WISER.

Sittings to take oral evidence, held at London, July 21st, 1880. *Present*—Messrs. R. Gibson (Chairman), Wm. Saunders and A. H. Dymond.

MAJOR JOHN PETERS' EVIDENCE.

Major John Peters, of London, was called and examined.

CARRIAGE OR BLOOD HORSES—PRESENT DEMAND.

To the Chairman.—I have been breeding horses for about twenty-five years, and have bred both carriage and blood horses. The present demand for the export trade is mostly for good roadsters, weighing 1,000 or 1,200 pounds. Bays and browns are the choice colours. They must have good action and style, and be well set up, to meet that demand. I would get a good Irish hunter, over sixteen hands high, and I would breed from it.

THE IRISH HUNTER.

It is a horse weighing from 1,100 to 1,200 pounds. To get the Irish hunter, I would cross the thoroughbred with well-bred English carriage mares. The horse should stand sixteen hands high.

[*Major Peters.*]

CARRIAGE OR FARM HORSE.

If a good carriage stallion is bred to a Clyde mare, it produces the style of horse which we get here, and comes up to what we want. Such a horse might be called either a carriage or a farm horse. As to the best pure bred horse to cross with a common mare, for general purposes, I don't know that you would want a pure breed, but a good well bred carriage stallion, or instead of that you might get a blood horse The stallion should be carefully selected according to the qualities of the mare. I would advise large thoroughbred horses for crossing the mares we have here.

GOVERNMENT INSPECTORS OF STALLIONS—LICENSE TAX.

I don't believe in using mongrels, and I think the Government should appoint some one in each county to look over the stallions that are travelling, and every man who travels a stallion should be taxed $50. I think that would remedy the evil. Many unsound mongrels are led around the country, and the farmers, many of whom don't know much about breeds, are led into patronizing them on account of their cheapness.

PROFIT IN HORSE BREEDING.

I don't find the raising of colts to be very profitable, as they are a bad kind of stock to be over-stocked with. As to the difference in the cost of raising a colt and a steer respectively up to three years old, it would cost more for the colt, as a steer will eat what a colt will not, but I could not give you the figures accurately.

COST OF FEEDING COLTS—VALUE AT THREE YEARS.

I don't think you could keep a colt over winter for less than $15 to $20, if it were properly fed. Many half starve their colts, under the impression that young animals can live on any thing, and the result is that they never attain their growth. A three-year old colt, if anyway well formed, or worth looking at at all, should sell for $80 or $100, while the steer would be worth from $40 to $50. At those rates I think it would be more profitable to raise the colt. There is greater risk in raising horses than cattle.

HORSES OF THE DISTRICT—AGE FOR BREEDING.

Our horses here are pretty well divided between Clydes and carriage horses, in fact you cannot tell the breed of many of them; they are just working horses. I would not think of breeding from a mare until she was over three years old, and even that is rather young. While a mare is breeding, or the colt suckling, I think it does her good to do light teaming, and work of that kind, but after they are so far advanced in foal, they should not work at all.

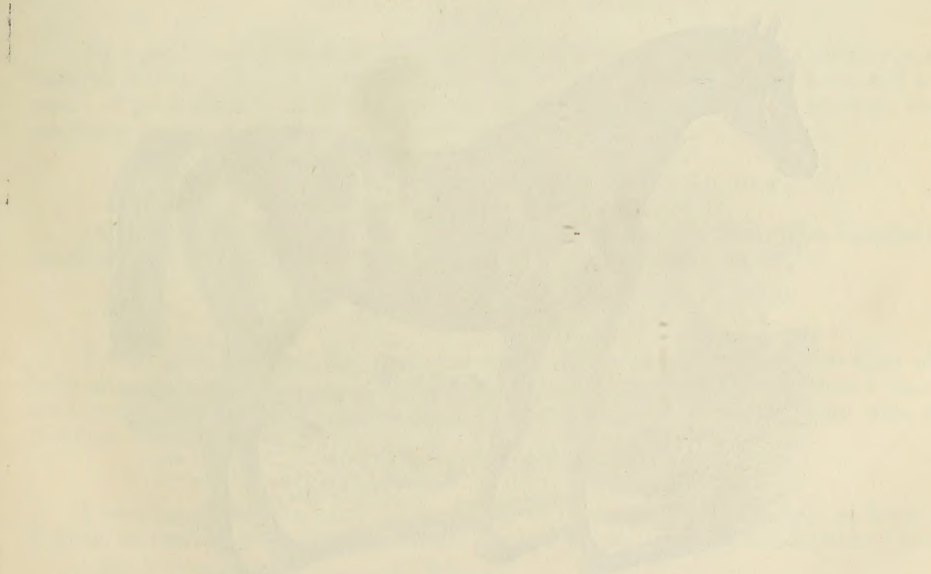
WEANING AND FEEDING COLTS.

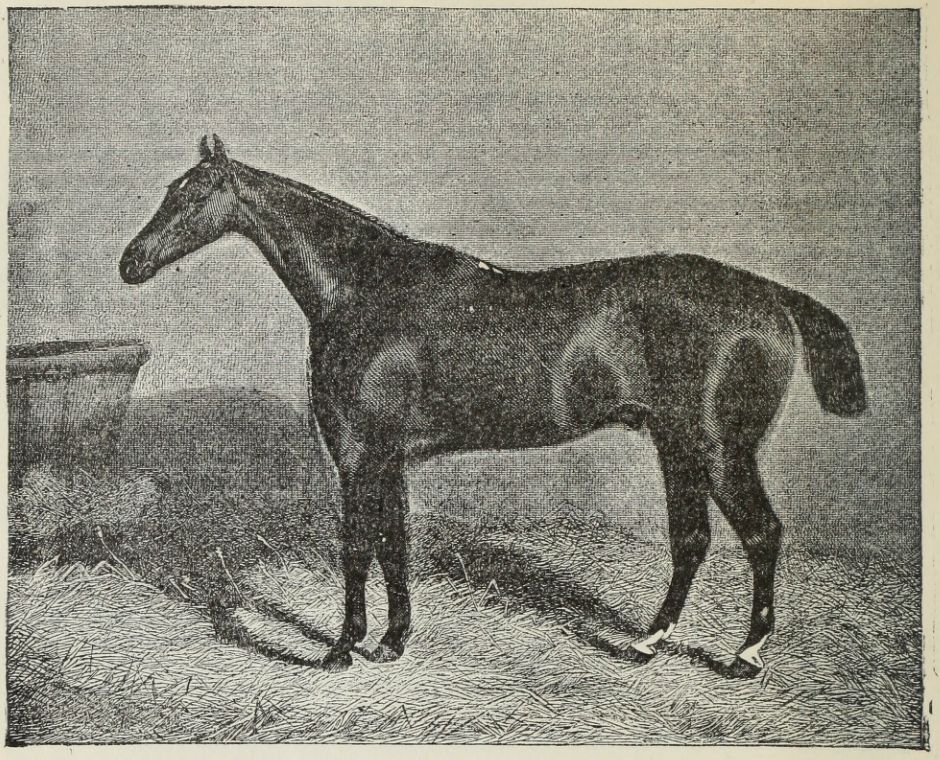
We generally take away our colts at six or seven months, and in the winter we feed them on grain, giving them a few carrots. At first we let them stay with the mare, as they are likely to learn to eat, while their mothers are eating. But whenever it begins to eat oats, we take the mare away. I believe in letting colts run in a loose box, and at no time should they be closed in.

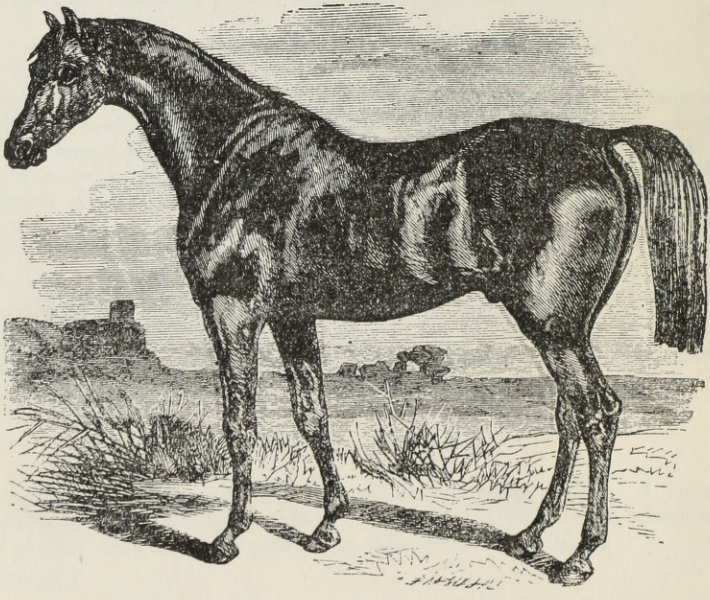
NUMBER OF SERVICES.

I think stallions should be restricted to a certain number of mares. A vigorous horse I would not allow to have more than eighty. But it would depend on whether it was a sure getter of stock. One that was sure might take more than eighty.

[*Major Peters.*]







FOR THE SADDLE AND HUNTING-FIELD.

CROSSING WITH THOROUGHBREDS.

I have been breeding particularly thoroughbred horses, and I have tried crossing them on common stock, with excellent results. I think thoroughbred horses should be used in all cases, as they produce horses which will save the farmer a great deal of time at his work, or in going to market, etc. Even for horses on our street cars, those which have some breeding in them are always preferred, as they last so much longer than others.

DEMAND FOR SADDLE HORSES.

There is a good demand for saddle horses just now. You can get a good saddle horse without a thoroughbred cross in it. To prevent poor stallions on the road and getting bad stock, I would be in favour of having an Act of Parliament imposing a license fee of $50, and that would keep most of them off the road.

THE LICENSE PROPOSITION.

To Mr. Dymond.—I admit that there are many stallions which are not thoroughbred, and which it would be desirable to allow the poor man to breed from. I would not put a tax on all horses that are not thoroughbred, but upon horses that do not come up to a certain standard, or are not free from blemish. I would have a censor appointed, who should decide whether horses came up to those conditions.

FOREIGN DEMAND FOR HORSES.

There is a good demand for horses, both in England and the United States, and pretty much the same class of horse is required for both countries. The horses that we send to England are those of a serviceable type, weighing about 1,000 pounds. They are not fast horses. The demand for riding horses is in the United States and Canada, principally the former. There is a demand in New York for rather heavy horses, from Canada; and to produce the kind which is wanted, a carriage stallion should be put to a good heavy mare.

CARRIAGE HORSES AND ROADSTERS.

By a good carriage stallion, I do not mean a thoroughbred. Such a horse would perhaps be able to go a mile in four minutes, and would be both a carriage horse and a roadster. A good carriage horse ought to be able to go ten or twelve miles an hour, but the roadsters we have here will go fifteen or sixteen miles an hour.

SPEED TO BE GOT ONLY FROM THOROUGHBREDS.

In order to get speed we must breed from the thoroughbreds. The Glencoe is my favourite, but the Lexington which came in afterwards is also good.

HAMBLETONIANS—HUNTERS.

I don't know much of the particular merits of the Hambletonian, but from what I have seen of them, I don't fancy them. The Irish hunter is got I think from a thoroughbred cross on a carriage mare. The English hunter is got in much the same way, but it is a finer breed.

A SERVICEABLE HORSE.

I would recommend a good thoroughbred stallion, that would weight at least 1,200 pounds, and stands not less than sixteen hands high, to cross on the common Canadian

[*Major Peters.*]

mares. That would produce a serviceable horse, both for speed and strength, and would export well.

GOOD PRICES.

I have sold some very valuable horses, bred from thoroughbred horses on good carriage mares. I had a mare got from a cross on the Royal George. I put her to a thoroughbred, and I sold the colt for $300. The highest price I ever got for a span of carriage horses was $550. Young stock of that class would not sell at all; they must be kept to a certain age. If a person was breeding a certain class of horses and got up his name for them, it would pay him well to have an annual sale.

STOCK OF HORSES DEGENERATING.

I think our farm horses have been degenerating the last two or three years, for the reason that good stock has been going out. People from other countries have been coming in and buying our best horses. The sires at present are not so good as those we had eight or ten years ago.

FRESH BLOOD WANTED.

People seem to be importing inferior animals. I have not imported any stallions lately. I strongly advise the importation of fresh blood from the old county. The blood stallions we have had lately are not heavy enough.

To the Chairman.—I don't think there will be any difficulty in getting horses weighing 1,200 pounds.

A WANT IN THE STATES.

To Mr. Dymond.—There is a demand both in Canada and the United States for light handsome riding horses. They sell for $150 to $160, or if extra good, $200. The price of the horse depends a good deal on the fancy of the buyer, but I have given the average of the market.

To Mr. Dymond.—We have no good breed of ponies in this country, and I don't think any attention has been paid to developing such an animal. There is not much demand for them, and I don't think it would pay to breed many of them. Twenty years ago we used to have some very nice ponies of our own, but there was no market for them. I could not suggest any means of getting a good breed of ponies, unless by breeding a French stallion with the small Indian ponies. I don't think the crossing of these small ponies upon small trotting horses would produce a good breed.

JOHN PETERS.

[Major Peters was also examined respecting cattle raising and feeding. His evidence on those subjects will be found elsewhere.]

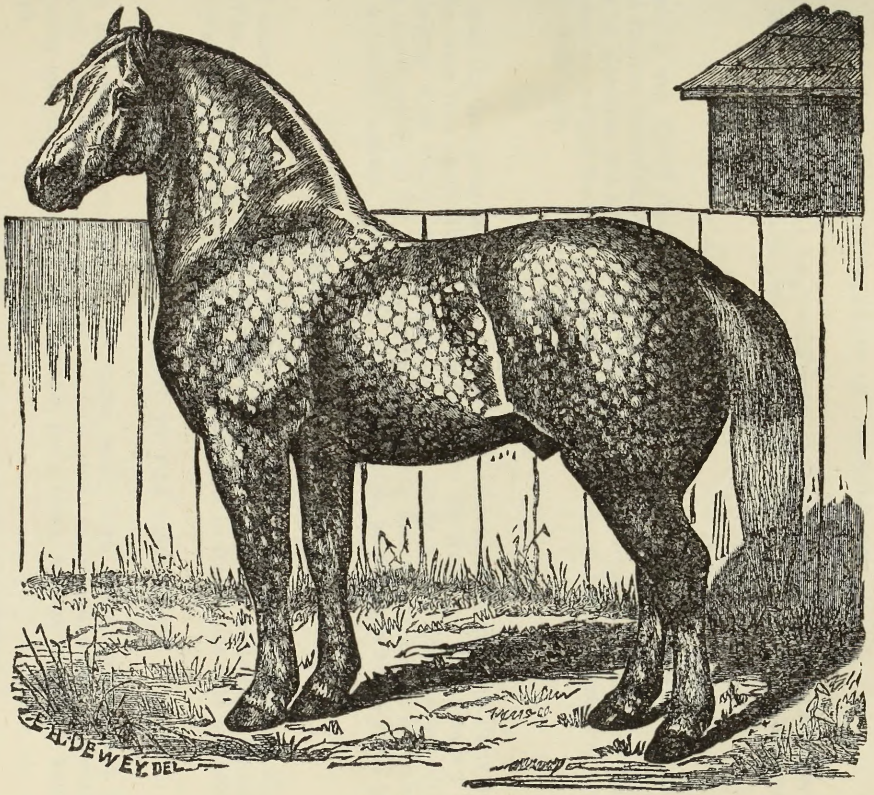
Sitting to take oral evidence, held at Walkerville, County of Essex, July 26th, 1880. *Present*—Messrs. Francis Malcolm (Chairman), and A. H. Dymond.

MR. HIRAM WALKER'S EVIDENCE.

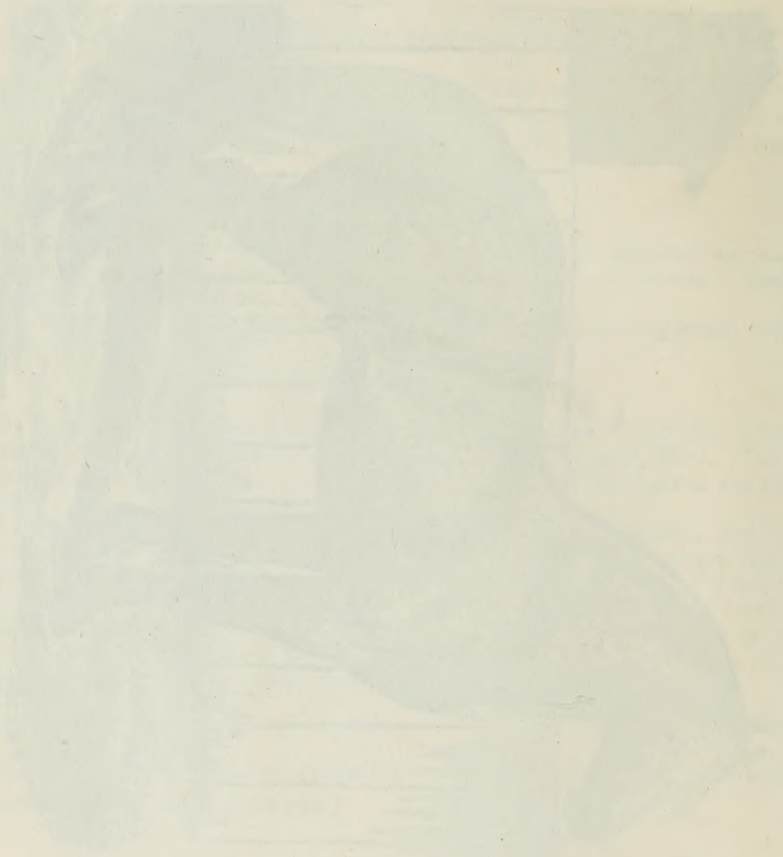
Mr. Walker having given his evidence respecting cattle feeding and shipping, in answer to Mr. Dymond said:—

We (firm of H. Walker & Sons) have bred horses of various kinds, particularly roadsters and general purpose horses.

[*Mr. Walker.*]



THE PERCHERON.



THE ROYAL GEORGE.

The Royal George is a good horse to cross on a common mare well selected, in order to raise roadsters.

THE SUFFOLK PUNCH.

For general purpose horses I have used the Suffolk punch on a common mare. We have not used the Clydes at all.

IMPORTATION OF PERCHERONS.

We recently purchased an imported Percheron stallion, *Romulus*, and three Percheron mares. We gave on this side $3,000 for the stallion and $1,000 apiece for the mares.

ROMULUS.

Romulus was foaled April 23rd, 1873. He was got by the (French) Government approved stallion Romulus, whose sire was the Government approved stallion Monarch. The dam of Romulus was a dapple-grey mare named Julia, sired by Romulus by Monarch. He is therefore in-bred from two famous horses, winners of all the great concourses of France in their time.

HIS PRIZES.

He won the first prize and gold medal at the Universal Exposition of Paris in 1878, and in the same year nearly thirty other prizes, two for trotting. Romulus is a beautiful dapple-grey with heavy white mane and tail; he is a very fast walker which is a valuable characteristic of the Percheron horse; he has fine action, and is, for so heavy a horse, a wonderful trotter. He stands 16¼ hands high, and weighs about 1,700 pounds.

PERCHERON MARES AND COLTS.

The mares are known as Juno, foaled May 5, 1875; Cozette, foaled March 23, 1875, and Fantine, foaled in the spring of 1874. We have got two colts from Fantine and Cozette respectively. Juno failed, but is now we think in foal as are both the others.

DISTINGUISHING POINTS IN THE PERCHERON.

The Percheron is a snug, close-built horse, easily kept, has a quick action, is a fast walker, and, for a heavy horse, a fast trotter, he is good tempered, and has great endurance. The majority are grey, but in the lot I bought from, there were several black horses and some bays.

GENERAL PURPOSE HORSES—FEEDING QUALITIES.

To cross our stock, or even as they are, they will, in my opinion, make excellent general purpose horses. They don't eat more than half what other horses eat to keep them in the same condition.

POSSIBLE IMPROVEMENT OF CLYDES.

Our Clydes, I think, would get better action and a lighter carriage if crossed with the Percheron. The Percheron has good bone and strength in compact compass. A Percheron horse weighing 1,800 pounds will go twenty miles as light as a pony.

[*Mr. Walker.*]

GOOD CARRIAGE HORSES.

A properly selected, large, well developed, light, common mare, crossed by a Percheron horse, should give a good carriage horse. I think the Percheron colts will be equal to any imported horses. We have a large number of mares in foal by Romulus.

INDIAN CORN GROWING.

We grow a large quantity of Indian corn. When we take the fodder into account, the crop is profitable. Essex and Kent cannot be beat for corn. We use the corn for distillery purposes. We have got 60 to 70 bushels of shelled corn per acre.

HIRAM WALKER.

Sitting to take oral evidence, held at Seaforth, August 12th, 1880. *Present*—Messrs. McMillan (Chairman) and Dymond.

MR. GEORGE A. HOUGHTON'S EVIDENCE.

Geo. A. Houghton, of Seaforth was called and examined.

To Mr. Dymond.—I am a large dealer in horses; about 200 horses a year have passed through my hands during the last twenty years.

MARKET FOR HORSES.

I generally buy as a commission agent; my market has generally been in Boston, I have also bought for the New York and Pennsylvania markets; I buy all classes of horses—both heavy draught horses and light general purpose horses; the former are required chiefly in the city, and the latter for the farm, for light waggons, and for street cars.

SOURCES OF SUPPLY—DEMAND.

I buy from the farmers for about twenty-five miles around Seaforth. The demand for horses is increasing, but there have been so many taken from this neighbourhood that the supply is getting short.

PREFERENCE FOR CANADIAN HORSES—PRICES.

Canadian horses are preferred in New York and Boston to horses from the Western States, and command from $25 to $50 a head more. For ordinary horses I have been paying from $90 to $100, and for good Clyde horses from $125 to $200. I consider Clyde horses more profitable for farmers to raise than any others, as they are able to work when they are two years or two years and a half old. The reason Canadian horses are preferred to Western American horses is that they are not fed up so high and will wear better. Western horses are fattened on corn like so many pigs, and it injures them. Canadian horses will thrive, while Western horses go backwards.

USE OF GOOD STALLIONS.

In all cases I think farmers should use thoroughbred stallions, and as good mares as they can get. In this district there are none but the best class of stallions used, as the farmers are learning that it pays them best.

[*Mr. Houghton.*]

EXPORTING YOUNG HORSES BAD ECONOMY.

The horses that suit me best are those five years old, but buyers are so anxious to get them that they take them at two years. Some of these young horses are sent to Pennsylvania to be fed for a year or two by the Dutchmen, and when they are got into good condition they are sent to the market. I think it would pay our farmers to feed up their horses here and take good care of them, and sell them direct to the market rather than to the Dutchmen. I think the number of horses raised in this part of the country is increasing

IMPORTED CLYDES.

All the pure Clydes in this part of the country are imported horses. All the Canadian-bred Clydes in this neighbourhood are crosses.

THE PERCHERONS.

I have seen Percheron horses, but not very many of them; but from what I have seen of them, they appear to be a very nice horse—perhaps as close a made horse as the Clyde, very little lighter in the bone, and with more action.

HORSES FOR GREAT BRITAIN.

There has not been a demand for any other class besides the Clydesdales here within the last two or three years. Three years ago I bought 300 horses for the old country market, and I was trying to get good roadster horses. That trade was very good for a year or two, but there was a drop in the demand. I have not gone into the question of the horses required for the old country. I confine myself to the horses in demand in this part of the country, and the heavier the farmers can get them the better.

LARGE SHIPMENTS—INCREASED DEMAND.

To Mr. McMillan.—I have shipped something like 250 horses from Seaforth since February last. There is a decided increase in the demand this year over last year. I think there will be a demand for all the grade Clyde horses our farmers can raise.

GEORGE A. HOUGHTON.

Sittings to take oral evidence, held at Toronto, October 6th, 1880. *Present*—Messrs. J. P. Wiser, M.P., (Chairman), and A. H. Dymond.

MR. T. C. PATTESON'S EVIDENCE.

Mr. Thos. C. Patteson was called, and gave evidence as follows :—

EARLY EXPERIENCE—LIFE LONG STUDY.

To Mr. Dymond.—I was brought up in one of the most sporting neighbourhoods in England, and there and at Oxford saw a great deal of hunting, horse-racing, and horse-breeding, and have visited nearly every breeding establishment and race-course of importance there. I have made a life-long study of the horse.

HORSE BREEDING—SHIPMENTS TO EUROPE.

I came to Canada in 1858, when I was twenty-three, and for the last ten or twelve

years have had a farm of over 500 acres, on which I have bred, experimentally, every kind of horses, except trotters. I have sent to Scotland and England half a-dozen consignments of horses selected in this country by myself, each time trying to meet the wants of buyers there as I heard them expressed on previous visits. I am conversant with the character of the horses raised in Ontario, and the supply to be found here, having travelled the country from Belleville to Stratford, in search of animals fit for export.

COMPARATIVE VALUE OF DIFFERENT BREEDS.

Mr. Wiser.—What are the comparative merits and value of the different breeds of horses in view of the demand for: (1) draught, (2) agricultural purposes, (3) roadsters, (4) export trade, (5) local trade?

TOO PROMISCUOUS USE OF CLYDES.

Mr. Patteson.—I suppose I may answer that question conversationally, instead of dealing categorically with each head. I think the tendency of horse-breeders in Canada, at the present time is to use Clyde, or heavy draught stallions too promiscuously, that is not only with big heavy mares, but upon small light mares as well.

THE CLYDES AS DRAUGHT HORSES.

The best horse for actual draught that we have, is unquestionably the Clyde, as nearly pure as can be got. By draught horses I understand you to mean such as are suitable for railway lorries, brewers' and distillers' waggons and drays, or fitted for taking about machines.

THE AGRICULTURAL HORSE.

The animal for agricultural purposes should not be so heavy as the Clydesdale, and therefore should not be of that breed. If he is by a Clydesdale out of a small mare, the cross is too sudden, and the progeny generally is an ill-shaped mongrel. Consequently no horse should be bred in that way. He should, in my opinion, be two-thirds light ordinary Cleveland bay or thoroughbred blood, and one-third heavy. You never see more than two horses ploughing in Canada, or teaming. We use lighter horses and lighter implements than in the Old Country. Farmers want horses able to work and to travel also.

THE ROADSTER CLASS.

As to roadsters, the American trotting stock, and some Canadian families which have been preserved, will produce all that is wanted, and we have that now in the Hambletonian, Royal Georges and Tippoos. This class can safely be left to its own merits and unassisted progress, particularly as the habits of the people tend very much to its cultivation. Every man who has a little spare money likes to have a fast roadster, and I can see a great tendency to improvement in this class of horses, and some in riding horses as such, more attention being paid to them by "Young Canada" than formerly.

THE HORSE FOR ENGLAND A CHANCE HORSE.

The horse for export to England is at present produced entirely by accident, being what is called a "chance" horse. He is of a different mould altogether from a horse generally considered valuable in this country; in fact, those horses which I have sent to England, and out of which I have made most money—getting guineas where I paid dollars—have been horses upon which the farmer or breeder set comparatively little value, and which they regarded as being worth much less than some straight-shouldered, cross-bred

machiner in their stable, or a shelly, weedy and often ugly animal, able to go at a 2:50 or 3-minute gait.

A RIDE-AND-DRIVE HORSE.

To Mr. Dymond.—These horses are generally picked out of farmers' teams, and have been got by a thoroughbred horse out of a pretty well-bred mare, partly of trotting and partly of coach blood. An English dealer will give you most money for a "ride-and-drive" horse, with the qualities of a good hunter about him, and many of our farmers' horses are of just such a class.

POINTS OF THE HORSE WANTED.

I will try to describe a model horse of this kind. He should weigh about 1,100 pounds, stand from 15-3 inches to 16 hands high—anything under 15-3 being classed as small—girth about six feet, the tendency in girth being to depth rather than width; should be short in the back, with very oblique shoulders, level quarters, high set tail, and legs planted well under him; of a good colour, with no objectionable markings; not more than six years old, and of course sound, and free from vice. Such an animal, up to 14 stone, would be worth 120 or 130 guineas, and can often be bought first-hand here for $120 or $130. Of course there are not many horses in this country which really come up to the standard I have indicated, and such as do exist have been bred entirely by chance.

WHERE TO FIND SUCH HORSES.

To Mr. Wiser.—If I wanted to buy twenty such horses, I should go into those districts where six or seven years ago was located a thoroughbred stallion of fair size and substance, with good bone, flat legs and two good ends, and I should be quite sure to find there some horses of the class I have described. The stay, dash and thoroughbred characteristics in the progeny would come from the sire, while the mare herself, say half English coach-horse, and half roadster, with no actually cold blood, such as that of the cart horse or the Clyde, would give additional weight-carrying power, and mares of this kind are plentiful throughout the country.

PREPOTENCY OF THE STALLION.

It is, moreover, indispensable that the stallion should be an animal able and apt to transmit his size and leading characteristics. It is not sufficient that he should have been an excellent racer. High prices have often been paid for great race-horses, who have turned out utterly valueless in the stud.

A SUGGESTION TO AGRICULTURAL SOCIETIES.

In this connection I would say that if the Agricultural Societies throughout the Province, were to add to the words "first prize for best thoroughbred stallion," the words "for improving the breed of horses in Canada," they would be taking a most advisable step towards elevating the standard of our horses. Judges do not like overlooking a notoriously fast horse in favour of one of better build with no record.

THE HORSE USED MUST BE PURE BRED.

Every horse used for perpetuating his breed should be of his kind absolutely pure, no matter whether he be a Clydesdale, a Cleveland, or what is always spoken of as the thoroughbred *par excellence*. A mongrel is of no value for breeding purposes. It is a mere matter of chance what he produces, as he is just as likely to "throw back" to the cold strain as the warm one. His bad blood is, in fact, more likely to "nick" with the mare's base blood than to rectify it.

[*Mr. Patteson.*]

THE CLEVELAND BAYS.

To Mr. Dymond.—There are not many Cleveland Bay stallions in the country. A few—perhaps not pure-bred—were exhibited both at Hamilton and Toronto at the late fairs. Those at the Toronto exhibition were shown by a farmer named, I think Somerville. There are no native pure-bred Cleveland Bays; in fact, I am not aware that there are any pure-bred mares of this class in the country at all. Mr. Abbott, of Montreal, imported two pure-bred mares, but I know of no others.

IMPORTATION OF CLEVELAND BAYS DESIRABLE.

I should welcome the importation of Cleveland bay mares for the improvement of our carriage stock, but the most we can hope for is the stallion. The Cleveland stallion comes from the district in England indicated by his name, and a good prize-taking specimen can be got there for $1,000.

THE LONDON CARRIAGE HORSE.

Bred to large bay mares, 16½ hands high—the more nearly resembling himself the better—he would produce London carriage horses for certain.

PRIZES FOR CARRIAGE STALLIONS.

In my opinion it cannot be too strongly impressed upon judges at exhibitions that the prizes in the carriage stallion class should, when possible, go to pure-bred imported Clevelands. At the Toronto Exhibition—I do not know who the judges were—the first prize for carriage stallions went to a very fine chestnut horse who was preferred by the judges to the Cleveland Bays exhibited. He was, no doubt, a good horse, but he had no distinctive breeding; he was of Royal George descent, valuable for general purposes, and would get roadster and trotting horses, perhaps, but he was not of the right colour to get horses for the English market. A pair of horses such as he would get could not be sold for much more than half the price that a pair sired by a good English coach horse would bring.

POINTS REQUIRED IN ENGLAND.

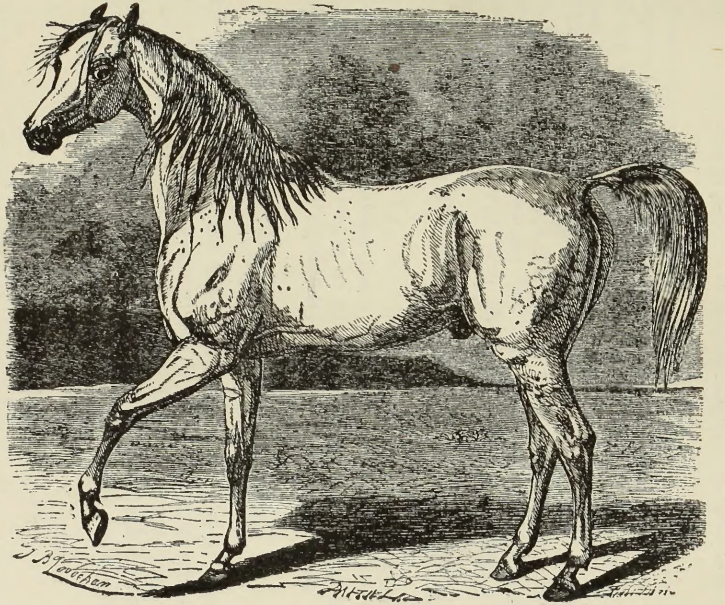
To sell in England, a horse must have a good forehand, and a good butt-end, and with the characteristics I have already sketched, mere speed is not much value in a dealer's eyes. If he has a stern on him such as the Royal Georges usually carry, I should say that he will, in that respect, quite come up to the mark.

CROSSING ROYAL GEORGES ON HAMBLETONIANS.

To Mr. Wiser.—By breeding a Royal George mare to a Hambletonian sire you shorten the legs, you thicken both ends, and altogether you produce about the best type of road horse which can be raised in this or any other country.

DIFFICULTIES TO BE ALLOWED FOR.

It must be borne in mind, however, when speaking of scientific breeding, that we have to deal with a scattered farming community, the members of which cannot be expected to act on any settled principle, or in concert with one another. There are no large breeding establishments in the country conducted on the joint-stock plan, where experiments can be carried into execution, and where different principles can be tested. Each man consults his own whim, or more likely, his own pocket or convenience. Rather than



THE ARAB HORSE.

incur the expense of a couple of days' travelling and a higher fee, he will not unnaturally put his mare to the first stallion that comes along. And for so doing he cannot well be blamed, as no doubt the trouble and risk attendant upon sending a mare some distance from home are not inconsiderable.

Joint-Stock Breeding Establishments.

One of the most likely ways to bring about a state of things whereby the farmer could improve his stock without incurring much expense would be to establish large breeding places in, say four or five different sections of the country. These could be conducted as joint-stock concerns, possibly assisted by the Government or Electoral Society.

Progress in Horse-Breeding in France.

Thirty years ago, a French horse was a term of ridicule in England, their breeds being considered of little or no value, while to-day, the horses in France are as good as can be found anywhere. The change was brought about entirely by the Government, who gave pecuniary assistance to societies established for breeding purposes, and bought English stallions and let their services out at a nominal fee. Now if our own Government were to follow this example, and place their stallions in the hands of respectable and responsible farmers, and charge for their services at a reduced rate, comparatively little expense would be incurred, and the ends of good breeding would be very much furthered.

The Proposal to License Stallions.

Licensing stallions would be a very desirable plan, but I do not think it is practicable. I do not think a system of registration requiring a horse to be up to a certain standard before allowing him to travel, would be advisable, because it would not be observed at all in the remoter districts, and only partially in the more settled ones.

Mongrel Travelling Stallions.

It is very desirable that some restraint should be placed upon the travelling of mongrel stallions, which serve no purpose but that of working mischief, but I am afraid the matter must be left to the improved judgment of the owners of mares. They will find that their neigbours who breed more carefully are making more money, and will naturally follow their example. I am afraid we shall have to rely upon this as the only means of bettering our present system.

A Steady Improvement Going On.

To Mr. Dymond.—Notwithstanding the want of interest and intelligence, there is most certainly a steady improvement going on. I do not know that there are more thoroughbred stallions travelling the country now than there were twenty years ago, but I think there are more well-bred horses among the farmers, which is chiefly owing to the increased number of county and township fairs, and the great rivalry among neighbours. The difficulty arises perhaps not so much from want of interest or intelligence as from the fact that the circuit of the thoroughbred stallions is so extended that they cannot be relied upon to be on hand when required ; and a mare is only three days in proper "use."

Government to Encourage Local Efforts.

It would be better perhaps for the Government to encourage local effort through some such channel as the Agricultural Associations than to take the matter directly in hand, though the Government have people in their employ who could select—as other Governments have done—and purchase good stallions and stand them.

[*Mr. Patteson.*]

Prizes Thrown Away.

The Agricultural and Arts Association have not been very fortunate in their efforts, and, in fact, I regard the prizes that have been offered and given in the thoroughbred class as so many hundred dollars thrown away every year. I think, however, that in our local Agricultural Societies we have at hand the machinery required to meet the necessities of the case, and I do not know, if we were to take advantage of it, that we should not secure the end better than in any other way. If each society—say of our electoral divisions—were to buy and place at the service of farmers three good stallions of the Clydesdale, coach, and thoroughbred classes, and only approved mares were allowed their services, the *summum bonum* would be arrived at at once, and the waste of money now given as prizes by the Provincial Society might be stopped. This waste is in the classes for mares, colts and fillies. The stallion prize might be increased. I have myself taken prizes with very inferior young animals.

No Increase in Thoroughbred Mares.

I should like it to be known that there are no more thoroughbred mares in this country now than there were twenty odd years ago. I suppose I have imported more thoroughbred mares than any other man now in this country, and I have found it necessary to sell nearly every one outside of it to the United States. I have even sent two bred here to Scotland. The reason for this is, that there is little encouragement to breed such horses here. Few men of leisure ride, and the thoroughbred is not meant for harness.

No Encouragement to Breeding Thoroughbreds.

Breeding thoroughbreds can only be made to pay by competition for prizes on the turf, and the turf has become so demoralized in Canada, that unless the old adage holds good, "when things are at the worst they mend," it may as well be abolished as pool-selling has been. There is no market for thoroughbreds in Canada.

No Race Horses of First-class Record in Canada.

We have never produced a race-horse in Canada, that has been at all first-class. One mare, indeed, we have in Toronto at present—Lady D'Arcy—who has taken second-class honours on the American turf, but there are no others worth mentioning. I am speaking of race-horses, not trotters.

The Pool Bill—Its Effects.

It is my opinion that without horse-racing, we shall never improve the breed of horses in Canada, and since the passing of the present Pool Bill the pursuits of the turf have come almost to a stand-still. Without wagering you cannot get together a crowd of people to see a race, without gate money from the crowd you cannot pay the stakes, and without the stakes you will not get the breeding.

Its Suspension Urged.

The full operation of the pool law has not yet been felt, and I would very strongly recommend that it be suspended for two years, associations being given to understand that they were on trial, and must keep down abuses, or suffer well-merited extinction.

Racing in New York State.

It is only a few years ago that racing in the State of New York was as demoralized

[*Mr. Patteson.*]

as it is here. But now Saratoga and Jerome Parks vie with Ascot and Goodwood in the strictness of regulations, and the immediate punishment of fraud, whether owner, trainer, or jockey, be implicated. The present state of things here is due to the timidity of some associations, and the collusion of others. The wrong sort of people are at the head of sporting matters, and respectable people, however fond of sport, are afraid to touch pitch. I speak as a breeder and sportsman entirely, because I am no gambler myself, and I give it as my conviction that we shall have no great improvement in our breed of horses, so long as the present pool law remains in force.

Exportation of Owen Cutler.

To show how little market there is for thoroughbreds here, I need only to point to the horse, Owen Cutler, that was sent from Montreal to France the other day. His owner tried to get $600 for him here, and finally sold him for $500, and he was then taken to England and sold to the French Government. He was a magnifient horse, but had no record, and consequently possessed no value in the eyes of people here. I have myself discontinued breeding thoroughbreds; there is no market for them. You could buy the whole thoroughbred class exhibited at Toronto or Hamilton for a bagatelle.

Sales of Thoroughbreds—Low Figures.

The diploma winner and first prize stallion at Toronto and Hamilton, was bought last winter at auction, at Ingersoll, in company with another, and I think a better horse, for a grand total of $600, and the others on the ground cost about the same; in fact, in the whole exhibit of thoroughbreds there was no horse, not being then a race-horse, which had cost the price of the big white steer.

The Stud Horses Wanted.

The kind of thoroughbred stallions that we want, to improve our horses, considering the dearth of mares, are not likely to be bred here, and consequently, the only way to get them is to import them. In general the importation of these stallions has been due to their coming here as race-horses, and they have been used for stud purposes, after their racing days are over. Vespucius, War Cry, Milesian, King Tom, Truxton, Sir Tatton, Jack the Barber, Tom Kimball, Cadmus, Black Jack, Vicksburg, Sir Archibald, Viley, Harper, Durell, and Mohawk, are instances of that, while Helmbold, Judge Curtis, Tester, Ruric, Tubman, Oysterman, Kenneth, Slap Bang, Charon, Lapidist, Reveller, and Princeton, may be cited as cases of sires imported solely for breeding. So long as there is no object to be gained by bringing race-horses here, so long, of course, will the chief source of supply in the highest breeding department be dried up.

Trotters—Good Roadsters.

To Mr. Wiser.—I would encourage the breeding of horses, with a view to produce trotters, one reason being that if fast trotters fail to be always produced, good roadsters are obtained, and at least, occasionally, a trotter is bred, which sells at a remunerative figure. I apprehend that for this purpose, too, thoroughbred stallions are required.

Rysdyk—The Messenger Strain.

For instance, Rysdyk is not only out of a thoroughbred mare, but on the other side comes from such an infusion of thoroughbred blood, as to make him almost a thoroughbred. That is to say, his sire, the horse we hear so much about, Rysdyk's Hambletonian, is the most in-bred horse in the world, tracing in almost incestuous degrees to Messenger, and the blood of that race cannot be crossed out like that of a horse tracing to different

[*Mr. Pattes on.*]

lines, some of whom are thoroughbred, and some not; in fact, you cannot wash out the indelible Messenger strain.

Royal Georges or Hambletonians.

I should say that out of this stock you could get hunters for the English marke equal to English-bred hunters, consequently I would encourage in every possible way, the breeding of trotting horses, from either the Royal George or Hambletonian families.

The Royal George and Clear Grit Families.

In speaking of thoroughbred stallions in Canada, I would wish to point out that the Royal George stallions, and Clear Grit and his sons, of whom I have seen much mention made during the course of the Commission's enquiries, must, in my opinion, be allowed to trace a great deal of their excellence to the thoroughbred blood in their veins.

Their Descent.

The Clear Grit family traces to Lapidist and the Royal George horse, Erin Chief—to the imported thoroughbred horse Charon; while both the Clear Grit and Erin Chief families are descendants af an imported horse, called Blacklock, a thoroughbred brought into this neighbourhood, and originally known as Fidget.

Both Trotting Families.

Both these families are pre-eminently trotting families, and when you take into account the thoroughbred blood in the veins of Rysdyk, you may assume that there is no trotting blood of any value in this country, that is not so mixed with that of the thoroughbred, as to bear out what I say, viz., that thoroughbred blood is essential to its excellence. Consequently we ought, even for trotting purposes, to encourage the importation of thoroughbred stallions. All the great American trotting families, the Stars, (Dexter), the Clays, (Patchen), Hambletonians, (Goldsmith Maid), boast of thoroughbred blood; while Lady Palmer, and others, were clean thoroughbreds themselves.

Horses that will not pay to Export.

It would not pay purposely to breed street-car or omnibus horses for the English market. The price of an omnibus horse delivered in Liverpool, London or Manchester, ranges from £33 10s., to £35, and at those prices no sensible man would go into the breeding of them here. These horses are in fact the failures, where it was intended to get something better.

Mode of Conducting the Export Trade.

There are two ways of conducting the export trade between this country and England. One is to take the horses over there yourself and sell them, and the other is to invite the English cavalry buyers, wholesale dealers, and job masters, over here, and sell them the animals on the spot. The latter is by all odds the best.

Horse Fairs at Proper Places.

But proper preparations ought to be made for the visits of the English buyers. Men like Mr. Withers and Mr. Hetherington—both large job-masters in England—have come out here, and they could not in the time at their disposal, pick up horses enough to repay them for coming. I would suggest that fairs—not auction sales—be held—say about the beginning of July—at central points, such as Belleville, Whitby, Toronto, Hamilton, St Catharines, London, Woodstock, and Brantford,to which farmers could bring their horses and at which American and English buyers, Canadian dealers and others, could rely upon

[*Mr. Patteson.*]

getting animals in sufficient numbers to make it worth their while to attend. Some such plan would be infinitely better than the system of taking horses over to England and disposing of them there, as Canadian dealers are at an immense disadvantage in the English market, rings being often formed against them immediately upon their arrival in the country, and every artifice and stratagem resorted to, to spoil the sale of their horses.

Want of Good Farmers' Horses.

I repeat, that immense harm is being done to the general class of our horses by the too promiscuous use of Clyde stallions. Last Saturday I took a couple of French officers—who are in this country, with a view to ascertaining whether, in case of emergency, a supply of horses could be obtained suitable for use in the cavalry and artillery departments of the French army—to some of the city stables, including those of a number of farmers' hotels, and I was perfectly ashamed of the wretched animals we saw. It was market day, and out of all the horses which were brought into the city, I am satisfied that there was not twenty good ones. They were almost invariably vulgar, fiddle-headed brutes, with long weak legs and necks, and ragged hips, slab-sided and in miserable condition, showing all the characteristics of a mongrel breed. Possibly, in many cases, the farmers who brought a team of such horses to market had a very much better team doing agricultural work at home, and in all probability, just such horses as the French officers were looking for.

Horses for Artillery Purposes.

If the French Government, or any Government, were to buy horses here for artillery purposes, they would look for animals between 15 hands 3 inches, and 16 hands in height, chunkily built, solid enough to carry a man and pull a gun at the same time, and with action and breeding enough to enable him to travel fast and actively.

Cavalry Horses.

The cavalry horses would be of much the same type, only lighter, having only to carry a soldier and his accoutrements, say about two hundred pounds in all. He would require to be about 1½ inches less in height, and with rather more blood in him. These are the commonest kind of horses throughout the country, and I have no doubt, whatever, that a contract could be filled with them.

Demand in the States.

There is a constant demand for the best class of our horses in the American market, one reason being that the Canadian bred horse is a far more serviceable and lasting animal than the horse bred in the States, owing to the latter being fed on Indian corn—greatly provocative of foot fever and inflammation—while the former is fed on oats and hay, which are much better food.

Preference in England.

In England the Canadian horse will bring £10 more than the American one. American cattle are, on the other hand, preferred to ours, and they get more corn than ours.

Horses to be Well Kept.

Our farmers are not sufficiently careful as to the condition in which they keep their horses, allowing them, in the fall of the year especially, to become very much run down. There is no occasion whatever for this. I find it true economy to feed my own working horses well: they get at least fourteen quarts of oats per day while they are working, and these horses do not look like those which we saw in Toronto.

[*Mr. Patteson.*]

Early Mismanagement Never Rectified.

The Canadian farmer is too often a poor man, and foolishly starves his colt the first year, when all the damage is done, the result being that he never attains the growth and development he would have done had he been well fed. You can feed a horse very economically his second and third winters, but it is absolutely fatal to his development to stint his food the first winter after he leaves his mother.

Horse Raising on Farms not Generally Profitable.

I think horse raising except for farm purposes is not generally profitable. I hold that by the time a horse is five years old, before which time you cannot, as a rule, sell him, he has cost as much as can be got for him. About 5 per cent. of the horses now raised and sold, a little more than pay for their breeding, of the remainder 25 per cent. may just cover outlay, and 70 fail to do so.

Cost of Raising Horses.

It depends very much upon the class of horse what it costs to bring him to maturity. There are some breeds capable of earning their keep at two years old, especially well-bred Clydes. The breeding of a farm horse does not therefore cost so much as that of a carriage horse. By the time a hunter or carriage horse has reached maturity he will have cost his breeder as much as he will get for him, and consequently he will have to look to the animal's manure and the incidental services he may have got out of him for his profit. It would not pay the exporter to give more than $150 or $175 for the animal, and it will have cost his breeder every cent of it to raise, break and bring him to market. An animal in this country at five years old is no more matured and seasoned than an English four-year old Keep and climate account for that.

To Mr. Wiser.—It would pay the farmer to treat his colts better; there would then be less risk and loss than there is.

What are the Inducements to Breed Horses.

Mr. Dymond.—What inducement is there to breed horses, if there is no money in the business?

Mr. Patteson.—There is no money made in raising horses, except in the case of a "chance" horse. You can buy cheaper and more satisfactorily than you can breed, but people will breed because to do so is the natural tendency of every man who owns a favourite mare. It is the agriculturalist's one piece of self-indulgence. You can only account for it in that way. Sanguine men have the material wherewith to breed, and consequently are tempted to do so; always hoping that a chip off the old block may be as good as the mother. I would not say that it is impossible for a farmer to make horse-breeding profitable, because I think that if he took more pains in breeding and rearing the animal he would get a higher price for it, but as it is generally conducted throughout the country, breeding certainly does not pay.

Comparative Cost of a Colt and Steer at Three Years.

Mr. Wiser.—What is the difference between the cost of raising a colt or steer, at three years of age?

Mr. Patteson.—I breed a great many steers, and have sent many to England. I know pretty well what it costs to raise them, and I can say that to raise a colt until he is three years old, costs, in round numbers, almost twice as much as it does to bring a steer to the same age. The fee for a blood horse's service is $20, as against $1 or $1.50 for a Durham bull. The colt's keep for the first year will cost as much again as that of

the steer, as he requires to be fed more expensive grain and a greater quantity of it, and so on every year; better stabling has to be provided, and he has to have better grooming and more care generally. Moreover, the charge for pasturing a colt is double that for a steer—they nip closer and exhaust pasture quicker. No matter whether the cheapest or the most expensive system is adopted, provided of course that it be alike in both, a colt at three years will have cost his owner twice as much as a steer of the same age.

A Racer's Picture Gallery.

Mr. Patteson here exhibited a series of plates illustrating the origin of the thoroughbred horse, some of which dated as far back as 1756. This, he believed to be the most complete series of the kind in existence. It included nearly all the old Arab progenitors —Eclipse, and all the most famous race horses since his time. He showed in frames also, pictures of Highflyer and Mambrino (sire of Messenger), the two being the *fons et origo*, he remarked, of all trotters and gallopers.

Cost of Breaking a Colt.

To Mr. Wiser.—I omitted to state that the three-year old colt would have put the owner to an expense of at least $20 for breaking, for which no equivalent would be incurred in the case of the steer. And I would remark that the chief fault found at home with our horses is their defective breaking. "Hands" and great gentleness are required. One cause of the bad breaking is the general habit of breaking the colts in double harness, which too often results in his having only one side to his mouth.

Risk in Raising Horses and Cattle.

Mr. Wiser.—Is the risk greatest in raising cattle or horses?

Mr. Patteson.—In raising horses. Cattle are subject to very few ailments and infectious diseases, and to scarcely anything in the way of depreciating blemishes, while quite one out of every three horses you may breed will have markings or something undesirable about him, either in the shape of a hereditary blemish or a radical fault in shape and make or wind.

Stallions now in Use.

Mr. Wiser.—What classes of stallions are being used, in what numbers, and to what extent?

Mr. Patteson.—The most numerous class of stallions is that known as the "general purpose" class, which ought not to be allowed to breed at all.

General Purpose Horses.

The Legislature might impose a restriction upon the use of these animals, who being bred for general purposes themselves are fit for nothing else, and should be castrated and used for those purposes. They are utterly unable to transmit their own good looks. They are the most numerous sires because they have been bred in the largest numbers, and farmers have used them under the idea their general purpose qualities would be reproduced in their progeny, but this is, of course, a mistake; for these very farmers would scorn to use a grade bull, and no Society gives a prize for a grade bull; the reason being perfectly well known. There are too few thoroughbred and Cleveland Bay sires.

Age for Breeding Mares.

Mr. Wiser.—At what age should a mare intended for a breeder be put to the horse?

Mr. Patteson.—Before she has lapsed into worn-out old age, and before her parts have become so set as to make it inconvenient for her to produce a foal. No mare should

be put to a horse before she is three years old, to produce a colt at four. If a mare be not put to horse before she is so old as to be useless for anything else (a very general heresy) her first foal is generally produced with great difficulty, is often decrepit and small and is usually a more or less poor specimen, besides being liable to injury at birth, owing to the mare's want of expansiveness and elasticity. A mare intended for breeding purposes should have a foal when she is six or seven years old otherwise there is, as a rule, considerable trouble at the first birth.

No Difficulty with Young Mares.

I do not find any difficulty with young mares, because their parts are expansive, and accommodate the passage of the foal with much greater ease. If a small mare be put to a big horse, the difficulty is that the head of the foal is larger than the mare's economy had reason to expect from her own size, and her generative organs being made only to pass a foal with a head proportioned to her own size, considerable trouble often accompanies birth. A mare should always be left to foal unassisted—only helped in case of necessity.

Working Mares in Foal.

Mr. Wiser.—Should a mare work when in colt or when suckling?

Mr. Patteson.—Agricultural mares may be allowed to work up to within a month of foaling, care being taken, of course, that they do not over-exert themselves. This does not apply to thoroughbreds or fast roadsters, which I should turn out after the sixth month, and allow to take their own exercise. It does not hurt an agricultural mare to work her within a month after foaling, but she ought to be in plough harness, or at any rate, without the shaft of a cart between her and the foal, so that the latter may have free access at any time.

Treatment of Colts.

I do not think a colt should be shut up alone until it is at least three months old. Sometimes the mare is taken out to work and the foal left behind in a box, but I do not think this advisable, because it limits the opportunities of the foal to suckle his dam. From the nature of a foal's stomach and digestive organs, I should say that he ought to have constant access to his mother until he is three months old and begins to pick grass.

Mr. Wiser.—At what age should a colt be weaned?

Mr. Patteson.—At about the age of five months.

Feeding Colts.

Mr. Wiser.—How should a colt be fed the first winter?

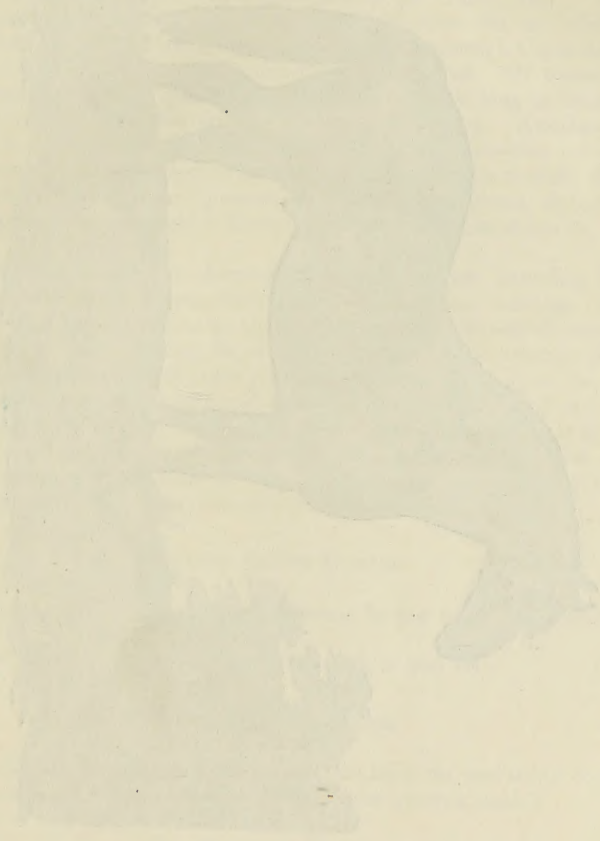
Mr. Patteson.—If early development and a high price be aimed at, and if sufficiently bred to warrant the expense, a colt for the first winter should be fed on "kibbled" —that is steamed—or crushed oats, at the rate of about four quarts a day. I prefer oats treated in this way to oats in their natural condition. I have tried both ways, and I find, as a rule, that the colts are fatter and plumper if fed on either crushed or "kibbled" oats. Besides this, bran, hay and carrots are to be given in moderate quantities, with constant access to water.

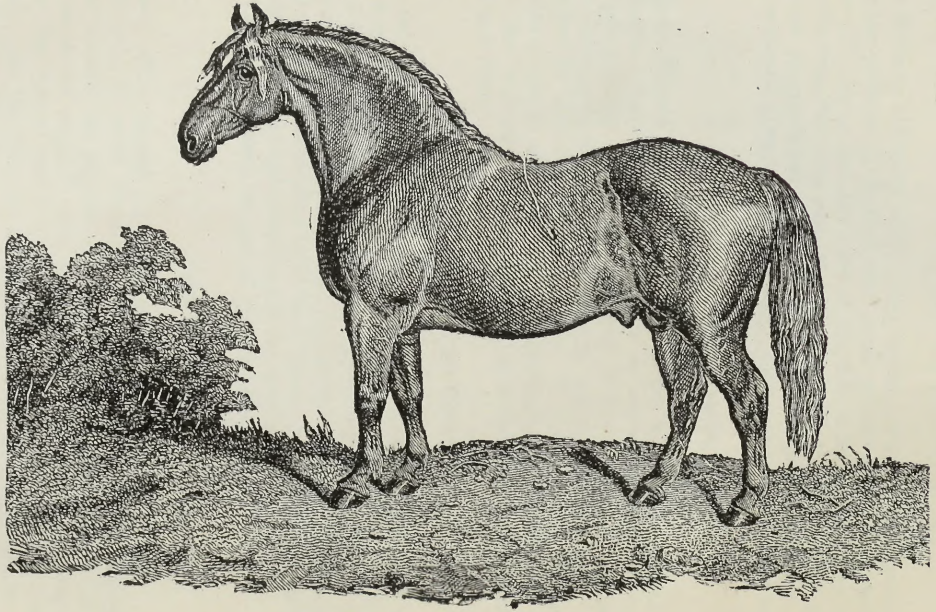
Tying Young Horses.

Mr. Wiser.—Should young horses be tied or run loose?

Mr. Patteson.—I would tie them, and allow them to run loose alternately. The sooner you can halter-break a young horse the better for all purposes, but I would not keep him always in the halter, and very little in the stall. I would tie him in a loose box occasionally, at other times allow him to run in it.

[*Mr. Patteson.*]





SUFFOLK PUNCH.

Number of "Services" in a Year.

Mr. Wiser.—Should entire horses be restricted to a certain number of mares?

Mr. Patteson.—I think on this subject, much misconception prevails, which is fostered by professional dogmas. I know as a matter of fact, that an exhausted horse, just able to procreate, can get as good colts as he ever could in the earliest and most vigorous days of his youth. I need go no further than Rysdyk's Hambletonian to prove the whole case. That stallion was impotent for two seasons in the middle of an unprecedented career at the stud, and the colts he got just up to the time of exhaustion were as good as those he got before, and they were right too after his recovery. Of course it would have been better for himself if he had been restricted, but he covered two hundred and five mares in one year, and I contend that the two hundred and fifth cover, if completed, was just as likely to result in a good foal as the first or fifth. This horse got Edsall's Hambletonian (Alexander's Abdallah) when two years old, and was nearly thirty when he died. A case occurred within my own experience where a Clyde stallion covered nineteen mares in one day, and the nineteenth mare was in foal. Of course too frequent covering ruins the horse—it, so to speak, kills the goose—but so long as he is able to complete the act, the colts will not suffer from what has gone before. Another case in point is that of Diomed, the winner of the first Derby. Through excessive covering in England, he was supposed to have become exhausted, was sold for a trifle and sent to the Southern States, where he stood for upwards of ten or twelve years, dying at the age of thirty-six, and there is now scarcely a horse of any breeding in America that does not trace back to him.

To Mr. Dymond.—I think our thoroughbred stallions are covering in the neighbourhood of one hundred mares a year during the season of four months. A great many of these come back the second time, so that many perform the act of covering at least one hundred and sixty times during those four months, or an average of about forty times in thirty days. Judging from their progeny, or the effects upon the horses themselves, this is not excessive. A Clyde horse exhausts himself less in covering mares than the less temperate and fiery thoroughbred; as a rule, the colder the blood, the more mares a stallion can cover with impunity. I think a Clyde stallion could cover two hundred mares a year without being at all injured. This is a matter I have looked into, and I am simply giving you the result of my experience and observation.

Diseases Among Horses.

Mr. Wiser.—Are any diseases prevalent among horses in your district; and if so, what are they?

Mr. Patteson.—None; except what all horse flesh is heir to.

Desirable Importations.

Mr. Dymond.—What breeds of horses not now here do you think could be beneficially imported into Canada for the improvement of our present stock?

The Suffolk Punch.

Mr. Patteson.—I think the chestnut Suffolk stallion would immensely improve our general purpose and agricultural stock, and possibly even our dray and heavy draught horses.

Merits of the Suffolk.

The feet of the Clyde stallion are very inferior to those of the Suffolk; being either flat, or shelly, brittle, and split, whereas those of the Suffolk are as sound as a thoroughbred's, that is to say, their texture is very firm, close, elastic, and not liable to break.

[*Mr. Patteson.*]

Again a Suffolk has scarcely any more hair on his legs than a Cleveland Bay, and his weight is almost equal to that of the Clyde. There are Suffolk stallions quite as heavy as ordinary Clydes, but the general weight is less.

Suffolks for Crossing Purposes.

I say that it would be wise not only to encourage the Suffolks as a breed, but for crossing purposes I value them much beyond the Clydes, for the reason that the latter crossed with a common mare gets a mongrel, because the cross is too sudden and violent, and the contrast too strong. On the other hand the Suffolk does not present so severe a contrast to the ordinary mare as the Clyde, being naturally a much lighter timbered horse, of greater endurance, smoother shape, and without the cleft rump of the Clyde, and a cross with him would produce an animal good for agricultural, dray, or omnibus purposes, or in fact anything short of a hunter.

Carriage Horses from Suffolk Mares.

I have seen many carriage horses bred by mating thoroughbred sires and Suffolk mares, and would not be surprised if that were the origin of the Cleveland Bay. A Suffolk horse of the proper kind is a chestnut resembling the Clyde in substance and contour, but has not the quantity of hair on the legs that the latter has, and which often serves to hide many imperfections and diseases. I should say the bone of the Suffolk is as big as that of the Clyde, but he is much like what a Clyde crossed twice with a Cleveland Bay would become. When I was last in England I saw great numbers of Suffolks in the county of that name, and in part of Norfolk. I hold not only that they are better horses for crossing purposes than the Clydes, but also that few fair specimens of the class have ever been imported into Ontario.

Price of a Suffolk Stallion.

A young Suffolk stallion can be bought in England for about 100 guineas, much the same price as would be paid for a Cleveland Bay. Mr. Simon Beattie has imported some Suffolks, and thinks highly of them ; but the most of his have been sold out of the Province. Mr. Beattie, with a pair of Suffolk mares, once took the Provincial prize over all comers in the class for heavy teams.

Mr. Dymond.—Are the Suffolks more active than the Clydes?

Mr. Patteson.—The Clyde horse is a most active horse. He has really pony action, and though the biggest, is one of the smartest horses on his legs in the world. I do not refer to one of those great lumbering, overgrown brutes we sometimes see, but to a horse such as that which took first prize at a Provincial show lately—he had pony action. But the Clyde is not more active than the Suffolk.

The Percheron Horse.

Mr. Dymond.—Have you paid any attention to the French horse—the Percheron?

Mr. Patteson.—I have seen many horses of that class in France, but do not know anything about them in the same way as I do of the Suffolks. I saw a two-year old at the show here this year, but he was easily beaten. I do not know who owned him. Mr. Watt exhibited a good one last year. The great fault of the Percheron is that he is inclined to be light in the middle, but his legs and feet are superior, perhaps, to those of either the Clyde or the Suffolk. He is a hardy, active horse, very sound and clean legged, but too often coarse in the head and sloping in the rump.

The Park Horse.

Mr. Wiser.—Why would not that horse, crossed with the right kind of mare, produce the "park" horse?

[*Mr. Patteson.*]

Mr. Patteson.—I suppose he would. Judging from your description of the park horse, I should say he is not a very common animal in this country. What was called in England the "cab" horse, you call a "park" horse. A cab horse weighs about 1,300 pounds, lifts his legs and keeps both his ends high, and travels well. I have one in my eye at the present moment, owned by a Woodstock hotel-keeper, named Farrell, the very *beau ideal* of the horse you mentioned. He has showy lifting action, and can drag anything behind him that any horse would be asked to draw, and go at the rate of eight or nine miles an hour. He happens to be a little light in the middle piece and not of good colour, but that kind of horse can always be sold in England, where they are known as "climbers."

Want of a Canadian Stud Book.

To Mr. Wiser.—I would strongly recommend the establishment of a stud book, or system of registration, in which a record might be kept of all pure-bred horses, including bloods, imported Clevelands, imported Clydes, and trotting horses, though the latter are not a distinctive breed. One volume of ordinary dimensions would be sufficient to cover all these, and the patrons of the various breeds would no doubt make each division the basis of a new volume for each particular class. I think a Canadian stud-book of that kind is called for very strongly. It is extremely difficult to ascertain anything about horses that existed twenty or thirty years ago. Even in the case of horses who were here less than twenty years ago, eye-witnesses who can be trusted are so few in number that very little can be definitely learned. It would be invaluable to breeders in Canada to be able to refer to such a book.

Need for a Board of Censors.

I got together part of the material for such a book myself in 1872, but gave the idea up. If the record of the past were perfected, and each volume added to by the registration of youngsters foaled from time to time, it would be necessary that a Board of Censors, or some official body of that kind, be appointed by the Government or the Agricultural Association, to examine the pedigree of animals proposed to be registered.

Bogus Pedigrees.

The manufacture of bogus pedigrees is very much on the increase, though the fraud is generally very clumsily done, and easily detectable by a man who knows anything of the subject. Still it is a source of danger, much ignorance prevailing, and breeders without meaning to tell falsehoods will sometimes circulate very absurd statements as to the pedigree of their horses, and the uninitiated swallow them whole.

T. C. PATTESON.

DR. ANDREW SMITH'S EVIDENCE.

Andrew Smith, V.S., was called and examined.

To Mr. Dymond.—I am a Veterinary Surgeon. I hold a diploma from the Edinburgh Veterinary College, and one from the Royal College of Veterinary Surgeons. I have had experience in the diseases of horses in Britain and also for nineteen years in Canada, during which time I have paid attention to the various forms of disease in Toronto and throughout the greater part of this Province.

DISEASES OF HORSES—DIGESTIVE ORGANS.

To Mr. Wiser.—Horses in this country are mostly subject to diseases of the digestive organs, in the form of colic, indigestion, interitis, etc. I do not think our horses are

quite so liable to disease as those of either Scotland or England, which perhaps, may be accounted for by the dryness of the climate.

LUNG DISEASE—EPIZOOTIC NOT FATAL.

Severe weather in winter has a tendency to produce lung disease. I have never known any fatal epizootic during my experience in this country. The epizootic or catarrhal fever, which attacked our horses eight years ago was not a fatal disease if ordinary care were paid to the affected animals, though it incapacitated them for the time. It might be called influenza or catarrhal fever, though I think the latter the preferable name. It was, in my opinion, a specific disease, due to some particular cause. The horses in Boston and New York are suffering from a form of catarrhal fever now, in a mild form, and not many animals are affected. As far as health is concerned, I think Canada is a good place for breeding and raising horses.

HEALTHINESS OF CATTLE—NO EPIDEMICS.

To Mr. Dymond.—Cattle are also very healthy. We have never had an epidemic among cattle at all, so far as my experience goes. The principal complaints affecting cattle are diseases of the digestive organs, and in some districts a form of anthrox, due to certain local causes.

SHEEP VERY HEALTHY—CONFINEMENT IN WINTER.

Sheep also are very healthy, though in some parts they occasionally suffer from over-confinement in the winter, and a too generous diet. I think sheep are better if kept in buildings during the winter if not too close. I do not think the basements of large barns form good shelter for sheep, where they cannot get fresh air. Sheep are better with an open yard to run into. Of course it is necessary to see that they are not allowed to get wet.

FARMERS' TREATMENT OF HORSES AND CATTLE.

I am acquainted generally with the farmers throughout the Province. I think their treatment of horses and cattle, is, as a general thing, pretty good. Horses suffer to a certain extent from mismanagement in the way of feeding, but on the whole, they are kept tolerably well.

IMPROVEMENTS OF LATE YEARS.

There has been a great improvement within the last nineteen years in the treatment of horses; in certain districts they are better kept. I have not noticed that the horses of farmers in this section are allowed to run down during any portion of the year. Horses, if not kept in sufficiently warm buildings throughout the winter, require more feed than they otherwise would.

SCARCITY OF GOOD HORSES—DEMAND.

There has been such a demand of late years, that good horses are scarce in this district.

TUBERCULOSIS IN THOROUGHBRED CATTLE.

Thoroughbred cattle are subject to complaints from which other cattle are comparatively free; I think, in particular, they are more liable to *tuberculosis*. This disease, which ultimately proves fatal, is not allied to any form of *pleuro-pneumonia*. The latter is a disease which attacks the pleura and lungs, while *tuberculosis* involves many other organs besides the lungs, including the digestive organs. It appears also in the form of tubercular deposits, and is, to a great extent, due to hereditary influence.

[*Dr. Smith.*]

TUBERCULOSIS NOT CONTAGIOUS.

Some people go so far as to say that it is a contagious disease, but my experience is the reverse; I would not term it a contagious disease. My opinion on this point differs from that of some of the veterinary surgeons in the United States.

PROFESSOR LAW'S OPINION.

Professor Law, for instance, holds *tuberculosis* to be contagious. My own experience, however, is, that it is not, and I have had evidence sufficient to satisfy me.

PRECAUTIONS TO BE TAKEN.

It is constitutionally hereditary, and is a disease which, I believe, is spreading among thoroughbred cattle, and which will continue to spread, unless very great care be taken to breed only from animals that are entirely free from it. By a careful selection of breeding animals it may to a great extent be avoided.

THE DISEASE ULTIMATELY FATAL—SYMPTOMS.

To Mr. Wiser.—Sooner or later this disease generally proves fatal. The indications are a general falling off in condition, and, if the disease affects principally the lungs, disease of the lungs; if the bowels, irritation of the bowels, occasional constipation, diarrhœa, and gradual wasting. It is a disease which destroys a great many of our high-priced cattle.

NOT EASILY DETECTED IN EARLY STAGES.

To Mr. Dymond.—It is not a disease which would strike the eye of an ordinary observer in the first place. It is very slow in its progress. Even a professional man would require to have some symptom to attract his attention, otherwise he might overlook it. For a short time the diseased animal does not appear to be affected very much, but after a certain time it begins to run down.

EFFECT ON THE MEAT.

I do not think this disease at an early stage would affect the wholesomeness of an animal intended for beef purposes, the complaint being local in certain vital organs. In a very severe form, that is to say if the animal were thoroughly diseased, the meat would be affected.

MAY BE ARRESTED.

To Mr. Wiser.—If the disease has run for a long time it becomes incurable. You may arrest its progress partially, however, by judicious management. The disease is also liable to aggravation from want of care and bad ventilation.

HEREDITARY AND A DISQUALIFICATION FOR BREEDING PURPOSES.

To Mr. Dymond.—An animal having a constitutional tendency to *tuberculosis*, might avoid the disease if great care and good treatment were given it. I do not know, supposing the disease were avoided for a generation or two, that it might be eliminated from a family affected by it. I would not recommend the breeding from an animal affected by this disease.

SIMILAR TO CONSUMPTION.

To Mr. Wiser.—It is a sort of consumption, and bears the same relation to an animal that consumption does to a man. It also affects the digestive organs, without the lungs, to some extent.

INFLAMMATION OF THE LUNGS.

Some animals taken from here, and said to be suffering from *pleuro pneumonia*, were in fact entirely free from it, their disease being simply sporadic inflammation of the lungs, and not contagious at all. Prof. Williams, of Edinburgh, perhaps the first surgeon of the day, examined the cattle sent over in the *Ontario*, and pronounced that not one of them was suffering from *pleuro-pneumonia*.

NO CONTAGIOUS DISEASES AMONG THE CATTLE IN CANADA.

The cattle of this country are entirely free from any contagious diseases whatever. A number of animals, of course, die every year, but this is generally due to some local causes.

GLANDERS IN HORSES.

I omitted to state that horses are subject to a contagious disease called glanders, which sometimes prevails in certain districts to a considerable extent. We have a law, intended to prevent the spreading of glanders, but it has never been enforced as it should be.

VETERINARY INSPECTORS.

To Mr. Dymond.—The Ontario Government have appointed inspectors in various parts of the Province, for the purpose of looking after contagious diseases and reporting the outbreak of any such. These inspectors are all veterinary surgeons, and they report to me, I being chief of the staff, and immediately on the appearance of any such disease, measures can be applied, with a view to its stoppage. In the majority of cases, glanders can be traced to contagion from horses already in the country. I do not think that a glandered horse has ever been imported into Ontario.

ALWAYS PREVAILING SOMEWHERE.

The disease is always prevailing somewhere, and liable to be disseminated; it never quite dies out. It is possible that it may be spontaneously generated. It is a well marked example of a contagious disease, admitting of spontaneous generation. Recently, however, one or two veterinary surgeons in England—Mr. Fleming in particular—have inclined to the belief that it is never spontaneously generated, but that it is always due to contagion in one form or another.

PROBABLE CAUSES OF GLANDERS.

To Mr. Wiser.—I think it is possible it may be originated by ill ventilation and want of sufficient nourishment. A striking proof that it may be due, in the first place to bad ventilation, was given during the Crimean War. It broke out among a lot of horses on board one of the transport ships. It was said that these horses were all perfectly sound when put on board, nevertheless, owing to bad ventilation, the disease broke out in a very severe form. During the American War an immense number of horses suffered from glanders, although in that case it is quite possible the disease spread by contagion.

SYMPTOMS OF THE DISEASE.

To Mr. Dymond.—The disease shows itself in a catarrhal form. It attacks the

whole system, but evinces itself principally in connection with the respiratory organs, accompanied by a discharge from the nose. This discharge is capable of producing the disease in another animal, being in this respect different from catarrh. It attacks the whole system, accompanied by farcy. Little ulcers are formed on the nose, and a casual observer would very easily mistake a case of glanders for one of catarrh. A horse suffering from glanders in a chronic or mild form, might live for years, two or three years, while the disease in an acute form might terminate fatally within two or three weeks. The virus is in a fixed form, and must come in actual contact with an animal to cause disease. Broken-windedness will not develop into glanders, though chronic catarrh may, if aggravated by bad ventilation. Ulcers on the nose and enlargement of the glands are the characteristics of glanders, by which it may be identified.

ALWAYS ULTIMATELY FATAL.

It is not curable in any of its forms, but is always ultimately fatal. You may as well kill your horse as soon as you know he has become diseased.

A CONDEMNED HORSE SOLD BY ITS OWNER.

I remember condemning a horse for being glandered, and hearing no more of him for some time ; subsequently I was consulted by a farmer near Barrie, who had lost three horses by glanders, and I found that the horse who had produced the disease amongst the others was the same horse I had condemned a year and a-half previous.

MORE STRINGENT MEASURES NEEDED.

I think more stringent measures ought to be adopted than those at present in force. Inspectors should have the power, which they have not at present, of ordering a horse to be killed, which, on careful examination, they find to be glandered.

CEREBRO SPINAL MENINGITIS.

Farmers now and again lose horses from *cerebro spinal meningitis*, induced in most cases by bad ventilation and drinking impure water.

EFFECTS OF BAD WATER.

To Mr. Wiser.—Water that has collected on the surface of the ground, even when covered with a green substance, may not be so bad as it looks, and cattle may perhaps drink of it with apparent impunity. But where there is decaying vegetable and animal matter in the water, or where the drainage of a stable collects in it, disease is apt to result in stock that drink from it. My opinion is that bad water is highly injurious to animals, and that they frequently die from its use. In Kentucky, where the stock is very generally watered from holes, there is a great deal of lime in the water.

FOOT AND MOUTH DISEASE.

Foot and mouth disease affected cattle some five years ago—particularly imported cattle—in Pickering and Chinguacousy. A report on the matter was published at the time. That is the only contagious disease I have ever known among cattle. Prompt measures were taken, the infected cattle were kept apart from others, and the disease soon died out.

THE CLYDE AND NORTH OF ENGLAND HORSE.

I prefer the Clyde and North of England horses for draught purposes. The North of England horse is very similar to the Clyde. I never gave any particular attention to

this specific department of horses. My reason for preferring the Clyde and North of England horses is that they mature early, and the farmer can consequently be soon remunerated for his outlay. They can be worked when two years old, and command a high price for ordinary horses.

AGRICULTURAL HORSES—THE SUFFOLK.

For agricultural purposes I would prefer a cross of various kinds; the Suffolk is valuable to cross, with a view of getting an animal of this kind. As I understand an agricultural horse, he is one rather less in weight that the Clyde, useful for ploughing heavy land, capable of drawing a good load, and of going at a fair pace, say five or six miles an hour, if necessary.

ROADSTERS—NOT MUCH IMPROVEMENT.

A roadster, on the other hand, would have to go much faster than that. So far as my observation goes, I think our roadsters are pretty good. I cannot say that I have noticed any marked improvement on this class during my residence in Canada. I have seen a great improvement in Clyde and agricultural horses.

To Mr. Dymond.—I do not think we are getting an improved class of roadsters to any great extent; in fact I do not think the horses we have now possess the quality the horses of some years ago did. They are speedy enough, however, and seem to be improving in this respect all the time, owing, I should say, to breeding from animals that have shown good form.

LAPIDIST—CLEAR GRIT.

One thoroughbred horse, at all events, has left his mark in this country in the way of trotting animals, viz., Lapidist. Clear Grit, by Lapidist, is also considered a very good trotting sire.

TROTTERS AND SADDLE HORSES.

A horse that I think would be a profitable one to breed, would be a trotting horse, of good size, fit for carriage and general driving, who, if he did not turn out a trotter, would at all events command a good price in the market. It would also pay to breed weight-carrying saddle horses from heavy thoroughbreds.

IMPROVEMENT IN SADDLE HORSES—HUNTERS.

There has been a great improvement during the last nineteen years in the saddle horses of Ontario. There are a number of good saddle horses in Toronto, which, for the most part, have been got by thoroughbred horses out of big, common, carriage mares. These may be called hunters, and for this class there is a fair market in Canada, and an excellent one in England. A good horse of this kind can be sold for $200, but if sold before he is "made," he will not bring so much. Farmers, as a general thing, do not "make" hunters, but when in their prime there is no difficulty in obtaining from $200 to $250 apiece for good heavy weight-carrying horses of this kind. I would advise farmers to breed from heavy horses if they wish to make money.

FARMERS AS HORSE BREEDERS.

I would not, however, advise farmers to go into horse breeding as a special business. When a man has a colt or two more than he requires, it is all very well to sell them, but I do not think it would pay to breed horses altogether.

LARGE THOROUGHBREDS AS BREEDERS.

I think that none but big thoroughbred horses ought to be used to breed from, and

the bigger the better. A big, heavy thoroughbred horse put to one of our common mares, would get a horse that would pay well in the English market. There is a fair market in Canada and the States for these animals, but the price depends a good deal upon their ability—they must be "made," in order to bring a good figure, and this is a process which requires time.

INFERIOR STALLIONS—BAD EFFECTS.

I think considerable harm is being done by the use of inferior stallions. The only effectual method of treating this difficulty would be to appoint a man to go through the country and castrate every stallion that was not considered up to the standard. The matter, at all events, is not an easy one to deal with.

CAUSE OF THE NUISANCE.

The difficulty of obtaining the services of a thoroughbred horse in many cases no doubt helps to perpetuate the evil, but very often all the farmer cares for is to have a foal, and he is not very particular as to what kind of a stallion he makes use of, provided his services are cheap.

PRIZES BY GOVERNMENT.

I think a little money might perhaps be very profitably spent by the Government in offering one or two handsome prizes for certain classes of horses, the animals to be up to a specified standard before they were deemed worthy of the prize ; the horses to be, say, heavy draught, trotting, and thoroughbred.

PRIZES AT FAIRS.

I think at our fairs prizes ought to be given for two classes of horses, one adapted to the getting of racing stock, and the other to the production of saddle horses and hunters.

BREEDING RACERS NOT PROFITABLE.

It does not pay to breed race horses in Canada at all, but I would advise our farmers to use a heavy, powerful, strong-limbed horse, up to a certain weight (not made up entirely of fat) and with good ends, if they desire to improve their horses.

HEAVY HORSES FOR THE STATES—SADDLE AND CARRIAGE HORSES FOR ENGLAND.

My experience has been that the most profitable horses for our farmers and for the American market are the heavy horses, while for the English market there is most money in nice carriage or saddle horses. But the trade done with England is not to be compared with that done with the United States.

THE UNITED STATES OUR BEST MARKET.

This year I do not suppose there have been exported from Canada to England more than a hundred horses, showing that the American market is the one we must look to, unless we devote our attention to breeding a class of animals suitable for the English one.

HOW TO MEET THE BRITISH DEMAND.

This we could do by breeding from strong thoroughbred horses, producing riding and driving animals that would command a good price in the English market. Carriage horses might, to a certain extent, also be got in this way, but I cannot say so much about

[*Dr. Smith.*]

them. I have known horses of the kind I speak of bring from 100 to 150 and as high as 200 guineas in England, but there are not many of them sent out. I do not think £100 a high price for a horse of this kind in England. In fact, when Mr. Beatty and myself sent over some horses, one that we paid £30 for, we sold for 120 guineas in Scotland after keeping him for a little while. He turned out to be a very good jumper.

AGE FOR BREEDING.

To Mr. Wiser.—A mare intended for breeding purposes might be put to the horse at the age of three; but I believe she will generally have a better colt if put to the horse when six or seven, or eight years old. In fact, I believe that when both sire and mare are fully developed in every way they are most likely to get good progeny.

NO DANGER IN DELAY FOR SEVEN OR EIGHT YEARS.

To Mr. Dymond.—The mare does not suffer by waiting until she is eight or nine years old, but may, if kept until she becomes older. I would use mares for breeding purposes as long as they would breed, but to get fine horses, I would breed when they were in their most vigorous condition, viz., from four up to eight, and nine, and ten.

WEANING AND FEEDING COLTS.

It depends altogether upon the colt and the manner in which it has been suckled as to the age at which it should be weaned, but, as a general thing, I should say a proper age would be five months. A colt should be well fed during its first winter; if ill fed he never recovers from the effect of the bad treatment, and is often quite stunted.

NUMBER OF "SERVICES."

I think entire horses should be restricted to a certain number of mares, say from eighty to one hundred for the season, making possibly one hundred and twenty or one hundred and thirty coverings. A thoroughbred horse should have fewer mares than a Clyde. I think putting a horse to too many mares affects his progeny. I have known cases where horses were put to a great many mares, and although they got quite a number of foals, many of them were weakly, even where the mares were good, resulting from the sires being to a certain extent overdone. A horse put to an ordinary number of mares will get a much larger percentage of foals than where he is put to too many. If indulged too freely in covering, the effect on the horse is to make him impotent, and occasionally to ruin him.

To Mr. Wiser.—Sometimes after becoming impotent a horse will recover, as in the case of Hard Fortune, who for two years was quite unable to cover a mare, but who ultimately became quite well, and got a great many colts. I have known, again, instances where paralysis of the *pœnis* was the result, rendering the animal quite useless. I would not like to give a positive opinion on the point as to whether supposing a horse should cover six mares, spermatazoa emitted by him into the mare would be as like to produce on the fifth occasion as on the first, the act being completed in each case. I think it is possible that the spermatazoa might not be quite so highly developed in the one case as in the other. Six mares is not considered too big a day's work for one of these heavy horses.

Mr. Wiser.—I never allow my horse to cover more than two mares a day, but then he gets two colts a day.

Mr. Smith.—I think it is a good practice. If I had a good horse I would limit him to a certain number of mares.

A FULLY MATURED HORSE MOST SERVICEABLE.

A good colt is most likely to be got by a horse fully matured, but an animal two

[*Dr. Smith.*]

years old may be put to mares without injury. You are surer of getting a good progeny when both mare and horse are matured; the older Lexington got the better his colts became. I would not put a two-year-old horse to a two-year-old mare.

A STUD BOOK WANTED.

There is a herd-book in existence for nearly all kinds of cattle now, and I think a separate stud-book for horses in Canada would be desirable, to include thoroughbreds, trotters, and even Clydes. In Scotland they have a book for Clydes.

BOARD OF CENSORS.

I think the proposal to have a board of censors appointed to supervise the pedigrees of animals proposed to be enrolled in such a stud-book a good one.

ANDREW SMITH.

Mr. W. H. Williams called and examined.

MR. W. H. WILLIAMS' EVIDENCE.

To Mr. Dymond.—I was brought up accustomed to horses, and have always taken a great interest in them. I am now Sporting Editor of the Toronto *Globe*, and in that capacity have lately visited many of the leading horse-breeding establishments throughout the Province.

The Rysdyk Horse-breeding Farm.

The most prominent one is that of Mr. Wiser, at Prescott, whose horses are chiefly of the Hambletonian and Messenger families, with some warmer blood crossed into them. I regard the introduction of Mr. Wiser's particular line of Hambletonians as extremely advantageous.

The Clay and Hambletonian Cross.

I am well aware that one of the most fashionable crosses of the present time is a cross of Clay and Hambletonian—or Bashaw and Messenger, to go further back—but I have always held, and I think the experience of any one who has seen the matter tested frequently on the turf is, that in the transmission of the Bashaw blood through many generations (from Grand Bashaw downward), it has not been preserved pure, but has become mixed with cold blood. There are repeated crosses through the Jackson and Clay families, where the pedigree of the dam stops short each time. I have seen a good many Clays trot, and I have seen very few that did not appear to be "quitters."

"Quitters."

This is, of course, more particularly a turf view of the matter, but a horse that is a "quitter" on the turf lacks the stamina to stand hard work on the road, and is apt to be wanting in the strength of constitution and prepotency necessary to reproduce one of his own race.

Rysdyk's Origin.

To Mr. Wiser.—I am speaking now more particularly of the Clay family. Instead of bringing the Clay cross prominently forward, Mr. Wiser has gone to the very best

blood we have—that of the thoroughbred—and his horse, Rysdyk, the stud-king there, is the son of a thorough-bred daughter of the great Lexington, and in that way I regard the introduction of the American trotting strains as important and useful.

Mr. John White's Racing Stud.

To Mr. Dymond.—Mr. John White, of Milton, is breeding a large number of thoroughbreds, and despite all that I have heard to the contrary, I cannot help thinking that he is doing a good work. He breeds thoroughbred race-horses. Mr. White has several fine thoroughbred brood mares, which he is breeding to race horses of exceptionally good ancestry, and the result is the production of some excellent colts and fillies. He put two colts and one filly of his own breeding on the turf this year, and two out of the three proved winners, while the third, though she did not win a race, ran second for the Queen's Plate in the best field of horses that ever started for it. I think that the fact that Mr. White has won no less than seven Queen's Plates ought to go far towards establishing his reputation as a breeder of race horses.

Mr. John Forbes.

John Forbes, of Woodstock, keeps two or three mares for breeding thoroughbreds and trotters. Mr. Forbes won the Queen's Plate this year with a filly from one of his own brood mares.

Col. Peters—A. McArthur—Burgess & Boyle.

Col. Peters is more or less breeding thoroughbreds, and Alex. McArthur has one of the best, if not the best thoroughbred stallion in Canada, and an excellent thoroughbred brood mare. Burgess Bros. & Boyle, of Woodstock, have, I think, three thoroughbred brood mares and a first-class thoroughbred stallion, besides keeping quite a stock of thoroughbred horses.

Sheriff Powall's Horses.

Sheriff Powall, of Ottawa, is breeding a few thoroughbreds and half-breds, and he has some very good stock; there are, besides, these three or four thoroughbred stallions about Ottawa.

Mr. Carroll's Horses.

Mr. Carroll, of St. Catharines, has also shown considerable spirit in bringing in a number of first-rate horses of the Mambrino Patchen strain.

Mr. Allen and Dr. Nash, of Picton.

Mr. John Allen, of Picton, has invested a good deal of money in importing good trotting stock, and Dr. Nash, the Mayor of Picton, has a couple of good colts from Chestnut Hill.

Mr. Vance's Clydesdales.

Thos. Vance, of East Zorra, had a very good display of Clydesdales at the Provincial Exhibition. He showed an agricultural three-year-old stallion with four Clydesdale crosses in him, a Clydesdale mare, and some half-dozen more, principally all pure Clydesdales of his own breeding and importation. They were not all thoroughbred Clydesdales; this stallion, for instance, would not be ranked as a thoroughbred Clydesdale. There are not a great number of thoroughbred horses for service in all parts of the Province.

[*Mr. Williams.*]

Bergin Bros. at Cornwall.

East of Cornwall there is nothing like a breeding establishment, except that which Bergin Bros. are carrying on. They have two good stallions, and I fancy it would be a very easy thing to pick up good brood mares in that vicinity, because the produce of Grey Eagle or Sheridan would cross well with that of Ringwood or Medway.

Horses in the Eastern Section.

I have not been through that section of the country lately, but I should say a large number of good cavalry horses could be picked up there, as the Grey Eagle is still perhaps one of the more prominent strains.

Grey Eagle.

I suppose some of those who have given evidence here have told you what Grey Eagle was; he was a cross between a small Norman horse and a thoroughbred mare.

Cœur de Lions—St. Lawrences—Black Hawks.

Besides the Grey Eagles, there are in that part of the country a few Cœur de Lions, some St. Lawrences, and some Black Hawks, the latter tracing back to a Morgan origin, though coming through a French medium. They are good-tempered, stylish road horses, and some of them have been very valuable; they are of a style and size that would answer very well in a cavalry horse. They are hardy, and at the time of the American war, immense numbers of them were shipped from that part of the Province. Such a thing as a coach horse, or a stylish horse sixteen hands high is not often seen down there.

Mr. Clark's Clydesdales.

Mr. Clark, of Ottawa, keeps some four or five Clydesdales—I think two coaching stallions, and a thoroughbred that I consider would be a very valuable horse for crossing with large mares for the production of fine, stylish park, or large carriage horses, or horses suitable for drawing broughams or coupés.

Views as to Breeding Trotters.

I would like to state my view of breeding trotters, as perhaps not quite in accord with that given by others in evidence before the Commission. I do not believe any man can breed phenominally fast trotters with any degree of certainty, and that a horse that has good trotting action, and plenty of breeding and quality, is just as likely to get a good trotter as a horse that has shown wonderful speed.

Phenominally Fast Trotters Accidental.

I regard the production of a phenominal fast trotter as accidental, while I look upon the production of first-class riding and carriage-horses from good mares, as merely the result of thorough prepotency and good breeding on the part of the sire.

Speed in a Sire not a 'sine qua non.'

I consider that speed in a sire is not a *sine qua non*, and that the prepotency of the sire may include all the qualities which go to secure speed, but will not always develop speed itself.

[*Mr. Williams.*]

Good Roadsters Needed.

In attempting to breed trotters, however, valuable roadsters, and a class of horses most useful to farmers are procured, and I would by all means, encourage the breeding of horses of the roadster type, but without depending upon the securing of speed as the great object. I wish the importance of breeding to good well-bred horses, and looking to other qualities besides speed alone could be impressed upon our farmers.

Volunteer—St. Julien.

The famous sire, Volunteer, has produced St. Julien, and I do not know how many others that have gone below twenty. I have never seen St. Julien, but nearly all the colts from Volunteer I have seen, have either been trotters or nothing. I also know a great many sires that produce both speedy and valuable horses. I do not believe in breeding to a bad individual, because he comes of a good family, but I think people are foolish to go wild over a horse because he has been fortunate enough to get a few trotters, while he lacks both form and breeding himself.

Clydesdale Breeders in the West.

There are some extensive breeders of Clydesdales in the Western part of Canada, other than those I have named; more, in fact, than I wish there were. A great many persons own an individual stallion, or one or two horses.

Wells Brothers' Erin Chief.

Wells Bros., of Aurora, never have less than two Clydesdale stallions; they also have some two or three trotting stallions—one, a notably good one, Erin Chief. I could wish that thoroughbred stallions were more plentiful than they are, but I am sorry to say our farmers do not value those we have.

Want of Intelligence Among Farmers.

If farmers would take an intelligent view of the case, and breed only to good horses, I do not think there would be a sufficient number of the latter to perform the services that would be required of them; but, as it is, I think we have more good horses than we have employment for.

The Licensing of Stallions Urged.

From conversation with horsemen all over the country, I am strongly of the opinion that the licensing of stallions would receive the support of every intelligent farmer and breeder in the Province. I would allow no stallion to stand for, or serve mares, unless he had a license. This plan is carried out in the States of Pennsylvania and Kentucky, and in the latter they charge a pretty heavy license fee.

Mr. Dymond.—The difficulty I see, would be to prevent owners of inferior horses standing them in their own stables, and to hinder those who chose to use them from doing so. How could this be prevented?

A Veterinary Inspection.

Mr. Williams.—The idea is, that in addition to obtaining a good round sum in the way of license fee, the licensing system would ensure the employment of a better class of horses, which would be made to pass a veterinary inspection. A great many of the Clydesdales I see at our fairs, I would be very sorry to breed to a healthy mare.

[*Mr. Williams.*]

First-Prize to a Sore-Legged Clyde.

Some of them have running sores and are otherwise diseased in the legs; in fact, I saw a Clyde with a running sore in his leg carry off a first prize in his class at a late fair. There could be no doubt at all that his leg was unsound.

Cleveland Bays—Objections.

There are a few Cleveland Bays in this Province, but I do not think so highly of them as Mr. Patteson does. The few I have seen have usually been very deficient in action, while their colts have been raw-boned, very slow to mature, not very strong in constitution, and while rather imposing in appearance from a side view, make bad horses to follow. I have not seen the Cleveland Bays in the Old Country, and I am speaking merely of those that have been brought out here, as nearly pure-bred as they can be got, and their progeny. I think the breed is pretty well run out.

A Veterinary Authority.

If I recollect rightly, Youatt or Spooner, in speaking of putting mares to large horses, says that the colts are not sufficiently supported at first, and the bone is developed at the expense of the muscular tissues, consequently they turn out to be oversized, thinly muscled animals, the very opposite of what we want, and, as a sample of these flabby raw-boned horses, the writer cites the Cleveland Bays. I never saw an English coach horse brought out to this country that was good for anything—though there may have been a dozen such.

The Suffolk Horse.

I do not know that I have ever seen a good Suffolk in Ontario ; I saw a magnificent one in the Province of Quebec. I very fully agree with what Mr Patteson said about the Suffolks, that they would prove a very useful breed in improving our stock.

Improvement on the Clyde.

From what I have heard of them, and judging by the specimen I saw—which was imported by Senator Cochrane—I should say that the Suffolk has a better head than the Clyde, is cleaner cut out under the jowl, has a better neck, is generally deeper and better formed about the chest, has a vastly better barrel, has full round ribs instead of the slab-sides of the Clyde, and is without the raggedness of the latter's hips. The loin is broad and well muscled, the quarters are well rounded, the weight well carried back to the buttocks, the stifles heavy, the gascons well spread, and the hocks well let down, and it is farther from the root of the tail to the bottom of the stifles. The Clydesdales are split up too much behind ever to make stylish or desirable horses, while the Suffolks give evidence of very much better breeding all over, being finer in the coat, and with legs comparatively smooth, and free from these gummy tissues and coarseness, so common in the Clydesdales. The legs of this horse that Mr. Cochrane imported were as clean as those of a good roadster, while they had all the weight of bone and sinew of which any Clydesdale could boast. I would very strongly recommend the importation of the Suffolk Punch as a means of improving our horses.

The Percheron Horse.

I am a good deal at a loss to know what a Percheron really is. I have seen so-called Percherons that I could not see were any improvement on the Clydes. You will find Percherons brought out here weighing 2,000 pounds, and you will find them down to 1,300 or 1,400.

[*Mr. Williams.*]

Marshall MacMahon.

Mr. Beattie, who has brought out a good many horses to this country, brought out a Percheron, called Marshall MacMahon, that I regarded as a very valuable horse to cross with our large mares, for the production of large, good horses. I have not seen Mr. Walker's stock at Walkerville.

Cavalry and Artillery Horses

I think the country at the present time is prepared to turn out a very fair class of artillery and cavalry horses, but for stylish carriage horses, horses that would bring the highest price, I think the market would be pretty easily drained. I think, however, that we have the material for producing the latter class, if it were properly used.

How to Get a Good Carriage Horse.

In order to produce horses of this kind, I would take any large well-formed mare, and breed her to a large heavy thoroughbred, several good specimens of which class we have in the country. I have now in my mind three thoroughbred stallions in Ontario that are big enough, when crossed with large mares, to produce fine stylish carriage-horses, that would stand sixteen hands at the age of four, and with action and general style which would suit them for the English market. I think the difficulty in producing this class of horses would rather be the scarcity of mares than of horses. Our importers hardly pay attention enough to the importation of large mares.

Selection of Mares.

I would, however, breed from our own mares, and I would even use a good mare with a big dash of heavy Clydesdale blood in her for producing geldings and mares, but I would rigorously exclude any male progeny of hers from the stud.

Natural Advantages for Horse-Breeding.

We have great natural advantages here for horse-breeding ; there is something in our climate admirably suited to it.

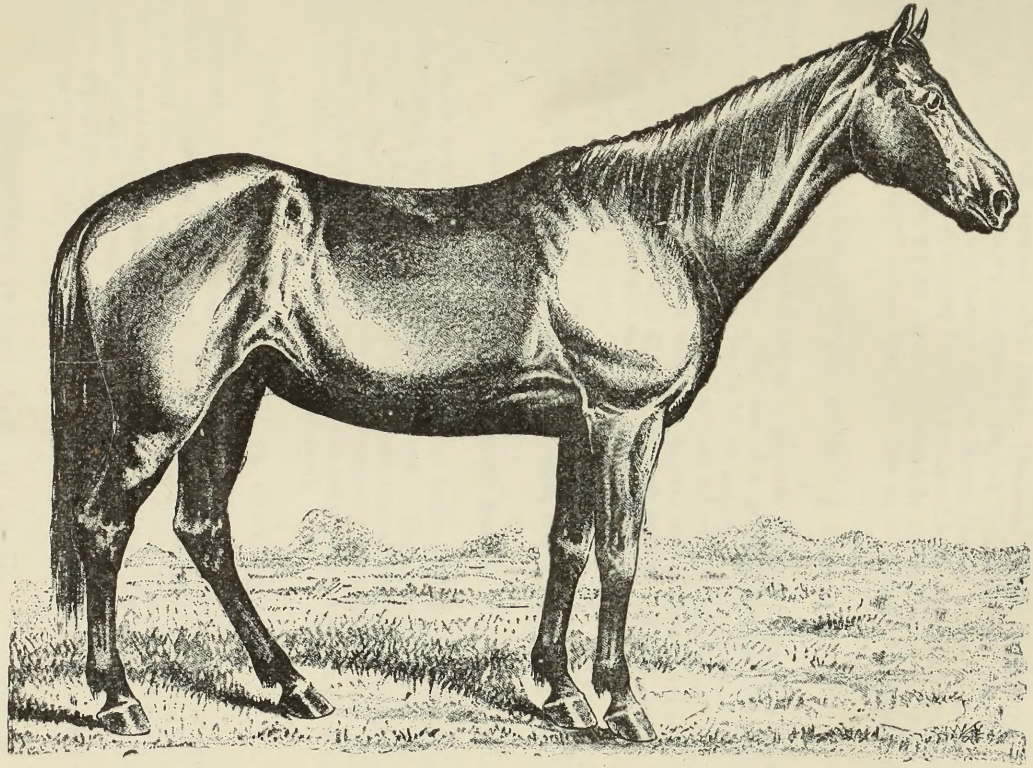
How to Found a Valuable Breed.

We have been marvellously successful in producing good horses of the roadster type, from perhaps rather scanty material, and I think the man who would have pluck enough to bring over a few Suffolk Punch mares, and breed them to well-bred trotting sires or fine stylish thoroughbred horses would, whether or not he made any money out of the transaction, have the satisfaction of founding a breed that would ultimately be of very great value to the country. There are persons in this country willing to pay a high price for a good horse, but the home market for high-priced animals is very limited, though a man can always get a good figure for a matched pair of stylish horses. I have seen $700 offered for a matched pair, the equals of which I would think myself in pretty hard luck if I could not breed almost every time in the way I have described.

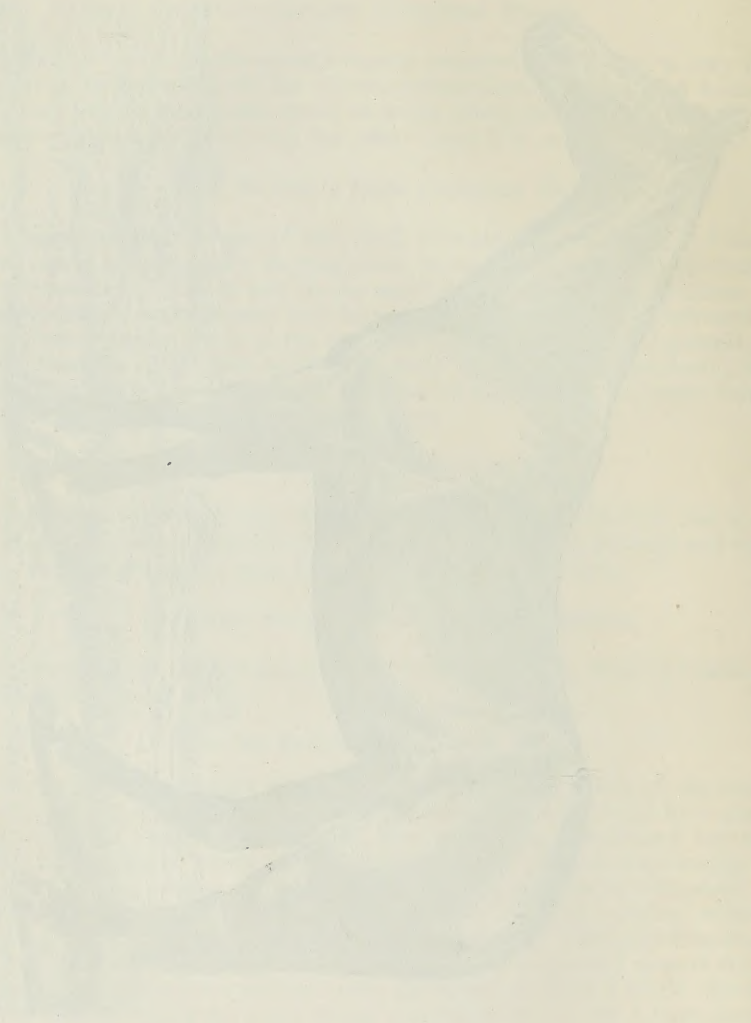
DEMAND FOR SUCH HORSES IN THE STATES.

Such horses are in good demand in the States ; in fact, I have invariably found that a stylish, high-stepping carriage horse is always a saleable article. In fact the demand in the States is of such dimensions, that if every horse in Canada were turned out in the way I describe, I have no doubt an abundant market could be found for them there, without one having to cross the Atlantic.

[*Mr. Williams.*]



"NINA"—BOSTON'S LAST DAUGHTER.



COST OF RAISING SUCH HORSES.

The cost to a farmer of raising a horse of this kind would be greater than that of raising a common animal by the increased fee for service, and no more.

HORSES THAT WOULD BE SERVICEABLE FOR SUCH A PURPOSE.

The following horses, crossed with large 16-hands mares, would produce the class of animals I speak of. Messrs. Burgess & Boyle's Princeton, Mr. Clarke's Magyar, Mr. Hendrie's Stockwood and Big Sandy, Major Macon (whose owner I do not know), Erin Chief, though not a very large horse himself, produced large stock, and I have no doubt Mr. Wiser's horse, Rysdyk, would be especially valuable in this way, for I have never seen any of his get from large mares that did not have exactly the style that was wanted.

THE " GENERAL PURPOSE HORSE " A MISNOMER.

The animal that is classed at our fairs as a general purpose horse is a misnomer, being very much too heavy and clumsy. My idea of a general purpose horse—that is a horse for a farmer's own use—is that he should be an animal, a pair of which (and many farmers have only one pair) can be driven to market, taken into the woods to haul out cordwood, or sent with the boy for the doctor at a good rate of speed, and this kind of horses is seldom shown as agricultural or general purpose horses. Those shown at fairs as agricultural or general purpose horses are mongrel Clydesdales, as a rule, and I think they are the worst class of horses we have.

To Mr. Wiser.—I think the best kind of general purpose horse are those horses that breeders produce with the idea of getting speedy animals, but which fail to develop into fast horses.

THE TRUE GENERAL PURPOSE HORSE.

In my opinion the excuse for the existence of the institution known as the trotting turf, is the production of these general purpose horses. They generally vary in height from 15 hands 1 inch to 16 hands, are moderate eaters, and although hearty, it does not take a small fortune to feed them, are closely and compactly made, hardy, free from disease, with plenty of style and action, and these are the horses that are left after the successful trotters are taken out of a breeding establishment.

HEAVY HORSES NOT REQUIRED FOR FARM WORK.

To Mr. Dymond.—I think the horse that weighs 1,050 or 1,100 pounds is, the year round, quite heavy enough for agricultural purposes and for all ordinary farm work, except, perhaps, that on the very heaviest of clay lands. I think, especially in the vicinity of Toronto, the farmers are doing themselves incalculable injury by breeding moderate-sized mares—mares good in their way—to those great big Clydesdales. It is the old story of the mother not affording sufficient nourishment for either the fœtus or the colt after it is foaled, and the result is a thin, flabby, loosely made horse.

IMPROVEMENT IN THE BREED OF HORSES.

I think, generally speaking, however, that we have improved in our breed of horses very much up to the present time.

DISAPPEARANCE OF CANADIAN FAMILIES OF HORSES.

Our breeders have not been as careful as they should have been in preserving our

local strains. For example, the Grey Eagles are rapidly disappearing, being bred out and mixed with inferior breeds, such as Clydesdales; the Royal Georges are going in the same way; a Tippoo is rarely seen now, (Tippoo was the sire of Warrior, and Warrior of Royal George, so that the two families are akin, though the Tippoo are the older); and the Kimballs, another valuable strain, are running out. Now, if breeders in years past had taken the pains to import good horses, and now and then get a good out-cross for these families, the results would have been much more favourable.

CLEAR GRIT.

This horse, Clear Grit, is a wonderful foal-getter himself, and I think his progeny crossed with the Messengers would produce a horse as near perfection in the way of a roadster as it would be possible to obtain.

A FAULT IN THE MESSENGERS.

The Messengers, though a very perfect race of trotters, are, very many of them, inclined to travel a little close behind, while the Clear Grits and the get of Lapidist generally, travel rather too wide behind, so that I believe a cross between the two would produce a horse whose hind feet in speeding would just clear his front ones on the outside, and would do away with the necessity for shin boots, toe weights and all that sort of thing.

REGISTRATION WANTED.

To Mr. Wiser.—In my opinion we want a thorough system of registration—we want our breeding systematized if possible. As everybody knows, the fast trotter is an exaggerated type of the first-class roadster, and in order to maintain his excellence, some means must be afforded by which men can test the speed of their horses. I do not wish to be understood as advocating rowdyism, or importing into our fairs any of the objectionable features of the turf, but I think that speeding trials at our exhibitions, properly conducted, and in the hands of good men, would be of immense value in horse-breeding. If a system of registration were introduced, and we should find a class of horses that were really good, we would have a history of that class, and would be more likely to breed from it. It is a self-evident fact that we must keep some sort of a record, that we must have a stock register, if we wish to preserve the breeds of our horses.

BOGUS PEDIGREES.

As it is now, there is misrepresentation of all sorts; men fix up bogus pedigrees of their horses, and people are deceived into breeding, perhaps from a half-bred Clydesdale, under the idea that he is a well-bred horse, and the only way to meet the difficulty is to have a register.

OFFICIAL CERTIFICATES OF PEDIGREE.

To Mr. Dymond.—Without speaking of a license, a certificate or register that had something like an official endorsation on it, would give confidence to the farmer, that where he pays his two dollars instead of one, he is getting the services of a well-bred animal. The success that has attended the system of registration in the breeding of shorthorn cattle is sufficient to put it beyond question, that it is the best and surest method to obtain careful breeding. If there were a system of registration it would put the means within the reach of farmers at once of telling whether the stallions that sought their patronage were thoroughbred or not

W. H. WILLIAMS.

[*Mr. Williams.*]

MR. GEORGE COCKBURN'S EVIDENCE.

Sittings to take oral evidence, held at Cobourg, October 19th, 1880. *Present*—Messrs. Aylsworth (Chairman) and Dymond.

George Cockburn, of the Village of Baltimore, Township of Hamilton, was called and examined.

THE CLYDESDALES.

He said,—I make a specialty of breeding horses. My preference in breeds is the Clydesdale, and though I have some blood horses, the most of my horses are draught. In 1872, we brought out a thoroughbred Clyde, and have been breeding Clydes ever since.

MARKET FOR DRAUGHT HORSES.

We sell most of our horses in Pennsylvania, and they are sent to New York and Philadelphia for draying and other heavy work. The buyers come around for them at all seasons of the year, and if the horses are to be had, they are sent to the Pennsylvania farmers to bring into condition—that is, horses that are in low condition, which the Americans purchase. I would advise the farmers in this country to procure the best Clydesdale mares to breed from, as heavy horses will, I think, always be in good demand. To raise a colt up to three years would cost about $100, and would be worth at that age from $150 upwards. When I speak of Clydes, I mean horses got by a pure Clyde horse from a common mare.

GENERAL PURPOSE HORSES.

For general purpose horses a Canadian mare, with some blood in her, or a roadster crossed by a Clyde, would be the best. The mare should be a large clean animal, not very heavy. Such horses as that cross would produce could be driven at the rate of five miles an hour. They are only suitable for slow work, and are perhaps more of a farm-labour horse than a general purpose one.

CLYDES NOT DETERIORATING.

I do not think the Clydes are deteriorating, and think, perhaps, they might be getting slower and colder-blooded, which is rather desirable, in order to make them steady working horses.

ROADSTERS AND CARRIAGE HORSES.

There is not so good a market for the lighter horses as for the heavy draught horses, unless they are good roadsters or carriage horses. Good horses of the kind I refer to, at four or five years old, are worth $150 to $175, if they are good square horses, with large bones. Such horses will earn their living on the farm at two years old, and, if kept in good condition, will sell well at four. These horses are out of good, large, well selected mares, by a pure Clyde horse. We have not bred any coach horses, but we have bred some which we call roadsters.

HOW TO PRODUCE THE ROADSTER.

To produce a roadster, a good strong hunter is required, with some blood in him, and one of our best common mares.

[*Mr. Cockburn.*]

CLEVELAND BAYS—PRICE OF CARRIAGE HORSES.

Cleveland Bays are good coach horses, and, if crossed on our farm mares, will produce good horses of that kind. There is a good demand for such horses in the United States. A first-class team of carriage horses would be worth from $500 to $1,500.

ENGLISH HUNTERS.

To get the hunter (for which there is a demand in England) we would require a mare, three-quarter bred, strong, and large, and a thoroughbred horse. I think that the Canadian mares would produce very good hunters.

THOROUGHBREDS—HAMBLETONIANS—ROYAL GEORGES.

The thoroughbreds in this country are generally wanting in bone; they have been bred too close. The Hambletonians, crossed on our mares, make splendid roadsters. The Royal Georges are pretty much the same as the Hambletonians.

VALUE OF GOOD HUNTERS.

Good hunters are worth from $125 to $150, and a very fine, well developed one would bring £100 in England.

THE PERCHERONS.

I have seen the Percherons, and think they would do well to improve our common breed. Their colour is a little against them, but it would not hurt them in the American market. They are not quite so good as the Clydesdales, as they are a little deficient in bone, when crossed on common mares. The Percheron mares, crossed with Clydesdale horses, would produce better stock.

THE SUFFOLK PUNCH.

The Suffolk Punch is a useful farm horse, but does not come up to the mark in bone. They have been tried here for breeding purposes, but do not amount to much.

FARMERS SLOW TO MOVE—NUMBER AND COST OF SERVICES.

Farmers generally in this district do not do much to encourage the importation of horses—that is thoroughbreds—for breeding purposes, owing to the expense. We charge about $15 for the services of one of our Clyde stallions, and take about 125 mares in the season, if the horse is mature and well developed. If a horse is put to too many mares in the season, he is not likely to be so good the next year, and it also affects his offspring.

LICENSING STALLIONS.

I think it would be a good plan to charge a license for stallions, though some farmers might not like it at first.

WANT OF HEAVY HORSES.

The supply of heavy horses is not equal to the demand at the present time in this locality, as farmers have hardly had time to breed them since the demand for them arose.

GEO. COCKBURN

[*Mr. Cockburn.*]

Sittings to take oral evidence held in Bowmanville, October 20th, 1880. *Present*—Messrs. DRYDEN (Chairman), AYLSWORTH and DYMOND.

MR. ROBERT BEITH'S EVIDENCE.

ROBERT BEITH, of the Township of Darlington, was called and examined.

A HORSE RAISING FARM—CLYDESDALES.

He said:—I live on the lake shore. My land is a heavy clay. I have a farm of 160 acres. I follow a rotation of crops, but recently have devoted special attention to the raising of Clydesdale horses.

ROTATION OF CROPS.

After sod I sow peas, then wheat, then perhaps barley, then roots, manuring after the barley. Then I would take off a crop of wheat and seed down, allowing it to remain in grass two years. Sometimes I sow oats instead of barley. I have not been growing spring wheat.

FALL WHEAT CULTIVATION.

I tried fall wheat this year but it was a failure. I have sown the Arnautka wheat this year, and another variety which came from Illinois recently. It resembles the Fife wheat, and has proved satisfactory. My experience agrees with that of previous witnesses as to the failure of the wheat crop. My average yield for the last four or five years has not been more than fifteen bushels to the acre. I think its failure is due to the seed running out.

SALT—LAND PLASTER.

I have tried salt but it has been of no particular benefit except to bring the crop in earlier. I have tried land plaster on turnips but the results were doubtful. It was Oswego plaster.

ROOT CROPS.

Our principal root crops are mangolds and carrots. The latter yield 700 bushels to the acre, and they are worth about five cents per bushel.

IMPORTATION OF CLYDE HORSES.

The first Clyesdale mare I bought was five years ago, but previous to that I had been using pure Clyde stallions. For twenty-five years we have been using pure bred stallions, and high bred mares, and at one time we imported these stallions into the country. Lately I have imported the Clyde fillies and the colts. I do not think the Clydesdales deteriorate here, if they are kept pure and are judiciously crossed.

BREEDING FROM CANADIAN MARES.

We breed our own well-bred Canadian mares to the best Clydesdale stallions we can procure, and when the colts reach four years old they can be sold readily at from $150 to $200. These are heavy horses, weighing 1,000 to 1,500 pounds or thereabouts. I find them very useful on the farm, and when I wish to dispose of them I can do so easily.

[*Mr. Beith.*]

DRAUGHT HORSES—THE AMERICAN MARKET.

I would not call them general purpose horses. They are rather draught horses for the American market. I sell to jobbers or dealers. Good Clyde stallions at three years old are worth about $1,000, bred from Canadian mares with four crosses in them.

GENERAL PURPOSE HORSES.

For general purpose horses of a lighter kind I would use a pure bred Clyde stallion and a common Canadian mare, rather small. I have used the English dray horse, but did not find it so satisfactory as the Clyde. The general purpose horses of which I have spoken may be driven at about six miles an hour.

THE SUFFOLK PUNCH.

I know very little of the Suffolk Punch, but though they have been imported by some of the neighbours they do not seem to be favourites, as they do not impress their qualities on the common stock as the Clydes do. There is a demand in the United States for rather lighter horses than those I have spoken of, for tramway or street cars. They bring from $80 to $100.

A COACH HORSE—CLEVELAND BAYS

I think the proper cross to produce coach horses is to cross a thoroughbred stallion and Cleveland bay mares. That is the way the English coach horse is produced, and I have never seen anything to equal them.

THE HAMBLETONIANS—THE MORGANS—GOOD ROADSTERS.

I have the Hambletonians and the Morgans. I find the Hambletonians quite satisfactory as sires to produce good roadsters.

INFERIOR CLYDES—CHARGE FOR SERVICE.

A great many so-called Clyde horses have been imported which are not pure enough to be registered in the Clyde stud-book. I charge $20 for services, and in consequence of the demand for heavy horses farmers are anxious to avail themselves of their services.

PROFIT OF RAISING HEAVY HORSES—LARGE DEMAND.

There is no reason why it would not be profitable to raise the heavy horses I have mentioned. For the eighteen months ending last March $45,000 worth of this class of horses have been sold out of this country, and at present there is a demand which we cannot supply.

COST OF RAISING HEAVY HORSES.

A horse of the large breed of which I was speaking would pay for its raising at three years old. It is better to break them in gently at that age. Horses which sell at three years of age for about $150 to $200 would cost about $100 to raise. I have gone into pretty close calculations on that point. I take into account the cost of the stallion's services.

ROBERT BEITH.

[*Mr. Beith.*]

MEMORANDUM OF INTERVIEW WITH LIEUT.-COL BARON FAVEROL DE KERBRECH, 1ST REG. CHASSEURS D'AFRIQUE, AND CAPTAIN HENRI DE LA CHERES, 13TH FRENCH DRAGOONS.

The gentlemen above-named were appointed by the French Government to visit the United States to study the cavalry system of that country and, incidentally, to ascertain what supply of horses, suitable for cavalry and artillery purposes, might in case of need be available in the United States or Canada. It appeared from their statements that considerable probability exists of the stock of available horses in France being insufficient for even the ordinary demand, although there is no intention of making foreign purchases at present. Within the last year, however, the French Government have bought horses both in Hungary and La Plata, but the results do not seem to have been satisfactory. In France the home supply is usually obtained from farmers in the agricultural districts. The horses required differ very little in type, although of different degrees of weight and strength. The weight carried by a light cavalry horse is 200 lbs., and by a heavy cavalry horse 250 lbs., including the trooper and all his accoutrements.

A short body, long neck, good quarters, life, spirit, and activity are essential qualities. The English riding and driving horse was mentioned as a model of the cavalry horse.

For the artillery greater weight and strength are required, but not so much as to produce heaviness of action. Six horses are sometimes attached to a gun, which with the carriage, will weigh 2,500 lbs.

The two officers remarked they had seen many good horses in Canada, and were favorably impressed with the country as a possible field of supply in case of need. In the street cars they noticed many horses of a fair stamp, and suitable for their purposes. The Clyde blood, however, they considered to be too predominant. The horse for them must have action and speed as well as strength. The Percheron, they said, was never used for cavalry or artillery purposes in France, being too heavy. The medium price paid for a horse by the French Government is about $200.

A. H. D.

ONTARIO AGRICULTURAL COMMISSION.

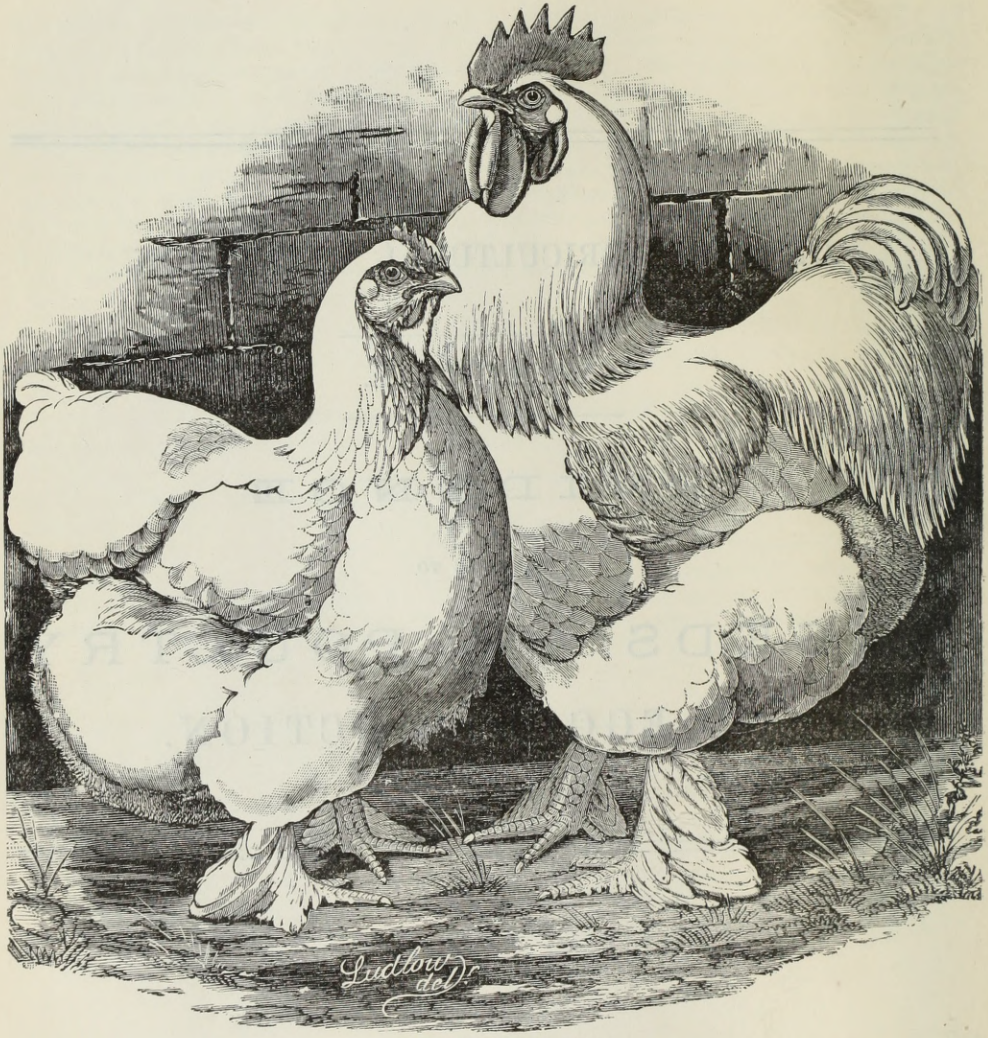
APPENDIX L.

EVIDENCE

RELATING TO

BREEDS OF POULTRY,

AND EGG PRODUCTION.



WHITE COCHINS.

ONTARIO AGRICULTURAL COMMISSION.

APPENDIX L.

EVIDENCE

RELATING TO

BREEDS OF POULTRY,

AND EGG PRODUCTION.

Sittings to take oral evidence, held at Toronto, Aug. 3rd, 1880. *Present*—Messrs. Thos. Stock (Chairman), Hon. S. C. Wood, and Messrs. Brown, E. Stock, and Dymond.

MR. W. H. DOEL'S EVIDENCE.

William H. Doel, of Doncaster, near Toronto, was called and examined.

To Mr. Thomas Stock.—I have paid special attention to the breeding of poultry for about ten years. I have bred Dorkings, Brahmas, Cochins, Hamburgs, Games, and most of the different breeds of poultry.

The Breed for General Purposes.

The breed which I would recommend for general purposes is the coloured Dorking. It is larger than the white Dorking, and is better adapted for the market. The coloured Dorking also comes to perfection for the table sooner than most other breeds, and there is more money in it in that way.

Other Breeds Discussed.

The Brahmas and Cochins are larger birds, but take much longer to come to perfection for the table than the Dorkings. The Dorking is plump and of excellent flesh. The Game is quite equal to the Dorking in quality, or perhaps more delicate; but the trouble with the Game is that you cannot keep so many Game fowls together as you can Dorkings. The Brahma, in flavour and quality, is very nearly if not quite equal to the Dorking. The flesh of the Cochin is too coarse and stringy to make it suitable for the table. If I were going into the keeping of fowls as a business, I should take the Dorking or a cross of the Brahma and the Dorking or some other breed, but I prefer the Dorking.

[*Mr. Doel.*]

The Brahma as a Stock Bird for Table.

The Brahma among fowls is in fact what the Durham is among cattle. You should fall back on the Brahma as a stock fowl, taking the male bird from that breed as the foundation of a good stock. I leave the Cochin out because it is not a good table fowl. The cross of the Brahma and the Dorking will give us a larger framed fowl than the Dorking and with more flesh upon it, and makes a superior fowl in every way for the market.

The Houdans Crossed for Laying—The Black Spanish.

For laying purposes, I would perhaps cross the Brahma on the Houdan. The Black Spanish makes a very good cross with the Brahma for laying. I have not heard anything about the cross of the Black Spanish and the Houdan, but I should suppose it would make a very good fowl, because the Houdan, it is supposed, came originally from the Dorking and the Poland. It is said to be a leading French fowl, and in fact the only French fowl that we have found to be hardy enough for this country.

The Plymouth Rock.

The Plymouth Rock promises to be a very good fowl, but it will not suit the farmer for a number of years yet as it can hardly be called a fixed breed yet. The farmer looks to have both a good fowl and a good looking fowl. The Plymouth Rock has been a cross until late years, and it has not been bred sufficiently long or with sufficient care to make it yet an established breed, so that it may be depended upon. It will do very well to use for crossing purposes, like any other common fowl, because when fowls are once crossed, they are nothing but common fowls, although some of them make better layers than many full-bred fowls.

The Houdans—Polands—Black Spanish.

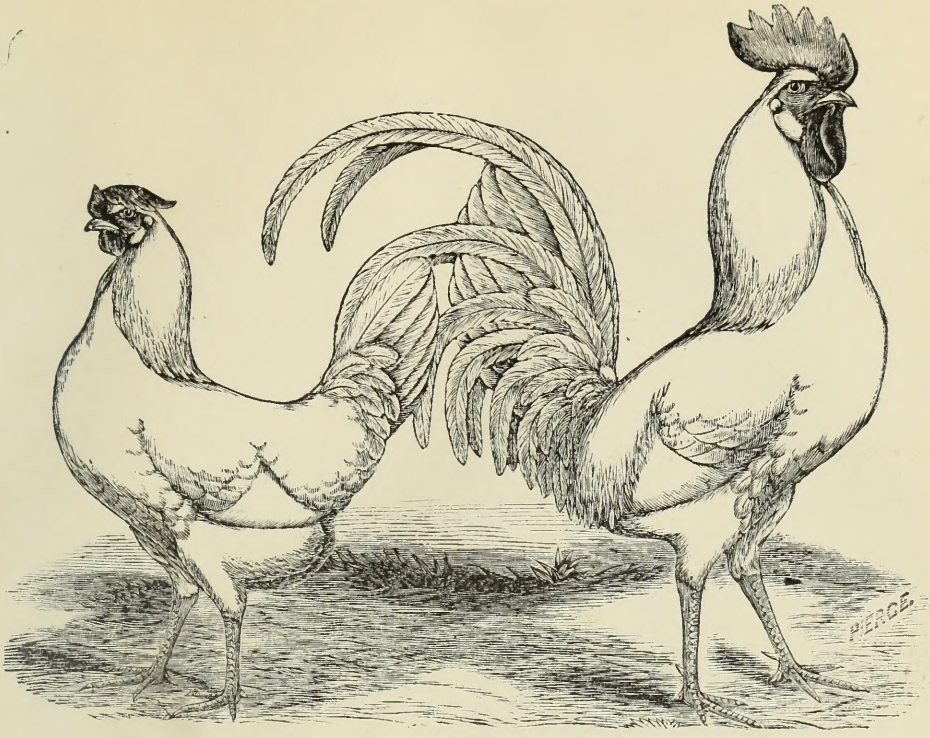
The Houdans, the Polands, and the Black Spanish fowls are not adapted for general use, because they are non-sitters and are not good table fowls. For general use, we must have a fowl that will sit as well as lay. The Houdan and other non-sitters, we find lay a larger number of eggs than the fowls that sit, for one reason, that their time is not taken up with sitting. Of sitting fowls, I suppose the Brahmas are the best layers we have. The Brahma, crossed upon the Black Spanish or the Poland, makes a very good fowl, preferable to a cross on the Hamburg, which I consider too small a fowl for general purposes. The flesh of non-sitting birds lacks the substance and flavour that we find in the flesh of sitting birds. The crosses of sitting birds with non-sitters are more inveterate sitters than even the full-bred sitting birds—a cross, for instance, of one of these Asiatics with the Black Spanish.

A Brahma and Spanish Cross.

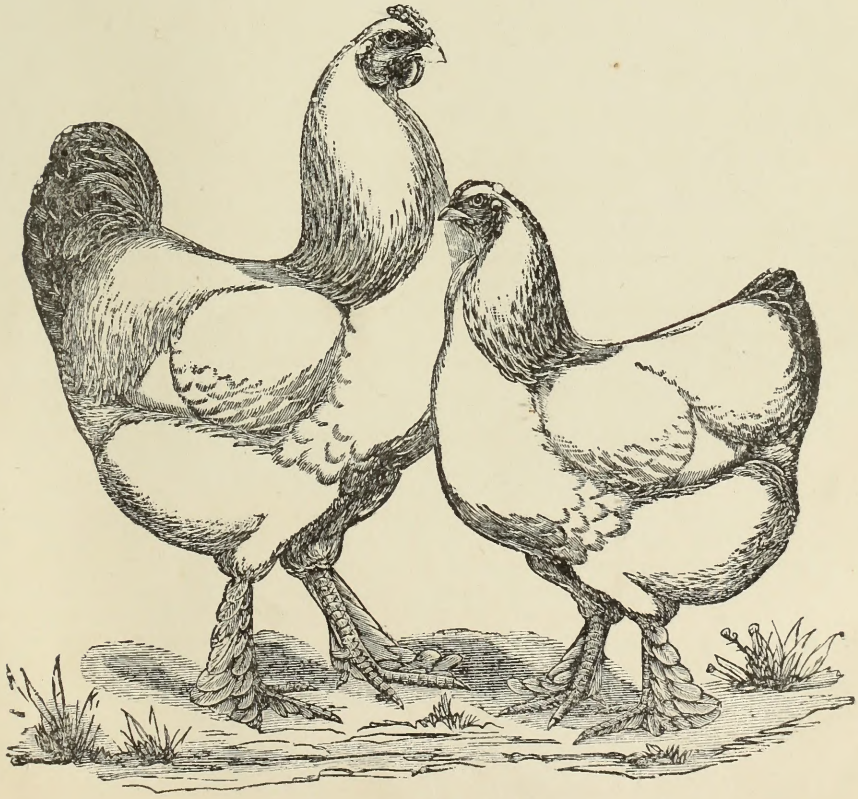
I have experimented in crossing the different breeds, and have found that the best cross of a non-sitting bird and a sitting bird was the cross of the Brahma and the Spanish, but I prefer the Brahma and the Dorking.

A Brahma and Dorking Cross.

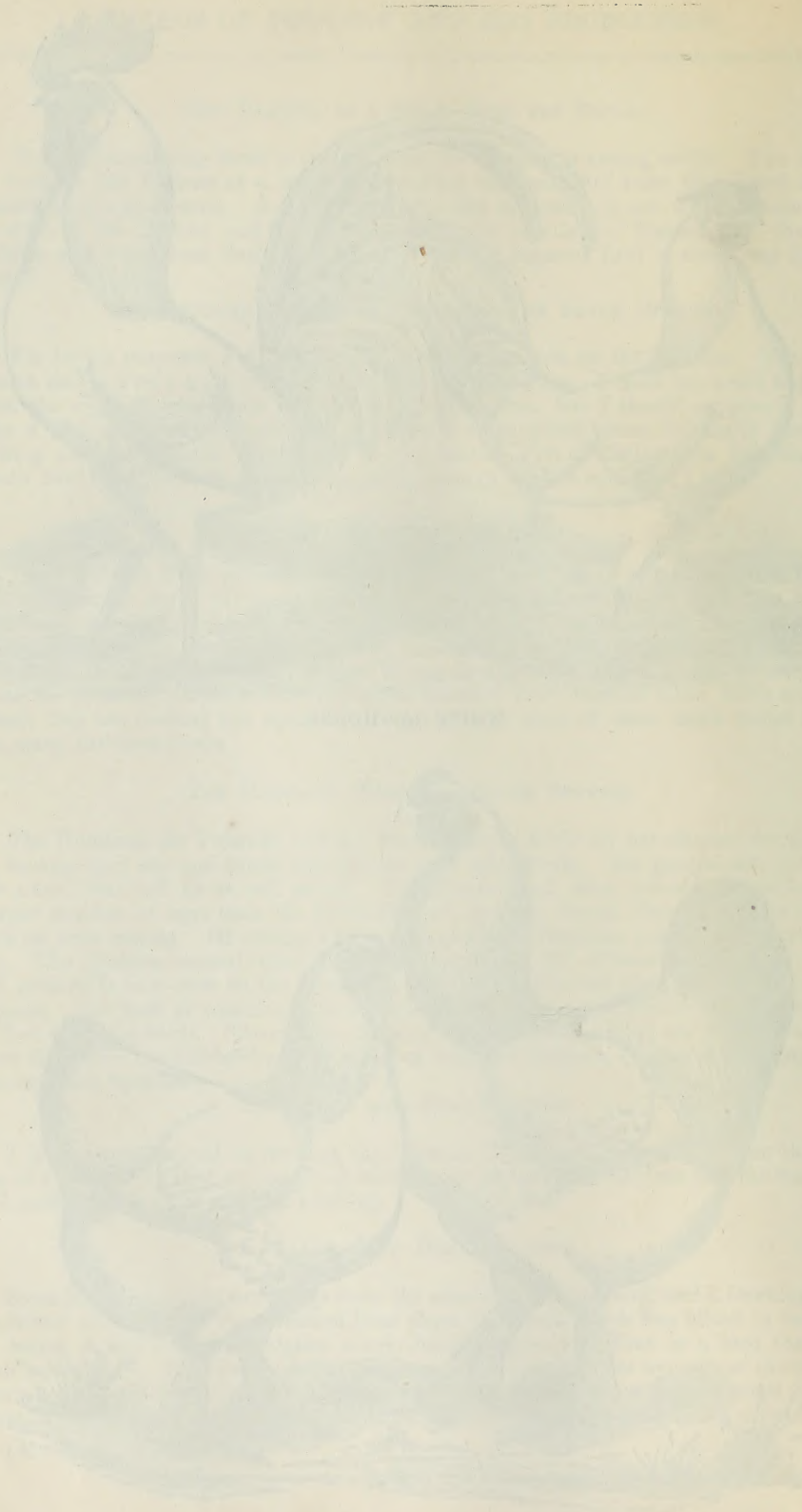
Some time ago I gave some eggs from the cross of a Brahma cock and a Dorking hen, to a friend of mine, and she obtained from them a cockerel which was killed in the fall, and before it was picked it weighed nearly fourteen pounds. That is a bird that was worth something for the table, although it was an exception. A fair average of the weight of such a cross would be nine or ten pounds for the cocks, and six or seven pounds for the pullets, live weight, or about eight pounds for the cocks, and five pounds for pullets, dead

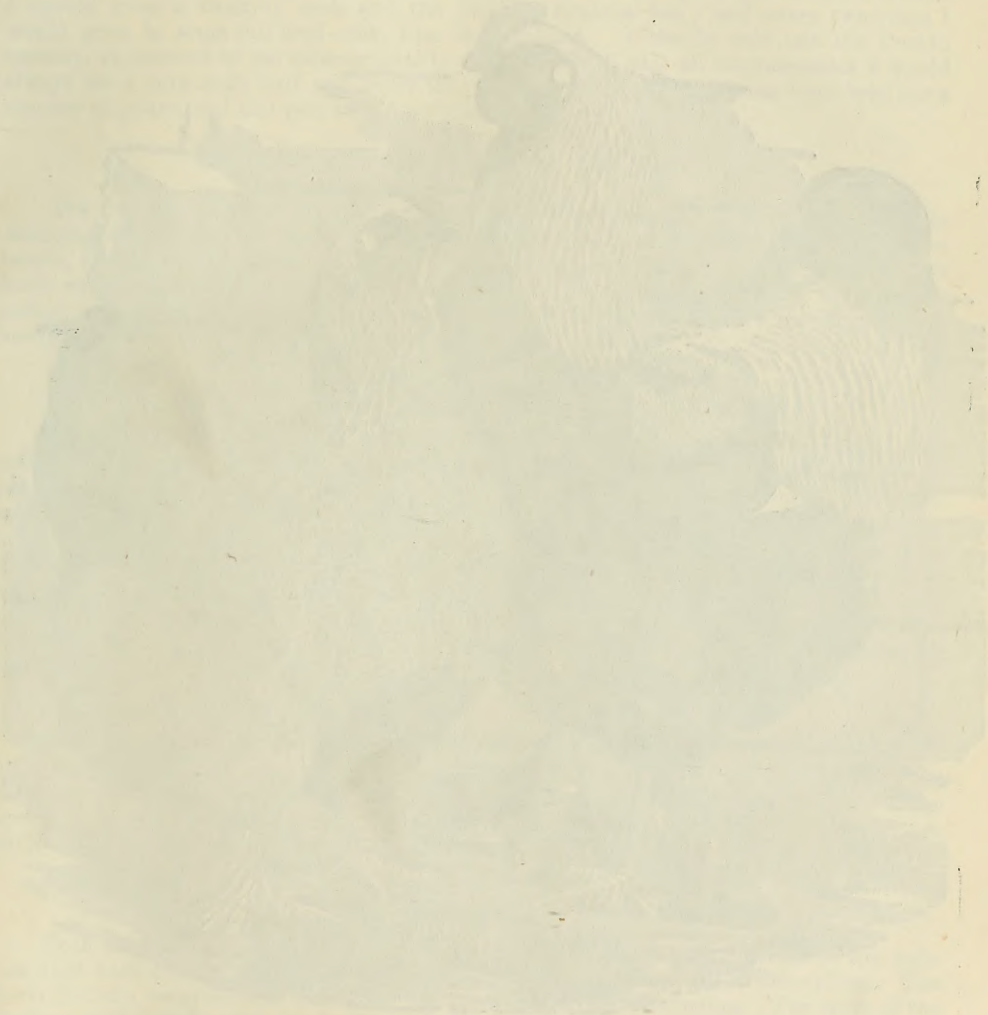


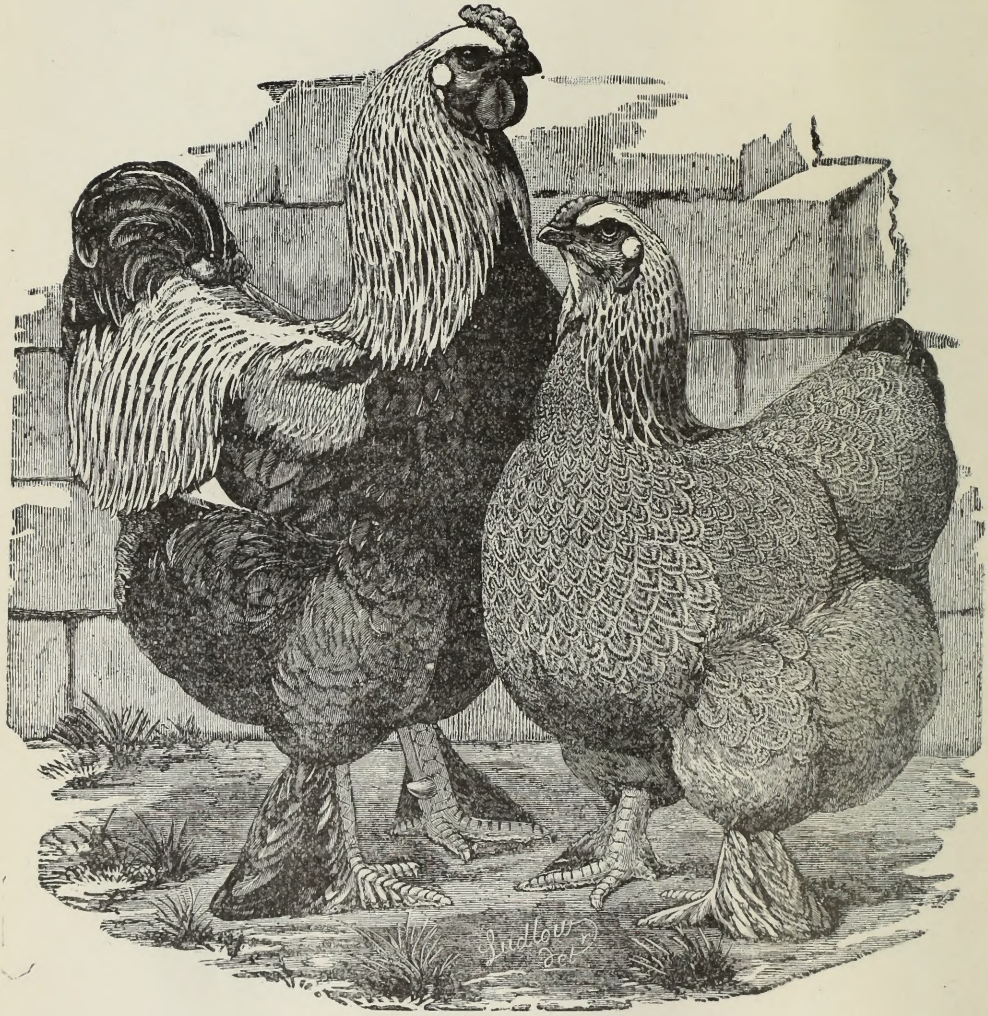
WHITE LEGHORNS.



LIGHT BRAHMAS.







DARK BRAHMAS.

weight. And then they come in earlier for the table than the full-bred Asiatic. They are improved in size, while the quality of the Dorking is not deteriorated in the cross.

System of Breeding.

To Mr. Dymond.—In breeding fowls I find that the cross generally receives its type from the male. If I were breeding, and crossing the Brahma and the Dorking, one year I should commence by crossing a Brahma cock and a Dorking hen; then in two years, I should cross a Dorking cock and the Dorking-Brahma hen; and every two years I would cross in some full-bred cock, like the Houdan. I should rule out the Cochin entirely, on account of the inferior quality of its flesh. Under all circumstances I would always use a pure male bird, and never take a cross except one which has been bred for a number of years, and had become a very good type.

The Dark Brahmas Preferred—The Game Fowl.

The Brahma I have been referring to is the dark Brahma. I have kept the light Brahma, but I prefer the dark. I don't think there is much difference between the two breeds, except in the colour. The objection to crossing the Game is, that it makes the fowls so pugnacious that you cannot keep many of them together; that is the only objection I have to the Game. The Game is a hardy fowl, but I don't think it imparts hardiness to the birds, or helps them to resist the climate.

Hardy Fowls.

That is also one objection to the Dorking, but I think it can be easily overcome. In breeding the Dorking, I have sometimes let them run without taking any particular care of them, and let the hen and chickens find a place of shelter for themselves, in all sorts of weather, and I find that in that way they become as hardy as any other fowls. The Houdan, I believe, is hardier than the Dorking. The Brahma is most decidedly a hardier fowl; and, for a fowl that will do well in winter or summer, and in all sorts of weather, if you do not care for getting a fowl fit for the table early, you cannot have a better bird than the Brahma. The Brahma is a good layer, and if taken proper care of—given proper attention and proper protection—will lay very well during the winter.

Care Needed in Winter.

But an objection to the Brahma, and to Asiatics in general is, that in winter you have to be extremely careful in feeding, or they will not lay at all, because they get very fat. The Asiatics have a greater disposition to lay on internal fat than other breeds. That is not owing to any delicacy in their constitution, although they are more subject to some kinds of diseases than other fowls, particularly to a kind of consumption.

Liability to Consumption.

Both English and American writers make the same remark with reference to the Asiatics, that they are subject to this particular disease which they call consumption. The fowls dwindle away in flesh until they die apparently from exhaustion. The cross of the Brahma and Dorking is more hardy, and does not show such a disposition to lay on internal fat in the winter. I find no difficulty in keeping Spanish fowls in winter, if I have a warm enough place for them; otherwise, their combs are liable to get frozen.

To Mr. Brown.—The Dorkings, I should say, would be the safest fowls in the hands of ordinary farmers all the year round.

To Mr. Dymond.—I don't think by crossing the Dorkings with the Brahmas you would diminish the hardiness in the cross; I think, rather, that the cross would be hardier. I have not found the Brahma to be a delicate fowl at all. I have found that

the cross of the Brahma with any of these fowls is quite as hardy as the Brahma itself, and perhaps more so, because I have not known the cross to be subject to the consumptive disease I have mentioned. What I know regarding the nature of this disease is what I have read in English works on the subject, and from personal experience. In England there are persons connected with *The Livestock Journal* who examine any birds affected, and report the result of their observations through *The Journal.* I have tried to get some of the journals to take up the matter here in a similar way, but they do not feel competent to do so.

Need for Investigation.

It would be a great benefit to the country if we could get the members of the different Poultry Associations to combine for the purpose of doing something with regard to general diseases of poultry. The Ontario Poultry Association is assisted by Government. If the Board of the Association would consent to pay a person to examine diseased birds, it would be an excellent thing for the country, because there are many birds which die annually and nobody knows what is the matter with them, and there are very few people who could learn by opening and examining a bird themselves. The difficulty is that we cannot induce any of the Associations to go to the expense of having birds examined scientifically.

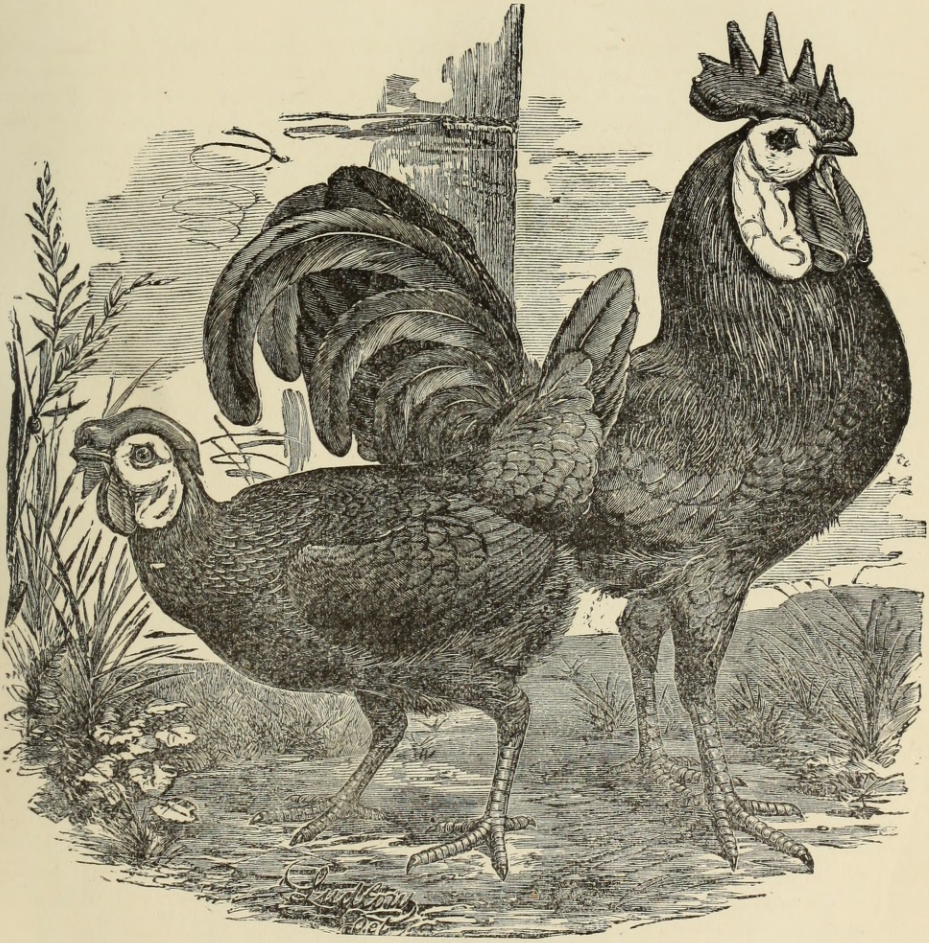
Poultry Raising in Ontario—Artificial Incubators.

To Mr. Thomas Stock.—I don't think poultry-raising is conducted as a separate industry to any extent in Ontario; I only know of one person who said he was going to make it a special business—that is a gentleman living near me. I have not had any experience with artificial incubators. As a member of the committee on the "Glass her" at the Toronto Industrial Exhibition last year, I watched it very closely. I approve of the incubator very much. By means of it, some of the non sitting fowls which are good layers could be made to answer the country very well. But the trouble with the incubators is this, that unless a person makes an almost separate industry of poultry-raising, he will not take the trouble to learn the working of the incubator; otherwise I think they could be made to pay very well. There are artificial mothers in connection with the incubators which are used with considerable success, though the weak point in the incubator has been a want of a sufficiently beneficent mother. Up to the present time it can hardly be said that the incubators have been a success; but I think eventually they will be successful.

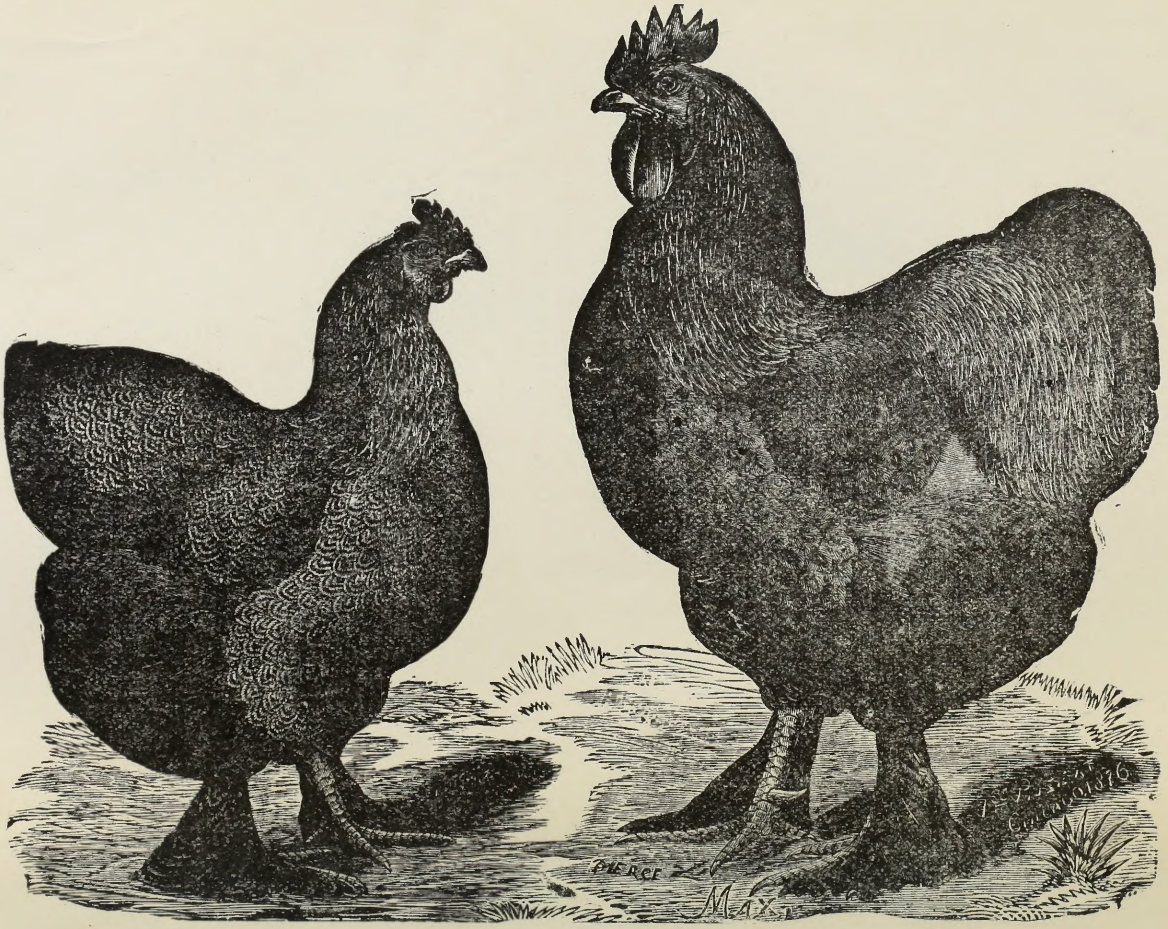
Constant Attention Required.

An incubator could be watched and attended to very well by women and girls; if a farmer's wife gave as much attention to the incubator as she now does to the dairy, she would reap more advantage. The incubator requires constant attention, and very few persons, unless they make it a special business, will give it proper attention. It is after the chickens are hatched that they require the most attention, because they have not their natural mother to attend to them, and to assist them in searching for their food, and to give them sufficient warmth when very young. I do not think as yet, however, it would be advisable for the farmers of the country generally to use the incubator. It might be used with advantage if one were established in a centre, in the charge of a person who made a special business of hatching for the surrounding farmers. They are using it in that way in England and in France. The people bring their eggs to the incubators, and in two or three days, after they are hatched, they come and take away their chickens and the eggs that do not hatch. I have read of a person named Brown undertaking to do the same thing in New Jersey, but I have no personal knowledge of the matter. I have great doubts that such is the case, although I have no doubt if a person made a business of it, he could supply a very large city with half-grown chickens for the table, and make it pay very well.

[*Mr. Doel.*]



BLACK SPANISH.



BUFF COCHINS.

Method of Feeding.

I have not raised fowls for market; I have simply kept them as a fancier and for the table. I have not tried caponizing. Poultry will not do well if they are fed on the same kind of food all the time. They must have green food, both in winter and in summer. A good plan is to have cabbages hung up where they can pick them all the time; mangold wurtzels are also good for them. I cut the mangold lengthwise, and throw it down to them, so that they can have access to it all the time.

The Langshan—A New Breed.

There is a breed of poultry said to be entirely distinct from any breed we have, and they are beginning to be bred very largely in England. I was going to breed them this year, and imported a trio for the purpose; but I am sorry to say that the two hens were stolen from me; I have retained the cock. It is a new Asiatic breed called the Langshan, said to have been brought originally from China by Major Croad of England. Those who have bred them say that they are equal to the Brahma or the Dorking. They are said to be nearly as early as the Dorking, and are much better layers than either the Brahma or the Dorking. They are not quite so large as the generality of the Asiatics, but I think they will attain to a larger size then the Dorking. As the "Glass hen," referred to above, will be on exhibition at the coming Toronto Industrial Exhibition, I would respectfully invite your Commission to examine the working of it, as I think it would please you very much.

Poultry Shows.

The various poultry exhibitions should be largely patronized by the public, as they are doing a great deal for the country. I would also strongly recommend that prizes be offered at the various leading exhibitions for "Dead poultry," prepared ready for market, thereby encouraging farmers and others to prepare their poultry in some proper manner, to give them a nice appearance; for were they got up with some appearance and taste, much better prices would be obtained, and the public would willingly pay better prices; as it is, not one fowl in ten looks hardly fit for the table when offered for sale prepared (?) for market.

WM. H. DOEL.

Sitting to take oral evidence, held at Guelph, July 13, 1880. *Present*—Messrs. Whitelaw (Chairman), Brown and Dymond.

MR. JAS. ANDERSON'S EVIDENCE.

To Mr. Whitelaw.—I have done a good deal of poultry raising. At present I have only four breeds of poultry—white and dark Brahmas, white Leghorns, and Black Spanish; I have also got some Bantams, but they are not of much account. I find poultry raising for breeding purposes to be very profitable.

Poultry Raising Profitable.

I have Toulouse geese and Aylesbury ducks, and I find them more profitable even than poultry. I follow poultry raising as an industry separate by itself. I did not go into it until four years ago, and I think it is profitable even to raise poultry for the table. I sell some eggs. Last year I think I sold over $100 worth of poultry for breeding purposes, besides having plenty for our own use.

[*Mr. Anderson.*]

Light Brahmas, Leghorns, Dorkings and Plymouth Rocks.

The light Brahmas are the best, taken altogether. The white Leghorns are the best layers, but they won't sit at all. The Dorkings or the Plymouth Rock are the finest table birds we have. But the Brahmas make the best mothers. I hatch all my duck eggs, etc., with them. The light Brahmas are the best poultry for this country. The Black Spanish are good layers, but they are very tender; their combs get frozen very easily, and in the breeding season you have to keep them separate, if you want to get the eggs pure. The best breeder is the Brahma. A cross between a Brahma and a white Leghorn makes an excellent fowl, as the Leghorns are the finest layers in the world. I have kept game fowls also, but they are too pugnacious. Brahmas are the breed that are usually fattened for Christmas, because they are the heaviest; I have got them to weigh as high as 18 pounds per pair dressed. The Brahma comes very early to maturity, and produces a large chicken; but I think the Dorking is the plumpest fowl for the table. When I feed them for market I shut them up entirely, and the darker you can keep them the better. Give them plenty of food—corn, oats, peas, and barley chopped up.

Speculation in Geese.

To Mr. Dymond.—I have not kept very close account of the profits of keeping poultry, but I have found it to be a very good investment. For instance, this year I bought a pair of Toulouse geese at the Poultry Association—prize geese—and they laid 45 eggs, from which I hatched 30 goslings, which I can sell at $5 a pair, if I keep them till the fall. That would be if I sold them for breeding purposes; but if I fattened them for market I could get ten cents a pound for them, and they will weigh about 35 pounds a pair when they are fat. I have never sent any poultry to the foreign market; I don't think anyone in this part of the country has done so. There have been a good many eggs bought up here to be taken to New York. I have had no experience of artificial modes of incubation. I use the Brahma hens alone for sitting purposes, because they are so much better mothers than any other breeds, and are so large that they will cover three or four more eggs than any other breed. In cold weather thirteen eggs are quite enough to put under one hen. I think poultry raising might be gone into by farmers with advantage, and thoroughbred fowls are decidedly more profitable than common fowls; they are quieter and more easily fed. I have not tried crossing common fowls with thoroughbreds. But I have tried crossing different classes of thoroughbreds.

To Mr. Brown.—I would advise the ordinary farmers of the Province to use the Dorkings or the Brahmas for the table, and Leghorns or Black Spanish for laying purposes; but the Brahmas are splendid layers during the winter, when you cannot get the Leghorns or the Black Spanish to lay. If you only feed the scraps to the Brahmas, and keep them in a moderately warm place, they will lay all winter.

JAMES ANDERSON.

Sittings to take oral evidence, held at London, July 21, 1880. *Present*—Messrs. Gibson (Chairman), Saunders and Dymond.

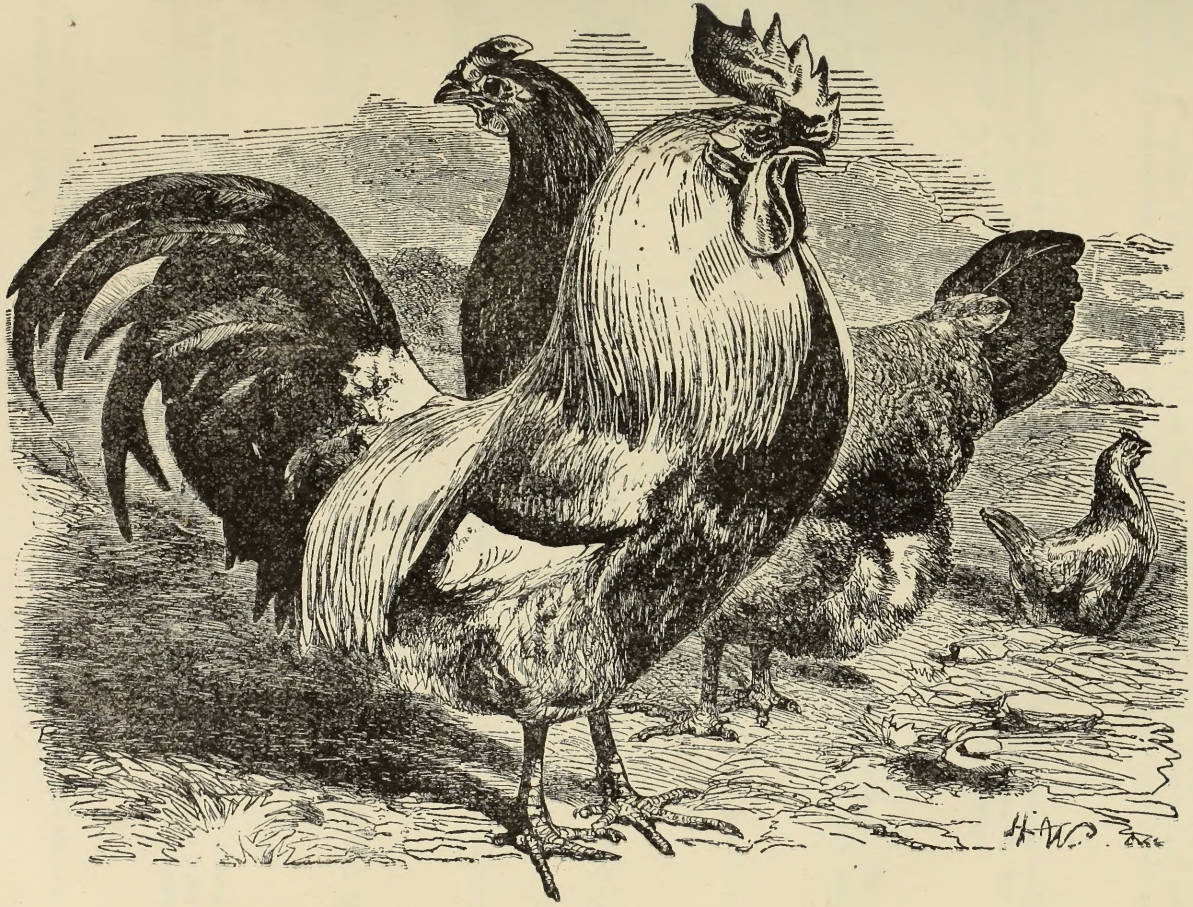
MR. JOHN PLUMMER'S EVIDENCE.

John Plummer was called and examined.

Polands, Dorkings, Game Fowls.

To Mr. Dymond.—I have been considerably engaged in poultry breeding in times past. My first experience was with Golden Polands, and I afterwards got some White Dorkings and some Duckwing Games.

[*Mr. Plummer.*]



DORKINGS.

Light Brahma Selected.

After that I tried 28 varieties of fowls and ducks together, and out of the different varieties of fowls I selected the Light Brahmas. Living in the city, and having small yards or gardens, I required fowls that would not only be profitable, but that would stand confinement and not trouble my neighbours, and those qualities I found in the light Brahmas.

The Game a Hardier Fowl.

If I were in the country, or had a farm, I would cross them with the Games, which would make a hardier fowl, and one that would forage more for itself, while at the same time it would be as good a layer and better for the table, though not quite so large.

The Dorkings—Eggs—Meat.

I have never found the Dorkings superior to other fowls for table purposes. They fatten easily but they do not grow large. Their eggs have a fine flavour and their meat is good.

The Black Spanish.

The Black Spanish fowls are good layers, but they are too tender; their combs and wattles are liable to freeze.

Silver Spangled Hamburgs.

The Silver Spangled Hamburgs are the best layers. In some places eggs are sold by weight, and there the Leghorns or Spanish would be good.

Winter Laying.

I raise my poultry for winter laying. They begin about the month of October and continue until about the first of April.

White Brahmas Good Setters and Layers.

The White Brahmas are good setters as well as layers, and for those who wish to raise poultry extensively they are good fowls.

Good Crosses.

I would cross them with the Game for raising chickens. If the Dorkings are crossed with the Game the result is a good fowl. Poultry raising, if properly conducted, is a profitable business. The cross of the Light Brahma and the Game would suit our climate best.

Artificial Incubation.

I have tried hatching by the use of incubators. I hatched the chickens, but the artificial mother was always the trouble. I did not go into it extensively.

Good Feeding.

In feeding for the table or market I did not go in for any particular treatment, only I fed them well.

[*Mr. Plummer.*]

Fancy Prices.

I have got from $5 to $100 for live birds, but I was raising for fancy prices and not for the market. I have raised cockerels to show at eight months old, weighing 9 pounds, and pullets 7¼ pounds. I have had no experience in the shipment of eggs to a foreign market.

Caponizing.

To Mr. Gibson.—I have caponized fowls, and have raised Brahma capons weighing 16¼ pounds at one year old. That is a very profitable business to go into for the market, but very few understand it. I killed eight fowls before I succeeded with the operation.

Increased Demand—American Market.

I think there is an increased quantity of poultry being raised, and a great many eggs are bought here for the American market. Farmers in this neighbourhood are going into it more than they used to.

JOHN PLUMMER.

Sittings to take oral evidence, held at Seaforth, August 12, 1880. *Present*—Messrs. McMillan (Chairman), and Dymond.

MR. DAVID D. WILSON'S EVIDENCE.

David D. Wilson, of Seaforth, was called and examined.

Egg Collection.

To Mr. Dymond.—I have been in business as an egg merchant, at Seaforth, for thirteen years. I keep seven or eight teams on the road collecting eggs from country storekeepers. The bulk of them are brought into my shop in cases, repacked in barrels, and shipped immediately, principally to New York.

Buying and Shipping Seasons.

The chief purchasing and shipping period is during the eight months from March until the beginning of November. I store, or what egg men would say, pickle my eggs in lime. After I close my shipments about the beginning of November, I have comparatively empty storehouses until the next year.

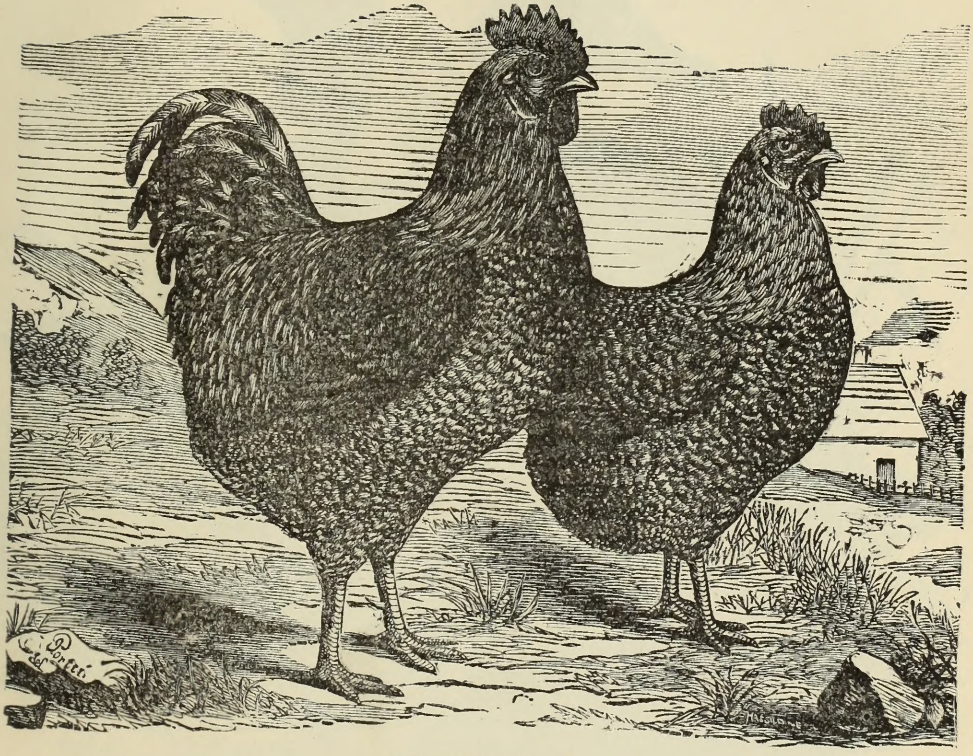
Eggs by the Million.

At the close of the present season about 9,000 barrels of eggs will have passed through my hands; in other words, estimating a barrel to contain 70 dozen, about 630,000 dozen, or 7,560,000 eggs. The collectors travel about 40 miles north, north-west, and north-east, and about 20 miles south of Seaforth.

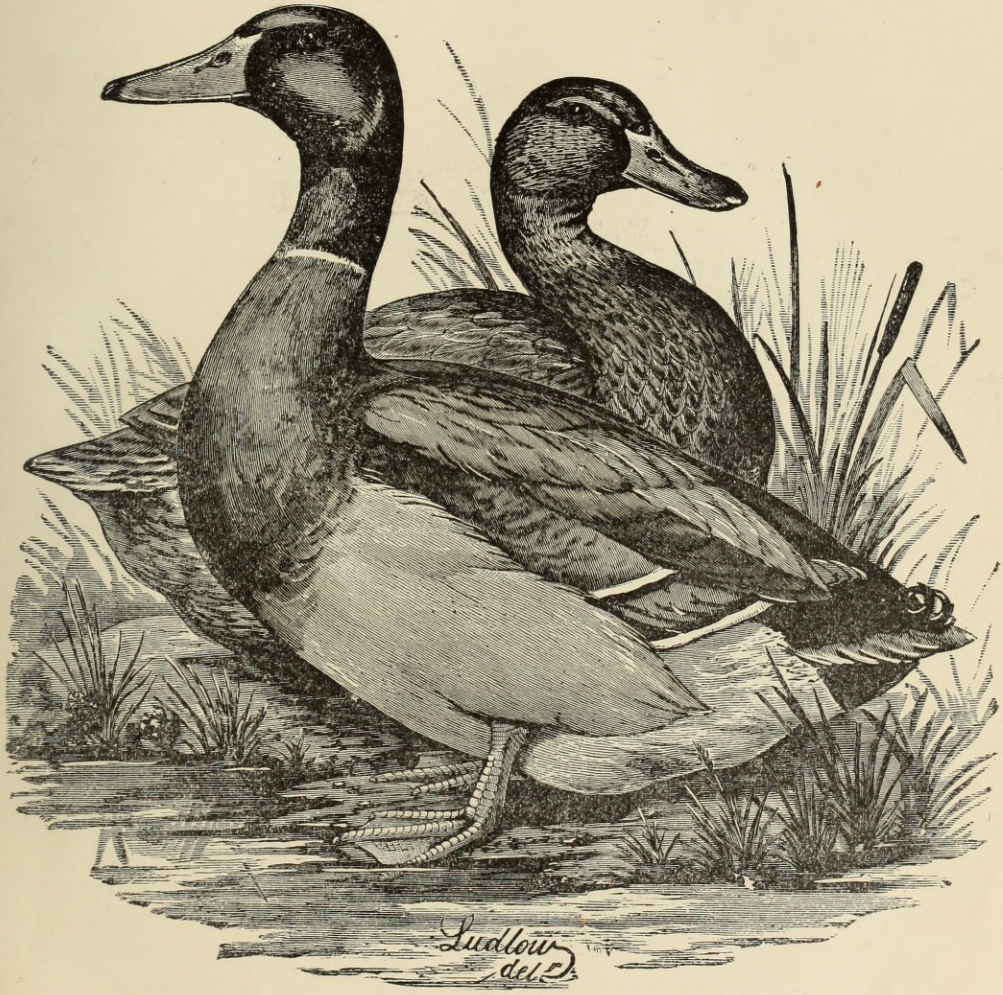
Prices Paid for Eggs.

The lowest price I have paid this summer has been 9 cents; 10 cents a dozen would be the average for the season. For two years previous to this year, I bought a considerable quantity in the spring at 8 cents. The highest price I paid last year was, I think, 14 cents. In buying eggs I travel over the whole county of Huron, a small portion of Bruce, the west, north-west, and north part of Perth, and a small portion of Wellington.

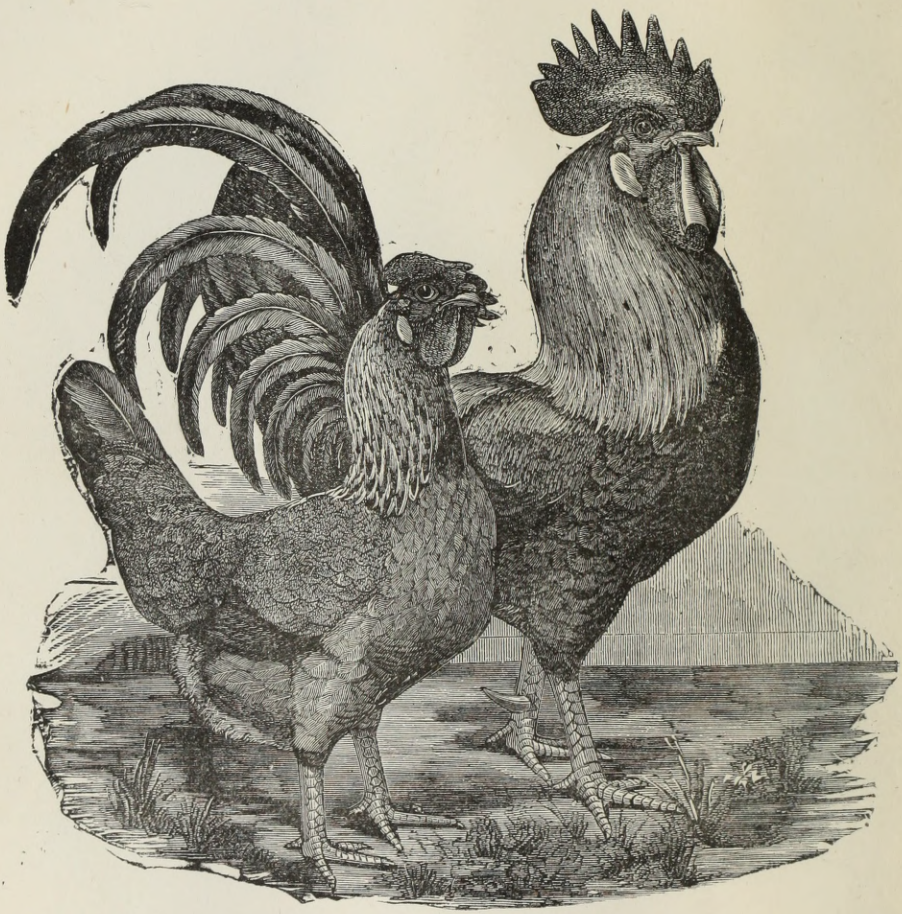
[*Mr. Wilson.*]



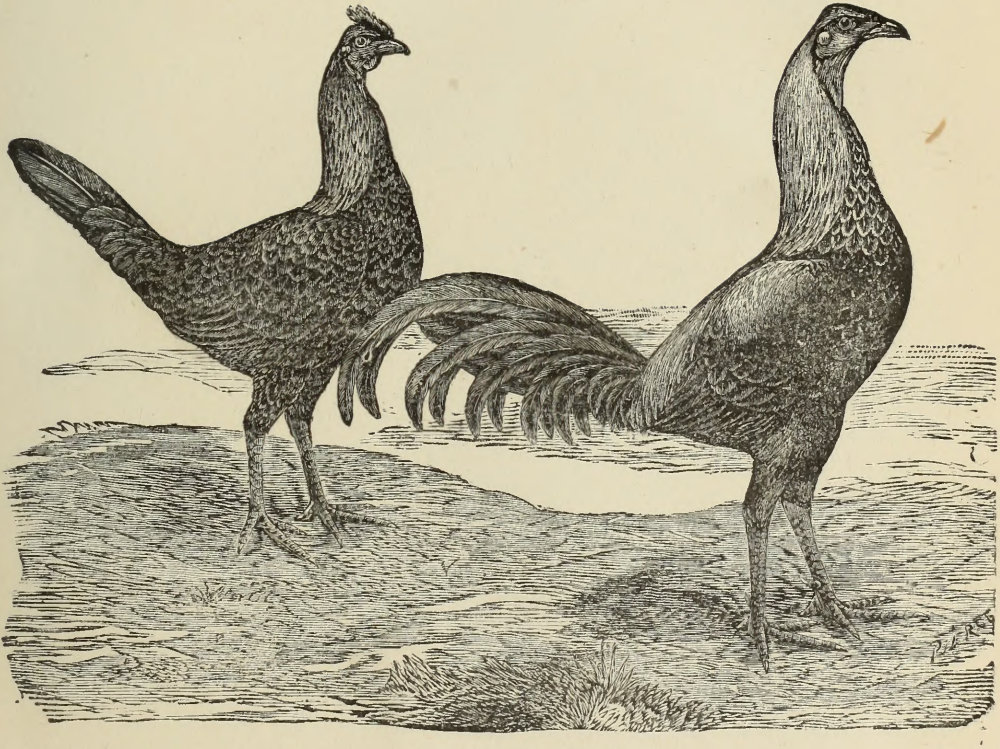
PLYMOUTH ROCKS.



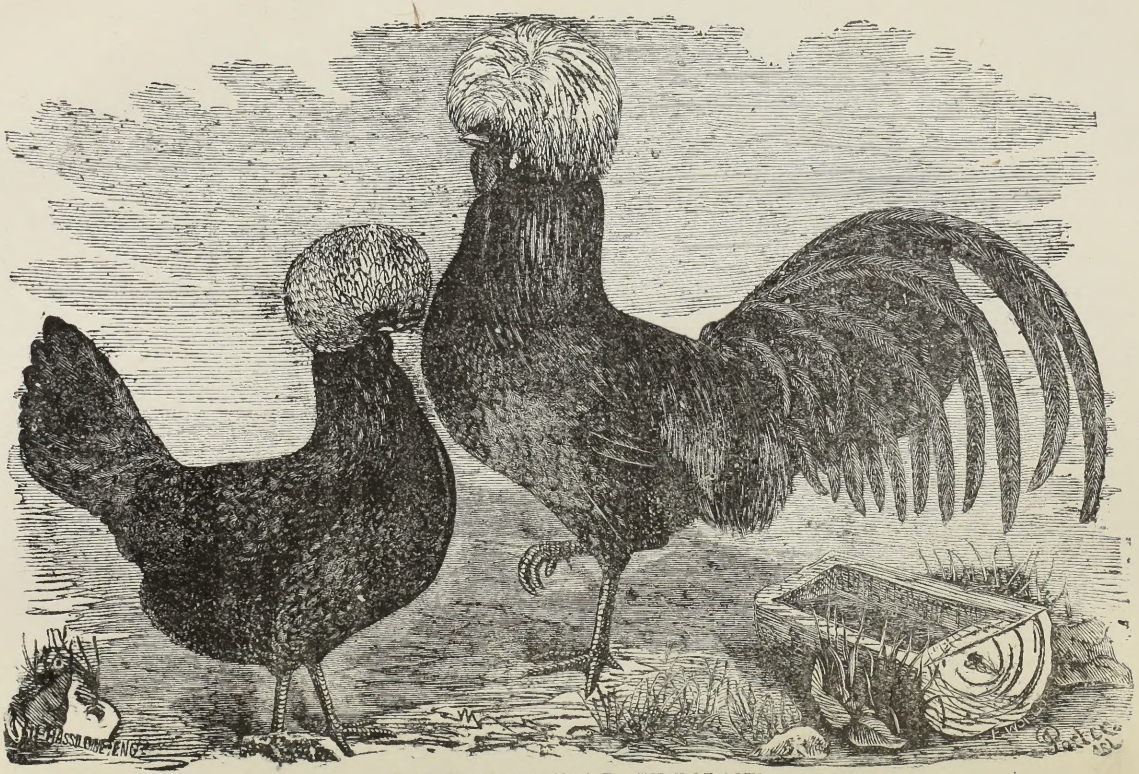
ROUEN DUCKS.



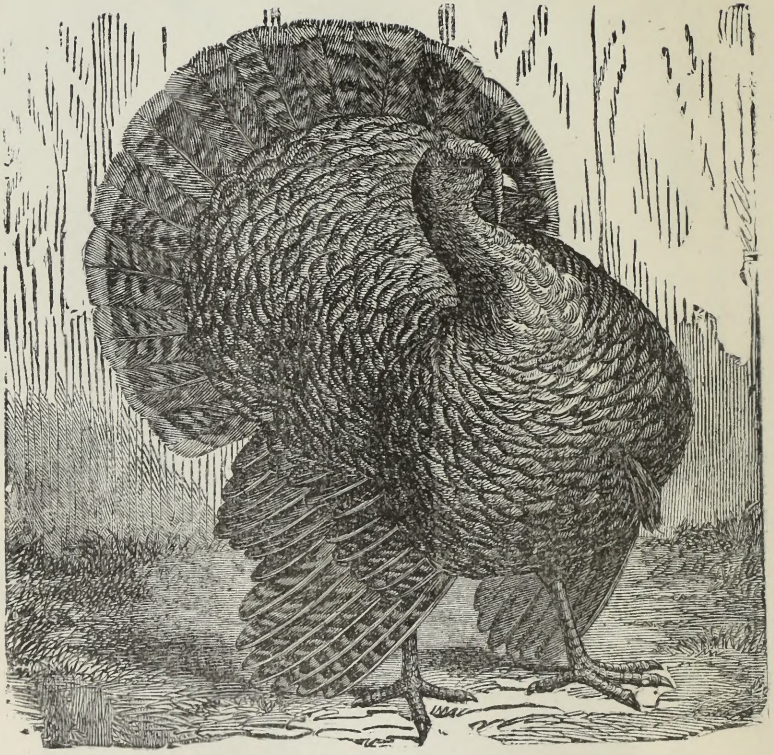
BROWN LEGHORNS.



GAME FOWLS.



WHITE-CRESTED BLACK POLAND.



PRIZE TURKEY.

The Egg King of Canada—Other Large Shippers.

I am the largest shipper of eggs in Canada; I have been called the Egg King of Canada in New York. There is a large shipper at St. Mary's—J. D. Moore—who ships probably half the quantity I do; there are D. K. McKnaughton & Co., at Chatham; there is another at Strathroy, another at Wingham, another at Walkerton, another at Fergus, another at the town of Waterloo, and a number of small shippers around Galt. There is no duty on eggs imported into the United States.

The Demand for Eggs in New York.

The demand for eggs in the New York market is practically unlimited. There is always a demand for a certain quantity, but if your supply exceeds that quantity, of course the price goes down, and as the price drops the consumption increases. During June, New York depends largely on Canada for its supply of eggs, while in January and February, before the hens begin to lay in the north, its supply comes from the south, and as the weather becomes hot, the supply from the south breaks off altogether.

Southern Competition.

In the south the hens are prolific when ours are doing nothing, while ours are prolific when those in the south are doing nothing, and one reason why I clear out my stock in November is, that if I kept it I would have to face the southern competition, which begins about the middle of December. The supplies from the south are very large. In the beginning of October, not only here, but all through the United States, the hens begin to moult, and consequently there is little or no egg production about December. I think hens, under the same circumstances, moult at pretty much the same period of the year.

Large Eggs Preferred.

The larger the egg, the better the price we get. There has not been any regular system of classifying eggs that I know of, but large eggs command a better price than small ones.

Shipments to England.

In shipping eggs to England, classification would be necessary; you would have to separate the small ones from the large ones, and the latter would command double the price of the former. The eggs of Hamburgs would not command in London or Liverpool more than half the price that Cochins, Brahmas, Dorkings, Black Spanish, or the Plymouth Rocks would. I have shipped some eggs to England. In some seasons it can be made profitable, and only in some seasons—that is, at some periods of the year, as during October and November. I think I tried four seasons of shipping to England, and in two of these seasons I got a little better price in England than in New York, and in two a little better in New York than in England; the difference in the price, as well as in the cost of shipping, was very trifling.

Freight Charges and Arrangements.

The last I shipped were carried from here to London for less than a penny a dozen. It costs about a cent a dozen to carry them from here by rail to New York. The freight of eggs is higher than the freight of flour, because they are a more perishable article. I don't think it would be possible to send eggs to England in midsummer. I do not say that it cannot be done, but they would have to be sent in refrigerators or in cold chambers, which would add materially to the expense of shipment. I never shipped any in

refrigerators. It takes three or four days to have them conveyed from here to New York. They are shipped in ventilated cars, and are carried safely in that way.

Packing Eggs.

I pack them in flour barrels, and the packing material I have always used, when I could get it, has been oat shells from the oatmeal mills.

Plymouth Rocks as Egg Producers.

As egg producers, I believe the Plymouth Rocks are as good a species of fowl as we have got. The Black Spanish is a good egg producer, but its eggs have one defect, that of having a thin shell, which necessitates extra care in packing. The origin of the Plymouth Rock breeds has caused very much bitter discussion, but in the estimation of breeders of the present day, the most reliable opinion appears to be, that it was the cross of a single-combed Dominique cock with Black Java hens. The Plymouth Rock is a good layer; it lays a large egg, with a strong, durable shell. It is a very good table fowl when it is no longer useful as a layer, and, when well cared for, comes very early to maturity.

Brahma and Game Cross.

The Brahma and Game make a good cross. The Game puts life into the Brahma. The Brahma is a dull fowl; it lays large eggs, but not many of them.

Increase in Poultry Keeping.

The farmers in this neighbourhood have gone into poultry raising much more largely since I settled at Seaforth. I can get eight times the quantity of eggs now that I could then in the same territory. During this year and last, the eggs have been of a better quality during the hot weather than I have known them to be before, as the nights have been cool, and there have been no long terms of hot weather.

More Care Taken—Effects of Hot Weather,

I attribute the improvement also to a little more care on the part of the farmers. When I first came here I got a great many eggs that were spoiled by having been kept too long. During the hot weather all the eggs we buy are examined individually, but in the spring of the year they do not require to be examined, as they are all fresh. I do not find any large proportion of them bad. In the summer of 1878, which was excessively hot, a considerable quantity of the eggs I bought were spoiled.

Feeding Sand and Lime.

In order to produce an egg with a strong, thick shell, it is necessary to feed a substance that will supply both lime and flint, and that can be obtained by feeding sand and lime.

Poultry Keeping Profitable.

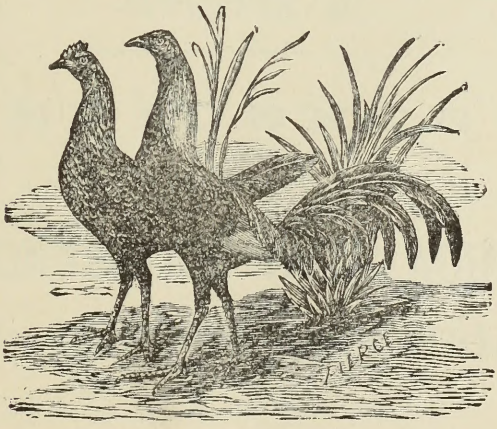
My opinion is that there is nothing that pays an ordinary farmer better than to keep, incidentally, a limited number of fowls. I do not think it would pay any man to keep a very large quantity of fowls for the production of eggs to be sold at 10 cents a dozen; but when a man has a farm of 100 acres, and keeps 50 or 60 fowls, to consume a great deal of stuff about the farm, that would otherwise go to waste, he can obtain a large quantity of eggs at a very slight cost. Under such circumstances, I think there is

no class of animals that pays better than a limited number of fowls. I think it is well, if possible, to combine both egg and meat producing qualities in a fowl.

Use of Salt on Land.

To Mr. McMillan.—I followed farming some time ago. I am not doing so now. I used salt considerably—to the extent of about 500 pounds to the acre—on both spring and fall wheat. For two years I salted a portion, and left a portion unsalted. In both seasons the spring wheat that was unsalted was more shrivelled and shrunk than what was salted, and was a little later in ripening. I was satisfied after very little experience that salt was beneficial as a fertilizer. I thought, so far as I could judge from appearances, that there was about double the quantity of wheat on the land which was salted than there was on the land which was not salted.

D. D. WILSON.



GAME BANTAMS.

ONTARIO AGRICULTURAL COMMISSION.

APPENDIX M.

EVIDENCE

RELATING TO

SALT IN CONNECTION WITH AGRICULTURE AND COGNATE INDUSTRIES.

ONTARIO AGRICULTURAL COMMISSION.

APPENDIX M.

EVIDENCE

RELATING TO

SALT IN CONNECTION WITH AGRICULTURE AND COGNATE INDUSTRIES.

Sittings to take oral evidence, held at Seaforth, August 11th and 12th, 1880. *Present*—Mr. JOHN MCMILLAN (Chairman), Mr. DYMOND, and (on the 12th) Mr. BALLANTYNE, M.P.P.

MR. RIGHTMYER'S EVIDENCE.

LEVI RIGHTMYER, was called and examined.

To Mr. Dymond.—I am at present a salt manufacturer at Kincardine. I erected my works there in 1871, and they have been for eight years in successful operation. My salt is manufactured from brine, by evaporation. I make one grade of common fine salt, and manufacture almost exclusively for the American market.

DEMAND BY AMERICAN PORK PACKERS.

The largest pork packers of Chicago and Milwaukee are my chief customers, both English and American packers. The pork packers for the English market are substituting my salt for Liverpool salt, one house taking this season 3,000 tons for that purpose, and, after trying it, call for more. The Canadian markets are chiefly occupied by English salt.

FISCAL IMPOSTS.

The Dominion Government, under the new policy of protection, have laid a tax upon our tubing, boiler plate, fire bricks, coal, etc., thus greatly increasing the cost of production, and at the same time allow English salt—which is brought over as a ballast—to be thrown upon our markets free of duty, so that Canada is a "slaughter market" for English surplus salt, as their salt is sold cheaper here than at home; besides there is a prejudice among Canadians against ours and in favour of foreign salt. Owing to these causes I am compelled to seek a foreign market for my productions or close my works. The American demand at present is sufficient for all that I can supply though the price of Michigan salt can be, and has been sometimes, reduced so low as to prevent the influx of Canadian salt.

[*Mr. Rightmyer.*]

EXTENT OF MANUFACTURE.

I make annually about 10,000 tons, about 8,000 of which I sell in the United States against a duty of $13,800, that is $1.60 per ton; the balance I sell incidentally in Canada. The pork packers use my salt for pickle and dry salting.

FORMER OBJECTIONS REMOVED.

When our works first started, and before a reservoir was formed in the salt beds affording means for settling the brine, there was found the presence of gypsum in the salt, though not to any considerable amount; since then we have had no complaints against our salt; on the contrary the reports of the pork packers, and those who have used it and dealt in it have been of the most favourable character, and no complaints have been made as to its giving a slimy appearance to bacon.

DRYING PROCESS.

The only process of drying that my salt undergoes is to lie a suitable time in the bins for drainage, when we barrel it or ship it away, in bulk, in vessels.

KINCARDINE SALT "THE PUREST KNOWN."

I have never had an analysis made of my salt, but the brines of Kincardine were at first analyzed together with the other brines of Ontario for the Government by competent chemists and pronounced the purest known.

AMERICAN TESTIMONY.

I have letters from H. H. Hayden, of Chicago, who is one of the principal dealers in both foreign and Canadian salt, and, writing under date of June 6, 1878, he says: "Canada salt sells readily. Your salt, as usual, is very choice and gives extra satisfaction. One of my customers has had it analyzed and with gratifying results." He writes again, February 17, 1879: "Your salt stands very high and will no doubt bring outside prices." Plankington & Armour, pork packers in Milwaukee, to whom I have shipped regularly for years, write: "Your salt is eminently satisfactory."

ENGLISH AND AMERICAN COMPETITION.

The English salt formerly came into competition with Syracuse and Saginaw salt in my district. The American salt was then very inferior; since then, under the supervision of State inspectors, aided by competent chemists, they have learned to remove many of the obnoxious earthy chlorides from their brines, and now make salt that pork packers use largely in their business. There is very little gypsum in my salt. I do not consider it the most prejudicial ingredient to be found in salt. I have no trouble with calcium or magnesium chloride. My salt has been used in my neighbourhood by farmers, for salting butter, and found to be excellent for that purpose. I think that neither English nor American salt is now used in my district.

AN ACTIVE DEMAND.

During the recent trade depression all the salt manufacturers in Kincardine except myself closed their works. I have hardly been able to supply all the wants of my customers this year, but prices are still low.

[*Mr. Rightmyer.*]

INSPECTION OF SALT.

There is no inspection of Canadian salt. An inspection might produce a uniform standard which would be desirable, but I have been opposed to the appointment of an inspector, as it could not in any way improve my salt, and would add trouble and expence without any commensurate return, and our burdens now are as great as we are able to bear.

FORMER COMPLAINTS.

There have been some complaints in the past of some Canadian salt which was said to be not clean or properly made.

REFUSE SALT.

We make some refuse salt—the first rakings after cleaning our pans, which is somewhat discoloured, and which we sell to farmers for land salt. Salt upon grain is found by experience to be very beneficial, as it strengthens the straw, prevents rust, and improves the quality and increases the quantity of grain.

SALT AS A FERTILIZER.

All the farmers who have used it report excellent results. We sell it for fertilizing purposes at $3 per ton. The pork packers in Kincardine who formerly used English salt now use mine exclusively, and their meats command best prices in the Toronto or other markets. They consider the salt equal to the best and surpassed by none.

L. RIGHTMYER.

DR. COLEMAN'S EVIDENCE.

Dr. T. T. Coleman, of the firm of Coleman & Gouinlock, of Seaforth, was called and examined.

VARIETIES OF SALT.

To the Chairman.—I have been manufacturing salt since 1869. I make three varieties—the common fine, the common coarse, and the dairy. The common fine is salt usually put up in barrels. The common coarse is used for pork packing and curing hides, and the dairy for table and dairy purposes. This year and last we have been manufacing a coarser variety for use in the shipment of dead meat in refrigerators to England. Our total production is 70,000 to 75,000 barrels a year.

MARKETS FOR SALT.

To Mr. Dymond.—Our market is in Canada and the United States. Since 1874 the most of our dairy salt has gone to Buffalo; very little has been used in Canada for dairy purposes until this year; this year we have sold a great deal of dairy salt in Canada; it is sold in bulk for the United States, and in barrels and bags for Canada; we also send coarse salt to the United States for curing meat; we have sent it to Alberger & Co., H. D. Waters & Co., and Klink, all of Buffalo; it goes direct into the hands of the slaughterer.

[*Dr. Coleman.*]

COMPLAINTS—THE CAUSE EXPLAINED.

Complaints have been made in Canada of a kind of briny scum which our curing salt is said to produce on the meat, but I do not think it injures it; I think I can account for this. The meat men in Canada do not deal fairly with us. Salt is made summer and winter; summer-made salt loses its moisture, while winter-made salt retains much of it, and as these men order most during the winter, we are abliged to give them winter-made salt, which is genarally frozen, and which, when it comes into contact with the meat, affects it in the way stated. If we went to the expense of drying the salt in stoves, as they do in England, this difficulty could be remedied; but if the packers would give us their orders in good time we could supply them with summer salt, so that the difficulty would not occur. My theory is that the slime is caused by the salt curdling the albuminous portion of the serum in the meat. Frozen salt dissolves rapidly on meat. The exterior portion is cured rapidly, and the inner portion is left uncured, which does not happen with dry salt, for the reason that the serum flows slowly from the meat; but with wet salt flows rapidly from the surface, hardening it and preventing the flow from the inner portion. I supply salt to Davies, of Toronto, but he gave it up on account of the sliminess. The evil comes from the meat, not from the salt; there is a good deal, however, in prejudice. It is our business, as dealers and producers, to endeavour to meet the market; we have good results with our salt here at home, and we should have the same in other parts of the Dominion. We send very little coarse salt in winter to Buffalo; it all goes by rail; we take special care that it is dry. Cowan, of Toronto, has not dealt with us, but R. Thompson has.

DRYING THE SALT.

I have not adopted any special means for drying the salt beyond keeping a couple of carloads ready for shipment on an elevated floor, where it is dryer than it would be on ground. My method of manufacturing is the same as Mr. Rightmyer's—what is called the English system.

INSPECTORSHIP OF SALT.

The reason the salt men did not want the Government to have an inspection of the salt was, that the market was very low at the time, and we did not want a tax. I do not think there is any want of uniformity in Canadian salt itself, but there is a want of a uniform standard of manufactured salt, and for this reason I think an inspector might be an advantage.

ANALYSIS OF SALT.

An analysis has shown that, of pure salt there is 98·73 per cent in Canadian salt, 97·82 per cent in Higgins' English salt, and 97·41 in Onondaga salt. The following shows an analysis of various kinds of salts—Canadian, English, and American.

	Coleman & Goulnlock's Pure Dairy Salt, by Prof. Ellis.	Ransford's Salt, by Prof. Croft.	Higgins' Eureka Salt, by Dr. Mott.	Ashton's. Salt by Prof. Weber.	Worthington's Salt, by Dr. Mott.	Deakin's Salt, by Prof. Weber.	Onondaga Salt, by Prof. Weber.
Sodic Chloride, or Common Salt	98·739	98·120	97·820	97·562	97·462	97·059	97·415
Water	·328	·500	·480	·927	·496	·969	1·009
Calcic Sulphate	1·156	1·300	1·482	1·315	1·703	1·649	1·300
Calcic Chloride	.....	.....	.....	.....	.....	.....	·102
Sodic Sulphate	.....	.....	.....	·142	·112	·150	.....
Magnesia Sulphate	.....	Trace.	·097	.....	.....	.....	.....
Magnesia Chloride	·016	Trace.	·122	·112	.....	·114	·081
Insoluble Matter	·017	·080	·025	·042	·066	·059	·063
	100·256	100·000	100·026	100·000	99·936	100·000	99·970

[*Dr. Coleman.*]

There may be a want of care among some of our manufacturers of salt, but the difficulty is largely owing to the buyers of salt themselves. So long as they can get a barrel of salt for a cent less than others are selling it for, they will take it without considering the difference in quality, so that there is no encouragement to produce a good variety of salt. The Buffalo people get their salt mostly in the summer ; but we sometimes sell them winter-made salt. Last winter we sent to the Syracuse Salt Company alone, 50 cars of summer and winter-made salt. We have no extra means of storage, because the demand is constant. Our storage is now 20,000 barrels. I don't think Canadian salt absorbs moisture from the atmosphere any more than any other salt; it should be kept from contact with dampness, and if allowed to remain stored for a certain length of time it would dry. I have had no complaints from Buffalo regarding my salt.

PRICES OF SALT.

At present Canadian salt is sold in Toronto at 85 cents a barrel, of 280 pounds; English salt is sold in Montreal at 86 to 90 cents a bag; English factory salt is sold at $1.60 to $1.75 per barrel, of 224 pounds; English salt is laid down in Toronto at from $6.75 to $8.75 per ton, while Canadian salt is sold there at $5.25 per ton.

RAILWAY RATES UNFAIR

One disadvantage Canadian salt suffers in attempting to compete with English salt is, that the Grand Trunk will bring a car-load of salt from Montreal to Toronto for $11, while it charges $24 for taking a car-load from Seaforth to Toronto, not half the distance.

DEMAND IN MARITIME PROVINCES.

Yet we send salt to Prince Edward Island and Halifax, St. John, N.B., Fredericton, (dairy salt and common fine), but no coarse ; they use English salt for curing fish ; our salt is well liked there, and we get as good prices for it as we do in the west.

INCREASED DEMAND FOR DAIRY SALT.

Since we brought the claims of Canadian salt before the Dairymen's Association at London last year, there has been a large and increasing demand for dairy salt in Canada —in the factories and among farmers. Canadian salt is now used at the Kinburn cheese factory; the Brucefield cheese factory ; by Malcolm, of Innerkip ; by Johnston, of Strathallen ; by Marshall of Stratford ; by Smith of Sebringville ; by Good & Clement ; by Fowler of Dunham ; W. R. Cranston of West Magdala, Teeswater Creamery; and numerous others ; in the county of Waterloo, by Fowler of Trowbridge ; at Durham in the county of Grey; at Paisley, and in London. This demand has sprung up this year.

TEST OF SALT FOR CHEESE MAKING.

There was a test made last year of several cheeses manufactured at Mr. McMillan's factory, at Kinburn, and in which different kinds of salt were used without our knowledge, and in the trial Canadian salt came out ahead of both English and American ; since then the demand for it for dairy purposes has increased, as the decision of the judges tended to remove the prejudice which existed against it.

SALT AS A FERTILIZER.

We sell a great deal of clean salt to farmers for fertilizing purposes, at $2.50 to $3 per ton, but it is not a very profitable trade at that price ; it is shipped by rail exclusively. This salt, notwithstanding the high rates of freight, can be laid down in Toronto for $5.25 a

[*Dr. Coleman.*]

ton, while the coarse English salt costs $6.75 in Toronto. There is nothing to prevent us from supplying the whole of Ontario as far east as Brockville with salt for fertilizing purposes. The argument used for the difference in the freight on English and on Canadian salts is that the railway companies have very little freight westward, but plenty eastward. In the spring it is difficult to obtain cars enough to ship all the salt that is demanded for this purpose. The same kind of salt is fed to cattle; the farmers prefer the clean coarse salt, as it can be sown more easily and evenly than the refuse or fine. There is very little salt sold for fertilizing purposes along the lakeboard in Canada; it is mostly used inland. Sometimes three or four farmers take a car-load among them. The quantity of salt sold is not at all commensurate with the wants of the land. The principal demand this year came from the county of Wellington; Oxford probably came next; the neighbourhood of Newcastle next; and the neighbourhood of Barrie fourth. I do not think salt has any effect primarily upon the grain, as an ingredient, but it acts as a chemical solvent of the soil, and in that way becomes a fertilizer; it is well known that salt makes the straw stronger and clearer, and prevents rust. I have seen a field of fall wheat, part of which was salted and part not, and the unsalted part bent over, while the salted part stood up straight.

CANADIAN SALT PREFERRED.

Although Syracuse salt is sold in Buffalo at 95 cents a barrel, and Canadian salt at $1.05 wholesale, and $1.35 retail, the buyers prefer our salt, because of its greater purity. We have sold to Kingan & Co., meat curers, Indianopolis, Standish & Hammond of Detroit, Atkinson of Chicago, Petty Bros. of Hensall, and John White of Mitchell. E. Cash of Seaforth, has been using it for five years; H. Robb of Seaforth, has used it for several years; Mr. Beattie of Seaforth, has used it for meat curing; Scott Robertson, when at Seaforth, used it. All these firms have been in the habit of using Canadian salt constantly for years. John S. Porter of Seaforth, has used it on hides, and no other, for several years; also Ladue Bros. of Detroit, for the same purpose, and pay 50 cents a ton more for it than for United States salt. Our firm has also received the following letter:

COLUMBUS, OHIO, *Sept. 2, 1880.*

Messrs. COLEMAN & GOUINLOCK, Seaforth.

Gentlemen,—I have just been awarded the first premium on your dairy and first on your table salt at the Ohio State Fair held here to-day. Also the cheese that took first premium was made with your salt.

(Signed) JOHN FELTON, Buffalo, N.Y.
T. T. COLEMAN.

The witness has, since the close of the sittings of the Commission at Seaforth, received the following letters which he requests may be added to his evidence:—

BLUEVALE CHEESE FACTORY, *Sept. 24th, 1880.*

Messrs. COLEMAN & GOUINLOCK, Merchants, etc., Seaforth.

Gentlemen,—I suppose you will be glad to hear that the cheese I sent to the Industrial Exhibition, Toronto, and that gained the first prize, and gold medal, was salted with your fine dairy salt. * * *

I remain, gentlemen, yours truly,

JOHN TOWNSON,
Cheese Maker.

[*Dr. Coleman.*]

LINDSAY, ONT., *October 1st, 1880.*

Messrs. COLEMAN & GOUINLOCK, Seaforth.

Gentlemen,—I have been in the packing business in this town for the last twenty-one years, part of the time in connection with C. S. Barker, and part of the time on my own account. The first twelve years I was here I used Liverpool salt; then I thought as the Canadian salt was so much cleaner than the Liverpool I would try it. The trial was satisfactory, and for the last eight years I have used Canadian salt altogether, and I think your books will show that most of it was purchased from your firm.

One great point in favour of Canadian salt is its cleanness, and I know from eight years' experience, curing from 3,000 to 5,000 hogs each year, that its curing qualities, and also its keeping qualities, cannot be excelled. Meats cured with Canadian salt have a brighter appearance, and the flavour is all that can be desired.

Yours truly,

GEO. MATTHEWS.

BUFFALO, *September 24th, 1880.*

Messrs. COLEMAN & GOUINLOCK, Seaforth.

Gentlemen,—I took first premium on Anchor Brand table salt at Detroit. No premium being offered for dairy I did not get it. I am first at Ohio, Northern Ohio, and Michigan State Fairs. I think it will count next year.

Yours,

JOHN FELTON.

MR. PLATT'S EVIDENCE.

SAMUEL PLATT, of Goderich, was called and examined.

FIRST DISCOVERY OF SALT.

To the Commissioners.—I was the first to discover salt in this neighbourhood, and the first to raise and make it. That was in 1866, and I have been in the salt business ever since.

DAIRY SALT A SPECIALTY.

I have been making a specialty of dairy salt for the last ten years. Three or four years ago I made 8,000 or 10,000 barrels a year; now I am making about 5,000. The cause of this decrease has been that in Syracuse they have been putting up inferior salt in small bags, and sending it to Chicago, Milwaukee, and other places, and reducing the prices so much that I could not compete against them. My principal market was Chicago, and what I put up in small bags was for family use. I also made a good deal in barrels for dairy purposes.

PURITY OF HURON SALT.

I have had a good deal of experience of the discussions in regard to the purity of Huron salt. I sent some to the annual show at Milwaukee, and it was analyzed along with Syracuse, Onondaga, Saginaw and Ohio salt, and I got the first prize. I also got the first prize at Chicago, at New York, in France, and fifteen or sixteen prizes at provincial and other shows here against English and American salt. The Canadian salt contained only

about 1¼ per cent. of foreign matter, while the English contained 2 per cent., and the American (Syracuse) 4 per cent. This analysis was made about four years ago.

ROCK SALT OPERATIONS.

I am familiar with the operations that were going on at Goderich to obtain rock salt. Mr. Attril sunk a shaft, but the operations are now at a standstill, and are not likely to be resumed. The rock salt obtained was very pure, especially at a depth of 1,065 feet. They obtained there almost completely pure chloride of sodium. I think it is the same bed that extends all over the county of Huron.

HOW TO GET RID OF IMPURITIES.

I think the salt in the Huron district is all alike, though there is considerable difference in the manufacture from the same class of brine. When I was at Syracuse I learned from Professor Englehart and Professor Smith that by bringing the salt water to saturation and allowing it to cool, you will give time for the gypsum to deposit before you dry it off. I have been trying that, and I have found the salt to be much dryer and better. The usual plan is, just to run the brine from the bed into the pan, but by this plan you do not get rid of the gypsum. The chloride of calcium is what causes the salt to be damp and makes cheese and butter bitter. The difference between my system and that of others is in my method of evaporation in the first place, and in the careful removal of the mother water from the pans in the next place. The removal of the mother water has the effect of removing the chloride of calcium or gypsum. In that way I start anew each week. It is only about a year and a half since I have adopted that plan.

MARKET IN CANADA.

I sell about 5,000 barrels of dairy salt a-year in Canada. About one-half of that is used by farmers, and the other half is put in small bags for household use. I dont think there is anything but Huron salt now used in Goderich. One storekeeper got a few bags of English salt last year, but I think he has them still on hand. I sell a good deal of salt to the farmers for butter-making at one-half cent a pound. The butter made from this salt is usually pure and good. There have only been one or two cheese factories in our neighbourhood—one at Benmiller and one at Tiverton. The gentleman who carried them on was Alex. McBain. He always used my salt, and he said it was equal to the English salt, and much cheaper.

SALES TO AMERICANS.

I sell largely to the American pork packers for curing purposes. They used to buy considerable dairy salt for dry salting in the summer season.

SALT FOR THE LAND.

The last year has been the only one in which there has been any particular demand for land salt from us. I saw two or three parties who used it the year before, and they told me that it increased the yield of wheat, stiffened the straw, and ripened the grain and made it of better quality.

METHOD OF MANUFACTURE.

I used to manufacture by the steam process. I do not now. I have invented a system of manufacturing salt which I think is superior to any other, only it is expensive; that is, by steam evaporation. The advantage is that the heat is equal all through the brine, and the salt comes out all alike. In the common mode of making salt in pans, the

pans get corroded, and the heat passes up the smoke stack, but if the salt is made on my principle, the heat cannot escape in that way.

SOLAR SALT.

While on the other side I spent about two months to see what I could do with solar salt. At Syracuse there are 1,000 acres covered with it. I think that would be the proper way to make salt here. It does away with the necessity of fuel, though the cost of covers is considerable ; but these covers last fifty or sixty years. I think it could be profitably adopted here, because our brine is so strong that there is not the need of so much evaporation as there. We could take off three crops a year, while they are able to take off only two crops. The Syracuse salt makers have several millions of dollars invested in that system. I think solar salt is purer than any other ; it is worth $2 or $3 a ton more. It is a large salt and just the salt that is required for packing and for fish.

SUNDAY SALT.

The salt used for packing fish is the coarsest kind that can be got. It is called Sunday salt, owing to its having been dried on Sunday when the works are closed and when it has the advantage of a slow fire. It would cost a good deal more money to make all the salt in the same way. Larger pans would be required, and it would not be necessary to rake them so often—perhaps twice a day.

ALL THE WORKS IN OPERATION.

All the works in my neighbourhood are now in operation; during the depression nine or ten works were closed, but a better demand has lately been springing up, chiefly in consequence of the demand for land salt.

PRICES OF SALT.

Common salt is worth about $3 a ton, f.o.b., or $5.50 at Chicago. It is all the same kind of salt, but here it is used for land, and there for packing. The Chicago packing house of Armour & Co. buy from us. I have had no complaints from them ; on the contrary, they say it is just as good for them as the English salt.

SALT MUST BE WELL DRIED.

I think the sliminess on pork is easily to be accounted for. Salt in the green state has a certain amount of water in it, and is therefore not useful for pork packing. Salt needs age. A certain amount of dampness can be removed by evaporation, but there is also a certain amount which can only be removed by time. After the free liquid is disposed of, a sort of latent dampness remains, which can only be got rid of by time. The English salt requires some time to come across the Atlantic, so that it becomes pretty dry before it gets here. We keep our salt in bins. It only requires about three weeks or a month to get dry. There is a great deal more moisture in winter salt than in summer salt. If the salt is kept long enough and until it gets perfectly dry before it is used, there will be no trouble in packing pork with it.

AGRICULTURAL EXPERIMENTS.

One or two farmers in our neighbourhood have been making a test of salt. One man named Jenkins, in the township of Colborne, in a field of seven or eight acres sowed one-half with salt, and left the other half without any. He had a good crop of spring wheat where he put the salt, and hardly any where he did not put it. All the farmers whom I have seen say that the salt effects a great improvement. At Goderich we have been getting

65 cents a barrel, while at Seaforth the makers have only been getting 55 cents, the difference being owing to our special convenience for shipping. We ship some by water to Windsor and the Georgian Bay. I think we can make it pay to sell at $3 a ton, with the present price of fuel.

SAMUEL PLATT.

MR. SPROAT'S EVIDENCE.

GEO. SPROAT, of Tuckersmith, was called and examined.

EXPERIMENTS WITH SALT.

To Mr. McMillan.—I farm 400 acres of land. I have experimented with salt as a fertilizer on my land. I did not see much effect from it on the first application, but I generally used it on turnip land, and the year after it had a magnificent effect. After the turnips, I sowed barley. I adopted a given line to show where I had sown the salt, and where I had not, and there was a marked difference ; the advantage of the salted land over the unsalted, on the barley crop, was as two is to one. I have never tried salt on fall wheat. I tried it on spring wheat this year, but the Hessian fly destroyed the crop, and so destroyed the experiment. I have been using salt for ten years. It makes the wheat lighter and clearer in the straw, it seems to make it ripen faster, there is a better berry in the grain, and it makes the straw firmer, though I don't think it increases the yield. I have not tried it on hay or fruit trees. I have not continued to use salt more than once on the same field.

QUANTITY USED PER ACRE—EFFECT ON CROPS.

To Mr. Dymond.—I generally use from 400 to 500 pounds of salt to the acre. I think it has the effect of creating moisture about the roots of turnips. I had a potato patch beside the turnips, but I did not sow any salt on it, and you could see a distinct line showing where the salt was sown and where it was not. The salt had also the effect of bringing the turnips ahead rapidly, and thus enabling them better to resist the fly. I could not say whether or not it benefited the turnips in point of size. It made the tops more vigorous. The effect on the barley was to strengthen the stalk and double the yield.

INCREASED YIELD OF BARLEY.

The year after the salt was sown on the turnips, the barley crop, which followed the turnips, yielded sixty bushels to the acre, that is ten or twelve bushels to the acre more than before. The barley also showed an increase in weight ; some that I weighed went fifty pounds to the bushel. I buy the salt at Seaforth.

USE OF SALT UNIVERSAL.

The use of salt as a fertilizer is becoming universal around here. I have not had the opportunity of testing its full effect on spring wheat yet. I have not noticed any effect from the salt on the weeds. I do not think there has been any danger from the use of too much salt. I buy it by the waggon load at $2.60 per ton. I never used less than 400 pounds to the acre ; that would be a cost of from 50 to 60 cents per acre.

CATTLE RAISING.

To Mr. McMillan.—I have raised cattle. I think the best breed for the Canadian farmer to cross with the native cattle is the Durham. I think beef steers should be ready for market in the spring, at three years old, when they should weigh 1,300 or 1,400 lbs. From the cross of a Durham and a common animal, I have obtained as good a milker as

you can get. In choosing an animal I would advise farmers to look to the animal itself and not to the Herd Book for raising strong healthy steers for feeding purposes. I would not consider an animal with four crosses as good as one with six crosses.

SALT FOR CATTLE.

To Mr. Dymond.—I keep a salt trough both in the yard and in the fields, so that the cattle can have access to it at all times.

CANADIAN SALT IN THE DAIRY.

To Mr. McMillan.—I have made both butter and cheese. I used Coleman's ground salt, and our butter has always commanded the highest price. Much of the bad butter on the market is due to the fact that the women have not facilities for making good butter. You should not blame the women for this ; blame the men.

To Mr. Dymond.—I have always used Canadian salt in making cheese, and I have never had a failure in my cheese in consequence. We take the salt just as it comes from the wells without drying it. The farmers around here won't use the dirty refuse salt, even for fertilizing. They cannot handle it so well. With reference to Canadian salt for curing purposes I have killed and cured sheep in the hottest summers, and I never want any better salt for that purpose than what we get around here.

HORSE BREEDING.

I raise horses. The cross from the Clyde I find to be the best and the most in demand—the cross of the Clyde male on our best Canadian mares. That is what is in demand in the American market for general farm purposes. There is a demand for heavier horses, but we have not the mares to raise them. The first cross of the Clyde is the best for the American market.

GEO. SPROAT, J.P.

MR. M. P. HAYES' EVIDENCE.

Martin P. Hayes, of Seaforth, was called and examined.

To Mr. Dymond.—Though not directly engaged in the manufacture of salt, I have an interest in it, and have paid a great deal of attention to the subject since salt was first discovered in the County of Huron here ; I visited all the manufactories of England and many in the United States, for the purpose of ascertaining all the methods of manufacture, and six or seven years ago I invented two or three important improvements which are now in pretty general use.

THE SALT YIELDING AREA.

I am acquainted with the salt yielding area of the Province. The salt exists in five beds overlying each other, with intervening strata of shales between them. The salt beds are about 130 feet in thickness, and so far have been found identical in quality where they have been bored into. Below a line drawn from Seaforth to Bayfield, at the lake, the brine is different from that above in consequence of the water which dissolves the salt becoming impregnated with iron and other ingredients which have an injurious effect upon it, but north of that line all the salt is of the same bed and of the same quality.

PROCESSES OF TREATMENT.

The processes of treatment are not the same in all cases There is a slight gain in purity by subjecting the brine to a heat of something over 135° Fahrenheit before putting

it on the evaporating pans ; it has been found by experience that gypsum leaves the solution at that heat ; all the brines here, as shown by an analysis by Dr. Goessman, are very much purer than any others ; he showed that the quantity of gypsum in our salt was very small; and after that the manufacturers discarded kettles, which they had previously used, and adopted pans.

REMOVING THE GYPSIUM—THE CHLORIDES.

I invented a method of depriving the brine of gypsum by passing it through pipes before it went into the pans, which is now in use at Rightmyer's, the International, and at the Merchants' Works at Seaforth. The boiling point of saturated brine is 225°, and that is the point at which boiled salt is made. Some makers get rid of gypsum by heating it in two pans, so that the gypsum is left in the back pan. The quantity of the chlorides of calcium and magnesium in our brines is very much less than in any of the English brines and the Oswego brines, so that if it were all left in, there would be nothing appreciable in quantity.

THE PUREST SALT IN THE WORLD.

Sterry Hunt's analysis gives in Canadian salt 97·730 of chloride of sodium, ·050 of chloride of magnesium, traces of chloride of calcium, ·932 and 1·020 of sulphate of lime, and 1·500 and 1·200 of moisture ; the chlorides leave the brine altogether when it is heated to 140 or 150 deg.; so that so far as chemical processes are concerned Canadian salt is the purest salt in the world. I am now referring to fine dairy salt, the common salt is made at so high a temperature and drawn so quickly from the pans that it is very apt to cake and stick together when put into barrels or boxes, and that would be an objection to it for domestic purposes.

LUMP SALT.

We tried the manufacture of lump salt here in 1873, but we could not get the workmen to pay it the same minute attention as is done in England, where it undergoes a variety of processes. There is no advantage in lump salt as regards purity or strength over any other kind, but being in hard square lumps of about 28 lbs. each, it is easily handled and shipped without packages of any kind.

DR. STERRY HUNT'S ANALYSIS.

I hand in Dr. Sterry Hunt's Analysis in his own handwriting for publication :—

MONTREAL, *Jan. 23, 1872.*

M. P. HAYES, Esq., Seaforth, Ont.

Dear Sir,—I have analyzed the samples of coarse and fine salts which you sent me Jan. 8th, as having been made at the Merchants' Salt Works in Seaforth, with Hayes' Patent Brine Heater and Evaporator. They gave the following results :—

	FINE SALT.	COARSE SALT.
Chloride of Sodium (pure Salt)	97·515	97·730
Chloride of Magnesium	·053	·050
Chloride of Calcium	Traces	Traces
Sulphate of Lime	·932	1·020
Moisture	1·500	1·200
	100·000	100·000

SYRACUSE SALT—ENGLISH SALT.

The Onondaga or Syracuse "factory filled" salt is purified from chloride of magnesium (the most objectionable impurity in salt for dairy purposes) by a special chemical process.

[*Mr. Hayes.*]

The best Ashton (English) dairy salt contains, according to the analysis of Prof. George H. Cook, ·059 per cent. of chloride of magnesium, and three samples of Goderich salt yielded me ·060, ·075 and ·090 per cent., while a fourth gave to Dr. Goessman ·031 per cent. The Seaforth salt, as shown above, gives decimal ·050 and ·053 per cent.

PROPORTION OF GYPSUM IN SALTS.

The proportion of sulphate of lime in the Seaforth salt is unusually small, as will be seen from the following comparison :—

Seaforth,	Merchant's Salt Works	·932 — 1·020 per cent.
Goderich,	Standly Works (Coarse)	1·037
Goderich,	Tecumseh Works (Fine)	1·530
Goderich,	Victoria Works (Medium)	1·207
Goderich,	(Goessman's analysis)	1·430
Syracuse,	Solar Salt	1·337
Syracuse,	Factory-filled (Trade Mark)	·091 — 1·351
Ashton,	Dairy Salt	1·381 — 1·430
Cheshire,	Rock Salt	1·650

The first three determinations of gypsum in Goderich salt are by myself, and correspond to the three determinations of chloride of magnesium given above for the same salt.

I remain, my dear sir,

Very truly yours,

T. Sterry Hunt.

CANADIAN CURING SALT.

The salt produced in Canada for curing purposes is perfectly pure, and better than English salt, but the salt in England is made in deeper pans and allowed a longer time to crystallize. In England they only draw the pans two or three times a week; if the same course were followed here our salt would be just as good, but at present the crystals of our salt, though as large, are not so hard and solid as those of English salt, and it is therefore not so well adapted for packing pork, strictly speaking, as English salt, but it is better for curing. English pans are 70 feet long, 22 feet wide, and 18 inches deep, while ours are 24 feet wide, 130 feet long, and from 9 to 12 inches deep. The difference is rendered necessary by the nature of our fuel, the heat from wood being more diffusible than the heat from coal. The result is that in England they get a salt with a harder and more solid crystal. With regard to the question of curing, Plankington & Armour, of Milwaukee, Chicago, Kansas City, the largest pork packers in the world, told me in 1876 and 1878, when I visited them, that they preferred Canadian salt to any salt they had ever nsed for the summer curing of meat, owing to its purity and the rapidity with which it acted on the meat. In consequence of this they had made a contract with the International Salt Company to take all the salt they produced in 1878, and they did so, but they have been using our salt since 1873, and are still doing so, although it is a little higher priced than Saginaw salt, on account of the American duty.

AMERICAN PACKERS AND CANADIAN SALT—SLIMINESS—ITS CAUSE.

Returns show that out of 1,300,000 hogs slaughtered in Chicago this year, Plankington & Armour slaughtered 700,000 ; one would suppose therefore that they had the best possible opportunities of judging of the value of our salt for curing purposes. The slimy appearance when it occurs must be owing to some defect in the cellar, not in the salt. There is a distinction between packing and curing; for curing in summer our salt is superior, but for packing, a firm, hard, crystallized salt is required, one that yields very slowly to the surrounding atmost pheric conditions, and for that reason Liverpool salt, which is made at a low temperature in-

deep pans, and has a hard solid crystal, is unquestionably superior to ours for packing purposes, but the preparation of our salt is in our own hands. By a slower mode of evaporation we can make our salt as dry and firm as the English salt, while it would have an advantage in being superior in quality. The same difficulty as to the want of dryness is found in England in the salt sold there for home use. The impurities in the salt are so trifling as to amount to nothing; everything depends upon the formation of the salt; for ordinary domestic purposes Canadian salt is as good as any; for curing purposes it is entirely superior to any salt in the world; this is admitted by all the best packers in the United States.

To Mr. McMillan.—If our salt was drawn off the pans only twice a week, as is done in England, it would be just as good as the English salt for packing purposes.

To Mr. Ballantyne.—One reason that our salt is not made slowly is that our manufacturers use wood which makes a quick fire; some of our salt which is made on the slow English process has a hard crystal and turns out very well. The large amount of salt used in this country for fertilizing and other agricultural purposes prevents sufficient attention being paid to the better drying of it; the manufacturers here find that they want the salt quickly, and consequently they make it quickly; as regards purity and cleanness of appearance our salt is far ahead of Liverpool salt.

FISCAL ARRANGEMENTS—RAILWAY RATES.

The chief reason why our salt is not more specially adapted to packing purposes is to be found in the fiscal regulations of our country, which are directly hostile to this branch of native industry. English salt is not only admitted free of duty, but it is often sold in our lower ports at less than the cost of manufacture. It is also transported by the railways from east to west at very low freights, owing to the large number of return freight cars going west, the railways carry salt at low rates. It is brought out as ballast by Quebec timber ships. For these reasons we have no home market for packing salt and therefore we do not produce it. But if we had a small duty on English salt, "sufficient to prevent its introduction as ballast" we could meet the requirement of the trade with an article of hard crystallized salt which on account of its great purity would be superior to English salt for all packing and curing purposes. Such a salt as I am describing could be sold here at lower prices than it is usually worth in Liverpool, but it cannot be produced under the present tarriff.

M. P. HAYES.

MR. GRAY'S EVIDENCE.

Mr. Wm. M. Gray, of the firm of Gray, Young & Sparling, of Seaforth and Blyth, was called and examined.

PRIZES AT EXHIBITIONS.

To Mr. Dymond.—I have been engaged in the manufacture of salt for ten years. We make mostly fine and coarse salt, and our market is principally in Ontario and the United States. The most tangible evidence that I can give with reference to the quality of Canadian salt is that wherever it has gone it has always taken the lead. We have exhibited it in Philadelphia, Sydney, and Paris, and at each of these places, where the awards were made after analysis, the Canadian salt received the highest award against all other nations (the witness exhibited medals which the firm had been awarded at each of those exhibitions).

COMPARATIVE ANALYSIS OF BRINES.

I have a comparative analysis of the brines of this continent, which shows that the amount of pure salt in the Canadian brine is 25 per cent., in Syracuse 16, in West

Virginia 7, and in Saginaw 15. I have also an analysis of the quantity of brine required to make a bushel of salt in each case. It shows that it requires 21 gallons of Canadian, 35 of Syracuse, 30 of Saginaw, and 67 of West Virginia.

CANADIAN VERSUS AMERICAN SALT.

We have evidence of the result of testing Canadian salt alongside of English salt at the instance of a gentleman who was endeavouring to introduce Canadian salt into the American market in 1876. I refer to Mr. Felton, of the firm of Felton & Rennie, of Buffalo. Here is a letter of Mr. Felton's of the 18th of March, 1876, written to our firm in connection with the agitation about Canadian *versus* English and American salt. He says: "I will answer your questions as fully and as briefly as I can. You ask what is the comparative demand for Canadian as against Onondaga salt. At the same price I should say it would be greater in a little while. The duties and freights add so much to its cost that Onondaga is sold from 10 to 15 cents lower, and so for all general purposes keeps Canadian salt out of the market or nearly so. We would compete succesfully if we could get freight rates as low for salt as they charge for grain."

TESTIMONIAL FROM BUTTER MAKERS AND PORK PACKERS.

I have letters from some of the first butter-makers in Western Canada who use Canadian salt, and they are uniformly favourable to it. Along with other manufacturers we supply a number of pork curers in Chicago as well as in Canada, and we have received no complaints. One curer in London, Ont., who formerly used English salt, now uses nothing but Canadian salt, and has never complained.

THE OLDER AND BRIGHTER THE BETTER.

I think the older and brighter the salt is the better it is for curing purposes. Water is contained in the salt when it is young. Nothing could dry it more satisfactorily than keeping it a long time in store. Liverpool salt is stove dried; that is a fine salt for table and dairy purposes, and is not used for curing. Our production and sales from Seaforth and Blyth works this year for all purposes will not be less than 100,000 barrels.

FARMERS USING SALT LARGELY.

During the months of March, April, and May of this year we have supplied 2,402 tons of salt to about 1,500 different farmers for fertilizing purposes, that is an average of 1½ tons to each farmer. I estimate roughly that the shipments of salt for land purposes from all Canadian works this year will be about 10,000 tons. Within the past two years the demand has taken a firmer hold on the farmers of this and adjoining counties. In ihe counties of Durham and Ontario it has been used for several years. The farmers generally prefer clean salt; it is sold here at $2.50 per ton. The cost of carriage has a tendency to decrease consumption. No farmer ought to use less than 300 pounds to the acre.

EFFECTS OF SALT AS A FERTILIZER.

The following letters, which I have recently received, speak of the effect of salt on this year's crops, though the effect is only partial, because the crops have not yet been threshed:

UXBRIDGE, *August 3rd, 1880.*

MESSRS. GRAY, YOUNG & SPARLING, Seaforth:

Dear Sirs,—Yours of the 2nd inst. to hand. Our experience with salt of all kinds is that it is beneficial. It increases the yield, hastens maturity, assists greatly in preventing rust; the grain is plumper and the straw stiffer. It appears to benefit all kinds of soil. We apply about 300 pounds to the acre.

Yours respectfully,

G. B. MILLER.

St. Helen's, *August 4th, 1880.*

Messrs. Gray, Young & Sparling:

Sirs,—In reply to your inquiry of the 2nd inst. I will state the results, as far as my observation will allow, of the use of salt as a top dressing on this year's crops.

Sowed from 250 to 300 pounds to the acre on spring wheat; variety, White Russian; soil, clay loam. Result: started cutting on the 31st of July, a heavy crop, a remarkably well filled head, clean straw unaffected by rust, will average at least 25 bushels per acre; a small portion not salted in corner of field badly rusted, and ten days later in heading.

Sowed a small corner of field of Silver Chaff fall wheat with salt. Result: straw brighter and heavier, head better filled, and grain brighter than where unsalted.

Sowed nine acres of Arnold's Victor at same rate per acre. Soil, much of it black muck, with clay subsoil. Result: a very heavy crop, though bad to take off; did not lie down too soon, consequently the heads are well filled, which I attribute to the salt alone.

Sowed a small piece of oats with salt. Result: ready for the reaper at least one week earlier than where unsown with salt.

None of these crops are yet threshed, therefore I can only speak as far as my observation will allow. I am fully satisfied that salt sown on fall wheat at the rate of 300 pounds per acre, besides producing a better sample of grain, will increase the yield at least five bushels per acre on any variety of soil; and what I say regarding the use of salt on fall wheat I repeat with greater force as to the results of its use on spring crops generally.

Yours respectfully,

Edwin Gaunt.

Wroxeter, *August 4th, 1880.*

Gentlemen,—Yours of the 2nd inst. is to hand. In reply, I have to say that the crop of spring wheat growing where I sowed the salt appears to be a very good crop, and to have very little, if any, midge in it. I attribute the good crop to the salt, at least I do not know any other reason for its being so good a crop as it is. It has been suggested to me that the salt may act as a stimulant and urge the soil to give forth its strength too rapidly, and thus ultimately exhaust the soil. I do not give this as our opinion, but only as I have heard it.

Yours truly,

Robert Gibson.

Hampton, *August 4th, 1880.*

Messrs. Gray, Young & Sparling:

Dear Sirs,—It affords me pleasure to answer your letter of the 2nd inst., asking my opinion on the sowing of salt. The farmers are delighted with the effects of the two car loads I purchased from you this spring on their crops. Although this season has not been so favourable as previous seasons for sowing, the results have been good. A very dry season gives the best result. Our land is light, dry, and sandy, and the salt shows the very best results on it. Two years ago I sowed salt on barley and seeded it, and the barley went forty bushels to the acre. Although the field had been seeded for eight or ten successive years without salt the seeds would dry out and die. This occurred for years, and I could not get a single crop of grass. But the year I seeded it on barley and sowed salt; it was surprising to see the crop of clover I had after cutting the barley. The clover came out in head, and, if allowed to grow, would have been fit to cut for seed; but I pastured it that fall, and the next summer I cut about two tons and a half of hay to the acre and then left it for seed. I cut clover for seed that fall, and it went a little over three bushels to the acre. It was the salt that pro-

duced such a good result. In the hot summer nights the salt draws the dews and keeps the young plants moist, so they grow right through the heat of summer, and the plants get strong and large by fall, and better prepared to stand the winter. Its effect on wheat is beyond description. It stiffens the straw and brightens it, and the rust has not so much effect on it. Another advantage is that the wheat ripens more evenly and the head is filled better. A still further advantage is that the salt can be tasted in the straw in the winter, so that cattle eat it much better than straw grown where salt has not been sown. The farmers around here have given the salt a thorough trial, and a cradler can trace the salt to the very furrow. If you sow it on a ridge or on the side of a hill you can see it over two miles away. It has a wonderful effect on oats; on roots it has also a good effect. I could say far more, but time will not allow.

J. H. Baulch.

EARLY ORDERS DESIRABLE.

If farmers would give their orders for salt earlier in the spring they would not be disappointed in not getting it, and we should have sold 25 per cent. more this year than we did. The rush generally comes just at the opening of navigation when there is difficulty in getting cars. The demand for salt for agricultural purposes has doubled during the past two or three years.

WILLIAM M. GRAY.

MR. MURRAY'S EVIDENCE.

John R. Murray, of Kinburn (Constance P.O.), was called and examined.

A TEST IN CHEESE MAKING.

To the Chairman.—I have manufactured cheese at Kinburn for the last eight years. I remember Professor Arnold visiting the Kinburn factory on the 22nd of August last year, and making a test of cheeses made with different kinds of salt. The kinds we used were, the Stapleton Patent Canadian Salt, Coleman & Gouinlock's Dairy Salt, Coleman & Gouinlock's Common Salt, and the Higgins English Eureka Salt. We made seven and a half cheeses and kept track of seven, so that I was able to say what kind of salt was used in each cheese. I branded them with letters known only to myself. The cheeses were then submitted to Professor Arnold and Mr. Ballantyne, and they examined them, I think, on the 26th of October. After an examination of over an hour, they finally decided that the cheese made with the Stapleton salt was the best; they said the cheese made with the English salt was not so good, but nearly as good, and Professor Arnold said that the cheese made with Coleman & Gouinlock's salt left a little taint in his mouth, but that age might take it away. I then told them the brands, and I afterwards branded the cheeses over again by changing the letters on them so that no one would know them afterwards. I also changed them about in the racks, because I thought Professor Arnold and Mr. Ballantyne might come back again and know the order in which they had left them.

A SECOND TEST.

They told me to save the cheeses until the Dairymen's Convention in February. I did so, and they were submitted to the convention. Goleman & Gouinlock's dairy salt then came out ahead; the Stapleton salt came number two, Coleman & Gouinlock's coarse salt, number three, and the English salt last. I was present when both judgments were passed upon the cheeses, but no one but myself knew the kind of salt used in each particular cheese. Professor Arnold was not a judge at the convention, although he was there, and he both differed from the decision of the judges at London, and from his own decision at Kinburn. At Kinburn he put the Stapleton salt first, while at London he put it

second. I think he put Coleman & Gouinlock's coarse salt first at London, although he had put it fourth at the factory. He was not speaking at London under responsibility as a judge, but was merely expressing his personal opinion.

LIABILITY TO CHANGES IN CHEESE.

Cheeses will change a good deal in four months, but not very much if they are made in the same vat. The conclusion I came to myself was that the cheeses were pretty near alike, and I think the judges came to the same conclusion, because it took them a long time to decide. Each member of the Convention's committee made a separate examination of the cheeses. The common salt I think is a little coarse for cheese making. If I were buying salt from Coleman & Gouinlock, I would buy their dairy salt. I am using their salt now in making cheese. I suppose the reason I use it and not the Stapleton salt is that it is handier for me to get it at Seaforth than the Stapleton salt at Clinton.

JOHN R. MURRAY.

MR. BALLANTYNE'S EVIDENCE.

Thomas Ballantyne, M.P.P., was called and examined.

EXPERIMENTS WITH CANADIAN SALT.

To Mr. Dymond.—In 1876 and 1877 I made a great many experiments with the Seaforth salt and the English factory-filled salt. I may say it was Higgins' that I used. I made the tests at different times and under equal conditions in every respect, and the result was decidedly in favour of the English salt.

THE KINBURN FACTORY TEST.

Last year, 1879, while Professor Arnold was here, employed by the Western Ontario Dairymen's Association, he made several tests or experiments at the Kinburn factory, and on the 26th of October Professor Arnold and myself examined a number of specimens of cheese which were shown to us as having been salted with the different kinds of salt, without our knowing which salt was used in any particular cheese; and after a careful examination of the cheese, we came to the conclusion that the cheese which we were informed was salted with the Stapleton (Canadian) salt was the best cheese, though the difference in the various specimens was very trifling.

CANADIAN SALT THE FINEST.

I have no hesitation in saying that there was a fineness and a solubility in the cheese salted with the Stapleton salt which was not in any of the others, and I have no doubt that we have in this country as good salt as can be got from England or anywhere else-

EARLIER EXPERIENCE.

I have made as many as twenty different experiments of Canadian and English salt in my own factory. The Canadian salt I used in the experiments first mentioned was all from the same manufactory. The Canadian salted cheese was harder and dryer than that salted with the English salt.

To the Chairman.—I did not have any analysis made of the salt. It was a mere practical test of the effects salt would have on the product after the cheese was ripened and kept for a considerable time. I kept all these samples of cheese till the following month of May. I think the result of the experiments I made in that year was to prevent

the use of Canadian salt by cheese makers, and I do not think any of the other factories in Western Canada used any but one or other of the brands of English salt.

AT THE CONVENTION OF 1877.

In 1877 I read the notes of my experiments to the Dairymen. I was unwilling to injure our Canadian salt interest; but anything that would improve the product of Canadian cheese was very important in connection with the competition to which we were subjected from the other side. There is a large quantity of both Ashton's and Higgins' salt used in the dairies of New York, and in the Western States these brands are used almost exclusively. The cheese makers have confidence in them, and they have too much at stake not to use just what is the best.

CONFIDENCE IN CANADIAN SALT NEEDED.

What is needed here is to establish confidence in Canadian salt, and then it will be used. I have no doubt as to its good inherent qualities; I have always said so.

MORE CARE IN MANUFACTURE NECESSARY.

A little more care in manufacturing is all that is necessary. Both Moulton and Thurber, the American agents of Ashton's and Higgins' salt respectively, have pushed the English salt very much, and sometimes claim credit for what they are not entitled to. The cheese which took the sweepstakes prize last year over American and all other cheese was claimed by Thurber to have been made with Higgins' salt, while it was not. It was Stubbs' salt that was used.

MODE OF EXPERIMENTING.

In making the former experiments, I first used the same quantity of salt and the same quantity of curd. I also tried less Canadian salt, and more English, but the cheese lost its flavour, though it retained the hardness peculiar to Canadian-salted cheese. In the Kinburn experiment the object was to test the quality of Canadian salt. Professor Arnold took full notes of that experiment. I did not take any notes, but I have a copy of his.

COARSE SALT REQUIRED FOR CHEESE.

I prefer coarser salt for cheese making; the cheese seems to ripen better with it as the cheese gets old. The most careful and experienced cheese makers, such as Mr. Merry and Mr. McAdam, prefer Ashton's salt on account of its being coarser than Higgins'.

VERY LITTLE DIFFERENCE.

To Mr. Dymond.—There was very little difference in the quality of the highest and lowest of the cheeses submitted to us at Kinburn last year. There was just a difference that a judge of cheese could see, and which time might produce in the case of the one and not in the case of the other.

THOS. BALLANTYNE.

[*Mr. Ballantyne.*]

MR. CRESSWELL'S EVIDENCE.

Edwin Cresswell, late Reeve of Tuckersmith, and formerly Warden of the County of Huron, was called and examined.

SALT AS A FERTILIZER.

To Mr. McMillan.—I have been using salt as a fertilizer on barley, but more particularly on turnips and mangolds. I used from 300 to 400 pounds to the acre every four or five years. I sowed it on barley with rather marked benefit. The straw was stronger and of a more golden colour, and the grain was brighter and plumper. There was not much increase in the yield. I think the principal effect is in the stiffening of the straw, and the salt renders the plant more proof against insect ravages and against rust. In this neighbourhood the farmers have been greatly annoyed by an insect resembling a flax seed, which attacks the stem of barley and spring wheat, particularly the latter, just above the joint, and causes the stem to turn yellow and become weak, so that it falls down; the salt, however, strengthens the straw, so that it can bear up against this pest.

To Mr. Dymond.—The effect of salt on turnips is that it increases the rapidity of the growth, and imparts to the tops a more healthy and vigorous appearance. Where the salt was sown and where it was not could be distinguished by the appearance of the crop.

USE OF SALT FOR CATTLE—HOGS.

I have about thirty head of cattle. I use salt freely as a feed for them as well as for butter. What I think is the cause of the bad reputation of Canadian salt is that many packers allow their hogs to become frozen stiff, and as they do not allow the meat to become thoroughly thawed out, they salt it while there is a piece of frozen meat in the centre of a ham, which does not receive the benefit of the salt. Another cause is that some men first give their meat a light salting, which does not reach the inside of the meat, but simply tans the outside. Two or three weeks after, when they come to salt the meat thoroughly, there is a stiff external coat on the meat, which prevents the salt from permeating it, so that in many cases the salt is blamed, when it is the curer himself who is at fault. I have salted hams for many years with Huron salt exclusively, and have never had a bad piece of meat.

G. EDWIN CRESSWELL.

MR. ROBERTSON'S EVIDENCE.

W. Scott Robertson, of Seaforth, was called and examined.

CANADIAN SALT IN PORK PACKING.

To Mr. Dymond.—During 1876 and 1877, I was engaged in the pork packing business, at Seaforth; I am not now. I turned out 600 or 700 hogs each season. I used Canadian salt exclusively—that manufactured at Seaforth. It gave us perfect satisfaction. I had no reason to doubt its purity, or its suitability to my business. We did not not experience any dampness or sliminess on the meat, more than is usual in the summer season, when it is kept in damp cellars, and if it is not handled and brushed; cured meat should be kept in a cool and airy cellar all the time. The Canadian salt gave us perfect saisfaction in every case. We packed in the winter—in December, January and February—and the meat was kept by us until July and August before it was all sold out; the salt we used came direct out of the bins; it might have been made for one or two months; we never used any but Canadian salt for curing meat.

[*Mr. Cresswell.—Mr. Robertson.*]

CANADIAN SALT IN BUTTER AND CHEESE.

I am now engaged in buying butter and cheese. I have superintended the manufacture of cheese on a large scale in the factories at Seaforth and Kinburn. We used both Canadian and Higgins' English dairy salt in the manufacture of cheese. I never could see any difference between the English and the Canadian salt. I never had any failure in consequence of using the Canadian salt; some supposed that the English salt gave the cheese a more mellow taste, and had not a tendency to impart to it a harshness like the Canadian salt. At one time Canadian salt was injured by the assertion that there was lime in it; but my experience never bore out that theory. I had no interest in any salt industry at the time; my only object was to make the very best cheese. My cheese generally commanded the highest price.

WALTER SCOTT ROBERTSON.

Mr. Robertson was then examined respecting the butter trade, his evidence on which subject will be found elsewhere.

MR. RANSFORD'S EVIDENCE.

Richard Ransford, of the Stapleton Salt Works, near Clinton, was called and examined.

STAPLETON SALT—ANALYSIS.

To Mr. Dymond.—I have been engaged in the manufacture of salt since the first development of the salt industry here; I am an analytical chemist by profession; in chemical purity and in quality I think all the salt-beds of this district are about the same; I have made a salt to imitate English factory-filled salt, used for dairy purposes; it was analyzed by Professor Croft on the 21st of June, 1879, and his analysis was as follows:—Chloride of sodium, 98 12; sulphate of lime, 1·30; magnesia, t races; water, 0·50; loss, 0·08. He found no soluble matter and no chlorides in the salt submitted to him; it was a factory-filled salt, specially manufactured. Professor Croft stated that this salt "may compare favourably with the best brands, and may be considered as nearly pure as salt is usually obtained, being almost identical with the Ashton salt." English salt had the preference in this country, and I wished to turn out a salt that would give dairymen no excuse to use English salt rather than Canadian.

VARIETIES OF SALT.

I manufacture all kinds of salt, but my ordinary salts are not so pure as my factory-filled; in making that I use a patent of my father's; it consists in heating the brine to a temperature of 150 degrees, and, keeping it at that heat for some time before putting it into the pans; this tends to eliminate the sulphate of lime, besides economy in heat.

MARKET FOR SALT.

Nearly all the salt I make is sold in Canada; I also sell some in Chicago and in New York State; it is principally used for domestic purposes by farmers. The factory-filled is usually sold in barrels; it is used in dairying, and I have never had any reason to doubt its adaptability for that business. It was used without my knowledge at a test with other Canadian and with Higgins' Eureka salt at the Kinburn cheese factory last fall, and Mr. Ballantyne and Professor Arnold pronounced the cheese made with it to be the best. If properly handled, Canadian salt ought always to be better than English salt, because of the greater purity of our brines. I only incidentally make salt for curing and packing purposes; I never had any complaints of it; I have sold large quantities during the past few years to farmers for fertilizing purposes.

PRICES FOR FACTORY-FILLED SALT.

To Mr. Ballantyne.—The factory-filled salt I sell at $1 a barrel of 280 pounds. What I wanted to do was to get a salt with an even grade and weight, so that when a man bought a barrel of that salt he knew what he was getting.

REMOVING THE GYPSUM—CHEESE—FREIGHTS—PRICES.

To Mr. Dymond.—Dairy salt is ordinary salt kilned and ground. The reason I prefer factory-filled salt for dairy purposes is that it becomes freed from gypsum, which is left in the pans in the form of scales, while ground salt has the gypsum all ground up with it, so that it cannot be seen. I think a salt with a grain to it is the best for cheese—a salt which is soluble, but slowly soluble. A barrel of my factory-filled salt, or 280 pounds, can be laid down in Toronto for $1.30, while a bag of ordinary English salt, weighing 224 pounds, costs $1.50 in Toronto; but the fashionable brands of English salt, such as Higgins' Eureka, and Ashton's, cost more than double the price of mine, and I know my salt is chemically purer than those, and I venture to say is equally well made. I am selling salt for fertilizing purposes to farmers for $2.50 per ton; the demand this year is double what it was two years ago.

UNFAIR COMPARISONS.

My idea of the principal reason why Canadian salt has had a bad reputation in Canada is that our dairymen and wholesale buyers will pay a high price for English-made salt, while they will only buy the common Canadian salt, and compare that with the high-priced English salt; the dairymen use the best Ashton salt, for which they pay $2.50 a sack, and compare that with our common fine, which only cost 55 cents a barrel; they pay little or no attention to the brand of salt in Canada, but they pay every attention to the brand of English salt.

THE STAPLETON BRAND.

To Mr. Ballantyne.—I have only been manufacturing factory-filled salt since last year; Canadian buyers have not hitherto discriminated sufficiently as to the different kinds of Canadian salt; I brand it with the name "Stapleton;" my brand is registered, and it is as distinct a brand as Ashton's; no other Canadian manufacturer that I know of pursues a similar course.

INSPECTION—SALT AS A FERTILIZER—PRIZE ESSAY—QUANTITIES.

To Mr. Dymond.—The difficulty about making a high-class salt in Canada is that people will not pay more for it than for the common article. I do not think it would be beneficial to Canadian salt to have it inspected and branded by an inspector. I have used salt as a fertilizer on my farm for the last ten years. About the year 1868 the Royal Agricultural Society of England offered a prize of £100 for the best essay on the use of salt as a fertilizer, and the essay which took the prize recommended the following quantities:—

	Pounds of salt per acre.		
Description of crops.	Light soil.	Heavy soil.	Heavy loam.
Wheat	500	450	400
Rye	550	500	400
Barley	600	550	450
Oats	650	600	500
Peas	600	550	400
Hops	600	500	400
Potatoes	600	400	350
Turnips or beets	500	400	300
Clover and grasses	700	600	450

Hay, 20 pounds per ton.

Fruit trees, four pounds, in trenches on each side of tree.

[*Mr. Ransford.*]

PRACTICAL EXPERIENCE.

I have followed these directions, and have received a great deal of benefit in grains, hay, pasture lands, and roots; on the hay land I scatter it lightly by hand in the spring. I believe the benefit gained from the use of salt is chiefly in the strength of stem. As a chemist, and coming from England, where salt is used so much, I always took it for granted that it was beneficial as a fertilizer. Salt acts in several ways on the land; it acts largely as a solvent, dissolving the ingredients of the soil much more rapidly and effectually than pure water; it retains the ammonia in the manure for the use of the plant, instead of letting it evaporate; and it attracts moisture from the air, and gives it to the soil. A certain amount of salt enters into the composition of all plants, and it is necessary for their health that they should have it. I think the geographical and climatic conditions of this country render it necessary that our farmers should use more salt than is used in England, where so much saline matter comes to the land from the sea; salt must not be used, however, as the sole manure; barn-yard manure must be used along with it; I don't think there can be any practical danger from using too much salt on land; I have sown salt in both the fall and spring, but I prefer the spring; I grew thirty-five bushels of fall wheat to the acre two years in succession when I used salt, and this year two fields of spring wheat have yielded 23½ and 21⅓ bushels respectively.

RICHARD RANSFORD.

MR. GOVENLOCK'S EVIDENCE.

THOS. GOVENLOCK, of the Merchants' Salt Works, Seaforth, was called and examined.

To Mr. Dymond.—I have been engaged in the salt trade for about eighteen months, and have been interested in the works for ten or twelve years. I agree substantially with Dr. Coleman's evidence.

LARGE SALES IN THE STATES.

I might just add that I have sold a good deal of salt to the packers on the other side, and they have been so well satisfied with it that one of them said to me that he would give 15 or 20 cents more a barrel for it than for American salt. Since April, 1879, we have sold, in Buffalo alone, 348 tons to one firm, 115 tons to another, 38 tons to another, and 552 tons to another—1,053 tons altogether. We have sold fine and coarse salt to the packers in about equal quantities; they use one kind for pickling and the other for dry salting. We have also shipped about 200 tons to Chicago for curing purposes. Nothing has been mentioned to me about the alleged dampness or slime on the meat. I am acquainted with the incident mentioned in Mr. Davies' letter, which you have read. The dampness was occasioned by the fact that the salt used was too newly made and consequently not in a properly dried condition. I think also that Mr. Davies is a little prejudiced. We do not manufacture dairy salt. The only difference between it and ordinary salt is that it is dried and ground. I don't think the quality is any better, but when it is applied to cheese and butter, it melts sooner and is incorporated into the cheese and butter.

USE OF SALT BY FARMERS.

I think the farmers all around here are using Canadian salt. A farmer, the other day, told me that he had cured butter with both Canadian and English salt, and that he could get more money for butter cured with the Canadian salt. We have sold salt for fertilizing purposes at from $2.50 to $3 per ton. I agree with the evidence previously given on this subject. This year we have sold in about three months 63,000 tons for

fertilizing purposes. Our works have been stopped for a month, in consequence of an accident to the well; the tubing burst and the rock caved in. The profit on salt sold by the wagon or carload for $2.50 per ton is too little, though if fuel continues at its present low price, we might continue to sell at that rate. We do not yet use coal here, we use wood exclusively. We pay from $1.25 to $2.50 a cord for wood.

PERSONAL EXPERIENCE.

I have, myself, had experience of the beneficial effects of salt on land. This year I have 200 acres of grain. I use from 400 to 500 lbs. of salt to the acre every year. If I put in a crop of turnips this year I apply it to the turnips, and if I sow wheat and barley on the same land in the spring following, I apply it again. I have fields that I have cropped successfully for five or six years. I have also used salt a little on grass crops, and I think it had a good effect. It helped both to hasten on the crop, and to increase the yield. It makes the turnips more vigorous; I think its chief result is in the strength and vigour it gives to the stalk of grain.

EFFECT ON SPRING WHEAT.

To Mr. McMillan—I have raised spring wheat five years; in that five years I had a crop of turnips in succession on a field where I sowed salt. I have never used any other fertilizer with such beneficial effects. Mr. Sproat said he would not use refuse salt, it is just as good as any salt for fertilizing purposes, only it is more difficult to sow.

THOS. GOVENLOCK.

Mr. Govenlock was further examined as to his experience in cattle-feeding and shipping. His evidence on those subjects will be found elsewhere.

MR. ROBB'S EVIDENCE.

Hugh Robb, of Seaforth, was called and examined.

CANADIAN SALT IN PORK PACKING.

To Mr. McMillan.—I have been in the pork packing business for four years; this year I packed four or five hundred hogs. I have been using Seaforth salt since I commenced. I have never had any complaints of the meat cured with it. We have sometimes had meat that did not cure very well, but this was more the fault of the meat than the salt, and it happens with all packers. We consider the Berkshire hogs the best for packing, as they are smaller boned and better fattened than other breeds. I have sometimes used newly made salt, which is somewhat damp. When packed meat is kept in a cellar this time of the year it is likely to get a little slimy, so that it has to be turned and new salt put on it every two or three weeks. The dryer and harder the salt is the better it will keep the meat, and I have tried to get the manufacturers to dry the salt more than they do.

To Mr. Dymond.—We have time and again to turn the bacon which is packed in square piles, in order to get the slime off it. We begin to pack on the 1st of October, and continue till the month of March, and we just use the salt as we can get it from the factory, but the older the salt is the better, because it is dryer. We can do the best curing in the cold weather. The slime on the meat does not affect it permanently, but unless it is rubbed off and the meat salted anew the meat will be spoiled altogether. I have not tried any but Canadian salt; I have no doubt that all that is required is a slower process to make the salt dryer.

HUGH ROBB.

[*Mr. Robb.*]

MR. THOMAS E. HAYS' EVIDENCE.

THOMAS E. HAYS, of Seaforth, Reeve of McKillop, and ex-Warden of the County of Huron, was called and examined.

SALT AS A FERTILIZER.

To Mr. McMillan.—I farm about 200 acres of land. I have used salt as a fertilizer, and I have found very marked differences in the places where it was sown and where it was not. It made the straw stiffer, and the wheat was better filled. I have used it on barley, spring wheat, fall wheat, and roots. I used some on oats, but did not mark any difference. I have been troubled scarcely any with rust in the fall wheat where I sowed the salt. I have used from 400 to 500 pounds of salt to the acre. I think the most benefit is obtained by sowing it on fall wheat in the spring.

To Mr. Ballantyne.—My soil is principally a rather light clay loam. I think the kind of soil makes a difference in the value of salt as a fertilizer. I do not think so much benefit is derived from it in a light gravelly soil as in good, strong loamy land, and generally, where the land is mucky, it makes a better and stronger straw.

QUANTITY USED PER ACRE.

To Mr. Dymond.—When I began using salt, I sowed about 300 pounds to the acre, but I now use about 400 pounds. I follow something like a rotation; I scarcely ever sow wheat after wheat, and I allow certain years to elapse without using salt. I have not used it on hay land. I have tried it on mangolds and turnips. I noticed the effect of salt on turnips first in a neighbour's field, where it was sown very heavily, and he had a stronger crop of roots where he sowed the salt. I think the reason was that the land was moistened by it. Since I have sowed salt on turnips, I have been able to get them thinned a week earlier than I did before; and the same may be said with regard to the wheat. Wheat will ripen a week earlier when salt is sowed. I have been using salt about ten years. In the first year, I think, I sowed only about a ton; this year I have sown seven tons; my whole farm has been pretty well salted. I have tried a smaller quantity of salt on the land, but I have found that where I put on about 400 pounds, it had the best result. I tested it for killing weeds and thistles, but it did not seem to do anything in that way.

THE THISTLE CROP.

I think the thistles are not nearly so plentiful in this neighbourhood as they were three or four years ago; I don't think the law for their destruction is particularly efficacious. Sometimes if you compel a man to destroy his thistles, he will have to destroy his whole crop. There are two ways of getting rid of them—either never to let them blossom, or to let them come to the blossom, and then cut them down and plough under. I prefer ploughing them in the fall, and dragging them. I use plenty of salt for my cattle. I sell all my milk to the cheese factory.

CHEESE FACTORY SALT.

They use Canadian salt in the cheese factory, although they formerly used English salt. The directors of the company told the cheese-maker one time to try both and to see if there was any difference. He was not able to see any difference; and Mr. Ballantyne and our salesman examined the cheese, and they could not see any difference. Mr. Ballantyne said that if there was any difference, it was in favour of this one, that was the cheese made with the Seaforth salt. That was what our maker reported to us.

THOS. E. HAYS.

[*Mr. Hays.*]

The following letter was laid before the Commission by Mr. Dymond, and was received as evidence :—

CANADIAN SALT IN CHEESE AND BUTTER.

OFFICE OF A. G. McDOUGALL & Co., SEAFORTH,
August 10th, 1880.

A. H. DYMOND, ESQ.,

Dear Sir,—I am sorry I have not the chance of being before you and your colleagues to-morrow, as I have to go to ship at Guelph, but at any other time will be glad to answer any questions to the best of my humble ability.

In reference to the butter and cheese business, I have been buying both on my own account, and for others, largely, for the past ten years, and for the past three years have also been selling personally in Liverpool and Glasgow, as also in smaller towns in both England and Scotland, and I have never yet had asked me by any butter or cheese buyer there when offering my stuff for sale, the question, "What kind of salt is this butter or this cheese salted with?"

Two years ago we packed our own butter, one-half with English salt and the other with Canadian. It was sold to one of the largest firms in Liverpool; they could not tell that which was packed with the English from that packed with Canadian salt. It is the opinion of many that the complaints against our Canadian salt not being so good for butter and cheese as the English salt have been made originally by a few interested individuals who were engaged in the double capacity of buyers of cheese, and also agents of English manufacturers of salt. Our butter, however much better than it formerly was, is still far from being an easy selling article in the British markets, and will always be so until we get into the creamery business and do away with dairy butter. So many different qualities of dairy butter in one lot depreciates the sale of the entire lot, no matter if there are choice among them. Another cause of our medium butter being difficult at ordinary times to sell at a paying price is the immense quantities of oleomargarine coming constantly into the home markets from the continent, from whence it is ordered as wanted, and they do not manufacture there quicker than the orders come in, consequently it is always sweet, and takes the market in preference to everything except our creamery or home-made dairy butter. I visited some of the manufactories of that oleomargarine on the continent last summer in order to get all the information I could respecting it, and am happy to say not without some success, for I learned, which I had often tried before in Liverpool and elsewhere to know, the difference of that article from real butter.

Yours respectfully,
A. G. McDOUGALL.

The following is the letter from Messrs. William Davies & Co., referred to by Mr. Govenlock, and others, in the course of their evidence. Mr. Davies was subsequently examined at Toronto, in relation to the pork packing industry. His evidence on that head, and as to the use of salt in his business, will be found elsewhere :—

TORONTO, *9th August, 1880.*

A. H. DYMOND, ESQ.,

Dear Sir,—Referring to your inquiry, *re* Canadian salt, we would say that some years ago we used nothing else in our curing, and during the winter we had not any complaints of the bacon so cured, but the following summer we found the bacon came out of the

cellar very strong, and our agents in England reported that it arrived in very bad condition. They not knowing the cause, instructed us to use more salt, but the more we used the more trouble we had. A friend in Chicago to whom we told our trouble, said it was from using Canadian salt, and that similar results had occurred there. We at once discarded it and used Liverpool, and have had no trouble since.

Last winter we used two or three cars from Seaforth, but we could not get it dry, so gave it up again. When Canadian salt is used, we find that there is a sediment (gray in colour) left on the bacon, which soon becomes slime, and this, if left long enough, eats into the meat and becomes very offensive. I need not say we should be very pleased to use Canadian salt exclusively if it served our purpose, as it can be had in bulk, thus saving the trouble of emptying bags, and the price is much lower.

We give you quotations at foot. A great desideratum in salt for curing is that it should be *perfectly dry*, the aim is to get the water out of the meat; of course, if we put wet salt on it, we are adding water, and we have not yet found any salt-maker here who would let us have it *dry*. When Canadian salt-boilers are prepared to furnish us with an article that serves our purpose, we are prepared to use it exclusively, and, if it costs more to make it, we are prepared to pay more for it.

Yours very truly,

WILLIAM DAVIES & CO.

Liverpool fine salt, stoved,	42	cents	per	100	pounds,	delivered.
" coarse	26	"	"	"	"	
Canadian	23	"	"	"	"	

Sittings to take oral evidence, held at Galt, August 18, 1880. *Present*—Messrs. Brown (Chairman) and Dymond.

MR. MOORE'S EVIDENCE.

John D. Moore, North Dumfries, was called and examined.

I have been farming about ten years. I own the farm that I reside on. There is 300 acres of it. I principally raise grain. I raised a considerable amount of stock at one time, but I am not doing much at that of late. My soil is a clay loam with gravelly hills.

GYPSUM A DECIDED BENEFIT.

Gypsum has been used on it ever since I can remember, and wherever it has been used I am satisfied it has been a benefit. I have not used it for two or three years. When I did so I put on a hundred pounds an acre on clover, about eighty pounds on peas, and about fifty pounds on wheat that was seeded to grass. When I used it on peas I cannot say that I found that it made any difference in the sample; but it made a marked improvement in the crop. It was a marked benefit all through to any crop that it was used on, even when it was sown year after year on the same field. It seemed to have lost its effect for several years latterly, and that is one reason why I gave it up. I always sowed it on the same crops, principally on clover and peas. I would put it on my first year's and also on the second year's grass. We did not often have grass more than three years.

[*Mr. Moore.*]

THE EFFECTS DIMINISHED BY TIME.

For a number of years if the gypsum was badly sown we could tell it very easily; but for a few years of late it did not seem to have quite the same effect, and for two or three years since that in which I sowed it I cannot say that I saw that it made any difference. I believed that having sown it for a number of years it had accumulated in the soil to such an extent that the land did not require it so much as it formerly had done. I did not notice that, with the same amount of gypsum, there was any difference between the crops raised on the two kinds of soil that I mentioned as being in the farm. I am satisfied that gypsum is a benefit.

SALT SUBSTITUTED.

Since I gave it up I have been trying salt, mainly to see whether the one is as good as the other. I tried salt a few years on turnips, and I found it a benefit. I also found it a benefit to barley.

EFFECTS ON BARLEY.

I have usually sowed barley the year after growing turnips, and I have generally found the salt more beneficial to the barley than to the turnips, though it was beneficial to the turnips also. When it was sown on barley the crop was better in every way; it ripened sooner, the sample was brighter, the straw stood up better, and as far as my experience went, I think I had double the yield. The quantity that I put on per acre was about a hundred pounds. The one sowing of salt was beneficial to both the roots and the barley. My crop of barley after the salting was about thirty bushels to the acre. I had never been very successful with that grain previously. I think the salting increased the yield about ten bushels an acre. Where I made a test I am sure the yield was double.

A COMPARISON—PRICE OF SALT.

I left a strip across a field on soil equal to, if not better than, that on which I put the salt, and the effect of the salt on the turnips was that they were better all through the season. I get land salt laid down here for about $4 a ton. I get it from Seaforth principally. I purchase pure salt. I bought the refuse for a number of years, but of late I get the purest. I gave almost as much for the refuse as for the purest.

SALT ON FALL WHEAT SOIL.

I tried salt on fall wheat and it was earlier and better than that on which there was no salt; there was a marked difference in the fall, and all through the next season; the straw was better and brighter, and it headed out sooner. The difference was so great between what was salted and strips that I left unsalted in the different fields that parties working in them asked the reason of the difference. I use salt altogether on wheat now. I have given up sowing barley. My land is a clay loam—some of it pretty stiff clay. I have not tried a larger amount per acre. I sow my salt broadcast on the wheat before the last cultivating. I just plough once about nine inches deep and cultivate it. I work the salt into the soil. I have no difficulty in distributing such a small quantity over an acre.

MORE GENERAL USE OF SALT.

I think a good many of my neighbours use about 200 pounds. The use of salt is becoming very general in our locality, and I find that the results are usually about the same. Some find but very little difference in the crop when the land has been sown before, and they then salt less for some time. Some have quit sowing on fields that have

been sown two or three times. I use salt for my cattle. I have found of late that they consume a large quantity if they get what they wish. I do not know that my farm is richer than my neighbours'. There are all kinds of soil within a few miles of it. I do not use any other special fertilizer; I have tried ashes a few times, but it is very difficult to get them. I have not gone into draining at all; my land is too dry. In a great many cases I have ploughed down a very heavy crop of hay, and I have found that after that the wheat promises to be a very heavy crop; but when harvest has come it has not been so large as I expected; in fact, it has very often been a poorer sample.

JOHN D. MOORE.

NOTE.—Much valuable information relating to the use of Salt for Manurial, Dairying, Curing and Feeding purposes will be found in the evidence under other heads.

ONTARIO AGRICULTURAL COMMISSION.

APPENDIX N.

EVIDENCE

RELATING TO THE USE OF

GYPSUM, PHOSPHATES, BONE DUST, AND OTHER FERTILIZERS.

ONTARIO AGRICULTURAL COMMISSION.

APPENDIX N.

EVIDENCE

RELATING TO THE USE OF

GYPSUM, PHOSPHATES, BONE DUST, AND OTHER FERTILIZERS.

Sitting to take oral evidence, held at Galt, August 18th, 1880, *Present*—Messrs. Brown (Chairman), and A. H. Dymond.

JAMES COWAN'S EVIDENCE.

James Cowan, of the Township of Waterloo, was called and examined.

To Mr. Dymond.—I am a farmer. My sons and I farm 550 acres. We carry on mixed farming, but are largely engaged in the breeding of Shorthorn cattle and Leicester sheep. We also raise very large crops of grass and roots. I have not used artificial manures to any extent. I have, however, used guano, bones, both fine and coarse ground, gypsum and some other manures, of which I have got barrels for the purpose of trying them ; and, excepting gypsum, I never saw any result from the use of any of them, with the exception of one wet year that I got benefit from using guano with barn-yard manure for turnips. I have experimented with salt, but without result.

USE OF GYPSUM FOR FORTY-FIVE YEARS.

I have used gypsum for nearly fifty years. I began to use it in 1835, when I commenced farming in Canada. At that time I hauled it from Paris. Since railroads were constructed, I often purchase in Galt, and take either Paris or Caledonia plaster, whichever happens to be kept for sale. One year I experimented with plaster from Nova Scotia, Caledonia, and Paris ; also at the same time with unleached ashes. The result from all the different plasters was equally good. The land sown with ashes was no better than where nothing was done to it. When I seed down with fall wheat, I sow plaster to benefit the clover, not the fall wheat. I found that plaster had a tendency to increase the straw and induce rust in fall wheat.

EXPERIMENT ON CLOVER AND FALL WHEAT.

For the purpose of seeing what effect plaster would have on fall wheat, I sowed a single cast of plaster across a field of fall wheat. The track of the plaster was quite conspicuous ; the wheat stronger and taller than the rest of the field, white and red clover

growing at the foot of it, while on the other part of the field no clover was to be seen. The wheat, though later, was not perceptibly injured by the rust, the reason, I think, being that that was not a year in which wheat was inclined to rust. I have made no experiment which would lead me to conclude that the use of gypsum had been the means of preventing rust. The use of it increases the quantity of straw, and causes the wheat to be a little later in ripening. I have not found that it makes the head any larger. Clover is the principal crop to which I have applied gypsum.

COMPARISON OF RESULTS.

I remember a field that was seeded down with what we call the big kind of clover; and where I put plaster the clover was so heavy that we could scarcely cut it, while on a small piece which I left unplastered for an experiment, there was hardly anything to cut. My ordinary course is, to cut one year and pasture another; but I do not remember what I afterwards did with that field. When I came to the Township of Waterloo, it was said among my neighbours, "Cowan may be a rich man, but he will have poor children." In other words, that I would kill my farm by using plaster.

DURABLE EFFECTS.

I don't think the beneficial effect of plaster is exhausted in one season. Plastering potatoes, one year, we were stopped by a thunder storm, and the work was not resumed. Next year the field was seeded down with barley, and plastered. The year following, meadow, and also plastered. And that fall the rows where plaster had been applied to the potatoes, could be distinctly traced to the very spot where the work was stopped by the storm. The good effects of the plaster were quite visible the third year after being applied.

PLASTER ON PEAS.

At first I plastered peas every year, and could always see the effects of it. And still if a crop of peas looks dwarfish, I invariably plaster it. I have plastered peas at all stages of their growth, and I have not seen that it makes much difference when it is put on.

THE SEASON FOR APPLYING PLASTER.

I have plastered on the snow. Generally I try to put the plaster on before the land is fit for ploughing in the spring; but I do it then more for convenience than because I think there is any special benefit in doing it at that time. I put it on from very early in the spring until the crops are too far advanced to be benefited by it. My land is generally a heavy clay loam. The subsoil is gravel when you go deep enough, but very few trees that fall turn up gravel. Where the land is wet I use no plaster. I do not think that, as a rule, we have put any on where there are under-drains; the land is still damp enough, and produces plenty of straw and hay without it. I have never heard it complained that the application of plaster makes clay land stiffer and harder to work; but my land has now got to be a good deal stiffer and harder to work than it was.

EFFECTS OF DRY SEASONS.

To Mr. Brown.—I have never seen gypsum fail as a fertilizer, except three or four years ago, that we had a succession of very dry seasons here, and I put it on several years without any apparent result, and quit using it to any extent; but we have now begun to use it again more largely.

WHEN AND WHY TO USE PLASTER.

I would use it without farm-yard manure on a farm that is rather poor or run down; I would use gypsum for the purpose of growing clover or raising peas; I should be sure to

get a heavier crop, and by this means increase the barn-yard manure. My experience does not enable me to say whether the continued use of gypsum without other manures would deteriorate the soil or not, nor whether it alone would be sufficient manure to bring up poor land. I have never ascertained that it makes any difference whether the plaster is applied in moist or in dry weather, but its effects will not appear till after rain. When peas look sickly and yellow in June I put plaster on them, and if there has happened to come a shower, in a week after you would not know the field to be the same. I could not say positively, but my impression is, that gypsum does good even if it does not reach the roots of the plant.

BEST TO PLASTER LIGHTLY.

I have been accustomed to put on a good deal less than a hundred pounds of gypsum to the acre; in fact, I am under the impression that it is best to plaster lightly and frequently. I would rather pay double the price for well-ground plaster than for coarse-ground. I do not know whether this is a prejudice or not. I do not know that I have observed any special difference between the effects of coarse and the effects of fine. I have never made a practice of mixing gypsum with barn-yard manure.

LIBERAL USE OF MANURES BENEFICIAL.

To Mr. Dymond.—I make a very large quantity of manure on my farm. With it I manure 30 acres every year for roots. I suppose I put from 15 to 20 loads of it to the acre. I use it in a well rotted state, haul it out in fall, well rotted without being turned. My farm was in a much less fertile condition when I purchased it than it is to-day. That change I attribute largely to the use of gypsum. I think if I had not used it my farm would not have been in anything like the condition it is in now. I do not think I should have made one-half the money without it.

COST OF PLASTER.

Gypsum generally costs about $4.50 per ton in Paris. I do not think that Caledonia gypsum is any different price in Paris from the Paris gypsum.

MODE OF SOWING IT.

We sow the gypsum all by hand. I have never seen any machines for the purpose of sowing it. I think I have heard of one. I have said that I would buy one irrespective of cost if it would suit me, because it is not a very pleasant job to sow gypsum by hand. I have not intentionally used over 100 pounds of gypsum per acre, though I may have exceeded that amount; generally I keep it under 100 pounds. If a field lacks straw I sow a little gypsum on that. I have not used it on peas of late years, except when they were looking a little sickly. They generally seem to grow strong enough without it now, a fact which I attribute to the plaster which has already been put on the ground. I have used from five to ten tons of plaster a year for many years past.

To Mr. Brown.—I would not put plaster on fall wheat with the expectation of doing it any good.

To Mr. Dymond.—As far as the straw was concerned I have found that it had a beneficial effect on fall wheat. The wheat was ranker, a little later, and, if it escaped rust, perhaps a little more of it to the acre. If I had clover that I was going to plough down, I would be sure to sow plaster on it for the purpose of making it as heavy as possible before I ploughed it down. I would not sow it on land I intended to summer-fallow. I never sowed plaster in the fall.

JAMES COWAN.

[*Mr Cowan.*]

EVIDENCE OF MR. TELFER.

ANDREW TELFER, South Dumfries, County of Brant, was called and examined.

To Mr. Dymond.—I farm 150 acres. It is mixed farming that I carry on. The crops that I mostly grow are wheat, barley and oats. I grow by rotation. I have not used fertilizers largely. I have used salt and plaster. I have not used any phosphates. I have used barnyard manure.

USE OF GYPSUM AND SALT.

I have principally used gypsum. On turnips I have used gypsum and salt together. I mix them and sow them broadcast. I drill up my ground before sowing them on the roots. I use gypsum alone, principally for clover. I do not put gypsum and salt on turnips after the crop has grown; I put them on the land before drilling. I have never used salt by itself.

EFFECT OF GYPSUM ON HAY.

The farm which I occupy and that of my brother were formerly one farm. It was divided some years ago. My brother used no gypsum, but I did, and this year I had a larger hay crop than he. I got nearly two tons per acre off my land, while my brother did not get one. I had not applied any manure but gypsum to that. My brother had not applied any at all, either farm manure or anything else. The position of the fields in the two cases was the same; they were both on high land; I could not see that, in that respect, one had any advantage over the other. They were about equally exposed. We have used plaster ever since we came to this country, which was over thirty years ago. We are about three miles from the plaster beds. Plaster has been obtainable from them during all that time. I am getting it now in a much finer state than it was in formerly. I think that being finer it will do more good; it will be absorbed the more readily.

PLASTER ON FALL WHEAT.

I applied a little of it this year to my fall wheat, leaving a part of the field without any on it, and now you could almost mow the part of the field on which I put it—the clover is getting out in head, while on the other part you can see the stubble quite plainly across the field. I do not know of any effect that it produced on the wheat itself this year. The wheat was all cut at the same time.

PLASTER ON CORN.

I have used gypsum on corn, and find that it produced a great effect on it; it makes it stronger, and causes a heavier crop, I think. I have not used it separately on root crops. The reason that I combined gypsum and salt was that a neighbour told me he had tried them together with good results. The use of them on turnips has been to give me heavier crops. I cannot say that the use of salt and gypsum together has caused the crops to grow faster.

PROPORTION OF PLASTER TO SALT.

To Mr. Brown.—I put about 100 pounds of plaster to 200 of salt per acre. I mix them together before drilling. I am not aware of the previous management of the fields to which I refer when I speak of my having obtained a hundred per cent. more hay off my field than my brother did off his.

NECESSARY TO APPLY IT EARLY.

I believe if you are late in sowing gypsum on wheat it will cause it to rust; it will make the plant grow stronger and ranker, and render them more apt to rust. I sow it

very early on my grain. If I could get clover to plough in, I think gypsum alone would keep up my land for a series of years. I have noticed that in a dry season gypsum does not take so much effect as in a damper one.

Quantity When Used Alone.

To Mr. Dymond.—When I use plaster alone I use about a hundred pounds to the acre. If the plaster is sowed late in the season it induces rust; I mean after the plant has got pretty well advanced—either wheat, barley, or anything else. One year we sowed it on wheat late in the month of May, and we were fully a week later in cutting this than in cutting wheat on which it was not put; it came up very rank and got rusty. I cannot remember when that was; it was some years ago. I cannot say whether it was a year that rust was very prevalent or not. I sow the plaster by hand. I would very much like to have some improved way of distributing it. I have not yet found any machine for doing it satisfactorily.

To Mr. Brown.—My land is not under-drained. It does not require it; it has a gravelly subsoil and a good natural fall. I raise from about fifteen to twenty-five bushels per acre of fall wheat. I had at one time the management of Mr. Christie's farm. I used considerable plaster there with effects similar to what I have stated. I used it principally on hay there. I always got my plaster from the one place. It is a gray plaster. We think the plaster we get now is much better than we used to get. We think it is equally good in quality and much finer ground.

ANDREW TELFER.

MR. PERLEY'S EVIDENCE.

Daniel Perley, of Paris, was called and examined.

To Mr. Dymond.—I am now farming only 150 acres; but when I was with my father we farmed 600.

FREE USE OF PLASTER.

We have always used plaster since I was ten years old. I saw a great deal of plaster sown on our place in the township of Ancaster. The people there used to say it would spoil the ground; but I was only there till I was ten years old, and the ground was good then, and I have seen it every few years since, and it is fully better now. Plaster has been a help to any ground I have ever seen it sown on. The land I am on is a clay loam with limestone bottom. I follow mixed farming. I have always found any gypsum that I have sown to be an advantage. My father always considered that 130 pounds of plaster gave him a quarter of a ton of hay. That amount of plaster would be worth about 30 cents. I follow a regular rotation of crops. I have always used gypsum on barley. I never used salt until within the last seven years. I tried it then with six acres of turnips. Before that I think I always got better crops in potatoes than in barley; but after trying salt I found that my barley looked better and was harder. I generally sow my turnips, and then sow the plaster over the ridges. I sow it broadcast. That, I consider, keeps the fly off for a day or two. I do not think plaster does any good sowed in dry weather. I do not think there is any use in putting plaster on the plant; it must be sowed early. Even if you could keep the plaster on the plant I do not think it would do a bit of good; it must get to the ground.

PLASTER AND ASHES.

I have used it a good deal on corn. For that purpose I mix it with ashes in the proportion of about twenty-five bushels of ashes to 150 or 200 pounds of plaster to the acre. I put about a handful of this mixture to a hill. I think this is good for barley

too. The result of applying it to corn is that you get as large a quantity of stalks the first year as you would of hay; and then I think it is a help the next year for the barley. My rotation of cropping is wheat, barley, then seeded down, then hay, then hay or barley. I always have barley after wheat. I might not sow gypsum on the wheat; but that would be the only year I would miss sowing it. I generally plough up sod and put in oats, and the next year put roots in on the clover sod with barn-yard manure.

QUANTITY OF SALT AND PLASTER SOWED.

I sow six or seven tons of gypsum every year, and about the same of salt. I think I find it an advantage to use it every season; I get as good crops as anybody. I use all the farm-yard manure I have. I do not keep very many cows. I have about eighty or ninety sheep. I have never had a failure in the use of gypsum. We generally commence to cut our clover about the 20th of June. The best result I ever had from the use of plaster was when I sowed it both in the fall and in the spring on the same grass; that was the best crop of hay I ever had. I considered that by sowing the plaster twice I gained a ton at least to the acre. This was on land that was in good, fair heart; it was the second crop that was ever on it. I prefer using plaster in the spring as early as I can get it on the ground. I always use salt separately. I sow it on the turnip ground, and then I sow the plaster when the tops have got up—I fancy that keeps the bugs back a day or two. Then if there comes a little bit of a shower the plants rapidly become more vigorous. I think I obtain better turnips from using the salt as well as the plaster. I think they have a better growth by using the plaster.

SALT ON BARLEY.

I have used salt on my barley. I almost fancy that if I rode around outside of my own neighbourhood I could tell the people that use salt and those that do not by the look of their barley. I have found through our neigbourhood that the barley of those who do not sow salt looks green, while ours is bright and clear. A neighbour of mine who sowed salt on his got it in sooner than barley on which he had not sown salt. I do not use salt on spring wheat. I sow it on fall wheat; and the straw stands a little higher and is harder. I think salt keeps the wheat cleaner. My farm is not underdrained. I lived in Burford before I lived here. I have seen plaster used for fifty years. The sheep I keep are Southdowns. I have kept them about twenty years. I prefer them because they are easy to fat, and are hardier and more prolific than the larger breeds. The only objection to them is the small amount of wool. I keep a pure breed. I have sold them in different places. I sold some in Ottawa last fall, and some in London. I am not breeding them just for butchers, but for breeding purposes. For mutton I would cross Leicester ewes with Southdown bucks.

A PLASTER SOWING MACHINE.

To Mr. Brown.—For, I think, twelve years I have worked on my roller a machine for sowing gypsum. I sow about six or seven tons a year with it. It is attached to the roller behind. It only cost me $15. The boys object to sowing plaster by hand; it gets in their eyes. My machine works with a slide; and it is turned by a little pinion on the end of the roller. I can sow with it from 50 pounds to the acre to 500. My father used Caledonia gypsum for four or five years, and we never found any difference between it and the other. It is a whiter plaster than ours; but a good many think it is whitened by lime being used in it. A good many also say that the Paris plaster is gray with slate; if it is, it is not so good. There is a gray plaster independently of that which has slate in it. I have never seen any difference between gray and white plaster in the results of using them. If there is any difference it is in favour of the gray plaster. Using salt on corn turns it yellow. I do not keep accurate accounts of the results of my experiments, though some years I have counted on my carrot and turnip fields. I find keeping accounts is too much bother for me; most of the farmers do.

DANIEL PERLEY.

[*Mr. Perley.*]

MR. MERRITT'S EVIDENCE.

W. Hamilton Merritt was called and examined.

GYPSUM BEDS AT CAYUGA.

To Mr. Dymond.—I am manager of the Grand River Gypsum Company of Cayuga. We have never bored to see what space our gypsum beds occupy; but they seem to be pretty extensive. We grind the gypsum at the mouth of the mine. We have a little different method of grinding ours from that of others. It is usually ground by mill-stones, but we use a disintegrating method, in which the stone is first crushed into small pieces, and then it is knocked by attrition to an impalpable powder; and in case any large pieces should pass over that would render it rough when rubbed in the hand, we sift it all in a screen, so that it is very fine. We believe farmers prefer it in that way. Our gypsum is white. It is pure gypsum. Of the gypsum in the beds worked by the Grand River Gypsum Co., Sir William Logan, F.R.S., in his Geological Report for 1866, states regarding their quality that it is "exceptionally pure." I have visited gypsum beds in England, France and the United States and never saw a mine where purer quality was obtained. Land plaster is supposed to be gypsum, as a rule, and that, chemically pure, is a white substance composed of thirty-three parts of lime, forty-six of sulphuric acid, and twenty-one of water of crystallization. I believe that the only part of Ontario in which gypsum beds are found is along the Grand River. They are only found besides, in Canada, in Nova Scotia and up in the Saskatchewan district. The Grand River ones are situated below Cayuga, above Cayuga, and in the neighbourhood of Paris. The gypsum found in these beds is not altogether the same in appearance.

VARIETIES OF GYPSUM.

In the higher beds at Paris it has a blue or gray character something like that which comes from Fayetteville in the States, called Oswego gypsum. This latter comes largely into Canada from Oswego. It comes up the canal from Fayetteville in barges, and is ground in mills at Oswego and shipped over in barrels as return freight. Fayetteville is close to Syracuse. I think almost the largest amount of gypsum that is used in Ontario is used along the lake shore, and it comes from Oswego. Gypsum is ground at Port Hope from the Oswego rock. The Oswego gypsum is sold, as a rule, in barrels, but we sell it chiefly in bulk—by the car-load. They allow twelve tons for a car-load. A barrel of the Oswego gypsum weighs about 300 pounds, I think. As our works have only been started about a year we do not barrel yet, except to a small extent.

PRICES OF GYPSUM.

We can lay gypsum down at about $5 a ton in Toronto in bulk; that is, $60 for a car-load. I think a barrel of Oswego plaster costs, laid down in Toronto, 80 to 85 cents. They pay 65 cents in Oswego, I believe, and then the freight is very small, being return freight. We could lay ours down in Toronto at about 70 cents a barrel without the barrels. The farmers seem to think that there is more virtue in gypsum in barrels than in what is in bulk, which is a mistake. We can deliver ours in bulk as cheap as, or cheaper than the Oswego in barrel. The Oswego gypsum is of a gray description, and the colour is due to slate and sand. There is about 25 per cent. less gypsum in it than there is in the white.

OSWEGO GYPSUM—COMPARATIVE ANALYSIS.

There was a piece of the Oswego gypsum given to me at the mines by the manager; he knew who I was, and therefore certainly did not give me the worst specimen; I could see

from the surrounding rocks that it was one of the best; and that contained 55·67 per cent. of pure gypsum as against 79·07 contained in the white Grand River gypsum, according to the Report of Mr. Heys, by whom it was analyzed. In the Oswego gypsum there was, of insoluble matter, which would be chiefly sand, 4·8, while in ours there was no insoluble matter. Of iron and alumina there was one 1·4 per cent. in the Oswego, and in the Grand River there was just a trace; of carbonate of lime, which is chalk or limestone, there was 13·31 in the Oswego, and a trace in the Grand River. Of carbonate of magnesia there was 5·7 per cent. in the Oswego; that, they claim, has of itself a fertilizing property; I do not think it has. There is none in ours. If carbonate of lime would not be a fertilizer I should not think it probable carbonate of magnesia would be. Of water and loss there was 18·12 per cent in theirs, and 20·93 in ours. We claim that ours is about 30 per cent. purer than the Oswego. That remark applies to all the Cayuga and Caledonia beds of white plaster.

A DAMP SEASON PREFERABLE.

To Mr. Brown.—As far as I have heard, from dealers and farmers, there seems to be more gypsum used in a dry season than in a wet one. Gentlemen here have said that it wants moisture; but this last season has been moist, and dealers have complained that because of this moisture there has been less used in certain districts—a great deal less. It was a new fact for me to learn from these gentlemen that it needed moisture. I have studied chemistry.

HOW IT OPERATES.

The plant itself takes up a small proportion of gpysum; but I do not think that is the main fertilizing property; I think it has an indirect benefit in retaining the ammonia which comes from the decomposing vegetation in the earth. When it is used with manure especially, by means of which the greatest effects are produced, it seizes on the ammonia, which would otherwise escape in the air, and I think the ammonia decomposes the calcium sulphate, or gypsum, forming ammonium sulphate, which is one of the greatest fertilizing agents there is, but which, on account of its expensiveness, cannot be used to a great extent alone. The most profitable way to use gypsum would be in conjunction with ordinary manure. When used on clover or leguminous crops, the ammonia generated by decomposition of some of the vegetation in the ground is retained by the land plaster, hence even without manure the benefit derived from its use is very great. A layer of land plaster should always be kept on the top of manure-heaps. Where this is done regularly I believe as much as 20 per cent. of the fertilizing property of the manure is retained, which otherwise escapes into the air. Gypsum is chiefly an indirect fertilizing agent. It seems to attract moisture, and greatly benefits plants by that. I do not think any of the ingredients in the Oswego plaster, which are foreign to ours, are fertilizers, except perhaps the carbonate of magnesia. I have not tried, or caused to be tried, any particular experiments for the purpose of testing the value of gypsum. Up to the present I have taken for granted the practical experience of farmers and those who have used gypsum.

CROPS REQUIRING GYPSUM.

The class of crops for which we chiefly have a demand for gypsum are clover and leguminous plants, turnips and that sort of thing; it is much used on corn and potatoes, and some have used it on both spring and winter wheat, oats, barley, and rye, besides fruit trees and garden plants, with good effect. We have a great deal of difficulty in introducing our gypsum cast of Toronto in consequence of the competition from Oswego.

HEAVY FREIGHT RATES.

The area of our market is at present pretty much limited to the western part of Canada. Nova Scotia does not interfere with our trade that I am aware of. I

have in my possession a letter, with regard to gpysum, which I received from a gentleman who was a great experimental farmer, the late Hon. George Brown. He seemed strongly in favour of railroads carrying fertilizers at a low rate, in view of the increased volume of produce and live stock it would secure them. The freights to distant points make gypsum expensive; but for this farmers might use it a great deal more. The railway companies would charge just the same for a car if the gypsum were put up in barrels. As a rule farmers get it from dealers in small quantities. It would come rather more expensive to the farmer if he got it in barrels, a small quantity at a time. We sell it to dealers who retail it to the farmers. When I spoke of the price just now I spoke of the price to the dealer. The price that I mentioned as that of the Oswego plaster was also the price to the dealer.

THE GYPSUM DEPOSITS—TREATMENT.

To Mr. Dymond.—I know our supply of gypsum is not inexhaustible, because it occurs in beds—regular deposits; and sometimes these beds end abruptly. The rock varies a little in quality. There is one slate band in our mine that comes up at places and then disappears again, and the bed thickens and thins as it goes along. We always try and remove these bands before taking the gypsum out of the mine. If you adulterate the white gypsum, the only thing you can adulterate it with is the slate and rock, and that makes it dark at once; whereas with the dark gypsum you could grind up any amount of limestone or anything else without the colour betraying its presence. The chemist alone can tell to what extent gray land plaster is adulterated. Knocking out the foreign substance entails a certain amount of expense. We clean the gypsum as much as we can. Our seam is from four to six feet deep. It is clay that is over the top of it, and below is hard slate. There is a prejudice against plaster which has been exposed to water, but I do not know whether the water hurts it or not. I should think that a certain amount of gpysum would be taken away by water filtering down through it when exposed to the rain. That would render it lighter and a little porous; but I do not think it would cause it to lose any of its virtue, although there is a prejudice against plaster that has been subjected to the weather and water and so on. We have a shed under which the gypsum is laid before grinding. Gypsum is a little lighter than limestone, and if there was limestone in it, it would render it so much heavier. I fancy clay is heavier than gypsum; I do not know for certain. Lightness of gypsum when ground would indicate greater purity. I should take it that filtration of water through gypsum would only result in a loss to the owner, and not, I think, in a deterioration of the gypsum. The band of limestone or slate which appears now and then in our bed has a shale rock beneath it. These bands are so well marked that they can be discovered by the eye when one is digging; we knock them off with a sledge. If plaster goes any distance at all the freight about doubles the price of it. We sold it at three dollars a ton last autumn at the works. We retail very little to farmers around our mill. It is at retail that we sell to the farmers in our neighbourhood at three dollars a ton.

W. H. MERRITT

LETTER FROM THE LATE HON. GEORGE BROWN.

The following letter from the late Hon. George Brown, referred to by the witness, was allowed by the Commissioners to be put in as evidence, the original being produced by Mr. Merritt:—

[COPY.]

TORONTO, *18th March, 1880.*

MY DEAR SIR,—I am very much interested in your proposed enterprise on the Grand River. I have been a large consumer of land plaster for over twenty years—many of these years to the extent of fifty tons per annum, and have not only been entirely satisfied with its singular effect on the crops, but astonished that any farmer can afford to carry on his farm without its assistance. Its effect on clover, peas, Indian corn, and indeed on all leguminous crops is magical. A good dressing of it, say 200 to 300 pounds per acre, will make all the difference between profit and loss on the crop of a field.

[*Mr. Merritt.*]

An old complaint against plaster is that it has a wonderful effect for three or four years, but that the land then becomes what is called "clover sick," and its power ceases to be felt. I think this is a misapprehension—nay, from much experience, I may say that I know that it is so. The true explanation of the "clover sickness" may be found, I am confident, in the great exhaustion of the land by the large crops taken from it, through the stimulating effects of the gypsum—*and the failure to restore the other elements of plant growth that have been exhausted by the same process.* Exhaust the land by great crops, and trust to gypsum solely for a continuance, and you may be disappointed; but couple with it a good dressing of barn-yard manure and you will not complain of your crop or of your land as "sick."

Another objection to plaster is the disagreeable task of sowing it—burning the fingers, flying in the eyes, and so forth. Also that it takes a great while to sow a large surface with it, and just at the moment when the spring work demands all the strength, and more than is available to the farmer. But all these objections are met by an admirable machine, constructed for the purpose of sowing plaster, made by Mr. John Watson, of Ayr, and by the use of which the laziest lout in the land can sit at ease behind his horse, with a stream of gypsum ten feet wide following behind him with perfect regularity, and with any desired weight to the acre, at the rate of twenty acres per day.

I have always held it as most unfortunate that the vast benefits to be derived from the use of gypsum are unknown to so large a body of our farmers, that even those that know and confess these benefits, avail themselves so little of them, and that some combined movement of railway companies and gypsum companies has not long ago been made to establish gypsum depots at railway stations so that it would be of easy access to all farmers over the land at reasonable cost. Nothing could contribute more to the rapid increase of crops in Canada than such a movement efficiently carried out. It would pay the railways to carry gypsum at the very lowest rate of freight, in view of the increased volume of produce and live stock freight it would secure to them.

I wish you great success in your enterprise—it is fortunate for us when our occupation is not only a natural and a pleasant one but contributes to the welfare of our country. If it be true that the man is a benefactor to his country who makes a blade of grass grow where none grew before, what must he be who makes the half-dead-and-alive pasture fields, that we see so painfully numerous over our country, rich with green verdure.

Believe me, faithfully yours,

(Signed) GEO. BROWN.

Wm. Hamilton Merritt, Esq.

EVIDENCE OF MR BARRIE.

Alexander Barrie, of Galt, was called and examined.

To Mr. Dymond.—I live in the Township of North Dumfries. I am farming about 300 acres of my own, and about 90 acres that I have leased. I do mixed farming. I raise wheat, barley, oats, and peas, and am pretty largely engaged in raising root crops and cattle and sheep. I have tested the effects of fertilizing agents to some extent. I have used ashes largely, both leached and unleached, salt and gypsum, as well as superphosphates to a limited extent. I keep a considerable quantity of stock in the winter, and fatten them for the market. I have about 20 or 25 head on my farm usually. During the winter I fatten between 15 and 20 head of cattle, and from 150 to 200 sheep. I make a considerable quantity of manure besides what I buy. I have bought of late years from 100 to 150 loads in the town. I give the farm all the food that I can get for it. I have been carrying on business about seventeen years on my own account. I have been accustomed to farming all my life. I have not used fertilizers very long, with the exception of gypsum. I have used it since I commenced farming on my own account.

THIRTY YEARS' EXPERIENCE.

This farm has been under the influence of gypsum for thirty or forty years. I have used it in a mixture with salt for root crops; but I have used it principally for clover and peas. With them I have used it by itself.

LITTLE BENEFIT IN DRY SEASONS.

In dry seasons I have never noticed any perceptible good resulting from the use of it. It requires a large amount of moisture to dissolve it so as to bring it into a condition in

which the plant can utilize it. In ordinary seasons when it has been in sufficiently early to catch the spring rain, I have always thought I received full return for my trouble and expense in sowing it. I think Liebig lays it down as a rule that four imperial gallons of water are required to dissolve one pound of plaster. I have paid a little attention to agricultural chemistry.

LIEBIG'S THEORY.

I think Liebig's theory is that the gypsum acts in a two-fold way, both as a stimulant and as an actual food to the plant; that in analyzing clover leaves and roots for instance, it is found that they contain a considerable quantity of sulphuric acid and lime; and gypsum is composed of sulphuric acid and lime with a little water.

THE BEST TIME TO SOW IT.

I have frequently sowed plaster in the spring of the year on clover as soon as the first leaves were sufficiently developed; and I think that is the best time to sow it. In doing this I have sometimes missed part of the clover, and if the atmospheric conditions were favourable, I have been able to trace the difference immediately between the clover on which plaster has been sown and that on which it was not. I have intentionally left a portion without plaster for the purpose of experimenting. I have not made any test as to quantity. Besides clover I have used gypsum on peas to good advantage in the early part of the season to assist them in growth.

PLASTER ON BARLEY.

This season by way of experiment I used it on barley. I got a fertilizing drill with a view of using artificial manures more than I have hitherto done, and it sowed from 150 to 400 pounds of plaster to the acre, the fertilizer depositing the plaster with the seed in the ground, and after I reaped the barley I saw no perceptible effect whatever, either on the barley or clover. This season was very favourable to making the test. The gypsum would have had a good effect if it had been sown as a top dressing after the barley and clover were brairded. I sowed salt and plaster mixed together—sowed it with a drill, and it had a most decided effect. I sowed that on barley on the same farm. The field on which I sowed gypsum alone on barley had been under grass for a number of years. The field that I sowed plaster and salt on had been eight years under grass. There had been no other fertilizer employed on either of them.

SALT AND GYPSUM COMBINED.

I applied the salt and gypsum on these in just the same way, about 200 pounds to the acre. I also applied the salt and plaster together in about equal quantities. I did not measure a piece off and thresh it separately; but the effects were quite decided—the straw was longer, the heads larger, and both straw and grain lighter in colour. The salt and plaster might have had a combined effect, but as to that I am not prepared to say. On the same field I sowed some salt alone, and the result was favourable, but I thought where I sowed the two together it was somewhat better. The soil was a lighter one, inclined to gravel here, whereas in the other case it was loamy.

SALT AND GYPSUM ON TURNIPS.

I had used salt and plaster previously on turnips. Those I sowed on a field of which I had manured a portion with barn-yard manure. On another part of the same field I used unleached wood ashes, and on another I used salt and plaster, and I could not see that there was any decided difference, except that, where I sowed the salt and plaster, the plant was somewhat more vigorous.

[*Mr. Barrie.*]

USE OF UNLEACHED ASHES.

I found that where I applied the unleached ashes in large quantities—about four loads to the acre, spread on early in the season and harrowed in some time before drilling—my crop of turnips was about as good as in any other part of the field, as good even as where I manured with barn-yard manure. I value unleached ashes as one of our best fertilizers, especially for root crop. I sow gypsum broadcast by hand. I have used a machine, but it was not very satisfactory. I used it for sowing salt, and the salt rusted it so that it got out of order. I have no permanent pastures. I have tried plaster on timothy, and it has had no visible effect so far as increasing the yield of hay. I have not generally kept the clover fields over three years under grass. I have applied the plaster every year on clover. I never think now of applying it on timothy.

CHARACTER OF THE LAND.

To Mr. Brown.—The general character of my land is clay and gravelly loam, from one to five feet deep, resting upon an open porous subsoil of sand and gravel. I just put on gypsum as I think the fields require it. I think it is one of those artificial manures which, when ground fine, soon dissolve, and that every rotation of crops the land requires a new dose of it. I think it is better to apply it frequently in small quantities than to put it on in heavy doses. Wherever I have applied gypsum to clover or peas, the season being favourable, I have obtained beneficial results. In the case in which I mixed the salt and the gypsum, the salt might have taken the place of the weather to some extent. I do not think it took the place of moisture, because it was a moist season. I would never think for a moment of using gypsum alone as a substitute for a manure. In renovating exhausted soils when spreading barn-yard manure fresh from the stables or yards, I sow gypsum over it. That, I think, prevents the escape of the ammonia.

MODE OF APPLYING MANURE.

As it is, the natural tendency of all manures to leach into the subsoil, I think it is highly desirable on soils having an open porous subsoil to keep the manure as near the surface as possible. I apply much of my manure during the winter season by spreading it upon the surface of the snow. If the ground is level, the melting of the winter's snow and spring rains leaches the soluble portions of the manure into the soil, and it is held in readiness to be utilized by the growing plant in the spring. When this is not convenient, I haul the rough green manure from the barn-yard into the field I wish to manure, and plough it in shallow as early as the season will permit. At this season of the year the manure decomposes rapidly, and the gases generated, instead of escaping into the atmosphere, are absorbed in the soil and utilized as plant food. I have not mixed gypsum with barn-yard manure in the fall in any case.

SUPERPHOSHATE.

I have used bone superphosphate this year, made in Toronto. It is just green bones dissolved in sulphuric acid with a small amount of animal matter in it. My experience of that is limited to this year alone. I sowed it on my barley crop with the fertilizing drill which I spoke of; but the drill did not work very satisfactorily, and I only got a small portion of it sown. Where I did sow it, it had a very decided effect in causing the barley to ripen at least four or five days earlier, and in giving a very bright appearance to the straw; but I have had no opportunity of deciding whether it increased the yield or not. I sowed some of it on the turnips this year, and so far it looks as if it had a beneficial effect on them. The turnips on which it has been sown have taken a considerable lead of those which are without it. It caused a very rapid growth of the turnips early in the season, and that protects the plants from the fly to a great extent. I find that gypsum does the same thing, but not to the same extent as the superphosphates. I have not tried salt alone for that.

[*Mr. Barrie.*]

GYPSUM ON CLOVER.

If I have a field in clover I apply gypsum to it, because it seems that gypsum is specially adapted to clover, more so than to any other crop that I have used it on. If the land had previously been heavily manured it would probably not be necessary to apply so much gypsum; but if gypsum were applied, it would probably have a good effect. If I had plenty of barn-yard manure I could farm, I think, quite well without artificial manures. I would not say that there is no advantage to be gained by using them. Where the atmospheric conditions were favourable I never failed to notice that gypsum had beneficial results, and if the land was good and rich these would probably show so much the better. I think the results of using it are such as to recompense one for the cost of the labour and the cost of the gypsum, especially when it is used on clover. I would not sow gypsum on fall wheat unless I was seeding it down. I would not use it on barley with a view of assisting the barley; it would only be for the purpose of assisting the clover that might be seeded down with it. I have an impression on my mind that gypsum sowed on fall wheat early in the spring would cause rust; and I do not think it would do any good to the grain. It might cause the growth of a larger amount of straw; but it would have no visible effect in increasing the yield of grain. Clover is a deep-rooter. I think that gypsum is a direct food to clover. The best effects that I have observed from the use of plaster have been on clover, and the second best on peas. I could not speak definitely as to its effect on the other crops. When manure is retained in the barn-yard during the summer season and forked over, with the view of assisting the process of decomposition, a liberal application of gypsum applied at different times during the season would be attended with very good results.

A. BARRIE.

MR. ELLIOTT'S EVIDENCE.

ANDREW ELLIOTT, of the Township of North Dumfries, was called and examined.

METHOD OF FARMING.

To Mr. Dymond.—I have been farming for about fourteen years on my own account. I own 350 acres. It is mixed farming that I follow. My land is mostly sandy loam with a subsoil of clay and limestone. The crops that I principally sell are barley and wheat. The balance I raise principally for feed; they are peas and oats. I raise a good many turnips and a good deal of clover. I plough about 250 acres. I raise about twelve to fourteen acres of roots yearly. I keep sufficient cattle to consume all the straw and hay I raise on the place, possibly from 30 to 40 head of cattle, and from 60 to 100 head of sheep. For root crops I generally plough the field in the fall, say wheat stubble after sod. I turn up clover sod very often. Through the winter I draw manure from the yard and spread it on the field if it is a level field, plough it in as soon as possible in the spring, and work the land as thoroughly as I can till about the middle of June.

PLASTER AND SALT—PROPORTIONS.

I then prepare the land by rolling it fit to drill, and mixed the plaster and salt in the proportion of about 200 lbs. of each, and that is sown broadcast and drilled in, and the seed sown in that. I generally make the drills thirty inches apart, and leave twenty inches between the plants. I find that the plaster and salt united have the best effect in keeping the vegetation green, and keeping it growing rapidly from the beginning to the end.

COMPARISON OF SALT AND PLASTER.

I have sometimes put in a strip of roots with salt alone and another with plaster alone, and sometimes a strip without either, and I have found the best results to follow

the use of salt and plaster mixed. There is no doubt a greater benefit is gained from the use of plaster alone than from the use of salt alone. Salt and plaster mixed have a specially beneficial effect not only on the turnip crop on which they are used, but on the succeeding barley crop also. On the barley crop the difference is so great that a stranger going through the field could distinguish a strip to which they had not been applied. If a field grows dirty I generally put in turnips, and I consider that turnips take pretty well the place of summer fallow to me. I never had a season when I have not considered that the application of plaster was worth double its cost to any crop I sowed it on, and on clover it will double the crop.

PLASTER ON ALL CROPS.

I sow it on all crops, and generally with good result. We are never troubled with rust as some parties are; but I have found that plastering fall wheat in the fall does away with the danger of rust, and materially affects the crop. I do not apply plaster in the spring if it is applied in the fall. I invariably apply it to barley whether I seed down or not. This year I had a field of twelve acres of barley on wheat stubble. There were two crops of hay on the field, and immediately on taking the last crop of hay off I ploughed the field and put it into wheat. About three acres of that field was manured last fall with the scrapings of the yard, and the balance was not manured. I sowed plaster and salt in the same field, both separately, and I left a strip without either salt or plaster on it, and the grain there was not so strong, but was badly crinkled down. On each side of that again I left a piece, the one sowed with salt and the other with plaster, and I cannot say that there was much difference between the grain on the two, but neither of those strips was as good as the grain on which salt and plaster were applied together.

USE ON THE SAME LAND FOR FIFTY YEARS.

To Mr. Brown.—Gypsum has been used on the land since it was cleared, fifty years ago. I would not be afraid to use gypsum continually. Taking them all through we raise better crops than we did twenty or thirty years ago. It is reasonable to suppose that I would have found it out by this time if the use of gypsum was prejudicial. The effect of the salt was not as good as the effect of the gypsum where I used them separately. Using plaster on the fall wheat in the fall seems to have a good effect in bringing the plants forward rapidly in the fall, and it gives the crops a good start in the spring.

THE THISTLE CROP.

Thistles are coming in on my farm rapidly. There is a decided increase in the thistle crop in this neighbourhood.

ANDREW ELLIOTT.

MR. GIBSON'S EVIDENCE.

David Gibson, North Dumfries, was called and examined.

COMPARISON BETWEEN PLASTERS.

I farm 160 acres. I do not use fertilizers much, except plaster. I have been using it about twenty-five years, but not steadily every year. I have used about a hundred pounds to the acre on grass land, and about fifty on new seeding; that is, on spring grain and so on. I do not use it on peas. I use it on clover. For a number of years I purchased my plaster in Paris. After that I thought it was not quite so pure; and I bought the white Caledonia plaster one year. When I got it home I thought it was very light, and I said to one of my neighbours, Mr. Keevers, "that plaster seems very light;

I would like that you would take a hundred pounds of mine, and I will take a hundred pounds of yours." It was the Paris plaster that he had. I told him that I would sow all of my field with the Caledonia plaster but a certain part, and I would sow this Paris plaster upon that; and he was to do the same with his land. He took the same number of pounds, but he had a larger bulk. After the crops bloomed and were pretty near ready for cutting I called upon Mr. James Wilson to walk over the fields with us two men to examine and see if he could find any difference between them; we did not tell him for what reason till afterwards. When he came upon the Paris plaster in the centre of the field he said "I think this the heaviest part that I have come across." I said, "you had better go over it again." He went over it a second time at another part of the field, and still said he thought that was the heaviest spot. I said "you had better go over to Mr. Keever's and examine that." He went over to Mr. Keever's, and he thought it was the lightest part. That is all the experience I have had in testing plaster.

RESULT OF EXPERIMENT.

The result of the experiment was that on the whole the crop manured with the Paris plaster was rather heavier than that manured with the white plaster; and I have not bought any of that white plaster since. The spots on which the different plasters were put were close to each other. There was not any difference between the conditions of the two parts. The soil was a clay loam. The judgment was arrived at by the eye alone; there was no cutting or weighing. We had noticed the difference ourselves before we called Mr. Wilson to look at it. The difference was sufficiently marked to enable us to see it plainly. We did not notice these two spots in after years. I should think it would be as much as perhaps twelve or fifteen years ago that this experiment was made. The same weight of plaster to the acre was sown by both. We weighed it with a scale. Both plasters were sown on the same day; and they were sown as nearly as possible on the same amount of land, ascertained by stepping it. For some years I have tried salt, plaster, and ashes mixed together on turnips. I think I have not tried salt alone. On one occasion I found these three articles mixed together to be a great benefit to the turnips; I think turnips come up better. Then, after we thin them, we sow the mixture again, and I think it keeps the worms off. In the first instance we have the ground all ready for drilling, and just sow the plaster on the surface. We then bring the two furrows together—that puts it in the centre.

DAVID GIBSON.

Sitting to take oral evidence, held at Toronto, September 29, 1880. *Present*—Messrs. Edward Stock (Chairman) and A. H. Dymond.

MR. DANIEL LAMB'S EVIDENCE.

Daniel Lamb, of the firm of Peter R. Lamb & Co., of Toronto, was called and examined.

ANIMAL SUPERPHOSPHATE.

To Mr. Dymond.—I am a manufacturer of fertilizers. Our firm was the first to introduce a bone mill into Canada in 1854. In artificial manures we confine ourselves to the manufacture of bone superphosphates and bone dust. The bone dust is obtained simply by grinding bones.

METHOD OF MANUFACTURE.

In the manufacture of superphosphates, we use about three parts of bone and one part of animal matter, and treat it with sulphuric acid, then grind and dry it. It requires about one-third of its own weight of sulphuric acid to manufacture it into soluble phos

phate, and the more sulphuric acid put into it the better is the manure produced. We are the only manufacturers of superphosphates from bone in Canada at the present time. Several have started, but they have not succeeded.

EXPORTATION OF THE RAW MATERIAL.

Of all the material we handle that can be turned into superphosphates, we export 95 per cent., and only manufacture five per cent. for use in Canada. That 95 per cent. we export in the shape of bone. We export over 2,000 tons of bone aunually from Canada. We do not export superphosphates, but manufacture just sufficient to meet the demand. It would not pay to manufacture for export, as the sulphuric acid is dearer here than in the United States. We manufacture about 100 tons of superphosphates annually.

LIMITED USE OF SUPERPHOSPHATES.

The use of superphosphates is very limited at the present time. Canada is the only agricultural country in the world that exports bones. These bones are sent to the United States and manufactured into fertilizers there—where there are many works that manufacture 30,000 tons a year. The amount of superphosphates imported into this country is very limited. There is no duty on it; all fertilizing materials are free. But we supply practically the whole demand, with the exception of mineral phosphates.

APPLICATION TO CROPS.

Superphosphate is suitable for all kinds of crops, but I should consider it especially beneficial to wheat and other grain crops. It can be applied with advantage to either light or heavy soil.

WHERE IT SHOULD NOT BE USED—BONE DUST.

But it should not be applied where there is a limestone formation, because the lime absorbs the sulphuric acid contained in the soluble phosphates, and causes it to revert back into insoluble phosphates, and depreciates it one-half its value. On such land I would always recommend the use of bone dust.

PRICES—COMPARATIVE VALUE.

We sell to the farmers, at $30 a ton, the same phosphates as are sold in the United States for $40. I have an analysis showing that ours at $30 is equal to the American at $40.

QUANTITY TO BE USED PER ACRE.

A farmer should use not less on the average than 500 pounds to the acre. That involves an expense of $7.50 per acre, and that quantity of phosphates would be considered equal to 30 or 40 loads of barnyard manure. The benefit resulting would last for two years, and you would get as much benefit in the second year as in the first.

USE OF BONE DUST.

Of bone dust I would use from 500 to 800 pounds to the acre. It costs $30 a ton.

TESTIMONIALS FROM AGRICULTURISTS.

I cannot give from personal observation the results of the use of superphosphates on land, but I have some letters on the subject—from E. G. Muntz, of Alport, E. Spencer, and R. Rivers, of Walkerton. I have also some old letters, among them one from the late Honourable George Brown, as follows :—

[*Mr. Lamb.*]

GLOBE OFFICE, TORONTO, *15th September, 1866.*

I certify that I purchased this spring from Messrs. P. R. Lamb & Co., of Toronto, ten tons of superphosphate, and used it on my farm, Bow Park, near Brantford. I have found it of great advantage from its application to the Indian corn and oat crop, and the young grass has also been much benefited by it.

(Sig.) GEORGE BROWN.

The following is a letter from Mr. Whitelaw, of Guelph :—

GUELPH, *September 7th, 1866.*

P. R. LAMB & Co, Toronto.

In reference to the superphosphate of lime purchased from you last spring, I have to state that I applied it to my turnip crop, and the result up to the present time is entirely satisfactory. To all appearance, I shall have a large crop, but I will be enabled to state more fully hereafter as to the actual results, as, by way of experiment, I have in the same field used barn-yard manure and bone dust, the latter at the same cost per acre as the superphosphates. I applied the superphosphate both with and without manure of any kind, but if I should judge from present appearances, the crop will be decidedly best when superphosphate has been applied.

Yours truly,

W. WHITELAW.

Mr. Whitelaw sent to *The Canada Farmer* the following statement of the results of the experiments tried by him :—

TO THE EDITOR OF THE CANADA FARMER.

Sir,—The subject of manures, and the merits of different kinds, being frequently discussed through your valuable paper, I take the liberty of giving you the result of an experiment made by me last season on a field of turnips, for the purpose of testing the qualities of different manures ; a part of the field getting no manure of any kind. All the manures were put in the drill and ploughed under, and the various lots were sown about the same time, and received the same treatment through the summer. When taken up a quarter of an acre of each lot was staked off and carefully measured, giving the following results. If taken by weight the yield in each case would have been much greater :—

Lot without manure of any kind produced at the rate of	360	bushes	per acre.
Lot with 600 lbs, bone dust per acre, cost $7.50....	534	"	"
Lot with 350 lbs. superphosphate of lime per acre, cost, including freight, $7.50.....	625	"	"
Lot with 220 lbs. superphosphate of lime, seven loads of manure per acre.....	635	"	"

The sulphur-phosphate of lime was purchased by me from P. R. Lamb & Co., Toronto. As to whether it will pay to purchase these manures, I will leave your readers to draw their own conclusions.

W. WHITELAW.

GUELPH.

The following letter is from Mr. George Woodriff, of the county of Huron, dated September 3rd, 1866 :—

PETER R. LAMB & Co.

GENTLEMEN,—I have great pleasure in testifying to the excellence of the superphosphate I purchased from you in the spring. I applied the article to clover, but not to

[*Mr. Lamb.*]

the entire field, and I am sure I am quite safe in saying that the hay crop was trebled where it was top-dressed with your manure. The rest of the field carried but a poor crop. In short, the thing paid.

I am,

Yours very truly,

GEO. WOODRIFF.

COMPLAINTS OF UNSATISFACTORY RESULTS.

We have also received letters stating that the superphosphate bone dust has not given satisfaction. For instance, one farmer complained of some bone dust he bought from us; but we found that he had bought three-quarter inch bones because they were cheaper, and it would take years to decompose this size. Superphosphates will not give satisfaction where there is a limestone formation, or it may not give satisfaction because the land is deficient in some other ingredient, such as potash, nitrate soda, salts, etc., for you only get good results where other things are equal, or where the superphosphate is used supplementary to other ingredients which are necessary to vegetable growth.

PUBLIC ANALYSTS—FERTILIZERS IN THE STATES.

It has often occurred to my mind that it would be a great advantage if the Government would appoint public analysts over the country, who would analyse the soil of farmers for a small fee. The farmers of the United States are more alive to the advantages of special fertilizers than the farmers in Canada. There are very large manufactories of fertilizers in Boston and Portland, Newark and Wilmington.

ANALYSIS BY PROFESSOR HEYS.

The following is an analysis by Professor Heys, of the Ontario School of Chemistry and Pharmacy, of the superphosphates manufactured by us :—

Moisture	9·64	per cent.
Insoluble phosphates	31·24	"
Soluble phosphates	7·92	"
Ammonia	2·12	"
Soda salts	4·82	"
Organic matter	25·80	"
Sulphate of lime, etc	18·46	"

VALUE OF SEVERAL INGREDIENTS.

The analysis shows 9·64 per cent. of moisture, which of course is valueless, 25·80 per cent. of organic matter, which is of nominal value, and 18·46 per cent. of sulphate of lime, which is also of nominal value. That leaves 14·86 per cent. of soluble phosphates, ammonia and other salts, all of which may be regarded as immediately valuable and direct in their operation, and 31·24 per cent. of insoluble phosphates, a portion of which, such as the bone, might be immediately absorbed, but the larger portion of which would require a further process of decomposition, and therefore might be regarded as only valuable in the second or third year.

COLLECTION OF BONES.

We collect bones throughout the country under a regular system. We have close on one hundred men collecting bones throughout Ontario, and shipping them to us. We make no difference in the value of bones. All bones are of equal value.

[*Mr. Lamb.*]

INDISPOSITION OF FARMERS.

About one hundred tons of bone dust and superphosphates is the entire annual output, and there is very little increase in the disposition among farmers to use them. We have agents for our superphosphates in every township. We consider that, up to the present time, we have not made one dollar on the mills we have put up for the manufacture of fertilizers. We get our profit from the bones we export and from the other branches of our business. We have tried to bring it to the attention of farmers through our agents and through a paper which we publish at an expense of $500 or $600 a year, and the press of Canada is constantly writing and copying articles on the subject, but the farmers do not seem to take it up.

WANT OF APPRECIATION.

I think this arises simply from their poor conception of what their needs are, rather than from a preference for other fertilizers. The subject is dealt with in full in a work called "Johnston's Lectures on Agricultural Chemistry," a very valuable book, which I consider every farmer in the country should possess. A Mr. Coe, who first introduced superphosphates into Canada, employed a lecturer who lectured all over the country on the use of fertilizers, and he lost $40,000 in attempting to introduce artificial fertilizers into Canada.

THE MINERAL PHOSPHATES.

I have had experience with mineral phosphates. The mineral deposits of Canada are the finest in the world; but one great drawback in the treatment of mineral phosphate is the large amount of lime it contains, and the large amount of sulphuric acid required to make it soluble, which makes it expensive. Thirty dollars a ton is the very lowest price at which we can sell bone phosphates. Mr. Whitelaw is the only one who has given us the precise results of an experiment with superphosphates.

EXPERIMENTS AT GUELPH.

The Agricultural College made some experiments with bone dust, and published the result of them. I think they have not experimented with the bone phosphate manufactured by us.

PROPORTION OF PHOSPHATE TO BARN-YARD MANURE.

I consider barn-yard manure equal to any other manure, but the farmers cannot produce sufficient, and many farmers of Ontario allow half of it to go to waste. We have found from general information that 500 pounds of our phosphate is equal to thirty loads of stable manure.

EFFECTS MORE LASTING.

To Mr. Stock.—The effect of superphosphate or bone dust will last longer than the effect of stable manure. Superphosphates will last for three years and bone dust for five. Farmers have told me that they use from 25 to 30 loads of stable manure to the acre.

DANIEL LAMB.

MR. NEIL J. CAMPBELL'S EVIDENCE.

Neil J. Campbell, of the Township of Nelson, County of Halton, was called and examined.

EXPERIMENTS WITH SUPERPHOSPHATE.

To Mr. Dymond.—I have been engaged in mixed farming in the County of Halton for many years. My brother and myself farm 800 acres. We have tried experiments with superphosphates, and we use all the barn-yard manure we can get, In 1877 we tried an experiment with mineral phosphate upon twenty acres.

SUPERPHOSPHATE ON EXHAUSTED LAND.

We fallowed two fields, and ploughed and cultivated them in the same way; the soil of the two fields was similar and the cropping upon them had been the same. They had been, as we thought, pretty well exhausted. We had sown one field two years in succession, and had got no crop of any importance from it.

COMPARISON WITH BARN-YARD MANURE.

Two acres of that field we covered with barn-yard manure to the extent of about twenty loads to the acre, and upon the balance of the field we put 250 pounds of mineral superphosphate to the acre.

THE RESULTS APPARENT.

From the time the blade appeared, any person could see the very place where the two manures were separated. The blade from the barn-yard manure came up quicker; the other came up very strong and looking like barley, and it maintained that position during the whole of its course, standing erect and very strong. When the crop was harvested, the results were just about equal; we had thirty-five bushels to the acre from each.

COMPARATIVE COST OF THE TWO FERTILIZERS.

The superphosphates cost $40 a ton; the 250 pounds would therefore be $5. Barn-yard manure, before it is put on the land, is generally sold at about 50 cents a load, so that what we used would be worth about $10 in the heap. The cost of drawing it and putting it on the land is very nearly equal to the cost of the superphosphate altogether, and it is therefore much more expensive. At that rate the barn-yard manure put on the land was worth $15, and the superphosphate was worth $5; and in the first year the results were the same.

EFFECT ON TIMOTHY.

In the following year we seeded it down with timothy, and the growth of the timothy was very rank—we never had anything like it. The land is still in grass this year, which is the third year of the experiment, and I still see no difference.

SUPERPROSPHATE ON WHEAT.

The other field was sown at the same time. We did not apply barn-yard manure to that field, but sowed a portion of it with superphosphate and left a portion without any manure. We put on 375 pounds to the acre, and we had forty-five bushels of wheat to the acre at harvest time, an advance of ten bushels to the acre from adding one-half more of phosphate. In its general ingredients it was the same soil in both fields, the same seed and the same mode of sowing, though there was a little difference in the cultivation. I think that was a fair experiment. The wheat I have been been speaking of is fall wheat.

[*Mr. Campbell.*]

AVERAGE YIELD OF FALL WHEAT.

Speaking generally, we obtain from twenty-five to thirty bushels to the acre from lands that we manure well, and we consider that a good crop. Some years we get more and some less. Our average, I don't think, would be more than twenty-five bushels, so that the result of the use of superphosphate was that we got twenty bushels to the acre more than our average, which we could account for in no other way, besides having the land after the crop in a condition of increased fertility.

BONE SUPERPHOSPHATE FROM BUFFALO.

In the following year we could not get the Brockville superphosphate, and we got some bone superphosphates from Buffalo; or rather, we thought we were getting bone superphosphate, but we concluded that a large portion of it was ashes. I could not give the results of that year definitely, because the wheat was considerably winter-killed. We had good results from the use of the superphosphate from Buffalo, but not so good as from the use of those from Brockville. We have faith in the latter, and we are trying it again.

PRICE OF MINERAL SUPERPHOSPHATES.

We pay $33 per ton for it f. o. b. at Brockville, but it costs $37 delivered at Burlington. Mr. Fotheringill, of the township of Nelson, is using superphosphate extensively on his root crop, and he has gained one-third where the superphoshate was sown. These farms are not under-drained. I have not indulged in under-draining to any great extent. The land was pretty hard clay, and has been cropped for many years. On stiff lands I think the effect of superphosphate would be as good as the effect of barn-yard manure, although there is no doubt that barn-yard manure loosens stiff land. This fall we have combined the barn-yard manure with the superphosphate, and next year we will be able to state the result of the experiment.

LAND PLASTER—GOOD RESULTS.

We have tried land plaster, sowing six or seven tons. I sowed five tons on spring wheat in 1877 with good results; the wheat was the best in the neighbourhood. In that year, when there was a great deal of rust and shrinkage in the wheat, twelve bushels to the acre was considered a good crop; but we had seventeen bushels. We sowed from 250 to 300 pounds of land plaster to the acre. We have also used it on clover with very good results. We always thought that we had as good results in the second year as in the first.

NEIL J. CAMPBELL.

MR. E. B. SHUTTLEWORTH'S EVIDENCE.

E. B. Shuttleworth, of Toronto, was called and examined.

To Mr. Dymond.—I studied chemistry in the Government School of Science, Dublin, and, in 1857, obtained from the late Sir Robert Kane a certificate of proficiency in that subject. Since that time I have been chiefly engaged in employments connected with chemistry, and was for about sixteen years manager of the Toronto Chemical Works. under the Messrs. Lyman. I am now engaged on my own account as a manufacturing chemist.

MINERAL PHOSPHATES.

About two years ago my attention was directed to the mineral phosphates, and I visited the phosphate district with a view of seeing the nature of the deposits, and the mode of mining, as well as the prospects of establishing a trade with Great Britain.

[*Mr. Shuttleworth.*]

SOURCE OF SUPPLY—PURITY OF DEPOSITS.

I found that in the townships of Buckingham and Templeton mining was energetically carried on, and some very profitable mines had been established. The deposits, like many others in Canada, do not form continuous veins, but occur as pockets. Some of these are very rich, and the mineral obtained is exceedingly pure, containing as much as ninety-one per cent. of phosphate of lime. There are, however, several other minerals, notably pyroxene, which occur with the phosphates, and which are often mistaken for it. Even experts sometimes find it difficult to pronounce on a specimen without having recourse to analysis.

THE BUCKINGHAM WORKINGS.

Some of the workings in Buckingham have been carried to a considerable depth, and it has, at least, been demonstrated that the deposits are not superficial. Although the district of country referred to abounds in apatite, I do not think it probable that the output will ever be very large, as no very great quantity is to be obtained in any one place. The facilities for transport furnished by the River du Lievre, and the close proximity of the Occidental Railway, will greatly assist the development of the mineral wealth of this region.

THE BRITISH MARKET.

After leaving the mines I went to England, and found that the demand for apatite was at that time very limited.

PREJUDICE, AND THE CAUSES ASSIGNED.

Considerable quantities of Canadian rock had been sent there, but there existed a prejudice against it, as it is not only exceedingly hard and difficult to powder, but contains a proportion of fluoride of calcium, which during the manufacture of superphosphates, gives rise to a very disagreeable gas, destructive alike to the health of the workmen and to the apparatus. I also heard it asserted that superphosphate made from Canadian rock was liable to revert to the original insoluble condition. There had also been considerable disagreement in regard to the analyses sent by the shippers.

CHEMICAL ANALYSIS IN ENGLAND.

Chemists in England take their test samples from a large number of specimens, representing the cargo very fairly, and often amounting to many hundreds of pounds. These samples are mixed and ground, and from this the test is taken. Canadian analysts have not been so thorough, and there has often been differences of as much as seven per cent. between the analysis made in the two countries. It is possible that the chemists' remuneration has something to do with this want of proper sampling. The fee for analysis in England is five guineas; in Canada, five dollars. The causes to which I have referred, coupled with the very depressed state of trade in England, had the effect of rendering the trade in apatite very dull, so much so, that I abandoned the idea of entering into the business.

SOURCES OF SUPPLY IN ENGLAND.

The main supply of material for the manufacture of superphosphate in England is furnished by coprolites, the fossilized bones and exuviæ of extinct animals. These coprolites are not nearly so rich as apatite, but are easily worked, and yield a very satisfactory product.

THE BROCKVILLE WORKS—BURGESS MINES.

Since my return from England I have visited the Brockville Chemical Works, an establishment where there exists every facility for the manufacture of superphosphate.

[*Mr. Shuttleworth.*]

The sulphuric acid used in the process is made on the premises, and the apatite is obtained from the mines of Burgess, where very considerable deposits are found.

APATHY OF FARMERS.

Mr. Robison, the manager and principal owner of the chemical works, informed me that he had for a number of years tried to induce Canadian farmers to use superphosphate, and had spent many thousands of dollars in the attempt, but, so far, with very little result. There are, however, some farmers of the more advanced class who have learned the advantage to be derived from the use of mineral manures, and these are principally supplied from the Brockville works.

PROSPECTS FOR THE FUTURE.

I do not think that the employment of fertilizers in Canada will be at all general so long as there is so much new land to be obtained. The establishment of agricultural colleges, and the superior education of the rising generation of farmers will, no doubt, hasten this result, and it is to be hoped that the labours of this Commission will not be without a very appreciable effect in the same direction.

METHOD OF MANUFACTURING SUPERPHOSPHATE.

The manufacture of the superphosphate might be carried on by the farmer, but the thorough powdering of the apatite, which is an essential step in the process, would be an almost insuperable difficulty. The apparatus for grinding is costly, and were the powdered rock to be purchased the saving would be inconsiderable. It has recently been demonstrated that the efficiency of the superphosphates is largely dependent on the pulverization of the apatite. Manufacturers in the Southern States, where large quantities of superphosphate are used for tobacco and sugar crops, are now very particular about this matter, not only to effect a saving of acid, but to increase the value of the manure.

HOW A FARMER MAY MAKE SUPERPHOSPHATE.

Supposing a farmer to have a quantity of apatite, ground to an impalpable powder, he might convert it into superphosphate by mixing three parts with two parts of ordinary sulphuric acid diluted with about eight times its weight of water, stirring thoroughly. The operation might be performed in a strong wooden box or trough, made of one and a half inch pine, with water-tight joints. For continued use the trough should be lined with sheet lead with "*burned*" seams, but for occasional employment this would not be necessary. After the acid is thoroughly mixed, and the conversion into superphosphate complete, the mass should be allowed to solidify, or be mixed with ashes, sand, or some absorbent materials.

OBJECTIONS TO PRIVATE MANUFACTURE.

Taking everything into account, I think the preparation of the fertilizer would be better left to the manufacturers. The freight on the ground rock would be almost as heavy as on the superphosphate; the handling of acid would be dangerous in unskilled hands; and the finished product would probably be inferior to that which might be purchased from reliable parties.

COMPONENT PARTS OF THE MINERAL APATITE.

The mineral apatite, as found in trade, consists of from seventy to eighty-five parts of phosphate of lime, a salt composed of eighty-four parts of lime and seventy-one parts of phosphoric acid. In this form it is almost insoluble in water, and is of little value to land. In order to render the phosphoric acid soluble, so that it may be assimilated by plants, it has to be changed in its chemical constitution, so that the proportion of lime

to phosporic acid shall only be one-third that of the native phosphate; that is, twenty-eight parts of lime to seventy-one of phosphoric acid.

SUPERPHOSPHATE.

In this form it is known as superphosphate, a salt which is soluble, and of the greatest value in agriculture. This change is effected by treating the native phosphate with sulphuric acid which combines with two-thirds of the lime, forming sulphate of lime, of which gypsum is composed. Commercial superphosphate is therefore composed of pure superphosphate mixed with sulphate of lime, with or without the addition of some absorbent material, as ashes, animal refuse, or the like.

PHOSPHORIC ACID IN SOILS AND PLANTS.

Phosphoric acid, or its salts, is a constituent of all fertile soils. In such, the qnantity present varies from one-tenth of one to one per cent. It is the characteristic constituent of the seeds of plants. Johnson, whose work on agricultural chemistry I cannot too strongly recommend to the farming community, says, that one acre of wheat, say twenty-five bushels, contains twenty pounds of phosphoric acid; an acre of barley, twenty-five pounds; hay, fifteen pounds; and turnips, fifty-four pounds.

RELATIONS TO ANIMAL LIFE.

It is a constant constituent of the bones of animals, composing a great part of their weight. It is also largely contained in milk. It is estimated that forty gallons of milk contain one pound of phosphate of lime; and the product of one cow will equal thirty pounds of phosphate per annum. This, with the quantity required to form bone, will amount to fifty-six pounds, which one cow will take from the products of the soil during a year.

DRAIN IN THE SOIL.

The great drain on phosphatic constituents must be made up by artificial supplies. These may be derived from, (1) guano, which contains, say seven per cent. of soluble phosphates and twenty-two per cent. earthy phosphates; (2) bone dust, which is at least half phosphate; (3) coprolites, or fossil bones, containing not more than forty per cent.; or (4) apatite, or native phosphate of lime.

SOURCE OF RECUPERATION.

Guano is seldom imported into this country, and phosphatic manures from coprolites still more rarely. Bone dust is not much used, but it is a very valuable manure, even when unprepared by acid. The effect of one dressing of bones has been observed for sixty years, but the effect of finely ground bones is immediately realized. This arises from the animal matter which they contain, which is almost at once assimilated by plants; after this the decomposition of the bone proceeds slowly. Bones are very porous, and allow of the permeature of gasses and water, by which they are ultimately dissolved. Superphosphate made from bones is a very superior manure; better, perhaps, than that made from apatite.

SUPERPHOSPHATE ON LAND.

When superposphate from apatite is put upon land the soluble matter is almost immediately precipitated or deposited where it comes in contact with the soil, but this precipitated phosphate is in an exceedingly fine state of division—perhaps not in particles larger than the 20,000th part of an inch. In this condition it may be dissolved by water, especially when crushed by the carbonic acid of the air. It has been found that such precipitated phosphate is soluble in water to the extent of thirty grains in an imperial gallon.

[*Mr. Shuttleworth.*

WHEN PHOSPHATIC MANURES ARE OR ARE NOT VALUABLE.

Although phosphatic manures are amongst the most valuable it must not be supposed that their application will always be followed by beneficial results. It is only when the soil is deficient in phosphates that they are useful. Again, Liebig has shown that though all the normal constituents of a soil may be present they will not be taken up by plants except there be a supply of nitrogen as well, and if one constituent of a soil be absent vegetation will not thrive.

ANALYSIS—EXPERIMENTS.

Analysis would be the most effectual method of finding out what might be deficient, but as this is expensive, and often beyond the reach of farmers, the next best mode is to experiment with different manures, and by observing the effect, experience may by gained which may be utilized the next season.

PEATY SOILS.

Peaty soils are generally deficient in phosphates, and the vegetable matter which they contain aids in the speedy and beneficial effects observed to follow the use of superphosphate.

PERSONAL EXPERIENCE.

I have heard of instances where sandy soils were also much benefited by this manure. I have tried these fertilizers in my own garden, and realized surprising results, but have no doubt that evidence from those who have experimented on an extensive scale on field crops will be laid before the Commission, and I therefore leave this part of the subject to those who are better informed.

E. B. SHUTTLEWORTH.

MR. JOHN ALLAN'S EVIDENCE.

JOHN ALLAN, of the firm of Gill, Allan & Co., of Paris, was called and examined.

PARIS AND CAYUGA GYPSUM BEDS.

To Mr. Dymond.—We are the proprietors of the Paris and Cayuga gypsum beds. We own sixty-five acres at Cayuga, and control all the mines at Paris. According to Sir William Logan's Geology, the beds of gypsum run through the peninsula of Western Ontario from Fort Erie to Goderich. The beds of white gppsum are found along the banks of the Grand River from a few miles below Cayuga to about the village of Caledonia.

DEPTH OF THE MINES.

In that section gypsum is found from forty to fifty feet below the surface of the ground, and is almost altogether white. At Paris, where the mines have been worked for a longer period, I believe, than at any of the other places, the present mine is fully 190 feet below the surface. As you go north, the beds of gypsum are deeper in the earth. I believe that gypsum has been taken out in the locality of Brantford, but not of late years. I do not think it would pay to mine it there, as it is not found in sufficient quantities. In boring for salt at Clinton and Goderich, gypsum has been obtained, showing that the farther north the deeper the gypsum is.

GYPSUM IN MANITOULIN.

I understand that it is found in Manitoulin Island, but I am not positive about that. It is not mined anywhere in Ontario except in the situations I have mentioned, in the counties of Brant and Haldimand, and on the banks of the Grand River.

GYPSUM IN NEW BRUNSWICK, NOVA SCOTIA AND THE NORTH-WEST.

It is also found in New Brunswick and Nova Scotia, and I have seen specimens from the banks of the great Saskatchewan in the North-West territories.

THICKNESS OF THE PARIS BEDS—COLOUR.

At Paris the gypsum underlies limestone, and there are several seams each from two to five and a half feet in thickness which are now being worked. Below the river level there is a bed of white gypsum about four feet in thickness. The Paris gypsum is generally called "gray," but the colour is not so marked as in the Oswego article.

THE BEDS AT CAYUGA.

At Cayuga the beds average about four and a half feet, and if care be taken in selecting, the gypsum varies little at any point on the river from Caledonia to Cayuga. This is the district from which is obtained what is generally known as "Caledonia Land Plaster." It is estimated that over six miles of tunnels have been run near Paris since the land plaster began to be worked.

METHOD OF MINING.

Gypsum is taken out by drifts, and all the tunnels have to be protected by propping with tamarack posts. We do not sink any shafts, but enter the mines from the bed of the river. The drifts are from six to eight feet in width, and the present one runs for nearly half a mile. The number of persons engaged in the mines varies according to the quantity to be taken out. Seven men can mine about one hundred tons per week.

THE MINES INEXHAUSTIBLE.

The mines at Paris and Cayuga are practically inexhaustible. There are beds of gypsum which cannot be worked on account of the expense, because there is no rock above them. Specimens of red gypsum are very rare in our section, and what is obtained of it is only kept as a curiosity. The Paris beds have been worked for over half a century. Before there were any means of grinding it the farmers used to break it up with hammers to prepare it for the land.

THE AMERICAN GYPSUM.

The competitor of Canadian gypsum is the American gypsum which comes from Oswego, New York, and Grand Rapids, Michigan. Analyses go to show that the white gypsum is purer than the gray ; but such analyses as we have are open to considerable doubt, because the specimens analyzed have been selected.

THE COLOURING MATERIAL.

We have not had an analysis made of our plaster. The dark material, I believe, is earthy matter, and I assume it to be an impurity. At Paris, where the covering is clay, the plaster that lies underneath is white. Where the covering is rock it is gray, and where there are rifts in the rock and the water gets down,it assumes the form of fibrous gypsum, or as it is commonly called, "honey-comb."

[*Mr. Allan.*]

GRAY PLASTER MORE VALUABLE.

My opinion is that the gray plaster is more valuable than the white for fertilizing purposes, on account of its solubility, which has been shown by tests on the land. The Cayuga white plaster is more crystalline than the Paris gray, and it therefore takes longer to dissolve. That is the reason why the immediate results are more satisfactory from the gray plaster than from the white, although there may be a better result from the white plaster in the second and third years. We sell both white and gray land plaster of our own manufacture. I filtered some of both kinds through water, and found that there was from five to eight per cent. greater solubility in the gray than in the white; that is, the water took up from five to eight per cent. more of the gray than the white. Another test showed eight per cent. more of solubility in the gray than in the white.

SALES OF PLASTER.

During the past season there have been about 8,000 tons of land plaster sold in Ontario. I arrive at that conclusion by getting from the Government books the quantity that was imported, and learning as near as I can the quantities sold by the different companies. The quantity used in Canada six or eight years ago was greater than it is now. It was then manufactured in the Province of Ontario as well as imported.

ROCK PLASTER IMPORTS AND EXPORTS.

It is brought across Lake Ontario in the crude state to Napanee, Cobourg, Picton, Belleville, and other places, and is ground on this side. There is no duty on it. We sell rock plaster on the south side of Lake Erie in the same way, and I suppose in nearly the same quantities. The freight upon it is a large element in its cost.

RISE AND FALL OF DEMAND.

I believe the recent dry season, together with the failure in the catch of clover in many parts of the country, have had a good deal to do with diminishing the use of plaster among the farmers. They found that it did not act so well as during the moist seasons, and after testing it one or two years many discontinued the use of it. But during the past year there has been an increase over the previous two or three years. The hard times have also had the effect of decreasing its use.

COST OF GYPSUM—FREIGHTS.

The cost of gypsum at the mines is $4.50 by the single ton. It is mostly sold in bulk, as it has been found too costly to put it in packages and barrels, although considerable is sold in that way. The price is of course less when larger quantities than a single ton are purchased. The high rates of freight charged for the transportation of land plaster have an important effect in limiting the quantity sold. Lumber rates are charged, which are considerably higher than are paid for coal. This precludes the sale of land plaster at points much farther distant than one hundred miles from the mines. We are confident that more liberal rates of railroad freights would largely increase the sale of land plaster. The cost per car, of sending gypsum from Paris to Toronto, is $18, and the car contains 12 tons. From Cayuga to London the cost by the car-load is $1.40 per ton; from Paris to London $1.20; from Paris to Goderich about $2.00. It costs in Toronto about $6.00. The plaster from Grand Rapids comes over in barrels; that from Oswego comes in rock, and is ground on this side.

EFFECTS AS A FERTILIZER.

From what I have learned of the use of land plaster as a fertilizer, I believe that clover, red clover particularly, receives the greatest benefit from it, as it is more largely

composed of sulphate of lime than any other crop grown by the farmers. It has also been found of great benefit to turnips, peas, and other leguminous plants. Its effects on the turnip is to assist its early growth, and it is sometimes used in conjunction with salt, with diverse results. On the same land both gypsum and salt have shown better results when used singly than when the two are combined.

LIGHT SANDY SOIL—QUANTITY TO BE USED.

I believe the universal testimony of farmers is that the gypsum has a better effect on light sandy soil than on any other. The quantity to be used depends upon the crop. Our advice is, never to use less than 100 lbs. to the acre, and most crops and soil require from 150 to 200 lbs.

HOW IT IS APPLIED.

It is generally used on corn by putting a spoonful in the hill along with the corn seed. The general opinion is that it should be sown for clover, as soon as the farmers can go on the land in the spring. It is sown broadcast.

EARLY SOWING DESIRABLE.

By sowing land plaster as early as possible it meets the spring rains and heavy dew, imparting strength to the plants, thereby protecting the roots from the heat of the sun, and keeping the soil cool and moist. The clover thus treated must give a better yield than if left to combat the dry weather without assistance.

SIR H. DAVY'S AND LIEBIG'S OPINIONS.

Sir Humphrey Davy says, "Gypsum furnishes direct nutriment to the crops." Liebig says, "It fixes the ammonia from the atmosphere." In Germany and England it is generally dusted over the young plants; in America it is frequently sown with the seed, and in the case of potatoes put into the drill. The advisability of adopting any of these methods will depend upon the nature of the soil.

CAUSE OF ITS VALUE AS A MANURE.

The value of gypsum as a manure is because of its solubility. It dissolves in water to the extent of one part in four hundred and sixty one. One imperial gallon of water will dissolve one ounce of gypsum. If the land be deficient in lime, the gypsum will act because of the lime which it contains, as well as the sulphuric acid. Sulphate of lime is more likely to benefit red clover and sulphate of potash the white. The kind of manure used, and the quantity also, ought to be determined by the nature of the soil and the crop to be raised.

MUST BE USED INTELLIGENTLY.

Gypsum has its special place in agriculture, and farmers who expect it to benefit all crops directly will be disappointed where it has not been used intelligently.

GYPSUM ON CLOVER.

For clover it should be sown early, say about the first week in April, never less than 100 lbs. to the acre on light soil. Then after the plant is well started, say about the first or second week in May, a second top-dressing of 50 lbs. to the acre. The trouble and slight additional expense will be well repaid. Fifty cents' worth of land plaster applied in this way will produce an average gain of over $3.00 per acre, over a crop not treated with gypsum.

[*Mr. Allan.*]

PARSIMONIOUS TREATMENT.

Many farmers who have failed to get good results from land plaster, acknowledge that they have not used more than 50 pounds to the acre. Such parsimonious treatment of the soil must always result in disappointment. Cold, wet land will not require either land plaster or salt until it is under-drained. I believe gypsum is a direct plant food to such crops as contain sulphate of lime in their composition, and that it is a stimulant as well by attracting ammonia from the atmosphere.

WHEN TO BE USED WITH COW MANURE.

Farmers have also told me that on light sandy soils the gypsum should be used along with cow manure rather than with horse manure, and that horse manure should be used on clay soil in conjunction with land plaster. The reason given is this, that horse manure is much more heating, and on that account does not show such good effects on light sandy soil as cow manure.

USE OF PLASTER ON THE MANURE HEAP.

I believe that the opinion is now generally held by the better class of farmers, and by those who have given this question a good deal of attention, that the best way to use land plaster is to throw it on the manure heap. Land plaster sometimes fails from atmospheric causes when thrown on the land, but it can never fail when thrown on the manure heap. It keeps the ammonia in the manure, and leaves it in the very best condition for throwing upon the land.

HOW TO MIX IT.

One gentleman said he believed it trebled the value of barn-yard manure when properly used, and his method of using it was this: when he found ammonia escaping he spread plaster on the manure heap three times, at intervals of a day or a day and a half, and by that time the ammonia was fixed, and the manure was rotted properly, and he carted it into the field and spread it from the waggon.

USE OF PLASTER IN THE STABLES.

I would recommend keeping a barrel in the stables and sprinkling it about there. It keeps down the ammonia and purifies the air. For this purpose it is better than lime, because when you sprinkle lime about a stable, and then throw it out upon the manure heap, it injures the manure, because it burns it up. The plaster as an absorbent takes up the ammonia, while lime would set it free.

WASTE OF BARN-YARD MANURE.

I believe that on many farms in the country, where the farmers own a horse and cow, and have heaps of manure, it is almost entirely wasted in consequence of the escape of ammonia from it. It is sometimes hardly worth throwing it upon the land, in consequence of the loss of all the valuable properties it contains.

AGENCIES FOR SALE OF PLASTER.

I believe now in every town and village of any considerable importance, persons are engaged in selling land plaster in small quantities, so that there is no difficulty in any part of Ontario, unless in Muskoka, in getting enough to try experiments.

EFFECT ON THE STRAW AND WHEAT CROPS.

In some of the northern counties of Ontario, the crops of wheat had failed in consequence of the weakness of the stalks, and I believe the use of land plaster would over-

come this evil. I have heard farmers state that land plaster has very much strengthened the stalks of wheat. Of course that would be the result of the absorption of ammonia and the attraction of moisture. It has been objected that in a little time the effect of the Gypsum passes away, or the land becomes plaster-sick, as it is called.

EFFECT OF DRY SEASONS.

I think one explanation of that difficulty is, that, during the past few years, owing to the dryness of the seasons, the land plaster has not shown the results which it would have shown in seasons of more moisture.

NOT THE ONLY REQUIREMENT.

But there is another reason which is farther reaching, and that is, in using land plaster, farmers have lost sight of the fact that sulphate of lime was not all that the land required—that other ingredients had been extracted from the soil, and that the land had become impoverished in other qualities than gypsum.

PLOUGHING-IN CLOVER.

In this country, where it is more difficult to obtain barn-yard manure than in countries where there are larger centres of population, the farmers have to adopt other means of fertilizing their lands, and we claim that clover should be ploughed in every three or four years at the least, and that in this way the use of land plaster will increase the strength of the roots and stalks of all kinds of grain.

LAND PLASTER NOT INJURIOUS.

I don't think the assertion is well founded that the land plaster deprives the land of any of its ingredients and thus impoverishes it. In those plants which do not contain any great quantity of sulphate of lime, the sulphate of ammonia which so greatly benefits them is not drawn from the soil by land plaster, and the moisture that is attracted does not come from the soil. There may be an eliminating process going on concurrently, which would go on in any case, whether land plaster was used or not; but I do not think land plaster has anything to do with impoverishing the soil. We find that land plaster produces better results when used on land which is deficient in lime. Where the land is calcareous it is not so much required.

COST AT GRAVENHURST.

Land plaster is retailed at Gravenhurst at $2 per barrel of 280 pounds.

SANDUSKY PLASTER.

The whiteness of land plaster is not always an evidence of its strength. The Sandusky land plaster from the western part of Ohio, which is very white, is practically useless, because there is no sulphuric acid in it. It is only lime.

LAND PLASTER IN THE GARDEN.

With regard to the use of land plaster in the garden, a gentleman who had made a test of it, stated that seven years ago, when he commenced to try it in his garden, he was sceptical of it. He tried it on zinnias, balsams, marigolds, asters, verbenas, and other flowers in the morning when the dew was heavy. The plants on which he had used it were in flower three weeks before the others to which it had not been applied, and continued to flower throughout the season.

[*Mr. Allan.*]

EFFECT ON GRAPE VINES.

He also used it on grape vines, commencing about the middle of May or the first of June, and sprinkling it on the vines and not on the ground. The result was that the leaves and blossoms came out very much more rapidly, and the vine was stronger and better able to withstand the ravages of insects.

A FAILURE AVERTED.

In his section of country grape culture this year had almost been a failure, but from eight vines in his garden, the oldest being five years planted, and the others in different seasons since, he obtained 500 pounds of grapes, which was more than all his neighbours obtained together, although some of them had a larger number of vines than he. That was in the county of Brant. He said the vines grew very strong, and were pruned as usual in the fall.

GYPSUM ON CURRANTS AND VEGETABLES.

He also used it on currants, and on vegetables of all kinds, with good effect. In the gooseberry patches on which he used it he had no mildew or insects. He tested the plaster very thoroughly by sowing it in alternate rows all through his garden.

ANNUAL SALES.

There are about 5,000 tons of gray plaster, and 3,000 tons of white plaster, sold annually in the country, a considerable part of which is imported. The farmers in different sections of the country vary in their preferences for the gray or the white, but the preponderance is in favour of the gray. Both are sold at the same price at the mines.

NORTHERN GYPSUM BEDS.

In the most northern bed of plaster mentioned in the geology of Canada, the plaster takes the peculiar form of six-sided crystals, as well as other forms which it does not assume in the southern beds. There is a fibrous gypsum found among the gray which, when ground up, looks like common salt, and is not considered good gypsum.

EXPERIMENTS AT THE MODEL FARM.

At the Model Farm some experiments were tried with land plaster, and the result was that a preference was given for the gray, because it was more soluble, and that accords with the experience of others. There is very little difference in the cost of producing the two, and they are sold at the same price.

A PLASTER SOWING MACHINE.

I believe Mr. John Watson, of Ayr, has now a plaster sower which is going to meet the want. It is to be attached to a hay rake, and has a box something the shape of the one on the seed drill, and it will sow from 100 to 500 pounds, as may be desired. It will sow about 20 acres a day, and its cost will not be more than $5 or $6. This machine, if a success, will be a very useful contrivance.

JOHN ALLAN.

ONTARIO AGRICULTURAL COMMISSION.

APPENDIX O.

EVIDENCE

RELATING TO

SPECIAL CROPS,

FLAX, TOBACCO AND BEANS.

ONTARIO AGRICULTURAL COMMISSION.

APPENDIX O.

EVIDENCE

RELATING TO

SPECIAL CROPS,

FLAX, TOBACCO AND BEANS.

Sitting to take oral evidence held at Chatham, July 23rd, 1880. *Present*—Mr Malcolm (Chairman), Hon. S. C. Wood, and Mr. Dymond.

MR. McKINLAY'S EVIDENCE.

TOBACCO AND BEAN CULTURE.

J. P. McKinlay, of the Township of Howard, was called and examined.

TOBACCO CULTIVATION.

To the Chairman.—I formerly cultivated tobacco to some extent, though I do not do so now. During the American war, when tobacco was worth $5 and $7 a hundredweight, it was a very profitable crop, but prices since then have fallen so low, and the Government has placed such restrictions upon its sale that it is not profitable. There is no obstacle in our district to the growth of tobacco on a large scale.

COARSE VARIETIES CULTIVABLE.

We cannot grow the finer qualities such as are grown in Virginia and Kentucky, but we can grow the Connecticut Seed Leaf, and the Thickset, which is a coarse, heavy variety. Some farmers used to cultivate from one acre up to seven or eight acres, but eight acres is a large crop for a Canadian farmer.

AVERAGE CROP—QUALITY.

The average crop of tobacco reasonably well cultivated, is about 1,500 pounds to the acre, though it will yield as high as 2,100 or 2,200 pounds in extreme cases. The quality is impaired by wet seasons and with early frosts; and it is much more easily taken care of after it is cut, in a dry season than in a wet season. It requires plenty of air, and some-

times artificial heat to cure. We generally succeeded in curing it in sheds and houses built for that purpose under cover. If it were not for the troublesome restrictions imposed by the Government, I think tobacco could be grown here with profit, and we could grow a good article.

THE BUSINESS NEARLY EXTINCT.

To Mr. Dymond.—The cultivation of tobacco is almost extinct in this district at the present time. It would be an exhausting crop to the land if it were long continued, but when a man has a farm of 100 or 200 acres, he could grow two or three acres of tobacco a year, without serious injury to the soil, if he applied plenty of manure.

A GOOD PREPARATORY CROP.

It is an excellent crop to prepare land for wheat, as the soil has to be so well cultivated. Even during the American war, no one went exclusively into tobacco growing, so that the crop did not work any mischief to the district.

THE TOBACCO WORM.

To the Chairman.—The tobacco worm was troublesome to the leaves sometimes ; and, if it was left alone, would devour a considerable portion of the crop, but it was an easy matter to overcome it by hand-picking.

A REGULAR CROP.

To Mr. Dymond.—Tobacco is quite a regular crop, and is not on the whole more risky than other crops. Knowing the prices which it would bring now if it were cultivated, I don't think farmers are losing much by growing other crops in its place.

AMERICAN TOBACCO GROWING.

The Americans are growing it more cheaply than they used to, and they can grow a better article than we can. Our market, if we were growing it, would be the Canadian market ; part of it used to be manufactured into cigars here, and part of it sent to Toronto and Montreal.

LOW PRICES ONLY OBTAINABLE.

We could not produce an article in Canada that would command anything like the prices which are obtained for the finer varieties. In fact we only grow a second or third-class article.

NOT MUCH TO GRIEVE FOR.

I don't know that we had very much to grieve over when we ceased growing it ; but it was a crop which suited farmers who had a family of boys, who could be employed in cultivating and taking care of the crop.

At 4 p.m. the Commission adjourned until Friday morning.

J. P. McKinlay was recalled and examined.

CULTIVATION OF BEANS.

To Mr. Dymond.—I have grown beans to a certain extent, about as much as the average farmer in my section of the country. This is peculiarly the bean-growing section of Canada. There is only a small area of country suitable for growing beans, but I could not say what is the reason why our district is adapted to their growth. They will grow successfully in the western and south-western portions of the township of Orford, but they are a failure in the south-eastern part of the township.

[*Mr. McKinlay.*]

A PURELY LOCAL CROP.

They are purely a local crop,—localized even in our district. In the lower portion of the township the land becomes more flat, and there is a tendency towards a stronger clay soil. The land is also more heavily timbered. I am now referring to the region where beans do not grow.

SOIL—DRAINAGE—PREPARATION FOR CROPS.

They succeed best on a sandy loam, with a clay sub-soil, or on a gravel loam with a porous gravel sub-soil, and they must have good drainage. The best mode of preparing land for beans is to plough in the fall, harrow in the spring, and perhaps roll it down and cultivate it with the gang plough. The oftener it is harrowed and cultivated the less trouble there will be with weeds.

A MELLOW SEED BED NEEDED.

The great object is to get a very mellow seed bed. The best time to plant is from the 5th to the 10th of June, as that gives a long time to work the land. The object is to give the weeds a start and then kill them, so that there will be no trouble with them afterwards.

VARIETIES OF BEANS.

There are three kinds of beans in the market: the Marrowfat, which is a large bean; the Navy, a small one; and the Medium, which is between the two. We cultivate the Medium mostly.

TREATMENT OF THE LAND.

The land requires just about the same treatment as for wheat, and if the beans are put in fertile soil, and the land is properly worked, a good crop may be expected. We grow beans on the same land for several successive years, but it is not a good practice. It is wiser to grow in rotation with other crops.

YIELD PER ACRE—PRICES.

The yield per acre will correspond very nearly with the yield of wheat, that is, from twenty to forty bushels per acre; thirty bushels would be a good average. I have oftener sold beans at $1.25 than at $1.50; about 95 cents is as low as they get. I should think that, for the last ten years, the average would be about $1.25, which would be $3.50 per acre at the yield I mentioned.

INCREASED CULTIVATION—FINE FALL NEEDED.

I think there is an increasing area under bean cultivation—this year especially. When there is a fine fall, and the people do a lot of ploughing, so that there is plenty of land ready in the spring, they generally plant a good many beans. Wheat doing so well the last few years has had something to do with stimulating the cultivation of beans.

PLOUGHING SOD FOR BEANS.

Ploughing sod in the fall or spring for beans, is the next best thing to summer-fallowing for a wheat crop, and we get the two crops for nearly the labour of one.

COST OF GROWING BEANS—MARKETS.

I would suppose that the cost of cultivating beans would be about $14 or $15 an acre. Our market is principally in the United States—the most of them going west. Our lum-

bermen use some of them, but a large proportion of them go to Detroit. Beans are grown in Michigan, and they were introduced into this country, by Americans from the State of New York. I don't know of any part of the country, north of the River Thames, where beans succeed well.

THE MARROWFAT BEAN.

To Hon. Mr. Wood.—The Marrowfat bean is one that commands the highest price particularly in the eastern markets, such as Boston and New York. We prefer cultivating the Medium bean because it is more profitable. The cultivation of the bean has the effect of cleaning the land to some extent.

MANURES—SALT—PLASTER.

To the Chairman.—We do not use artificial manures in our part of the country at all—just common barn-yard manure. We use salt and plaster occasionally, but to a very limited extent. The plaster is sown upon clover, to get the clover to grow well, and produce a good crop of seed. The bean crop is not considered more exhaustive than barley or wheat, and I don't think it is so exhaustive as oats. I grow about half as much beans as I do wheat.

HARVESTING—WET SEASONS.

To Hon. Mr. Wood.—Beans are a very delicate crop to harvest in a wet season.

To the Chairman.—The old-fashioned mode of harvesting beans was to go along the rows and pull them, but we have machines that cut two rows at a time, and a man follows with a fork, and they are left in small bunches of about a fork full. The threshing is often done with a flail, and a man can thresh twenty or thirty bushels a day. The concave of the common threshing machines can be adjusted, so as to thresh them.

BEAN STRAW AS FEED.

The straw of the bean makes excellent food for sheep. I have not given my sheep any hay in winter for years ; they prefer bean straw to pea straw, I think.

INSECTS—BLIGHT—WET HARVESTS.

Beans do not suffer at all from insects or diseases, except, that in very hot weather, if the blossoms are out, they are apt to blight. I have seen the frost take them in the fall, before they were ripe, but we are in the habit of planting them much earlier than we used to. Those that were planted later produced heavier crops, but there is far more risk in harvesting them. When they get damaged by the weather, we have to hand-pick them, and that is a very tedious job.

J. P. McKINLAY.

Sitting to take oral evidence held at Seaforth, August 12th, 1880. *Present*—Mr. McMillan (Chairman), and Mr. Dymond.

MR. JOHN BEATTIE'S EVIDENCE.

CULTIVATION OF FLAX.

To Mr. Dymond.—I have been cultivating flax for a number of years. In 1877-8 flax that usually sells at 12½ cents a pound did not bring more than about 7½ cents a pound. On the whole, I think flax raising is profitable.

[*Mr. McKinlay—Mr. Beattie.*]

MARKET FOR THE FIBRE.

The market for the fibre is in the United States—in Boston, New York, and other places. We usually manufacture it in the winter, and sell it in the winter and spring; it does not pay to hold it over till the warm weather.

PRICES—YIELD PER ACRE.

Last season we got from 12 to 12½ cents a pound for it, at which price it pays very well. A fair yield of flax would be 240 or 250 pounds, dressed, to the acre. The return on the fibre would be something like $30 an acre. I reckon about 15 bushels of linseed to the acre to be a fair yield. It has been sold as low as $1 a bushel. It is, at present, commanding $1.15. That would be about $20 an acre for seed.

CULTIVATION OF FLAX EXPENSIVE.

The cultivation of flax is very expensive; hand labour is nearly altogether required. Calculating seed, rent of land, ploughing and drawing, it would cost about $19 to get the product of one acre to the mill. Another way we handle the flax is to furnish the farmer with the seed, and pay him $12 a ton for his flax. We usually estimate on a crop of two tons to the acre, undressed.

COST PER ACRE.

The undressed flax costs me about $19 an acre. The flax business, at these prices, would pay very well, providedyou could get a good crop, but you cannot gain anything if you have to handle a bad crop.

LARGE GROWTH OF FLAX—SOIL.

I grow flax myself. Quite a number of farmers about here are growing it also. Flax does very well on rough land, which is newly broken up. The class of soil I prefer for it is a clay soil. A light soil does not do. I do not think flax is hard on the soil, because I have had good crops after it. I think it is a good thing to seed down with on old land. But I think a man, in order to make the cultivation of flax a paying business, must go into a German settlement, where they will grow flax.

EFFECTS ON GRASS.

Flax is a very excellent thing to spread upon land to make grass grow. I have had, I think, the best hay crops grown around here, and I don't know any reason for it except that I spread flax on the land.

CLEAN LAND ESSENTIAL.

To Mr. McMillan.—I don't think flax requires any more manure than any other crop. I am of opinion that you can grow good flax on a field where you cannot grow wheat at all. Good strong land is not so essential for flax as clean land. The best paying crop of flax that I had was grown on an old field, and the only trouble I had was with some thistles. A farmer, to make flax growing profitable, should not sow more than ten to fifteen acres on a hundred acre farm. The flax is a capital thing to rot the sod, and I have seen just as good fall wheat after flax as I have ever seen grow.

JOHN BEATTIE.

[*Mr. Beattie.*]

Sittings to take oral evidence, held at Toronto, October 27th, 1880. *Present*—Messrs. Dryden, M.P.P. (Chairman), Brown, Dymond, Byrne, Malcolm, Wilson, Whitelaw, and Thomas Stock.

MR DONALDSON'S EVIDENCE.

John A. Donaldson, Toronto, was called and examined.

To the Chairman.—I have been an agriculturist in my time, and have given attention to the culture of flax. I took some interest in collecting information about it, when I was home in 1861 and 1862.

VISIT TO IRELAND—ENCOURAGEMENT BY GOVERNMENT.

This was in Ireland, where I saw a great deal of it during those two years. I didn't go there for that purpose, but being in Ireland on behalf of the Government for immigration purposes, I thought it would benefit our farmers to know something about the cultivation of flax in this country. I brought the matter before the Government, and they gave encouragement to the growth of it, through the Board of Agriculture, and the whole matter was brought before the public, through the press.

PAMPHLET ON FLAX CULTURE—MEETINGS.

I am the author of a pamphlet on the cultivation of flax, which was written about that time, and which was largely circulated. The question was taken up by the farmers of Perth, Waterloo, Oxford, and York. Messrs. Gooderham and Worts did a great deal in the business, at Streetsville. There are some 40 mills in the Province. The means I employed, for getting the matter before the people, were the distribution of the pamphlet, and holding meetings in different parts of the country, at which meetings I placed information before the people, and showed them samples I had brought with me of flax grown in all parts of the world. The results of my labours have been satisfactory.

RECENT DEMAND—MARKETS—NEW FIRM.

For the last four or five years, there has not been so much doing. The United States is our market for fibre, and recently, prices have fallen there, but it has been reviving again, and the trade here is likely to revive. A new firm has been established in the State of New York, and one of the members has said that they would be able to consume all the fibre we could raise in Canada.

BEST LAND FOR FLAX.

The best land for flax is a rich friable clay loam, and a good subsoil.

CANADA A FLAX COUNTRY—FLAX AS A CROP.

If you find land of this description, you can grow flax in any part of Canada. It has been discussed, whether flax is an exhaustive crop, and there are about as many of the opinion that it is, as there are of the contrary opinion.

HOW FLAX IS GROWN—SEED.

Farmers frequently sow flax after wheat, when the land is rich and in good tilth. It is cultivated broadcast. It requires to be well cultivated before the seed is sown; then harrow with a fine harrow, and roll. Farmers know quite well enough how to grow flax. A bushel and a half is the proper amount to sow per acre. If the plants are few per acre, you have a rougher fibre, and if you want a fine fibre, you have to seed thick, about two bushels per acre.

[*Mr. Donaldson.*]

FLAX CULTURE IN IRELAND.

In Ireland they do not, as a rule, take the seed off, but it is allowed to ripen on the stalk. The whole of the nature is thus left in the fibre, which is consequently of a better quality.

TAKING OFF THE SEED.

We take off the seed here, and don't get so good a fibre. The seed is not allowed to ripen on the stalk in Ireland. The ripening of the seed on the stalk takes away the nature from the fibre. The average product per acre has been about two tons, with the seed on. We have had as much as three tons, but two is about the average.

NO DANGERS TO CULTIVATION—REMUNERATION.

There are no dangers to the cultivation of flax in this country at all. It stands the heat well, and it comes in between the hay and wheat harvest as a rule. The millers adopt the plan of giving the farmers $12 a ton, they in the first place furnishing the seed to the farmers, and afterwards deducting the price of the seed, when the stuff comes to the mill. At that price, they would realize, on an average, $24 per acre, the price of carrying it to the mill being included in that figure. There would be from 200 to 300 pounds of clear scutched fibre per acre, according to the quality of the flax.

THE TOW—OIL CAKE—LINSEED OIL.

We consider the tow would cover the expenses of scutching or thereabouts. The surplus seed is used for making oil cake and linseed oil. The market for these articles is very good.

DEMAND FOR OIL AND OIL CAKE.

Mr. Elliott, who has an oil mill in this city, told me the other day that they could not get a sufficient supply of seed to meet the demand they had for these articles. A great deal of the oil cake we make is exported. We have two mills in operation in Ontario, one at Baden owned by Messrs. Livingston & Co., and another by Messrs. Elliott & Co. of Toronto.

TIME FOR SOWING—HARVESTING—DRYING.

The time for sowing is as early as you can get on the land in the spring. Flax is generally harvested by hand. There is no preparation before it goes to the mill except to dry it. It is bound up in small bundles, stooked and left to dry a few days, then taken to the mill and either housed or stacked out. At the mill, they have a machine for taking off the seed, which they can do very rapidly. I hold that, in all parts of Canada, we have land fit for the cultivation of flax.

FLAX MANUFACTURES.

The only goods manufactured from flax in Canada are twines, ropes, and cordage. There is a manufactory at Doon for this purpose. Messrs. Gooderham & Worts manufactured it largely into seamless bags and twines, at Streetsville, until their works were burned.

FLAX COUNTIES—RENTAL OF LAND—EXPENSES.

It is chiefly in Wellington, Waterloo, Perth, and Oxford they grow the most flax. You can rent land for flax in Waterloo from $4 to $5 an acre. Seed is worth $1 a bushel, and it would require one and a half bushels to the acre. I think $8 would cover all the expenses of an acre, including seed. Of course you can't fix the exact amount, because it depends on the nature of the land and other things. $10 would cover all expenses, manuring and everything.

[*Mr. Donaldson.*]

LINEN MANUFACTURE.

Linen is made from the fibre of flax. The flax that we export is used in the linen manufactory. We have no linen manufactory in Canada now.

MARKET FOR FLAX SEED—FLAX GROWING IN MANITOBA.

There is a market for any quantity of flax seed we can grow. I am aware the crop has been tried in Manitoba, and I understand it has succeeded very well there. The Mennonites have tried it, and it has proved a great success with them. I don't suppose any soil is better adapted for it than that of Manitoba, and I have no doubt it will be one of the staple crops of that country, in a short time. I don't consider it to be very exhaustive of the soil. From all the information I could gather, I found that the evidence that it was exhaustive was about as strong as that it was not.

NOT LIABLE TO FROST.

Flax is not subject to frost. We have never known it affected by frost here. If there is a very heavy crop in a wet season, it is apt to lie down and to suffer loss in that way.

DEW-ROTTING THE FLAX.

The process of preparing it, after it leaves the mill, may be of some importance. It is taken out of the mill to the grass and dew-rotted. At home, they put it in pits to rot. Here, it is brought out to the field and allowed to remain there ten or twelve days, according to the weather, then it is taken up and brought back to the mill and scutched. They are growing very little flax in Muskoka.

GROWTH OF HEMP.

Hemp is not grown in Ontario at all, that I know of. I have no positive information on that subject, but I think it could be grown as profitably as flax.

YIELD OF FLAX SEED.

The number of bushels of seed per acre to be got from flax is about ten.

FLAX PULLING MACHINES.

It is best to pull the flax by hand, but pulling machines, capable of pulling four acres per day have been invented, and used to a considerable extent, by Mr. Brown, of Woodstock, and others. It seemed to me to do very good work, but of course it don't pull up the smaller straws. It takes four or five good hands to pull an acre in a day. I have no doubt, if it were carefully cut, as much could be got, as by pulling by hand.

JOHN A. DONALDSON.

The following letter has been received by Mr. Donaldson since giving his evidence :—

LETTER FROM MESSRS. J. & J. LIVINGSTON.

BADEN, *October 30th, 1880.*

J. A. Donaldson, Esq., Toronto.

DEAR SIR,—We have your favour of the 28th, and note contents. In reply would say : we think there was about 10,000 acres sown in flax this season. The competition for seed was quite keen this year, and all of it easily disposed of, and three times the quantity had it been here. The market for fibre is fair, although none of the present crop is in shape to sell at present. We think there will be no difficulty in selling although prices, at present, are low, owing to foreign flax being sold cheap.

Yours truly,

J. & J. LIVINGSTON.

[*Mr. Donaldson.*]

ONTARIO AGRICULTURAL COMMISSION.

APPENDIX P.

EVIDENCE

RELATING TO

AGRICULTURAL EDUCATION.

ONTARIO AGRICULTURAL COMMISSION.

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EVIDENCE

RELATING TO

AGRICULTURAL EDUCATION.

Sitting to take oral evidence, held at Toronto, October 22nd, 1880. *Present*—Messrs. JOHN WATSON (Chairman), J. B. AYLSWORTH, E. H. HILBORN, WM. BROWN, EDWARD STOCK and A. H. DYMOND.

PRESIDENT MILLS' EVIDENCE.

JAMES MILLS, M.A., President of the Ontario Agricultural College, Guelph, called and examined.

I have been one year in charge of the College. I laboured on a farm till I was twenty-one years of age; after that I devoted my time to study and teaching in Collegiate Institutes. I was head master of Brantford Collegiate Institute before I took charge of the Agricultural College.

OBJECTS OF THE COLLEGE.

The objects of the College and farm together are, first to give theoretical and practical instruction in husbandry to young men who intend to follow either general mixed farming, stock farming, or gardening; and secondly, to conduct experiments tending to the solution of questions of importance to the farming community, and to publish the results from time to time.

WHAT IS BEING DONE.

1. IN THE COLLEGE.

In the College young men are provided with board, washing, and instruction in the following subjects:—

Agriculture and Live Stock, which we consider one of the most important branches of the curriculum. A full course of lectures is given in this subject, treating it as thoroughly and practically as the circumstances permit. The animals are handled and examined in presence of the students. We think the work is done efficiently, and have evidence that it is producing good results in the country.

Chemistry—inorganic, organic, and agricultural. The course of lectures in this very important department is extensive and practical.

[*President Mills.*]

Veterinary Science—discussing at length the anatomy, physiology and pathology of horses, cattle, sheep, and pigs; also veterinary *materia medica.*

Botany—structural, physiological and economic.

Zoology—an outline of the subject.

In *Geology* and *Physical Geography*, especially as regards the formation and peculiarities of soils, a full course of lectures is given.

Political Economy, which is treated as one of the most important subjects. Discussions are had on such questions as production, land, labour, capital, division of labour, free trade and protection, distribution of wealth, wages, money, credit, credit cycles, functions of Government, etc.

English Lectures, exercises in composition, and the reading of standard authors, the aim being in a short time to do as much as possible towards assisting young men to speak and write correctly in their own tongue.

Arithmetic, with special reference to the requirements of farmers in every-day life.

Mensuration, mechanics, levelling and *surveying*—a short course of lectures, with practical exercises in each. Students are taught as much *book-keeping* as is required in keeping farm accounts.

There is a short course of lectures on *meteorology* and a more extensive one on *entomology*, treating especially of such insects as are injurious to vegetation.

2. On the Farm.

Secondly, as to what is done *on the farm*—students are put through a course of apprenticeship in the following departments :—

(1) *The Farm Department*, which embraces all the operations of general farming.

(2) *The Live Stock Department*, including the feeding, cleaning, handling, judging, and general management of cattle, sheep, horses and pigs.

(3) *The Horticultural Department*—digging, planting, weeding, and all the operations of ordinary gardening; also fruit culture, pruning, grafting, budding, layering, etc., and floriculture somewhat fully.

(4) *The Mechanical Department*, in which students are taught the use of tools, and afterwards shown how to make gates, fences, whiffle-trees, waggon tongues, etc., and are required to do all the general repairs needed about the College and farm buildings.

(5) *The Experimental Department*, where the students assist the foreman in such work as testing various kinds of seeds, and the effects of different manures on soil and crops—especially artificial manures, such as salt, lime, plaster, bone dust, superphosphates, etc.; observing the results of different modes of manuring, sowing, cultivation, etc.; comparing the several breeds of cattle, thoroughbred and grades, breed with breed, as to hardiness, beefing qualities, time of maturing, quantity and quality of milk, etc.; also comparing the different breeds of sheep—pure blood and crosses, as to hardiness, wool, mutton, etc.

The Regular Course of Study.

The regular course of study in the College commences on the 1st of October, and is one of two years. Lectures continue through three terms, from the 1st of October till thr 30th of June. The fall term is from the 1st of October to Christmas; winter term from Christmas to the 31st of March; spring term from the 16th of April to the 30th of June.

Daily Work of Students.

During these three terms, the daily work of each student is as follows :—

One hour military drill under a competent drill sergeant, the object being to set the students up and give them a little better carriage than some of them have when they come to us;

Three hours' lectures in the College.

[*President Mills.*]

Four to five hours' manual labour on the farm, with the live stock, in the garden, and in the carpenter shop ;

Two hours' study at night under a master.

When the first year students are out working, the second year students are in at lectures, and *vice versa*, so that out door work and lectures inside go on simultaneously from the 1st of October till the 30th of June each year. During the summer term, from the 1st of July to the 31st of August, there is nothing done but outside work, ten hours a day. September is a vacation for all except the heads of the institution.

Special Course.

Besides the regular course above described, there is a special course, commencing on the 1st of October and continuing till the 31st of March. It gives the professors a great deal of extra work, but is a convenience to farmers' sons. It is a special course for their accommodation. They do no manual labour, and the professors, by doing double work, give them the lectures of the summer session, in addition to the lectures of the regular course, so that in one session of two terms (1st October to 31st March), they get the whole year's lectures, and return home to work on their own farms early in April.

Terms of Admission.

The terms of admission are easy, the standard being precisely the same as for the entrance to the high schools. The certificate of admission to a high school in Ontario is accepted as equivalent to passing our matriculation examination. I don't think the time has yet come for raising the standard. If you raised it, many farmers' boys, who are the best students, would be excluded. In my opinion, it is high enough for the present, and meets the wants of the farming community. As to the expense of attending the institution, I believe it is lighter than in any similar institution on this continent or in Europe.

The Expenses.

The expenses are as follows :—Tuition fee, for ratepayers and *bona fide* residents of the Province of Ontario, $25 a year ; for non-residents, $50 a year. Board and washing charged at cost—about $2.25 a week. Every student is paid for his work at the rate of from five to ten cents an hour, and the amount thus earned is credited on his board account, so that the entire outlay for tuition, board, and washing is from $35 to $50 a year to an Ontario farmers' son who understands ordinary farm work ; from $45 to $65 a year to an Ontario boy who has not been trained to work on the farm—such boys as we get from the cities of this Province ; from $65 to $85 a year to a non-resident.

Written Declaration.

We require a written declaration in every case that the applicant intends to be a farmer. In the majority of cases the declaration by students has been kept, but there are a few instances in which ex-students profess to have changed their minds, and have not gone into farming. On the whole, the declaration has been a *bona fide* agreement.

City Students.

There is a constant interchange of young men between the country and the city, many from the country going into the city, and many from the cities studying to be farmers. Some of the best workers we have are from the city. I think the tendency to go from the city to the farm is increasing. People are beginning to think more and more that farming is preferable to city life. Some city boys are worse to manage than country boys of course, but others are not. Those we have had this year are not at all troublesome. We

have some excellent young men from the city, and young men who really intend to be farmers. Many of them desire to become stock farmers in preference to anything else.

Disposition to Become Farmers.

I can hardly say what is the cause that is now leading those young men to the study and practice of farming. One of the reasons why young men from England, Ireland, and Scotland are sent here to study farming appears to be the depression there, and the consequent desire to get acquainted with our system of farming, and to settle here. I think the institution of the College has increased the desire for farming among citizens. Many a young man is quite willing to go to a college to learn farming, when he would not apprentice himself to a farmer. We have had several instances of this kind.

Letters from Farmers—Greater Interest in Farming.

I have had letters from farmers whose sons have been at the College, wanting to send their other sons to it also. I have had three such letters within two months, in which the writers said they would like to send others of their family to the College, as those who had been sent to the College had, after leaving it, taken much greater interest in farming. The political economy we use is that of Professor Jevons. We use also Rogers'; and lectures are delivered on the subject.

A Museum Much Needed.

A museum at the College is much needed. We have quite a collection of insects, entomological and geological specimens, but no place to keep them. I am safe in saying we have $500 or $600 worth of specimens going to waste for want of a museum. The teaching of these branches must be imperfect, so long as we are without such a museum. The students are encouraged to make collections of specimens, and they have done a good deal at it this year. I would not say that entomology could not be taught efficiently without having a museum of the kind I speak of, but I think it could be taught much better if we had one to put the specimens in.

Number of Students—The Special Course.

We intend to accommodate 135 students this session. The most we ever tried to accommodate before was 92. There is no practical objection to the special course given to farmers' sons except the extra labour it imposes on the staff. The proportion of those who take this special course is generally not more than a fifth of the whole number of students, about 16 out of 80. It costs them more for the time they are at the College, as they do no work. This year I suppose we shall have 15 students out of the 135 coming from outside of the Province.

Mode of Admitting Students.

The way these students are admitted is as follows:—I file all the applications as they come in, and wait till the 8th or 9th of September before giving a decided answer to non-residents. If, at that time, the applications from Ontario are not sufficient to fill the vacancies, I notify in their order such as have applied from Britain or the Lower Provinces. The applications are considered on the 8th or 9th of September, so that the College may be full when opened on the 1st of October.

Ontario Boys the First Chance.

Ontario boys, of course, get the first chance if they apply within a certain reasonable time before the opening of the College. If they send in their application after the 1st of

October and are refused admittance they cannot reasonably complain. We have always given something of a preference to a farmer's son over any one else.

Ages of Students.

We don't admit a student under fifteen years of age, but there is no limit in the other direction. We have students from 15 to 30, but most of them are from 15 to 22 years of age. I have not found anything objectionable in having students of these different ages together. The entrance examination is the same for all students, whether from Ontario or not.

The College and the Wants of the Farming Community.

As regards the extent to which the College is meeting the wants of the farming community, I would say that it is meeting them only to a limited extent. This being so largely an agricultural country, the number of young men engaged in agricultural pursuits, and intending to engage in such, is very large, compared with the entire population, while the accommodation in the College is limited. One hundred and fifty will be the utmost we can accommodate under our present arrangement. Already the number of applicants is considerably larger than we can admit even with a fee. We feared when the fee was imposed that the attendance might be reduced, but it has not turned out so.

Young Men from England.

I may say here, from my experience this year, and from statements made by Mr. Dyke, of Liverpool, who lately visited us, that I have no doubt I could fill the College with young men from Britain intending to settle here, who would be willing to pay a fee of from $100 to $500 a year. These would mostly be such as intended to remain in this country. What young men from England want in this country is some place where they can get acquainted with Canadian farming and the ways of the country, before they settle down. Some of the very best boys we have, the best workers, and the most intelligent, have come from the old country. The young men from England are generally of the middle class, not wealthy, but with considerable means, capable of bringing perhaps £1,000 or £1,500.

The Most Successful.

I think as a rule that those who have come to Canada without much capital have been most successful. Men of the middle class in England, who come out with some capital, and intend to work here, are a valuable acquisition to the country. As I said before, the College is meeting the wants of the country only to a limited extent, but at the same time I think it would not be wise to establish any additional colleges at present. Ontario has done nobly for the cause of agricultural education; it has made a very praiseworthy and intelligent effort to meet the wants of the farming community.

Agricultural College Necessary.

Although it would not be wise to increase the number of colleges, it is time that these questions were discussed; we should begin to consider what is being done elsewhere, and lay plans for the future. A mere glance at other countries will show us that their experience has taught them that agricultural schools and colleges are necessary.

Agricultural Education in Great Britain.

The people of Great Britain think that their country is very poorly provided for in the matter of agricultural education, and yet they have five institutions in which the agricultural portion of the population can be instructed in the principles of their voca-

tion. These are the Royal Agricultural College, Cirencester; the Chair of Agriculture in Edinburgh University; the North of Scotland School of Chemistry and Agriculture at Aberdeen; the Wilts & Hants Agricultural College at Downton, near Salisbury; and the Laboratory of Agricultural Chemistry in London. They are not under the control of the Government. I don't think their teaching is so practical as that in our Ontario College.

Agricultural Education in Ireland.

In Ireland, every county is provided with agricultural schools and small farms to illustrate the principles taught. There are 240 such schools in Ireland. They are divided into first-class schools, middle-class, lower class and garden schools. They are partly under the control of the Commissioners of Education, and partly under local management. The funds for their support consist of the money obtained from the produce of the farms, a small fee paid by the pupils, the Government grant, and a local assessment, as in our public schools. The Government grant for the support of these schools last year was nearly $30,000.

Agricultural Education in Germany.

In Germany there are 1,305 schools for teaching agriculture. They are divided into higher schools, middle schools and lower schools. In addition to these there are rural, garden and winter schools for the same purpose. These schools are maintained partly by the State and partly by the locality in which they are situated. Last year the Government grant to the agricultural schools was over $163,000.

Austro-Hungary—Italy.

In Austro-Hungary a similar system of agricultural schools has been established, and last year the Government contributed over $70,000 towards their support. Italy also has recently been establishing agricultural institutions. The Government grant last year for the support of such institutions was nearly $90,000. The experience of those old countries has convinced them that it is necessary to establish and support such schools; and I think this fact is a lesson to this Province, which depends more on its agricultural resources than any of the countries mentioned.

The Guelph College Commended.

I think the method of education adopted in the College at Guelph is one of the best. The testimony of several gentlemen from the United States' Colleges, and a few from Great Britain, who have visited us during the year for the purpose of examining our system is, that our course of study and method of instruction are better adapted to accomplish the object in view than those of most agricultural institutions on this continent and in Britain.

Good Practical Farmers.

We have had quite a number of such visitors this summer, and their opinion is that our institution is particularly suited to making good practical farmers and stock raisers, and that we succeed better than almost any other in combining the practical and theoretical. In the old country the theoretical is done successfully, but the practical part is not accomplished so well. The same remark applies equally to the United States, and is acknowledged by the gentlemen who came from there to visit us.

The College Strictly Agricultural.

The strong point in favour of the Ontario Agricultural College is that it is strictly an agricultural and not a general college, a farmer's college, if you will. The associa-

tions are all of the farm, and the whole institution tends to make the student more and more pleased with the occupation. I don't think any man could say that a farmer's son has been weaned from the farm by going to the College, as is the case with some in the United States.

Room for Extension—A Laboratory Needed.

I think there is considerable room for improvement in the way of extension. First, we are greatly in need of a large practical laboratory fully equipped with the best apparatus that money can secure, where 80 or 85 students could be put to practical work, at the same time under our chemist. I cannot emphasize this want too strongly. We require a place where the students can learn to analyze plants, grains, soils, manures, ashes of plants, etc., and thus see for themselves what soils must contain in order to produce certain crops.

A Laboratory Wanted for the Country.

Such a laboratory is required, not only for the students, but for the country at large. I think one of the great needs of the farming community is a laboratory of agricultural chemistry, where at a small cost manures, soils, grains, etc., from different parts of the Province could be analyzed, and the results published for the information of farmers—a place where some such work could be done for this country, as is done for Britain by such men as Voelker, the chemist of the Royal Agricultural Society; Drs. Laws and Gilbert; Mr. Jamieson, chemist of the Highland and Agricultural Society; and McDonald Cameron, of the Laboratory of Agricultural Chemistry in London.

Practical Chemistry in the States.

In the United States great prominence is given to practical chemistry. We are behind the States in this respect.

A Good Library Needed.

We need also a library which will contain the best works on every subject taught in the College, and a good supply of general reading for the students. Such a library I consider necessary for the success of the College. In my answer to a previous question I mentioned the need of a museum, where specimens collected by students and professors, and sent by friends of the institution, could be kept for educational purposes.

Hot Houses—Propagating Houses—Professor of Horticulture.

We should have new hot and propagating houses, with a botanical laboratory and museum, under a professor of horticulture to take charge of the department, and lecture on botany, horticulture, root culture, floriculture and forestry.

Teaching in Horticulture.

The practical work in horticulture is well done now, but the teaching in that department is not what it should be. The equipment is not sufficient—it is altogether behind the times.

Blacksmithing.

I think something could be done at the College in the way of blacksmithing. There are cheap portable forges now, costing about $25, which could be used for the purpose of teaching the boys how to weld and temper iron and do general repairs. We have not done anything in that direction.

[*President Mills.*]

Slaughtering.

We have given no instruction in slaughtering. I admit that the subject is one of some importance to farmers.

Two Years' Course too Short.

I think that a two years' course is too short a one. The chief difficulty I see in the way of a three years' course is the additions that would require to be made to the staff of teachers. We might be able to give the lectures and instruction necessary for three classes of students instead of two with the same professors, if we abolished the special course. I have felt that the time at present is too short.

Surveying and Measuring.

When I spoke of surveying and levelling I referred to land measuring, laying out drains, etc. We seek in every department to teach that which most directly meets the wants of farmers.

Use of the Laboratory.

I don't think it is necessary that a farmer should be able to analyze his own soil, but if students do a little of that kind of work they become more thoughtful and intelligent workers afterwards.

Insufficiency of the Present Laboratory and Library.

What we have in the shape of a laboratory at present is scarcely worthy of the name. We can accommodate only two or three students at a time. The apartment is about eight feet by twelve. It was never intended for a laboratory. The estimated cost for a new and suitable laboratory would be $12,000 at least. The one at Lansing, Michigan, without the apparatus, cost $10,000. The library, at the present time, contains a number of reports of the Royal Agricultural Society, the Herd Books, a few reference books in the different departments, and some general reading matter. The selection is a good one so far as it goes, but it is entirely too limited. We are adding scarcely anything to it.

Correspondence with Foreign Associations.

I correspond with State Boards of Agriculture, and other institutions in Britain and the United States, to obtain their publications. I send a copy of our own report to every such institution, and request theirs in exchange. I generally receive them, but have not been successful in some instances.

Chemistry on the Farm.

It would be quite an advantage to students to be able to tell the different ingredients, and the quantity of each ingredient, in soils and manures, but, as a rule, students could not furnish themselves with the necessary apparatus. In many instances they might be able to tell the different ingredients and something of the proportions. There is an effort now made at the College to teach students to analyze soil, but it is under very trying circumstances. We have a man who is able and willing to do the work, but he has neither the apparatus nor the room. The theoretical knowledge for analyzing is taught our students, but the practical application of this knowledge only to a limited extent. If we had a suitable laboratory, the students could very readily be taught to make a qualitative analysis of any given soil or manure, and to determine approximately the quantities of the different substances. With the other work which the students have to do, it would require more than two years to fit them for making thoroughly reliable analyses. We

want a place where our chemist can work for the benefit of the whole Province, as well as for our own students. At present, I may say that we cannot analyze manures and soils at all satisfactorily, because of the want above mentioned, viz., a laboratory with suitable apparatus. I think the intention of the Government is to furnish us with such a laboratory before long.

Veterinary Studies.

When we give three hours a week to veterinary science, one of them is devoted to the actual handling and judging of some particular horse. One-third of the time set apart for lectures on agriculture is employed in handling, judging, and criticising cattle or sheep.

Agriculture in Public Schools.

From my observation and experience, I am of opinion that something could be done in our public schools in the matter of primary agricultural education. I think a primer discussing the first principles of agriculture, could be introduced into all our rural public schools, and made compulsory. That has been done in some States of the Union. Even if it were not well taught, farmers' sons would get valuable ideas from the mere reading of such a book ; it would cause them to think on the subject of farming, and to see that it is a subject which requires thinking. I realize the difficulty of introducing an element of this kind into our public schools, seeing that the programme is already crowded ; but if the agricultural interests of this country are the most important interests, if success in agriculture means success in every other business, and failure in agriculture failure everywhere else, the interests of our country demand that time should be found—that a portion of the time spent in school should be devoted to this study. Even if the programme is crowded, room should be made for this subject.

An Agricultural Primer.

I think a primer would be sufficient at present, so far as our public schools are concerned. I would make no distinction between boys and girls ; both should study it.

High School Life Adverse to Agriculture.

The subject could not be successfully taught in a high school. The whole tendency of high school life and work is to wean young men from the farm. The ambition of the masters and of nineteen-twentieths of the students is altogether in another direction. Agriculture in our high schools would be like agricultural departments in colleges, a signal failure.

County Agricultural Schools.

Instead of attempting to teach agriculture in our high schools, I think an agricultural school should be established in each county under a competent master, with a fair laboratory, where young men could be taught the principles of agriculture and agricultural chemistry, botany and fruit culture, veterinary science, a little geology and physical geography, reading in agricultural books and papers, writing, spelling, English composition, and arithmetic. I venture to say a school of that kind in any of our counties would be one of the most popular schools, and one of the best attended, especially during the winter season. I hardly think it would pay to attach farms to such schools, because attempting too much would lead to inefficiency. After the student had received instruction in a county agricultural school, he could apply the principles on his own farm, and if he desired to be instructed further, he could go to the Agricultural College.

[*President Mills.*]

European Agricultural Schools.

In Ireland, Germany, Austria, and Italy, the agricultural schools are not self-supporting. They are supported partly by Government, partly by fees, and partly by local assessment. To establish and support such a school in each county would cost considerable, but the agricultural interests of this country are so important that there would be no great risk in making the necessary outlay. I don't know that it would be wise to push the matter just yet, but the time will come when there should be one such school in each county. The experience of older countries than ours has convinced them that separate agricultural schools in different parts of the country are necessary. I am strongly of opinion that the subject would not be successfully taught in our high schools.

Agricultural Education in Connection with Colleges a failure.

It is a fact generally admitted in the United States and in Scotland, where they have had experience, that a department of agriculture in connection with an Arts college is a failure, and I am thoroughly satisfied that a department of agriculture in our high schools would be a still greater failure. It would be a dead letter, and thus bring discredit on the whole question of agricultural education.

How to Make Farming Attractive.

Several things might be done to make systematic and scientific farming more attractive to farmers and farmers' sons. That object would be accomplished by making farming more remunerative and more respectable, by educating our young men to the belief that farming is an honourable occupation, as honourable as any profession, by infusing into them the idea which prevails in the old country, where men are anxious to farm, even at a loss in money, for the sake of the social status which it gives them—the idea which Rome entertained in her best days, when Virgil and Horace prided themselves on being farmers, and loved to talk of their farms and their flocks.

The Agricultural Societies to do more.

I think our township and county agricultural societies might do something more than they have done. In Holland these societies not only hold shows and give prizes as ours do, but pay teachers in elementary and other schools, and provide lectures on agricultural subjects, delivered during the winter months to the farming community, and do so with the best results.

Studies in Farming and Stock Raising.

A great deal has been said of late about the Agricultural and Arts Association, and the funds it disposes of. If that Association would devote a portion of its funds to the same object as the Arts and Science Department of England does under the Government, that is, if it would prescribe a course of study in agriculture and stock raising, hold local examinations in convenient centres, and give prizes and certificates on the results of those examinations, it would do a good work for this country. Thereby the study of agriculture would be encouraged, an interest in the subject would be created, and teachers for agricultural schools would be provided.

The Royal Agricultural Society of England.

The Royal Agricultural Society of England holds examinations and gives prizes, but the Art and Science Department has done a good deal more in that direction. At the first examination conducted by that department only 150 candidates presented themselves.

[*President Mills.*]

This year there were over 3,000. To all who reached the required standard, a certificate was given. I think a portion of the funds of our Agricultural and Arts Association might advantageously be spent in holding such examinations.

Farmers' Institutes.

The holding of farmers' institutes in winter would promote the interests of agriculture. In Michigan part of the duties of each professor of the Agricultural College is to attend meetings throughout the State and deliver lectures on subjects connected with agriculture and stock-raising. Those meetings are largely attended. The farmers enter heartily into the discussions, and are much profited thereby.

A Solid Objection.

No doubt such meetings would be a benefit to this Province, but the work of lecturing could not be done by the professors of our Agricultural College, for the simple reason that we have no vacation.

The Michigan College.

The Michigan Agricultural College closes for about three months in winter, during which time the professors have little else to do but prepare and deliver lectures at such institutes.

Arrangements for Lectures.

If the township agricultural societies should take the matter in hand, it would be left with each society to say when and where lectures should be given. The lectures should not be too formal. If a lecture is very formal and learned the farmers are only dazed by it, and do not enter into any discussion of the subject. I think the subjects treated should be practical common sense subjects—no learned theorizing, no flattering of farmers for the sake of popularity, as is too often the case.

Farm Home Surroundings.

Farming could be made more attractive by educating our young men to keep the surroundings at home more tidy, and to beautify them by planting trees and keeping a neat piece of lawn about the farm house. Any one who travels through the country must admit that the farmers' homes are often bleak and unattractive, when they should be the very opposite, and might be so with very little trouble, and scarcely any extra expense. The great carelessness of many Canadian farmers in regard to this matter is, I think, a strong reason why it should receive considerable attention at our College.

Young Women at Agricultural Colleges.

We have no accommodation for ladies. If we had, I think we could not undertake to add cooking and other branches specially adapted to their wants. To undertake too much is always a source of weakness. In several of the United States colleges they allow ladies to come and go without assuming any responsibility in the matter. If we admitted ladies to our college, and allowed them to form such intimacies as they thought proper, we should very soon get into disrepute, and be scandalized over the whole country.

Public Opinion—Supervision of Students.

Public opinion exacts a great deal of us as regards the supervision of students—[*President Mills.*]

where they go, what they say and do. Personally, I see no objection to educating boys and girls together, even at college. From my experience in high school work, I should not hesitate to admit both sexes into any institution under my charge, if the public were a little less exacting and unreasonable.

County Schools—A Plan not Difficult.

I don't think there would be much difficulty in maturing a plan for the establishment of such county agricultural schools as I referred to. They should be supported by the Government and by a county tax.

JAMES MILLS.

MR. WILLIAM JOHNSTON'S EVIDENCE.

Wm. Johnston, M.A., ex-President of the Ontario Agricultural College, having been invited to make a statement said :

I would ask as a favour that, in the evidence I am about to give, you would allow me, as Shakespeare makes Antony ask, "to speak right on," and defer any questioning until I have finished what I have to say upon the subject of agricultural education, from the notes which lie before me. They are notes which I have used before whilst connected with the Agricultural College; a portion of them has been obtained from Europe, another portion through the kindness of the Hon. John Eaton, Commissioner of Education for the United States, and still another portion from the reports of the agricultural colleges of the same country, which I was enabled to obtain by sending our own Agricultural College Report in exchange for each of those you see lying around me. The copies of our Report have been supplied through the kindness of the Hon. Mr. Wood, that my evidence might be as exact, reliable and recent as it was possible to be.

In taking up the subject of agricultural education I would consider it with your permission, under the following headings :—

I.—Agricultural Education.

1. What agricultural education is, and how it is to be imparted.
2. The relation of the State thereto.
3. Consider what should be taught in an agricultural college, and what appliances are requisite for teaching.
4. In order to consider the last subject thoroughly, sketch the history of the rise, progress, and present condition of the agricultural schools and colleges of the world, and from their experience draw lessons for our own guidance.
5. Consider each of the plans followed in these institutions, and give the plan of a Canadian Agricultural College, having regard to primary education, and the economic condition of agriculture in the country.
6. Sketch the history of the Ontario Agricultural College, giving its progress and present basis and condition.
7. Sketch an outline of what should be its permanent organization under the charter obtained last session in working up the plan already given.

After doing this, in as brief a manner as possible, I would like in the second place to ask you to give half an hour's attention to

II.—Agricultural Experiment Stations. Considering

1. The various ones in the world at present, their objects, aims, and results.
2. Our own, and its aims and organization.

[*Mr. Johnston.*]

I.—AGRICULTURAL EDUCATION.

1. What Agricultural Education is, and how it is to be Imparted.

In the first place then we must answer the question, What is agricultural education? Education itself is, in the first place, the training or drawing forth of intellect, and, in the second place, the giving of facilities. The former is the process of making skilled workmen, the latter of giving them good tools. The process may be seen in our most primary public schools, and the two objects go hand in hand. Thus the facilities given the child are, an acquaintance with its own language, the means whereby it can do simple business, and a knowledge of its place in time and space. And these are obtained by learning the three R's, grammar, geography, and history. And in obtaining these facilities there is always going on, in the hands of the skilful teacher, the training of intellect, or, in other words, the development of the powers of observation, memory, reasoning, and judgment; whilst at the same time, by the exercise of good discipline, there are acquired such intellectual habits as thoroughness, exactness, and concentration. And what is true of the primary or public schools is likewise true of all our high schools and colleges. In every and all parts of what is known as a liberal education, there will always be found the double object and the double result; and the most liberal education is that which turns out on the fields of the world the most skilful workmen wielding the best tools.

In new countries, like our own, it is not possible to give to such a large proportion of the population, even the medium parts of what is known as a liberal education. The youth must, at an early age, become a worker—in most cases a producer—and it becomes a question of prime importance how his education, beyond its elementary stages, shall be what is called a practical one, and yet fulfil the double object of all true education. Hence arises the question of technical education. That may be defined in one of its aspects as a higher education, (speaking of higher as that which is beyond the elementary), directed towards a special end. In the second of its aspects it is a training for a special trade, occupation, business, or profession.

Now I hold it is quite possible to give a technical education in the first of these aspects, and still, whilst giving facilities, train intellect. For instance, in teaching a young lad, who is to be a farmer, elementary mensuration, farm book-keeping, or even the outlines of agricultural chemistry, it is quite possible to train the intellectual faculties at the same time—indeed they must be so trained, and in our country where seven-tenths of our population graduate at the public school, it is a question of great importance whether, if any higher education is to be obtained, it should not combine more than it strives to do the practical with the theoretical in the technical. Be that as it may, you will see the point to which I am tending. It is the answer to the question with which I started.

Agricultural education is a branch of technical education, and like all technical education has a two-fold aspect. It is in the first place the giving of a higher education (in the sense in which I have defined the word education) to those about to become farmers, by adding on to the elementary branches taught in the public schools subjects directly pertaining to agriculture, and teaching them; and in the second place, it is the training of young men for that particular business or occupation.

2. What is the Relation of the State thereto?

In order to answer the question let us examine the relation of the State to primary and higher education. With regard to the first, the position taken by our laws is often misunderstood. The State does not educate, but it causes the parents to do so. It decides what shall be called an education, sees by inspection that it is obtained by all children, and encourages it by liberal grants and special assistance. As regards secondary or higher education, it only encourages and assists; but it does that in our Province with a munificent hand.

[*Mr. Johnston.*]

Now, agricultural education in its first aspect of a higher education stands upon the same level as all other higher education, and should receive from the State, at the very least, all possible assistance and encouragement. If it receive more, it must do so on other grounds than that of its being a species of higher education. It does receive more, and on what additional grounds? Well, in the second place, it is urged that the higher general education, as given in our Province, assisted as it is by the State, forms a part of the educational training of commercial and professional men, and of them almost exclusively; that few, if any, taking advantage of it as it exists, return to the ranks of the producing classes, if they come from them and naturally belong to them; and that as statesmen have to do with things as they exist, they must give a counterbalancing amount of assistance to the establishment and carrying on of technical schools for the producing classes. But mainly it is urged that the increase of productions, especially manufactured and agricultural, is, if these be well exchanged, a national benefit, and upon this broad national ground it is right and proper to establish and maintain, as well as assist, technical schools for the producing classes of the community. I do not think that the argument is a conclusive one. I think that the producing classes should themselves found, maintain, and largely govern such schools, lower or higher, and receive a proportionately large amount of assistance from the State. But they have been acted on in many countries as conclusive, and if in any, surely in our own Province, where seven-tenths of the ratepayers are farmers, could the right and duty of the State to establish and maintain a technical school, schools, college or colleges, for the class of agricultural producers, be maintained. Granted the relation of founder and maintainer to the State, let us pass on to consider,

3. What should be taught in such a School or College Established for the Benefit of Agricultural Producers, and what Appliances are needed in Teaching?

We will answer the question after a brief consideration of what is taught and used in other such schools and colleges, but we may shortly consider the subject as we say "*a priori*" before looking at it "*a posteriori*." It is evident that it will depend in the first place very much upon the system of education, the social condition of the people, and the economic condition of agriculture in the country. Let us keep to the case of our own Province. Now, with us, the farmer is in this generation, whatever he may have been in the past, a working capitalist, and the profits of capital and the wages of labour are usually shared by himself and family, or, if divided at all, a portion of the latter is given to his labourers—more commonly labourer. In our case farming is a *business*—a *trade*—and must be more and more made, as it is now made by every intelligent and successful farmer, an *applied science*. The youth about to engage in it must have his studies and training directed to this threefold aspect of farming. It is unnecessary to say that he must have the elementary branches of a public school course, before beginning, as a basis. To perform the *business* of farming, he ought to have in addition a knowledge of farm arithmetic, farm book-keeping, business forms, farm mensuration and land measuring, practical mechanics, and a general knowledge of the laws relating to real and personal property, and of the markets of the world. To be skilful in the *trade* of farming he must serve years of apprenticeship, as in every other trade, and that can only be perfected, never acquired, in any school or college, no matter how large the farm attached may be. Yet in every such school or college, just because farming is a trade, a course of apprenticeship must be joined to a course of study. Lastly, farming is, or should be, I have said, an applied science. Do not be afraid, gentlemen, of that word, science. There are two meanings to be attached to the statement. A science in one sense, and that the most important one, is a collection of the principles and laws that are deduced from the facts of observation. And those principles and laws again become the rules of practice. If therefore we can gather together the rules of practice of the best farmers, and from them deduce any laws, we will be making what may in one sense be called a science of agriculture. Now this collection of the rules of practice or principles of the

science of agriculture is what we mean by what is called in the European colleges agronomy, or, as we would say, the theory of practical husbandry. But closely connected with agriculture are many of what are universally recognized as sciences. The three main things dealt with by the farmer are, the soil, the plant, and the animal. Connected with the first are plainly such sciences as geology, physical geography, and chemistry; connected with the second, botany and chemistry; and connected with the third, zoology, veterinary anatomy, physiology, and pathology. Whilst therefore, to the students of an agricultural college who were unable to take a full course, it would be sufficient to give the science of agriculture in the science of practical husbandry, to those who could spare the time necessary to have a thorough knowledge of that subject, it would be necessary to teach such subjects as geology and physical geography, with meteorology; inorganic, organic, agricultural, practical, and analytical chemistry; structural, physiological, systematic, and economic botany; zoology and entomology; veterinary anatomy, physiology, and pathology, ere the field of agriculture, as an applied science, was thoroughly covered. And for the regular course all these subjects would require to be included, though all the students, as I have already said, should not be forced to take them, for to many, the time necessary for the acquirement of the knowledge requisite to pursue the *business* and carry on the *trade* of farming is all that they can spare in our new country before beginning the work of life for themselves. If such are the subjects that should be taught in an agricultural college, what are the appliances requisite to teach them? Speaking in a general way, which is all that we are doing here, they may be said to be, a farm with all the necessary farm buildings, permanent improvements, stock, and implements, with special stock, implements and farm buildings; lecture rooms, laboratories, libraries, museums, boarding houses, and teachers.

Having thus considered the meaning of the term agricultural education, the relation of the State thereto, and in an *a priori* way, the subjects necessary to be taught in an agricultural college, with the appliances requisite for such technical teaching, we may turn our attention, in order to understand this third part of our subject more thoroughly, to what has been done and is being done the world over in this matter of agricultural education. And it will be sufficient if we consider

4. The History and Present Condition of Agricultural Education in Europe and America.

The first school in the world for the teaching of agriculture was founded by Emanuel von Fellenberg, upon his estate of Hofwyl, near Berne, in Switzerland; though in the same year Prince Schwartzenberg established a similar school upon his estate of 300,000 acres, at Krumau in Bohemia. In 1803, a High School of Agriculture was established at Prague, teaching such subjects as agricultural chemistry, mathematics, farm book-keeping, hydraulics and drawing. In 1806, on a farm of 2,480 acres, was founded the agricultural school of Möglin in Prussia; in 1809, that of Grätz in the Austrian Province of Styria; in 1818, that of Hohenheim, in Wurtemberg; in 1821, Rouville in France; and in 1822, that of Schleissheim, near Munich, in Bavaria, on a farm of 7,000 acres, followed. In 1827, were established that of Grignon in France, and Templemoyle near Londonderry in the north of Ireland. In 1829, Tharand in Saxony; in 1830, Eldena in Prussia; and in 1833, the Agricultural College of St. Petersburg, that of Grand Jouan in Brittany, and Lichtenhof in Bavaria, were founded. In 1835, Geisberg in the Duchy of Nassau; in 1838, Glasnevin near Dublin in Ireland; in 1848, Cracow in Poland, and the farm schools of France; and in 1849, the Royal Agricultural College of Cirencester in England. In a single decade thereafter, there were of agricultural schools and colleges—in Britain 67, in France 75, in Russia 64, in Austria 7, in Italy 2, in Denmark 4, in Belgium 9, in Germany 124, and in all Europe about 360. Two decades more bring us up to the present time, and we may now pass on to consider the agricultural schools and colleges of Europe. And in the first place we will take our own mother land in each of its three divisions.

A.—EUROPE.

BRITAIN.

In *England* as we have already said, the Royal Agricultural College was established at Cirencester in the County of Gloucester in 1849. Although the name would imply supervision if not assistance by the State, it should be stated at the outset that in neither England nor Scotland does the State take anything to do with agricultural education. It is left to private enterprise and the supervision in the one case of the Royal Agricultural Society, and in the other of the Highland and Agricultural Society. The Royal Agricultural College is situated on one of Lord Bathurst's farms, about a mile and a half from the town of Cirencester. The College building, which has a frontage of 190 feet, contains class rooms, library, museum, laboratories, lecture theatre, chapel, dining hall, dormitories, and apartments for resident professors. The farm of 500 acres is of variable quality, and is rented to a tenant with the condition that the students shall see all operations. This fact will prepare you for the announcement of its objects, which are first to train young men for land agents or stewards, and secondly to make farmers. Students are admitted at the age of eighteen on passing an examination on the ordinary English subjects. The regular course is one of four years, with two sessions in each year, the spring session extending from the 10th of February to the middle of June; the autumn session from the 10th of August to the middle of December. The curriculum includes chemistry—inorganic, organic, practical, agricultural and analytical; botany—structural, physiological, systematic and economic; natural philosophy, mensuration, mechanics, surveying and book-keeping, geology and physical geography, veterinary surgery and practice. Some of the students perform practical work under the farmer, but the majority only look on. The fees for tuition and board are £125 sterling per annum; for tuition alone to the out students, as they are called, £50 per annum. The staff is composed of a Principal, a Professor of Agriculture, a Professor of Chemistry, a Professor of Natural History, a Professor of Mathematics and Surveying, a Professor of Veterinary Surgery, an Assistant Chemist, and one or two masters and tutors. The Patron is the Prince of Wales, and the institution is controlled by a Board of Management, twelve in number, of which the Duke of Marlborough at present is President. The number of resident students is about seventy-five. The revenues of the College are obtained from the fees, subscriptions and the interest of private endowments. It is unnecessary to add in conclusion, that its objects, as its results are not what would be wanted in a Canadian Agricultural College, though its course of study and appliances would be of certain value as precedents. In the spring of this year there was established the Wilts and Hants Agricultural College, with which Professor Sheldon, at present on a visit to this country, is connected. It is almost a transcript of Cirencester, and need only be mentioned. Besides these two there are no other agricultural schools or colleges in England.

In *Scotland*, agricultural education has been taken charge of by the Highland and Agricultural Society, which by a supplementary charter, granted in 1856, was empowered to grant diplomas. The subjects of examination are, the science and practice of agriculture, botany, chemistry, natural history, veterinary science, field engineering and book-keeping. There are three examinations, known as the Second Class Certificate Examination, the First Class Certificate Examination and the Diploma Examination. The Board of Examiners is composed of ten members, and the whole number of diplomas granted from 1856 to 1878 was thirty-four. In 1876 there was established the North of Scotland School of Chemistry and Agriculture, at Aberdeen. The curriculum is much the same as the standard laid down by the Highland and Agricultural Society, whose diploma the students are trained to take, as well as the certificate of the Science and Art Department, Kensington. The students, numbering last session about 120, board in Aberdeen and attend these classes, for which they pay a tuition fee of £1 per session. Besides this, there are no agricultural schools or colleges in Scotland.

[*Mr. Johnston.*]

Ireland is the only part of the United Kingdom that has a regular system of agricultural education. In that system there are four steps. In the first place, all the national schools, which correspond to our public schools, are obliged to use an agricultural text book. In the second place, there are 115 of the national schools that are selected as schools, which have not only a teacher, but a farmer and a small farm attached, and form national agricultural farm schools. In the third place, there are 16 national model agricultural schools with model farms attached. And in the fourth and last place, there is the Albert Institute at Glasnevin, which is in reality the National Agricultural College of Ireland. The second and third classes of which I have spoken receive assistance from the State. The Albert Institute is supported by it. It is situated at Glasnevin, about three miles from Dublin, on a farm of 180 statute acres. The buildings comprise the usual class-rooms, library, laboratory, museum, dining hall and dormitories (for seventy-five students), which are always full. The professed object of the institution is three-fold—to train farmers, land stewards, and teachers of the agricultural schools. The matriculant must be seventeen years of age, and in addition to the three R's, history, geography and grammar, passes in Euclid and book-keeping. The successful students of the Dublin Normal School have the privilege of attendance, and require but a year's residence for a diploma. For all others it is a two years' course. That course comprises agriculture, horticulture, botany, vegetable physiology, chemistry, geology, animal anatomy, physiology and pathology, arithmetic, book-keeping, land surveying, levelling, drawing, English grammar, and composition. The staff is composed of a superintendent, a farmer, a gardener, one or two literary masters, and a number of visiting professors, whom from its close proximity to Dublin it is very easy to procure.

The farm, which is very well cultivated, is divided into a model farm of 50 acres and a large farm of 130 acres, under three different kinds of rotation. The resident students assist in the work of the farm, though labour is not imperative on all who attend lectures. Such is the system of agricultural education pursued in Ireland. Let us now pass to the countries of

NORWAY AND SWEDEN.

In Sweden, the system of agricultural education is administered under the Royal Agricultural Academy of Stockholm, which is not, as its name would suggest, a teaching institution, but rather a Government bureau, having under its control the twenty-seven Agricultural Schools, the two Agricultural Colleges, the Stockholm Experimental Farm, the Model and Experimental Dairies, and the Agricultural Societies, so that there are three steps in the system. In the twenty-seven Agricultural Schools farming is taught practically as well as theoretically, each one having a farm attached. The two Agricultural Colleges are situated, the one at Ultana, near Upsala, in the north, and the other at Altnarp, near Lund, in the Province of Scäne, in the south. The latter is situated on a farm of 600 acres, and is divided into a higher and lower school. In the higher school are the sons of the aristocratic and wealthier class, in the lower the sons of the peasants, who do the work of the farm whilst the others look on. The course of study in the higher school is one of two years, and is not so extensive as those of Britain, and not so technical, for as the primary school system is rather deficient, it is imperative that greater attention should be paid to the ordinary branches of study. The theory and practice of agriculture, horticulture, chemistry, botany and surveying, with the common business branches, form the curriculum. Besides the regular school with its higher and lower divisions, there is a farriery school and a dairy school. In 1876 the attendance at Altnarp Agricultural College was 127—60 in the upper school, 36 in the lower, 25 in the school of farriery, or veterinary college as we would say, and 6 in the dairy school. In that same year the Government grant to all the Agricultural Schools and the two Agricultural Colleges was $47,800. In Norway there is an Agricultural Institute at Aas, south of Christiana, but it is very much similar to that of Altnarp; and being founded after that model, we need not waste time with it. But the model of both was found in the country to which we now turn, namely,

DENMARK.

and the institution there taken as a model was the Royal Agricultural and Veterinary College at Copenhagen. This was established as a High School of Agriculture in 1856, and has been in flourishing order ever since. I will not trouble you with the curriculum, which is almost the same as that of Glasnevin, with a department of forestry added and the department of veterinary science much more widely extended. Indeed, the veterinary school is one of the most famous in Europe. Besides it there were in 1877 about 100 agricultural schools, called High Schools of Agriculture, through the country, all in a flourishing condition. At each of these there is taught, as well as agriculture, botany, chemistry, zoology, natural philosophy, arithmetic, book-keeping, grammar, geography, general and Danish literature and history, drawing and surveying. They are very popular, for the course, which is one of six months, is frequently taken over twice and even three times by the students, who return each winter for the purpose. There is also a peculiar but good plan worthy of notice taken by the Royal Danish Agricultural Society, to whose fostering care the State commits the matter of agricultural education. Farms willing to take students are inspected, those thought worthy selected, and students sent to them, who undergo yearly examinations on theory and practice, and are drafted as soon as ready into the Copenhagen Agricultural College. In the year mentioned there were 77 such farms chosen, and on them 178 students under the charge of the Society. Nowhere in Europe is this form of technical education we are considering more thoroughly carried out than in the little kingdom of Denmark.

RUSSIA.

Strange as it may seem, Russia was one of the first countries in Europe to follow the lead of pioneers in agricultural education. She has a number of agricultural primary schools, but I am sorry to say I can give no description of their working. In 1853 was founded the Royal Agricultural College of St. Petersburg, on a farm of 330 acres, with an endowment of $525,000, and in 1877 it was flourishing with an attendance of nearly 300 students. The College of Agriculture and Forestry, near Moscow, was founded in 1865. Its course of study, which is one of two years, embraces agriculture, agricultural technology, botany, chemistry, mechanics, horticulture, and forestry. And the third and latest established, that of Novo Alexandrina, in the north, was in 1877 very prosperous, with an attendance of 127 students. And in speaking of Russia there must never be forgotten that province which, ethnologically, philologically, and politically, is so utterly distinct from the Sclavonic portion of the empire—the freest part of the absolute monarchy of Russia,—the Province of Finland. Here there are two agricultural high schools, which, in 1878, had about 200 students, whilst that of agriculture is one of the leading departments in her University of Helsingfors.

AUSTRIA.

Leaving the sick man and the countries he keeps in a ferment around the Ægean, let us turn our attention to that most conglomerate of the nations of Europe—Austria. I will give the agricultural schools and colleges of the German Provinces of Austria along with those of Germany, to which they more naturally belong, and examine those of Austro-Hungary, but the following statistics from the Report of the Imperial Minister of Agriculture, for 1875-6, may not be uninteresting. The head centre of the agricultural schools and colleges of the empire is the Royal Agricultural College of Vienna, which had, in the year mentioned, 167 students. There were 69 schools of agriculture, with 2,035 students; 174 evening schools of agriculture, with 5,537 students; whilst agriculture was taught in 2,128 of the public schools, arboriculture in 4,034, bee culture in 1,486, and silk culture in 862. In connection with these there were 3,215 orchards and 4,032 gardens, whilst farms belonged to each of the sixty-nine high schools of agriculture mentioned, and in them were given the previous year diplomas to 623 students.

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The course of study in the Royal Agricultural College is as follows: theory of agriculture, agricultural literature and technology, agricultural machines and implements, rural constructions, botany, zoology, chemistry in all its branches and applications to agriculture, natural philosophy, astronomy, meteorology, French, German, English, Italian, book-keeping, political economy, mathematics and applications, agricultural statistics and finances, practical work in the fields and laboratories. Some of the professors have a world-wide reputation, as Prof. Exner, for technology, Prof. Neumann, for political economy; Prof. Zöller, for chemistry; and Prof. Hecke, for practical agriculture. Leaving the German provinces and turning to Austro-Hungary, we find under the charge of the Minister of Agriculture at Pesth, and all receiving liberal grants from the State, four agricultural colleges, namely,

1. Ungarisch-Altenburg, with eighteen professors and 148 students.
2. Keszthely, with nine professors and 72 students.
3. Debreczin, with eight professors and 57 students.
4. Kolosmonostor, with twelve professors and 74 students.

As all have a uniform system, we may select the second. It is one of the oldest in Europe, established by Count Festatics on one of his estates on the shores of the Platten See, on a farm of 300 acres, and is furnished with complete buildings, laboratories, and gardens. Everything is a model of its kind. Every field is under a different rotation, and all the principal varieties of stock are represented. For the twenty years before 1874, the year that I have reported, there were 1,831 graduates, and sixty-two per cent. were following agricultural pursuits. In that year the State grant was $20,000. The course of study, which, as I have said, is the same in all the four, is arranged as follows:

First Year—*Winter Session*: Mathematics, physics, mechanics, geology, chemistry, physiology, botany, agronomy, horticulture, drawing.

First Year—*Summer Session*: Engineering, zoology, botany, agricultural chemistry, agricultural mechanics, cattle breeding, study of wool, vine culture, plant culture.

Second Year—*Winter Session*: Rural economy, political economy, technology, cattle and sheep breeding, forestry, farm buildings, climatology, statistics, drawing.

Second Year—*Summer Session*: Book-keeping, farm valuation, technology, forestry, management of horses and pigs, veterinary, agricultural law, buildings, drawing.

ITALY.

There are three principal institutions that have been established in Italy since its emancipation, which have become very successful, a High School of Agriculture and Veterinary Surgery at Turin, another at Naples, and an Agricultural College at Milan. The latter was founded by a royal edict of April 10th, 1870, though the main portion of the expense is borne by the Municipal and Provincial authorities. The General Government grant last year was about $6,000. In it there are three principal courses:—

1. A regular course for regular students of agriculture.
2. A Normal School course for the education of teachers of agriculture.
3. Special courses for those who conduct great agricultural enterprises (such as drainage), which in Italy are carried on by the provinces.
4. And there is also a somewhat extensive experiment station in connection with the institution, in which all the students assist.

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SPAIN AND PORTUGAL.

In *Spain* there has recently been established, or rather reorganized, a Royal College of Agriculture and Forestry near Madrid, whose curriculum is closely allied to those we have already given, and which is very successful. The theory of agriculture is also taught in each of the ten national Universities, viz.: Madrid, Salamanca, Valencia, Oviedo, Barcelona, Seville, Granada, Valladolid, Santiago and Zaragoza.

In *Portugal* there has been a High School of Agriculture within fourteen miles of Lisbon since 1852. In 1865 it was re-organized, placed totally under the charge of the Government, and the name changed to the "General Institute of Agriculture." Its course of study embraces the subjects commonly found in the curriculum, and need not be here repeated, except that the division of subjects into departments is rather peculiar, the departments being,

1. Agronomy, or the Theory and Practice of Agriculture.
2. Sylviculture.
3. Rural Engineering.
4. Forest Engineering.
5. Veterinary Surgery.

I have a very pleasant recollection of the visit of its Professor of Agriculture in 1876, to whom I am indebted for the report of the institution.

SWITZERLAND, BELGIUM AND HOLLAND.

In *Switzerland* there are Agricultural Schools in the cantons of Vaud and Basle, a Federal Polytechnic Institute at Zürich, which has as one of its branches the theory and practice of agriculture, and agricultural departments in the Universities of Berne, Basle and Geneva.

In *Belgium* there was in the winter of 1876-77 a State School of Horticulture at Ghent with 35 pupils, a Practical School of Horticulture at Gendbrügge, which taught agriculture on the Belgian scale as well; another Practical School of Horticulture at Vilvorde with 23 pupils; and the State Agricultural College at Gembloux, with an attendance that session in the regular course of 61 pupils. The latter was established on a farm of 160 acres near Gembloux in 1862, has a staff of eight regular professors, and costs the State annually about $17,000 for maintenance. The course of study includes agriculture and agricultural technology, horticulture, botany, chemistry, geology, zoology, geometry, surveying levelling, mechanics, the economy of forests, rural law and rural architecture, and veterinary science and practice.

In *Holland* there was established in 1876 the Royal Agricultural College at Wageningen. The course is one of three years, and comprises:—

1. Technical branches—agriculture in theory and practice.
2. Scientific—natural history and chemistry practically applied to agriculture.
3. Literary subjects—the Dutch and German languages, geography, history, mechanical drawing, natural philosophy, and governmental science.

FRANCE.

There are three steps in the agricultural education afforded by the Republic of France, namely:—

1. The Farm Schools (Fermes Ecoles).
2. The Provincial Agricultural Colleges.
3. The National Agricultural College (Institut National Agronomique).

As the farm schools are very much different from anything we have been heretofore considering you will pardon me if I dwell a little longer upon them than may perhaps be even

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desirable, seeing that your time is limited and the ground yet to be covered not inconsiderable. These schools, though some were in existence before, were taken under governmental patronage in 1848, and most of them were founded thereafter. The aim was to establish one in each of the eighty-six departments of France, as near the centre as possible. They are said to have been founded on the recommendation of the famous philosopher, M. Cousin, who became Minister of Public Instruction in 1840. Their object as laid down in the Act founding them is twofold :—

1. To furnish good examples of tillage to the farmers of the district ; and
2. To form agriculturists capable of intelligent cultivation either upon their own property or that of others, as farmers, tenants, or managers.

The farms vary in size from 200 to 2,000 acres, and all have gardens, nurseries and orchards attached. The buildings are constructed in a plain and substantial manner, as nearly approaching the better class of farm buildings in the particular department as possible. The director is chosen from the best farmers in the department, and besides him there are, composing the staff, a farmer, an overseer of accounts as he is called in Europe, a nursery gardener, a veterinary surgeon, and according to the district, the director of some specialty, as a shepherd, a vineyard manager, a silk grower, etc.

The pupils are young men from the country families, and number from 25 to 40 in each school. As they work the farm and as the farm houses are only of a medium size, of course no more could be admittted. For entrance, these pupils have to be sixteen years of age and pass an examination on the subjects taught in the primary schools. After entrance they all work on the farm. The hours devoted to instruction are three daily on a yearly average—more in winter and less in summer. The first hour is spent in studying a manual of practical agriculture or listening to lectures on that subject from the farmer or director ; the second to lessons, given by the overseer of accounts, on arithmetic, book-keeping or land measuring ; and the third to the arrangement of notes taken during the practical instruction from the various managers on the fields, in the stables, and in the sheep-folds. A few of the pupils are attached to the gardens or nurseries, so as to become gardeners, and they undergo the same routine.

The Government pays the board of each pupil and allows him 70 francs per annum for clothing. The director is obliged so to conduct the farm as to afford the best means of instruction to the pupils ; to submit his books and accounts at any time to the examination of the Government Inspector of those schools ; to send annually to the Minister of Public Instruction a full account of state of the school ; and to publish a full account each year of the farm's operations, successes or failures. The aggregate produce of the farm must be equal to that of the other farms of the department; if not, in two years consecutively, the Government patronage is withdrawn, and the Board, which is composed of practical farmers, immediately finds another director. Owing to the low state of primary education in France, and the practical difficulties of handling the farm schools,—as there is always in directing unskilled labour,—the majority of them were for many years failures, but learning from the few that became successful, and primary instruction progressing apace, the great bulk of them have, for a few years before and since the Franco-Prussian war, become decided successes. In the following table I have given the names of the Farm Schools supported by the Government in 1872, the year I have got hold of. It is a bad year, for the Republic was scarcely fairly at work, and everything was upside down in France. Many of the old ones since opened had been closed, but the list will suffice to give an idea of the system, and it is the only one I have :—

No.	Name of the Farm School.	Year of Foundation.	Number of Pupils in 1872.	Total Number of Graduates since the commencement of the School.
1	Riffeland	1830	35	410
2	Les Trois-Croix	1832	32	346
3	La Mautaurone	1830	37	359
4	Saint Michel	1843	37	297
5	Saint-Gildas-Des-Bois	1840	24	282
6	Bain	1847	30	224
7	Chauvaignac	1847	33	299
8	Kerwaek-Trevarez	1847	34	248
9	Lavallade	1847	33	318
10	Chambaudin	1848	30	242
11	La Chauviniere	1848	24	Not given.
12	L'Orme-du-Port	1848	33	192
13	Berthand	1849	24	149
14	Berptas	1849	30	211
15	Beyrie	1849	27	282
16	Germainville	1849	33	244
17	Lahayevaux	1849	32	256
18	Lanmoy	1849	41	222
19	La Villeneuve	1849	36	Not given.
20	Le Montat	1849	34	293
21	Les Plaines	1849	33	387
22	Montceau	1849	24	179
23	Monto	1849	24	179
24	Nolhac	1849	31	200
25	Puillerols	1849	40	328
26	Pont-De-Veyle	1849	29	329
27	Puilboreau	1849	33	214
28	Rayah	1849	34	307
29	Toulon	1849	24	230
30	Recoulettes	1851	21	201
31	Saut-Gautier	1851	33	191
32	Saint Rémy	1851	65	682
33	Les Hubandieres	1852	33	166
34	La Satie	1857	38	195
35	Saint-Doust-La-Paoute	1861	36	168
36	La Malgrange	1868	25	10
37	Macharre	1868	24	Not given.
38	Saint Elvi	1868	33	11
39	La Chassaque	1869	24	Not given.
40	La Roche	1869	36	10
41	Merlieux	1869	34	Not given.
42	Etoyes	1870	30	Not given.
43	Le Grand Rests	1870	28	Not given.

II. Such are the farm schools of France, and we may now pass on to the second step—the Provincial Agricultural Colleges. Three of these are now in successful operation, the most successful being that of Grignon. This was established as far back as 1827, by an Agricultural Society, to which Charles X. ceded 1,200 acres of the public demesnes for that purpose. From that until 1848, it received assistance to the extent of 25,000 francs annually from the Government, and in the latter year it was incorporated in the general scheme of agricultural education already referred to. The staff is composed of six principal professors, though there are other teachers. These are

1. Professor of Agriculture.
2. Professor of Zootechny (Economy of Animals).
3. Professor of Sylviculture and Botany.
4. Professor of Chemistry, Geology and Physics.
5. Professor of Rural Engineering, Mechanics and Surveying.
6. Professor of Political Economy, Rural Economy, Rural Legislation, Book-keeping, Literature, &c.

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And the subjects of study, which are much the same as those we have before enumerated as forming the curriculum of Agricultural Colleges, are divided into the following four good departments.

1. Mathematical Sciences.
2. Physical and Natural Sciences.
3. Technological Sciences.
4. Agricultural Sciences.

III. Passing to the last step, we have the National Agricultural College which used to be the Royal Agronomic Institute of Versailles; but which, stopped by the war, was in 1876, re-organized as the Institut National Agronomique, or National Agricultural College, as we would say, and established in Paris. In the session of 1877, it had 17 professors and 96 students. The course of study is one of two years, and comprises the following subjects:—General and Practical Agriculture, Agricultural Technology, Comparative Agriculture, Rural Economy, Zootechnics (economy of the Farm Animals), Sylviculture, Horticulture, Arboriculture, Viniculture, Chemistry in all its branches, and applications to Agriculture; Botany, Zoology, Geology, Physics, Meteorology, Mechanics, Rural Constructions, Administrative Law, and Rural Legislation. So much for the system of Agricultural education in France. Let us now turn to the last, and, for our purpose, the most important country in Europe, namely:

Germany.

The system of agricultural education pursued in Germany has four steps.

1. The inferior agricultural schools, or agricultural improvement schools.
2. The Intermediate General Agricultural Academies and the special Agricultural Academies.
3. The Agricultural Colleges.
4. The Agricultural Departments of the Universities.

The latter train the professors for the second and third, and their graduates must have been successful farmers ere they enter; and the first are feeders to the second and third. Those two, the academies and the colleges, differ more perhaps in the method and extent of teaching than in anything else, the curriculum of the former being more akin to those we have already mentioned or have yet to mention, than is that of the colleges. This will be more clearly seen after I have described one of the latter. In the list therefore, that I propose to give, I will leave out the first and fourth and include only the second and third. Before giving it allow me to say, by way of preface, that in Prussia alone, during this year (1880), there have been in successful operation under State patronage, 9 agricultural colleges and academies, 43 agricultural schools, 14 agricultural evening schools, 3 schools for the teaching of meadow culture (Weisenbauschulen), 10 schools of horticulture and arboriculture, and 23 other agricultural schools for various general purposes. From the Report of the Royal Prussian Statistical Bureau for the year 1876 we learn that in that year she had 6 agricultural colleges or academies, with 44 professors and 320 students, 46 agricultural schools or academies with 277 teachers and 1,409 students, 29 schools of arboriculture and viniculture with 71 teachers and 313 students and 6 schools of forestry, having an agricultural department attached, with 27 teachers and 237 students. And this is Prussia alone. The following is a list of the Agricultural Colleges and academies of Germany, and the German Provinces of Austria. Of course, they are not all Agricultural Colleges, but it is difficult, in our estimation, as I have said, to separate between the academies, and the colleges (though not difficult on the German system, for they count only about 9 colleges), and both are given together under the one name of Agricultural Academies:

I. Agricultural Academies of Germany, and the German Provinces of Austria.

1. Altstadt.
2. Annaberg.
3. Arendsee.
4. Auerbach.
5. Badersleben.
6. Barzdorf (Austria).
7. Bauhof.
8. Bautzen.
9. Bayreuth.
10. Beberbeck.
11. Berlin.
12. Bitburg.
13. Brandis.
14. Brunswick.
15. Burgstadt.
16. Brünn (Austria).
17. Brieg.
18. Cainistadt.
19. Cappeln.
20. Carlshof.
21. Chrudun.
22. Cleve.
23. Cloppenburg.
24. Dahine.
25. Deuklingen.
26. Dobeln.
27. Ebstorf.
28. Daubrawitz (Austria).
29. Edelhof (Austria).
30. Edthop (Austria).
31. Eibenschutz (Austria).
32. Ellwangen.
33. Erfurt.
34. Feldsberg (Austria).
35. Fleusburg,
36. Forbach.
37. Frankenfelde.
38. Franstadt.
39. Freiberg.
40. Freilung (Austria).
41. Fütchen.
42. Geisenheim.
43. Giessen.
44. Gliechow.
45. Görz.
46. Göttingen.
47. Gray (Austria).
48. Grossan (Austria).
49. Gross (Austria).
50. Gottenbof (Austria).
51. Hagenan (Alsace, 1871).
52. Halle.
53. Hegue.
54. Heiligenheil.
55. Herford
56. Hildesheim.
57. Hohenheim.
58. Hohemvestedt.
59. Hracholusk.
60. Jena.
61. Kaaden (Austria.)
62. Carlsruhe (Baden.)
63. Carlsruhe (Prussia.)
64. Kiel.
65. Kerchberg.
66. Klagenfurt.
67. Kotzobentz.
68. Landsberg.
69. Lehrhof.
70. Leipzig.
71. Lichtenhof.
72. Lubwerda (Austria.)
73. Leignitz.
74. Meissen.
75. Liedinghausen.
76. Mahrisch.
77. Marburg (Austria.)
78. Marienburg.
79. Marienburg (Prussia.)
80. Meppen.
81. Merseburg.
82. Metz (Lorraine, 1871.)
83. Michelstadt.
84. Mödling.
85. Münich.
86. Nenenburg.
87. Neumünster.
88. Neutitscheim.
89. Nieder-Briessnitz.
90. Nieuburg.
91. Oberhermsdorf.
92. Ochsenhausen.
93. Pfreutsch.
94. Pirna.
95. Poppelaub.
96. Poppelsdorf.
97. Prague.
98. Preron (Austria.)
99. Proskau.
100. Quedlinburg.
101. Reifenstein.
102. Rieseurodt.
103. Rochlitz.
104. Sourburg.
105. Samter.
106. Schelling.
107. Scheuerfeld.
108. Schivelhein.

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109. Schkenditz.
110. Schlettstadt (Alsace, 1872.)
111. Chemnitz.
112. Schönbrum.
113. Schollnitz.
114. Spitzings.
115. St. Michele.
116. Strasburg (Alsace, 1872.)
117. Tabor.
118. Teschen.
119. Thalheim
120. Thüngen.
121. Trient (Austria.)
122. Triesdorf.
123. Troja.
124. Varel.
125. Weihunstephan.
126. Weilburg.
127. Weisskirchen (Austria)
128. Wentsie.
129. Wittenberg.
130. Wollherskrug.
131. Wrietzen.
132. Würzburg.
133. Wurzen.
184. Quaim.
135, Zwatzen.

II. Academies of Horticulture, Arboriculture and Viniculture.

1. Alltrof.
2. Brumath (Alsace.)
3. Brünn (Austria.)
4. Eldern.
5. Geisenheim.
6. Hohenheim.
7. Carlsruhe (Baden)
8. Klosteruenburg,
9. Koschmin.
10. Köthen.
11. Kremo.
12. Mödling (Austria.)
13. Proskau.
14. Rötha.
15. Saussouci.
16. Weinsberg.

III. Schools for the Teaching of Meadow Culture.

1. Constanz.
2. Czersk (Austria.)
3. Glinvitz.
4. Offenbing.
5. Siegen.
6. Suderburg.
7. Wiesbaden.

By this list you will see that in Germany and the German Provinces of Austria there are, besides the elementary agricultural improvement schools and the agricultural departments in the universities, 135 agricultural academies and colleges, and 23 special academies for special agricultural departments working, in all 158 such academies in Germany. Each of those academies have farms, gardens, etc., attached, and the curriculum of each is much the same. Amongst them there are about a dozen—nine especially—very noted agricultural colleges, and as our time will admit of but one selection, we may take

The Agricultural College of Hohenheim.

It stands at the head of the system of agricultural education in the Duchy of Würtemburg. Besides it, as feeders to it, there were in 1877, 5 agricultural academies, 5 agricultural winter schools, (for farmers), and 851 agricultural improvement schools (Fortbildungsschulen) with 17,844 pupils. Hohenheim was opened, as has already been said, in 1818, with some 8 students in the old castle. It has grown since then and looks more like a good sized village at present, than like anything else, as architecture has not been heeded, and the buildings have been erected at different periods of time. The College is divided into what are called schools, (which is a common German method of designating college divisions), and of these there are three regular, and a few special ones. The regular are :—

1. Higher School of Agriculture.
2. Lower School of Agriculture.
3. School of Horticulture.

In our consideration we will take the first alone. In the first place the staff consists of 15 regular professors, with many tutors and professors for the special subjects. The course of study for the Higher School is one of two years, but of course, other two have already been spent in the Lower School. The curriculum is as follows :—

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I. *Agriculture.*

1. General agriculture.
2. General plant culture.
3. Special plant culture.
4. Meadow culture.
5. Grape, hop and tobacco culture.
6. Fruit culture.
7. Kitchen vegetable culture.
8. Horse breeding.
9. Sheep breeding.
10. Breeding of small animals and poultry.
11. Silk worm and bee culture.

II. *Agricultural Business (Professional).*

1. Bookkeeping.
2. Taxation and rural law.
3. Political and rural economy.
4. Literature.

III. *Forestry.*

1. Forest botany.
2 Forestry proper,
3. Growing woodlands.
4. Technology of forestry.
5. Forest taxation.
6. Forest laws.
7. Encyclopædia of forestry.
8. Practical forestry.

(Carried on in their forest of 4,800 acres and experimental forest of 120 acres.)

IV. *Mathematics Connected with Agriculture.*

1. Arithmetic.
2. Algebra.
3. Planeometry.
4. Stereometry.
5. Trigonometry.
6. Practical Geometry.
7. Mechanics and physics.
8. Applications of all these to agriculture in mensuration and principles of machines, land measuring, etc.

V. *Sciences Connected with Agriculture.*

1. General chemistry.
2. Agricultural chemistry.
3. Practical chemistry.
4. Analytical "
5. Special botany.
6. Vegetable physiology.
7. General zoology and entomology.
8. Animal anatomy, physiology and pathology (veterinary).
9. Veterinary practice.

VI. *Farm Buildings.*

1. Architecture (farm).
2. Mechanical drawing.

And it must be remembered that this is but the agricultural school of the higher division (though the lower teaches the elements of the same things). There is besides a regular curriculum for the horticultural and special schools as well. The titles of the lectures such as I show you now in this circular of our agricultural college, in Hohenheim, fill a large octavo volume. For instance, in the first subsection under Agriculture, there are of headings alone 22 pages. Besides this regular course, there are a great number of special courses of so many weeks each, as for instance, a shepherds' course, a fruit growers' course, a vine growers' course, bee-keepers' course, etc., etc.

To enter the lower school, the pupil must be 18 years of age, and have passed through the regular public school. Terms and sessions are as usual, and in reality for a regular student four years must be spent at the institution, though many take some of the special courses. The students sleep at the buildings and take their meals in the town. The number in the higher school in 1878 was 75. The whole number I could not find.

The farm consists of 780 acres, of which 120 acres are used as an experimental farm, and 50 of them divided into 500 experimental plots. Of live stock there are 4 different kinds of cattle, 6 of sheep, 4 of horses, 5 of pigs and 9 of poultry. The best implements in Germany and the best artificial manures of the world are used. But on this farm are also a great number of industrial shops. These are in

I. *Applied Chemistry Branch.*

1. A sugar beet factory.
2. A brewery.
3. Distilleries.
4. A starch factory.
5. A vinegar factory.
6. A malt house.
7. Fruit-drying and canning establishment.

II. *Mechanical Branch.*

1. Agricultural machine and implement factory.
2. Blacksmith and wagonmakers' shops.
3. A drain tile manufactory.

III. *Special Branches.*

1. Flax industry buildings.
2. Silk-worm industry buildings.
3. Buildings of the department for distribution of seeds.
4. Buildings of the department for distribution of stock.

And there is, I had forgotten to mention, a library of 10,000 volumes on agricultural or cognate subjects, three extensive and well fitted laboratories, and a museum, in which, amongst thousands of other things, are over 2,000 models, of which, for instance, 140 are ploughs.

And this is only in the agricultural school. Acres are covered with the gardens, nurseries and orchards of the horticultural school, whilst there are greenhouses, hothouses, gardens, plots and fields, in which and on which have been conducted for a quarter of a century some of the most extensive agricultural experiments that have ever been known. And when to all this is added a forest of 4,800 acres and an experimental plantation of 120 acres, it will be no exaggeration to say that we have passed under review one of the most complete agricultural colleges in the world.

In Asia, Africa, and South America, with the exception of three in Hindostan, one in Japan, and one in Brazil, there are no agricultural schools or colleges of any note; and we may therefore, leaving Europe, turn our attention to our own Continent, and consider the agricultural and mechanical colleges of

B.—THE UNITED STATES OF AMERICA.

Although a few were previously in existence, yet the majority of the agricultural colleges of the United States have taken their origin from an Act called "The Land Scrip Act," passed by Congress in 1862, entitled in full, "An Act donating land to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts." By this Act some 9,600,000 acres of Federal lands were set apart on the basis of 30,000 acres to each Senator sent by any State of the Union to the Senate, to form an endowment fund for such a college within the State accepting it. This land was to be sold under the direction of the State so accepting, and the proceeds safely invested. The object aimed at is set forth in the fourth Section of the Act, which says that this money, so obtained, "shall be inviolably appropriated by each State which may take and claim the benefit of this Act to the endowment, support, and maintenance, of at least one college, where the leading object shall be, without excluding other scientific and classical studies, to teach such branches of learning as are related to agriculture and the mechanic arts, in such a manner as the Legislature of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

The plain intention of the Act was to assist in founding a mechanical and agricultural college in each State, but in all the States a struggle was entered into by existing colleges to obtain the endowment, on condition of their getting a farm, and adding to their other departments an agricultural department. In about half the States, some one of these colleges succeeded; in the other half, the State authorities obeyed the spirit of the Act, and established a separate agricultural and mechanical college in the State. The former have not, in a single instance, proved successful. Before taking up each State in detail and giving a very brief summary of what has been done and is still being done, I hand you a synopsis of those colleges as they were in 1876, which appeared in my report to the Government for the year 1878.

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AGRICULTURAL COLLEGES OF THE UNITED STATES, 1876.

STATE.	Locality in the State.	NAME OF THE COLLEGE.	Whether an independent college or a department of a university.	No. of Professors and Assistants in the Agricultural and Mechanical College.	No. of Students in the Agricultural or Mechanical College.	No. of Students pursuing Agricultural or Mechanical Studies.	Interest on Investments made from sale of Land Scrip (Act of 1862). Endowment.	No. of Acres in Farm.	Value of Farm (not buildings).
							$		$
Maine	Orono	State College of Agriculture and Mechanic Arts	In. College	8	115	115	7,864	370	10,000
New Hampshire	Hanover	Dartmouth College	Univ. Dept.	11	24	24	4,800	365	21,090
Vermont	Burlington	University of Vermont and State Agricultural Col.	Univ. Dept.	8	23	23	8,130	no farm.	.....
Connecticut	New Haven	Yale College—Sheffield Scientific School	Univ. Dept.	31	230	230	8,100	no farm.	.....
Rhode Island	Providence	Brown University—Agri. and Mech. Department.	Univ. Dept.	13	35	35	6,624	no farm.	.....
Massachusetts	Amherst	Massachusetts Agricultural College	In. College.	8	111	111	8,022	383	37,000
New York	Ithaca	Cornell University—College of Agriculture	Univ. Dept.	21	58	58	35,000	150	22,000
New Jersey	New Brunswick	Rutger's College—Scientific School	Univ. Dept.	10	42	42	6,960	100	45,000
Delaware	Newark	Delaware College	Univ. Dept.	8	43	16	4,980	not known	.....
Pennsylvania	Centre County	Pennsylvania Agricultural College	In. College.	13	161	161	24,420	600	75,000
Maryland	College Station	Maryland Agricultural College	In. College.	6	77	40	6,900	285	14,250
Virginia	Blacksburgh	Virginia Agricultural and Mechanical College	In. College.	10	255	255	20,639	250	28,000
N. Carolina	Orangeburgh	Claflin University—Agricultural Department	Univ. Dept.	9	61	61	7,500	not known	.....
S. Carolina	Chapel Hill	N. Carolina University—Agricultural Departm't.	Univ. Dept.	6	40	40	10,000	116	10,000
N. Georgia	Dahlenoga	N. Georgia Agricultural College	In. College.	8	93	93	14,000	60	2,500
S. Georgia	Athens	State College of Agriculture and Mechanic Arts	In. College.	5	245	30	3,000	25	1,000
Alabama	Auburn	Alabama Agricultural and Mechanical College	In. College.	7	104	80	16,224	100	2,200
Mississippi	Rodney	Alcorn University—Agricultural Department	Univ. Dept.	4	57	57	5,679	250	5,500
Louisiana	New Orleans	Louisana Agricultural and Mechanical College	In. College.	6	209	115	13,734	600	40,000
Texas	Bryan	Texas Agricultural and Mechanical College	In. College.	6	50	50	12,000	2,200	20,000
Kansas	Manhattan	Kansas State Agricultural College	In. College.	16	303	303	20,491	255	25,500
Arkansas	Fayetteville	Arkansas Industrial University	In. College.	12	45	45	10,400	160	12,000
Tennessee	Knoxville	East Tennessee University—Agricultural Depart.	Univ. Dept.	12	58	58	23,760	260	24,060
Kentucky	Lexington	Kentucky University—Agricultural Department.	Univ. Dept.	8	94	94	9,900	433	130,000
Ohio	Columbus	Ohio Agricultural and Mechanical College	In. College.	11	140	126	30,000	320	200,000
Indiana	La Fayette	Pardue University—Agricultural Department	Univ. Dept.	8	71	71	20,314	159	47,700
Illinois	Urbana	Illinois Industrial University	In. College.	15	187	187	28,200	570	56,000
Missouri	Columbia	Missouri University—Agricultural Department	Univ. Dept.	6	70	70	3,040	640	60,000
Michigan	Lansing	Michigan Agricultural College	In. College.	13	166	166	16,880	676	47,320
Iowa	Ames	Iowa State Agricultural College	In. College.	15	300	75	34,822	850	51,000
Minnesota	Minneapolis	Minnesota University—Agricultural Department.	Univ. Dept.	8	6	6	13,901	120	12,000
Wisconsin	Madison	Wisconsin University—College of Agriculture	Univ. Dept.	16	124	124	13,490	196	40,000

As already stated, I have obtained the reports of the most of these colleges for 1879-80, and, if you will bear with me, I will condense the more valuable facts relating to each as we go on, merely mentioning those that are agricultural departments of other colleges or universities. And in taking up the several States, I generally take those down the Atlantic coast, around the Gulf, and then inland, following the course, I daresay, in which I learned them when a school-boy. Allow me, therefore, to proceed in that way, and take as first in order:

(1) *Maine,*

and before saying anything about this one in particular, allow me to say that I will take up the points regarding any college in the following order:

1. Establishment, location, and buildings.
2. The staff.
3. Course of study and departments.
4. Terms of admission.
5. Terms and sessions.
6. Boarding establishment.
7. Library, laboratory, and museum.
8. The farm and general character of the farming.
9. The farm buildings.
10. The stock and implements.
11. The departments of the farm.
12. The labour system.
13. Rules and regulations.
14. Revenue and expenditure.
15. Salaries and fees.
16. General management.
17. Results.

Of course I will not treat on more than one or two of these points perhaps in each, but when I do so they will follow in the order indicated. To return then to *Maine.*

The State Agricultural College is situated between the villages of Orono and Upper Stillwater, a mile from each, and nine miles from Bangor. The buildings are in three parts—two form dormitories and class-rooms, the third forms the library, laboratories, and museum. Besides these there are residences for the professors. Of the latter there are eight, namely, a professor of English literature and moral science, who is President; a professor of mathematics and physics; a professor of chemistry; a professor of civil and mechanical engineering; a professor of natural history; a professor of modern languages and military instructor; a professor of drawing and field engineering; and a farm superintendent and professor of agriculture. Besides, there are also a steward, a secretary, and a librarian.

There are five full courses:

1. A course in agriculture.
2. A course in civil engineering.
3. A course in mechanical engineering.
4. A course in chemistry.
5. A course in science and literature.

The course in agriculture is one of four years, and is as follows:

FIRST YEAR.

First Term.	*Second Term.*
Physical geography.	French.
Meteorology.	Algebra and geometry.
Algebra.	Farm drainage and botany.
Rhetoric.	P.M. Book-keeping and labour.
P.M. Labour on farm.	

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SECOND YEAR.

First Term.	*Second Term.*
French and farm implements.	Mechanical cultivation of the soil.
General Chemistry.	English literature and physics.
Trignometry.	Analytical geometry and qualitative chemistry.
P.M. Free hand drawing and chemistry.	P.M. Mechanical drawing and field work.

THIRD YEAR.

First Term.	*Second Term.*
Physics.	Zoology and entomology.
Physiology and anatomy.	German.
German.	Astronomy and mechanics.
Agricultural chemistry.	P.M. Chemistry and experimental farming
P.M. Chemistry.	Analysis of American authors.
Analysis of English authors.	

FOURTH YEAR.

First Term.	*Second Term.*
Comparative anatomy.	U.S. Constitution and political economy.
History of civilization.	Mineralogy and geology.
Dairy farming and stock breeding.	Cultivation of cereals.
Historical readings and analysis.	Landscape gardening
P.M. Experimental farming and agricultural botany.	Rural architecture.
	Sheep husbandry.
	Mental and moral science.

The terms, it will be seen, are two in number, and correspond to what are usually called sessions. The first extends from the 6th February to the 28th June ; the second from the 7th August to the 23rd November. Candidates for admission must be fifteen years of age, and pass an examination on the ordinary English branches, algebra to quadratics, and the first five books of Euclid. The College furnishes everything for the boarding house. The library has 2,640 volumes, constantly being added to. The laboratory is a good one and the museum is rapidly filling up with specimens. The farm contains 370 acres. The farming is not of a very high order. The value of the stock is given at about $5,000. There are Shorthorn, Ayrshire, and Jersey cattle ; Cotswold and Southdown sheep ; and Yorkshire and White Chester pigs. There are the usual farm implements in good style and quantity. The receipts of the farm for 1876—the year I have—is put down as $3,257.76, whilst the expenditure is $4,046.90. Experiments of various kinds are carried on. The students are required to labour three hours a day. The cost of board is $2.60 per week, fuel and washing, 50 cents additional. Rooms are free, but bedding and furniture, as also light, has to be furnished by the students. Tuition is free to all residing in the State ; to outsiders it is $12 a term. There are the usual literary and other societies. The regulations are strict. Amongst them may be mentioned one compelling all students to attend daily prayers and public worship on the Sabbath in some one of the churches in the neighbouring villages.

The revenue was (speaking of 1876) $20,354.52, made up of $9,398.10 from the Endowment fund, $8,000 of a Legislative grant, and $2,911.33, the proceeds of a loan of $3,000. The expenditure was the same amount, made up of $12,400 for salaries and $7,954.52 for expenses. None of the latter was for board. The salary of the president was $2,000 per annum ; that of the others ranged from $1,500 to $1,800 per annum. The College was under a board of nine trustees, who reported directly to the State Legislature. I cannot speak as to the results, but know that the College is in a better condition now than in 1876. You will pardon the somewhat lengthy condensation of the facts regarding this institution, for they will do as a standard to judge others by. I pass no opinions regarding any of them.

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(2) *New Hampshire.*

The Congressional endowment was appropriated by Dartmouth College, situated at Hanover, whose authorities bought a farm of 365 acres, worth $21,000. The result is, that out of 439 students attending in 1879, twenty-four only were taking the agricultural course. The sum of $4,800 is realized annually by the endowment, or $200 an agricultural pupil. The total number that have graduated in agriculture out of thousands graduating, is twenty-six, of whom twelve are now farming. If these figures be not enough to show the utter folly of an agricultural department to an ordinary college, it may be mentioned further, that last year the stock reported on this farm was eight cows, fifteen heifers, two horses, one Durham bull, and four pigs. Comment is needless. I will trouble you very little with statistics regarding agricultural departments in the colleges that have managed to get the Congressional grant, for they have been from the point of view of true agricultural education, utter failures. Indeed, this in New Hampshire is one of the best of them.

Vermont.

The University of Vermont accepted the Congressional Land Grant and formed an agricultural department. The amount of the interest of it for 1875-76 was $8,130. Out of 303 students attending the university during the session mentioned, four were taking an agricultural course.

(3) *Massachusetts.*

This State has under operation one of the most successful agricultural colleges in the United States, and it is so because it teaches agriculture and nothing else. The mechanical part is taken by the Massachusetts Institute of Technology at Boston. The college is situated near the Town of Amherst. The buildings consist of two large dormitory buildings capable of accommodating about 110 students, eight dwelling houses for the professors, the college building proper, with class-rooms, library and laboratories, green and hothouses and farm buildings. The staff is composed of:

1. The President and Professor of Botany and Horticulture.
2. Professor of Agriculture.
3. Professor of Mathematics.
4. Professor of Chemistry.
5. Professor of Modern Languages.
6. Professor of Natural History and Military Science.
7. Two or three other teachers.

The course of study, which is one of four years, is as follows:

FIRST YEAR.

Agriculture, Botany, Chemistry, Human Anatomy and Physiology, French, Geometry, Algebra, Elocution and English Composition.

SECOND YEAR.

Agriculture, Organic Chemistry, Comparative Anatomy, Pathology, Dairy Farming, Market Gardening, Analytical Chemistry, Zoology, Mensuration, Surveying, Drawing, Commercial Arithmetic and Book-keeping, Laboratory Practice and German.

THIRD YEAR.

Agriculture, Horticulture, Agricultural Chemistry, Systematic Botany, Mineralogy, Fruit, Forest, and Vine cultivation, Physics, Astronomy, Entomology, Rhetoric, English Composition, and Drawing.

FOURTH YEAR.

Stock Farming, Rural Architecture, Landscape Gardening, Mental and Moral Philosophy, Geology and Physical Geography, Engineering, Political Economy, and English Literature.

There are three terms in the year. A good library and an excellent laboratory exist. The boarding house accommodates 110. Two students have each a bed-room and a study in common. The farm is good, stock and implements of the latest. Two hours a day every other day is the minimum amount of labour. The cost is about $250 a year. The tuition fee is $12 per term; room rent, $5 per term; board, $3.50 a week; washing, 50 cents per dozen; incidentals (chemicals, etc.), $6 a term. Almost every agricultural society offers a bursary of $50 per annum, and the institution is supported, not only liberally by the State, but by private endowments. The amount of the endowment fund is now $360,067, but the interest is divided between the College and the Institute of Technology. It is under a Board of Management, which reports to the State Legislature.

(4) *Rhode Island.*

Brown University has obtained the endowment, amounting to about $6,600 annually. Out of 260 students attending during the session of 1879-80, only 8 were pursuing agricultural studies. There is no farm.

(5) *Connecticut.*

The interest on the fund arising from the Congressional Land Grant, amounting to about $8,100 annually, is appropriated by the famous Sheffield Scientific School, with its 1,200 students learning various mechanical arts.

(6) *New York.*

The endowment has gone in this State to the support of an agricultural department, or as they call it, a college of agriculture, in Cornell University. It yields a yearly revenue of about $35,000. During the session of 1879-80, out of 463 students attending Cornell, 35 were pursuing the agricultural course. Out of the 600 graduates, 8 have graduated as bachelors of agriculture. The farm contains 150 acres, valued at $22,000. Experiments are carried on. Though like all university agricultural departments, this is a failure, it is owing to the system, and not to the teaching or system of teaching, as the following curriculum will show. The numbers refer to the hours per week during which lectures are received:

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and Conic Sections (5); Drawing, free-hand (3); German (5), Rhetoric and Composition (2); Six lectures on Hygiene, beginning on the first Tuesday in the term.

Second Term.—Algebra (5); Drawing, free-hand (3); German (5); Rhetoric and Composition (2).

Third Term.—Chemistry, general, practice and lectures (3); German (5); Rhetoric and Composition (2); Trigonometry and Mensuration (5).

SECOND OR SOPHOMORE YEAR.

First Term.—Chemistry, Agricultural (5); Chemical Practice, Qualitative Analysis (2); Anatomical practice (2); German (3); Experimental Mechanics (3).

Second Term.—Chemistry, Agricultural (5); Chemical Practice, Qualitative Analysis (2); Anatomical Practice (2); Zoology (3); German (3); Electricity and Magnetism (2).

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Third Term.—Botany, lectures (3); Field Work (2); Entomology, lectures (2), practice (2) (4); German (3); Land Surveying (4).

THIRD OR JUNIOR YEAR.

First Term.—Botany, compositæ and field work *or* practical horticulture (2); Entomology (3); Agricultural Chemistry, Quantitative Analysis (3); Heat (3); Veterinary anatomy and Physiology (5).

Second Term.—Acoustics and Optics (3); Botany (vegetable physiology), lectures (3); Vegetable Histology and Laboratory Work *or* Practical Horticulture (2); Chemical Practice, Quantitative Analysis (4); Veterinary Medicine and Surgery (5).

Third Term.—Acoustics and Optics (3); Botany, special field or laboratory work *or* practical floriculture (3); Chemical Practice, Quantitative Analysis (5); Veterinary Medicine and Surgery (5).

FOURTH OR SENIOR YEAR.

First Term.—Agriculture, lectures (5); practice (3) (Tuesday and Thursday afternoons); Botany (fungi) (3); Principles of Horticulture (2); Geology (3).

Second Term.—Agriculture, lectures (5); practice (2) (Tuesday and Thursday afternoons); Botany (systematic and applied, lectures) (3); Laboratory Work on Gramineæ special groups (2); Horticulture (2).

Third Term.—Agriculture, lectures (3); practice (3) (Tuesday and Thursday afternoons); building Materials and Construction (2); Constitutional Law (5).

In Cornell, with all her fame, agriculture is simply a university department, and therefore a failure. Nothing more need be said; nor need the curriculum of the Agricultural course of any other college or university be given.

(8) *New Jersey.*

Rutger's Scientific School, situated near New Brunswick, with a staff of 11 professors and 162 pupils, appropriates the Congressional land grant (which is giving now $6,900 annually) by buying an adjoining farm of 100 acres for $45,000.

(9) *Delaware.*

Delaware College, with 5 professors, 3 assistants, and 43 students, obtains the endowment of $4,980 annually by making an agricultural course and buying a farm of 80 acres.

(10) *Pennsylvania.*

In 1863 this State accepted the offer of Congress of the year before, and applied it to the endowment of its State Agricultural College which had been founded in 1859. This institution is situated in the Village of State College, Centre County. The main building, built like our own, of magnesian limestone, is 240 feet long, 80 feet of an average breadth, and five stories high, exclusive of attic and basement. It contains the usual public rooms, library, laboratories, museum and dormitories. Improvements made in 1878 render everything very complete. The water used in the building is pumped from an artesian well and is inexhaustible in supply. The sewage system is complete, and every room, hall and passage-way is supplied by one or more upright steam radiators on the most improved system of steam heating. The laboratory facilities are above all most excellent. The staff is composed of eleven professors, four assistants, and four other officers. The curriculum is divided into four courses of study—an agricultural course, a classical course, and a scientific course. These courses run into each other a little, as, for instance, the scientific course supplies the agricultural one with the elements of the pure sciences. The following are the subjects of the agricultural course, the numbers representing the hours per week devoted to the particular subject:

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AGRICULTURAL COURSE.

FRESHMAN.

Fall Session.		*Winter Session.*		*Spring Session.*	
Agriculture	5	German	3	German	3
German	3	Higher Algebra	5	Physiology	2
Higher Algebra	3	Physiology	4	Elementary Botany	5
History	4	Elementary Botany	3	Geometry	5

SOPHOMORE.

Fall Session.		*Winter Session.*		*Spring Session.*	
Horticulture	4	Plant Culture	5	Soils	4
General Chemistry	4	General Chemistry	4	Agricultural Chemistry and Lectures	4
Geometry	5	Trigonometry	4	German	2
German	2	German	2	Animal Physiology	5

JUNIOR.

Fall Session.		*Winter Session.*		*Spring Session.*	
Farm Machinery	3	Fertilizers	3	Domestic Animals	4
Surveying	3	Physics	3	Physics	3
Zoology	2	General Geometry	3	Constitution of United States and Pennsylvania	2
German	2	Zoology	2	Zoology	2
Rhetoric	3	German	2	German	2
Physics	2	National Economy	2	Rural Law	2

SENIOR.

Fall Session.		*Winter Session.*		*Spring Session.*	
Veterinary Science	3	Rural Architecture	2	Landscape Gardening	3
Physics	3	Rural Economy	1	Astronomy	5
Geology	3	Geology	4	English Literature	2
Moral Philosophy	2	Physics	3	Mental Philosophy	5
English Literature	2	Logic	3		
Civil Engineering	2	Entomology	2		

Students desiring a shorter course in Agriculture are permitted, upon action of the faculty, to select from the different years of the above course any studies taught the same session and not conflicting in time of recitation, for which they are found prepared. Certificates, under the seal of the College, of the amount of work thus done are given to such students.

As will be seen, the course is one of four years, and there are three sessions in each year. There is a library of 2,000 volumes, and an extensive laboratory in which, for each of the last two years respectively, the agricultural students are required to spend 180 hours annually at practical analysis.

The farm is one of 240 acres, besides those taken up by buildings, etc., making in all 300. Different breeds of cattle, sheep, and pigs, and the latest improvements in implements are found, though the farming is not of a very high order. The students all labour for two hours daily, either for three, four, or five days out of each week. The students room in the building, paying for rent, heat, use of furniture and incidentals, $69 per annum. Board is $3 per week, and washing fifty cents per dozen. Tuition is free.

The buildings and farm are valued at $532,000, and on them there is a mortgage for $33,000. The amount received from the endowment fund is about $25,000 annually. During the session of 1879-80 there were 159 pupils, of whom 37 were ladies. Of 116 graduates since 1862, there have been 43 graduates in agriculture, though only 12 are

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known to be at present (1880) following agricultural pursuits. The management is in the hands of a board of 23 trustees, of whom eight are *ex officio* members. One-third of the remaining 15 are elected annually in rotation, the constituency being ultimately the delegates from the county agricultural associations. In connection with the institution are three experimental farms.

(11) *Maryland.*

I need not trouble you with any lengthened description of Maryland Agricultural College, for though it be an independent college it is on much the same plan as those already described. It is situated in Prince George County, near College Station, nine miles from Washington and 28 from Baltimore. The main building is of brick, 120 feet long, 54 feet wide, and six stories in height, and contains the usual public rooms and dormitories. Candidates for admission pass an examination on the ordinary English branches. The course of study is one of four years, with two sessions in each year. It is divided up into seven departments, of which mathematics is one and classics another. The farm is one of 286 acres, valued at $14,000. Stock, implements, and mode of farming all poor. Fruit, flower, and kitchen gardens are good. The expenses of a student are put at about $105 per session, or $210 per annum. In 1876 there were 81 students in attendance. In that year the State grant was $6,000 to maintenance, and the interest on endowment was $6,900. The institution is under the management of 11 trustees, responsible to the State Legislature.

(12) *Virginia.*

There are three institutions in this State teaching agriculture and receiving a share of the endowment. The first of these is the Hampton Normal and Agricultural Institute for the higher education of the negroes. From this Institution come the Hampton singers, to whose sweet strains and plantation songs you have all doubtless listened. The second is situated at Morganstown and is mostly an agricultural department of the West Virginia University. The third is the Virginia Agricultural and Mechanical College, situated at Blacksburg. It was founded in 1872. The main buildings are two in number, each 135 by 45 ft., and two stories and a basement. There are, also, the usual professors' residences. The course of study has no new features that would render it worth while mentioning. It is more technical and not so general as either of the last two we have given. There are 7 professors and 3 assistants, and last session about 300 students. The annual income from endowment alone is about $21,000. The farm is one of 250 acres, and has good stock and implements.

(13) *North Carolina.*

Here the endowment, yielding $7,500 of an annual income, was obtained by the University of North Carolina, and the usual result followed.

(14) *South Carolina.*

In this State, Clafin University, situated at Orangeburg, secured the handsome endowment of $11,500 annually, though, unlike her sister just mentioned which has not even a farm, she purchased one of 116 acres for $10,000.

(16) *Georgia.*

This State has a method of her own in dealing with the matter we are considering. It forms a department of the Georgia State University, but there are four separate Colleges—all Agricultural Colleges—and all affiliated to the State University. The curriculum for each—the same one—is prescribed by the University and is as follows:—

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COURSE FOR DEGREE OF BACHELOR OF AGRICULTURE.

FRESHMAN CLASS.—1. English; 2. Algebra; 3. Geometry; 4. Linear Drawing; 5. History; 6. Botany.

SOPHOMORE CLASS.—1. English; 2. Algebra and Geometry completed; 3. History; 4. Book-Keeping; 5. Geometrical Drawing; 6. Trigonometry, Mensuration and Surveying, with Practical Exercises; 7. Botany and Zoology; 8. Agriculture.

JUNIOR CLASS.—1. Chemistry; 2. Agricultural Chemistry, with six hours per week laboratory practice; 3. Natural Philosophy; Mechanics of Solids, Liquids and Gases; Acoustics, Light and Heat; 4. Natural History; 5. Surveying and Drawing; 6. Agriculture—its principles, its methods, its products, methods of propagating plants, general nursery management, practical illustration on Experimental Farm; 7. French or German; 8. English Literature.

SENIOR CLASS.—1. Industrial Chemistry; 2. Agricultural Chemistry, including the chemical composition of the plant, the laws regulating its growth, the physical and chemical properties of the soil, the composition and manufacture of Fertilizers; 3. Laboratory practice in Agricultural Analysis, of six hours per week; 4. Natural Philosophy—Magnetism, Electricity, Meteorology; 5. Astronomy; 6. Agriculture—implements, crops, farm management, stock breeding, economy of labour; preparation of manures and composts, taught practically on the Experimental Farm; 7. Geology and Mineralogy; 8. Rural Engineering and Building Construction; 9. English Literature.

The North Georgia Agricultural College is situated at Dahlonega and was established in 1873. The staff is made up of 7 professors and one teacher. Last year there were 325 students in attendance, but 278 of these were in the preparatory class. The building is 122 x 87 ft. and three stories in height. Farming poor. The South Georgia Agricultural College opened in September, 1879, is situated at Thomasville, Thomas County. Buildings are three in number, all well equipped. In September, 1880, there were 170 students in attendance, 18 in the college course and 152 in the preparatory class. The Southwest Georgia Agricultural College was opened at the same time as the last, at Cuthbert, Randolph County. Buildings, when completed, will accommodate 350 students. This session there are 178 students, of which 21 are in the College and 157 in the preparatory class. The Middle Georgia Agricultural College opened in January of this year, is situated at Milledgeville, Baldwin County. There are 351 students in attendance this session, though it be the first. Tuition is free in all the four, and expenses run from $10 to $15 per month. All are under the authority of the University of Georgia, which receives for them from the endowment fund about $17,000 annually. ("Jimmy is hangin' roond a man they ca' Samuel Johnson wha' teaches a schule and caa's it an academie."—*Boswell.*)

(16) *Florida.*

The Florida State Agricultural College, situated at Eau Gallie, upon a farm of 4,000 acres, was only begun in 1877. The buildings are not even now fairly completed.

(17) *Alabama.*

The State Agricultural and Mechanical College is situated at Auburn, Lee County, sixty miles from Montgomery, on a farm of 100 acres. In 1877 it had a staff of six professors and two assistants, and an attendance of 98 pupils. The curriculum is divided into four courses, and a student can graduate in any one of the four. They are Agriculture, Literature, Science and Engineering. There is nothing particular to be noted about the Institution.

(18) *Mississippi.*

In this State the Congressional Land Grant amounting annually to $11,357.50, [*Mr. Johnston.*]

is divided between two universities, the University of Mississippi, and Alcorn University, neither of which report any students attending lectures in the agricultural department.

(19) *Louisiana.*

Situated on a farm of 600 acres near New Orleans, the Louisiana State Agricultural and Mechanical College has only got fairly to work. It has been dealt very liberally with by the State, and the amount of income from the Land Scrip Grant is about $13,500 annually. There is no new feature worth noticing except that very successful evening lectures for mechanics are carried on in connection with the mechanical branch of the institution.

(20) *Texas.*

The annual catalogue for this year, which is the fourth that has been issued, gives the number of students as 144, and of professors as 10. The President reports a scheme for complete reorganization, and the young and energetic professor of practical agriculture, who has just entered on his duties, promises to make his branch what it ought to be on a farm of 2416 acres.

(21) *Kansas.*

This State, though one of the youngest, is known to be one of the most energetic of the United States, and has an interest to us because that so many Canadians are to be found settled within its borders. Its usual energy has been displayed in the matter of agricultural education. The State Agricultural College, situated at Manhattan, is emphatically *the college* of Kansas. The Buildings are—the College, of which the north wing, 52x108, only is completed; the Chemical Laboratory, in form of a cross, 36x 99 and 46x75, of one storey; the Mechanic's Hall, of two stories, 39x103; Horticultural Hall, 32x80, of one storey; Societies' Hall, 46x96, of two stories; and the old Bluemont College, with additions used as the Boarding House. The staff is composed of six professors, two masters and four superintendents, and the curriculum is a very composite and meant to be a very practical one. For besides the department of Practical Agriculture there are departments of Drawing, Printing, Telegraphy, as well as Sewing and Household Economy, and out of 276 students attending in the session of 1879-80, no less than 73 were ladies. So that whatever experience we may gain from this Institution in the matter under consideration, no doubt valuable information not found in any report of course, could be obtained on the question of the co-education of the sexes. The year, which commences on the 8th of September, and ends on the 8th of June, is divided into the Fall, Winter, and Spring terms. The following, then, is the regular course of studies laid down last fall for this session:—

STUDIES FOR 1880-81.

FALL TERM.

First Year.—Arithmetic. English Structure. Geometrical Drawing.
Second Year.—Algebra completed. Elementary Chemistry. Horticulture.
Third Year.—Geometry. Elementary Chemistry. Botany.
Fourth Year.—Agriculture or Hygiene. Meteorology. Psychology.

WINTER TERM.

First Year.—Book-keeping. English Analysis. U. S. History.

Second Year.—Geometry, with Drawing. Practical Agriculture, or Household Economy. Organic Chemistry and Mineralogy.

Third Year.—Trigonometry and Surveying, or Household Economy. Organic Chemistry and Mineralogy. Horticulture.

Fourth Year.—Logic. U. S. Constitution. Zoology.

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SPRING TERM.

First Year.—Algebra. English Composition. Botany, with Drawing.

Second Year.—Geomctry completed. Entomology and Anatomy. Analytical Chemistry, or Household Chemistry and Economy.

Third Year.—Analytical Chemistry, or Household Economy and Chemistry. Mechanics, with Drawing. Agricultural Chemistry, or General History.

Fourth Year.—Geology. Political Economy. Agricultural Chemistry.

Students are allowed to enter at 14, on passing an examination on the three R's, Grammar, Geography and History. The Library has in it some 3,000 volumes, the Museum is fast filling up with collections of grains, grasses, plants, woods, insects, models, and instruments, and the Chemical Laboratory is divided into six rooms fitted with tables and apparatus for 40 students at simultaneous work.

There are two farms of 155 and 100 acres respectively. There arc herds of Shorthorn and Jersey cattle, of Berks and Essex pigs. The mechanical side is largely developed, as there are a carpenter's shop, a shop for iron work, a printing office, a telegraph office, sewing rooms, and "kitchen laboratories." (I give the word as I get it, supposing that it means "kitchens.")

All the students are forced to labour one hour per day, but voluntary labour at eight cents an hour is encouraged in the shops or in the fields.

Tuition is free. The college takes nothing to do with board, and as it is only one mile from Manhattan the students are able to walk out and in to the town. The average expense is placed at from $60 to $150 per annum. The annual interest of the endowment is about $20,500, and that with fees and occasional grants from the State Legislature towards capital account is found to be sufficient. The college is under the control of a Board of Regents, which reports triennially to the State Legislature.

(22) *Arkansas.*

The Arkansas State Industrial University is situated at Fayetteville, on a farm of 100 acres. It leans to mechanical studies more than agricultural. In 1877, out of 270 students, only twenty-five were in the agricultural course. As I intend describing Illinois Industrial University pretty fully, and this is on the same plan, I will pass on.

(23) *Tennessee.*

(23.) The Land Grant under the Act was obtained by the East Tennessee University, changed last year to "The University of Tennessee." It amounts to the sum of about $23,700 annually. Agriculture is therefore one of the departments of Tennessee University. The usual results have followed. Out of 275 students attending last session, thirty-seven were taking lectures in agriculture, and then only in connection with other courses.

(24) *Kentucky.*

In 1878 the agricultural department of Kentucky University, which had previously enjoyed the endowment, was separated from it, and became the Agricultural and Mechanical College of Kentucky. It is situated at Lexington, in the city park of fifty acres. Its name is, however, I am afraid, simply a misnomer, for the curriculum is altogether too pretentious for that of an agricultural college, whilst the facilities for teaching practical agriculture are wanting. Time, however, will tell. In 1879-80 there were 136 students.

(25) *Ohio.*

In this State a course directly opposite to that of the last-mentioned one has been followed. The Ohio Agricultural and Mechanical College, which was organized in 1873, and managed as such for five years, became, by an Act of the State Legislature of May 1st, 1878, "The Ohio State University." It received a fine start, as when founded in 1870,

the endowment was already $500,000. Franklin County and Columbus City gave a bonus of $328,000 to have it located there, and the State has given in Legislative grants on capital account since 1870 over $300,000. The number of students has gradually increased—90, 118, 143, 254, and 309, making the steps forward until, as a State University, it commands a still greater number. But as an agricultural college, it has sealed its fate. In 1879 it was hard work to gather together the requisite thirty students to attend a course of lectures on agriculture. Its farm of 320 acres is rather well farmed—a something not always the case in these institutions.

(26) *Indiana.*

The endowment, now amounting to about $320,000, was obtained by Purdue University, situated at La Fayette. One student out of 150, according to the latest accounts, manifested a leaning to agricultural subjects.

(27) *Illinois.*

Perhaps one of the finest industrial universities to be found anywhere is "The Illinois Industrial University," situated at Urbana, Champaign County, Illinois, sixty miles south of Chicago. But it can scarcely be called an agricultural college, except as the latter forms part of an industrial university. The buildings are fifteen in number. We have no time to enter on a description of them. They form one of the finest set of college buildings on the continent. The chemical building, containing five laboratories, all completely equipped, is supposed to be one of the best in the world. There are four colleges, divided into twelve schools. These are as follows:

I. College of Agriculture.

II. College of Engineering.

1. School of Mechanical Engineering.
2. School of Civil Engineering.
3. School of Mining Engineering.
4. School of Architecture.

III. College of Natural Science.

1. School of Chemistry.
2. School of Natural History.
3. School of Domestic Science.

IV. College of Literature, Science and Art.

1. School of English and Modern Languages.
2. School of Ancient Languages.
3. School of Art and Design.
4. School of Military Science.

The following is the curriculum for the "College of Agriculture."

Agricultural Course

Required for the Degree of B. S. in College of Agriculture.

FIRST YEAR.

1. Elements of Agriculture, Chemistry, Trigonometry, Algebra and Adv. Geometry. Shop Practice (optional).
2. Elements of Horticulture, Chemistry, American Authors, or Free Hand Drawing.
3. Vegetable Physiology, Chemistry, Rhetoric.

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SECOND YEAR.

1. Agricultural Chemistry (Soils and Plants), Botany, German.
2. Agricultural Chemistry (Tillage, Fertilizers, Foods), Botany, German.
3. Economic Entomology, Zoology, German.

THIRD YEAR.

1. Agricultural Engineering and Architecture, Animal Anatomy and Physiology, Geology or Ancient History.
2. Animal Husbandry, Veterinary Science, Physics or Mediæval History.
3. Landscape Gardening, Veterinary Science, Physics or Modern History.

FOURTH YEAR.

1. Meteorology and Physical Geography, Mental Science, History of Civilization.
2. Rural Economy, Constitutional History, Logic.
3. History of Agriculture and Rural Law, Political Economy, Laboratory Work, Graduating Thesis.

The terms and sessions are the regular University ones, whilst libraries, laboratories and museums are on the University scale.

The farm of 623 acres is divided into a general and stock farm of 410 acres and an experimental one of 180; and different breeds of cattle, sheep and pigs, with the latest implements, are kept. Tuition is free. The annual expenses are set down at from $123 to $250 per annum. As to rules and regulations the following quotation from the last report may be of interest :—

"STUDENTS' GOVERNMENT.

"For several years an experiment has been in progress, in self-government of the Students of the University. By permission of the Faculty, the General Assembly of the Students was organized, and a constitution adopted providing for the election of a President, Vice-President, Secretary and Marshal; for a Senate of twenty-one members, a court consisting of a Chief Justice and two Associate Judges. Under this constitution laws are enacted by the Senate, which become valid only when approved by the Regent and Faculty of the University. All offences against these laws are tried before the Student's Court, and punished by fines according to the class of the offence. Students refusing to pay the fines imposed by the Student's Government are referred to the Faculty, and if sentence is approved, are sentenced to such penalties as the Faculty may deem proper. The government has thus far rendered important aid in maintaining good order in the dormitories and grounds, in preserving public property, in preventing the visiting of saloons, and in other matters requiring the intervention of authority, and above all in cultivating kindly relations between the Students and Faculty, and a spirit of manliness and self-control."

The question of Revenue and Expenditure can be of no interest to us as the Institution is so large. The staff alone numbers 30. The whole is under the control of a Board of Trustees. And lastly the result in the matter of agricultural education is highly unsatisfactory. During the session of 1879-80 out of 474 students in attendance only 14 were pursuing an agricultural course.

(28) *Missouri.*

Connected with the University of Missouri are 10 Academic Schools and 8 Professional Schools. One of the latter is Agriculture. By the report of 1879-80 I find that out of nearly 600 students in attendance 48 were in this school.

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(29) *Michigan.*

This was the first state in the Union to establish an Agricultural College, and the one so established, as it was the first so it has continued to be about the best, of all the agricultural colleges of the United States. It was opened in May, 1857, took advantage of the Morrill Act, under it became endowed, and gradually progressed until it has reached its present position. It is situated about three miles east from Lansing on the banks of the Red Cedar River, on a farm of 676 acres, which whenbought was almost all woods. The buildings, which are mostly of brick stand in the midst of grounds that have been laid out by a professional landscape gardener, whose plan is being gradually unfolded, and the process of development is the easier that the groves and part of the original forest are left untouched. There is in the first place "College Hall," 100x50, three stories and basement; in the second, "Boarding Hall," 116x116, three stories exclusive of basement and mansard; in the third place, "Dormitory," 50x84 of three stories; in the fourth place, the "Laboratory," 51x100 of one story and basement; in the fifth place a row of six dwellings for the president and professors; in the sixth place, the farm house and labourers' cottages; in the seventh place, the green houses and shops; and in the last place, the farm buildings, including amongst other things, four barns. The staff is as follows:—

1. President and Professor of Mental philosophy.
2. Professor of Chemistry and Curator of the Laboratory.
3. Professor of Zoology and Entomology, and Curator of the General Museum.
4. Professor of Botany and Horticulture, and Curator of the Botanical Museum.
5. Professor of English Literature and Librarian.
6. Professor of Practical Agriculture.
7. Instructor in Mathematics and Civil Engineering.
8. Assistant in Chemistry.
9. Secretary.
10. Foreman of the Gardens and Assistant Foreman.
11. Foreman of the Farm and Assistant Foreman.
12. Steward.

The academic year is divided into three terms which are rather singularly arranged. The first term begins on about the 23rd February and ends about the 23rd May; the second about the 29th May and ends about the 22nd August; and the third begins about 30th August and ends about the 22nd November. The following arrangement of lectures for 1877 gives the full curriculum as well as a complete idea of the order of teaching. The course, it will be seen, is one of four years:—

First Term, 13 Weeks.

Years.	8 A.M.	9 A.M.	10 A.M.	11 A.M.
Senior.....	Agriculture.	Physiology.	.....	Mental Philosophy.
Junior	Mechanics 7 weeks.	Agricultural Chemistry	French.	Drawing 6 weeks.
Sophomore .	.....	French.	Geometry.	Elementary Chemistry.
Freshman ..	Algebra A.	Algebra B.	Composition A. History B.	History A. Composition B.

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SECOND TERM, 12 WEEKS.

YEARS.	8 A.M.	9 A.M.	10 A.M.	11 A.M.
Senior.....	.....	Political Economy, 6 weeks. U. S. Constitution.	Moral Philosophy.	Zoology and Geology.
Junior.....	.....	Entomology.	French.	Physics.
Sophomore .	French.	Organic Chemistry and Blowpipe Analysis.		Trigonometry and Surveying.
Freshman ..	Botany A. Algebra B.	Algebra A. Botany B.	.....	Agriculture.

THIRD TERM, 12 WEEKS.

YEARS.	8 A.M.	9 A.M.	10 A.M.	11 A.M.
Senior.....	Astronomy 6 weeks. Landscape Gardening	.....	Logic.	Civil Engineering.
Junior.....	Astronomy, 6 weeks.	English Literature.	Anatomy 6 weeks.	Meteorology.
Sophomore .	Analytical Chemistry.	Analytical Chemistry.	Analytical Chemistry.	Mechanics.
Freshman ..	Botany B. 6 weeks. Book-keeping.	Botany A. 6 weeks. Geometry B.	Geometry A. French B.	French A.

Candidates for admission must be 15 years of age, and pass an examination on the ordinary English branches. The library and museum, especially the "museum of mechanical inventions," are good, but the most complete thing about the institution is the Laboratory, which includes a model lecture room for 80 students, an analytical room for 48 working students, rooms for higher chemical analysis and researches, the Professor's private laboratory and study, and store rooms for a splendid set of instruments and chemical apparatus.

Of the 676 acres about 300 have been cleared and laid out in systematic order. The farming is not what we would call first class. The means of illustration are however good and consist of six breeds of cattle, five of sheep and four of pigs, an apiary, a greenhouse of four rooms, a flower garden and lawn, a kitchen garden, small fruit garden herbarium, and an experimental plantation. All the students are required to labour at least three hours daily, and are paid for labour that is worth anything at the maxium rate of ten cents per hour. Tuition is free, matriculation and graduation fee respectively are five dollars. Room rent is $1.25 per term, students furnishing all furniture and bedding. Board about $2.75 per week, washing 42 cents per dozen. Students pay $20 in advance on board bill. They pay for incidentals and chemicals per annum the sum of $18.75. The rules and regulations are pretty strict. Regarding them the following extract may be of value:—

"The maintenance of order in the Dormitory and Boarding Hall is largely entrusted to the students, who for this purpose have organized themselves into seven districts. These select captains and lieutenants, who make and execute rules, and councilmen, who form a court for the trial of offenders. Each district holds an election for the choice, by ballot,

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of the three officers, on the second Saturday of each term. The executive officers meet weekly with the President of the College, and the proceedings of the council are subject to approval of the faculty."

The plan so sketched has however, I am given to understand, not worked so well as was expected. In 1879, the number of acres unsold of the Land Grant was 155,525. The total amount of proceeds of those sold and invested was $275,104.28, which yielded in interest $16,602.02. The following is the statement of revenue and expenditure as I gather it from the State Report for 1879, which is not very clear on the point:—

REVENUE.

Interest	$16,602 02
Current and Special Appropriations	7,087 74
Casual Revenue from Farm, Garden, &c.,	9,370 08
Receipts from Students	12,021 11
Total	$45,080 95

EXPENDITURE.

Salaries	$17,114 35
Boarding Hall	13,402 82
Special Appropriations	4,242 10
Expenses	10,490 45
Total	$45,249 72

There are a good many cross entries in the Treasurer's statement, but this is, I think, a fair summary of it. For board, the students paid in $8,872.68, and for it the Treasurer paid out $13,402.82, leaving a bonus to "Boarding Hall" of about $4,500. The salaries paid are the lowest of any college we have mentioned as yet, except Maine. The President receives $3,000 per annum, the next three professors $1,800, and the last two $1,400 each. The Secretary has $1,250, and the Foremen $600 each, except the Gardener, who receives $743 per annum. A special feature is a course of lectures to farmers, and a series of institutes delivered and held respectively during the winter months by the professors who are enabled to do so by the strange freak of having the long vacation at that season of the year. The general management of the institution is in the hands of the State Board of Agriculture composed of eight members, with the Governor of the State and the President of the College, members *ex officio*. Of 124 graduates up to 1877 the total number of agriculturists was 51, and of professors and masters in other agricultural colleges 11, making exactly 50 per cent following "agricultural pursuits."

(30) *Iowa.*

The Iowa State Agricultural College, which is situated at Ames on a farm of 850 acres, was opened in 1869. The buildings are very fine, and the two main ones very extensive. The staff is large, consisting of 13 professors, 6 masters, and 4 foremen. The course is wide in its range, and is divided into

1. School of Agriculture.
2. School of Horticulture.
3. School of Veterinary Science.
4. School of Domestic Economy.
5. School of Military Science.
6. School of Literature and Language.
7. School of Mathematics and Physics.
8. School of Chemistry.
9. School of Biology.
10. School of Philosophy.
11. School of Mechanical Engineering and Architecture.
12. School of Civil Engineering.

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In other words the term "Agricultural College" applied to this institution as to so many similar ones in the United States, is simply a misuse of the English language. The endowment nets annually about $40,000, and the State has erected all the bulldings.

(31) *Wisconsin.*

The University of Wisconsin, situated at Madison, has bought a farm of 196 acres, and obtained the endowment, yielding about $13,500 anually. In an historical sketch of the Institution, published in 1876, professing amongst other things to give the occupations of its 474 graduates, I do not see the word "farmer" after any of them.

(32) *Minnesota.*

The University of Minnesota, situated at Minneapolis, on a farm of 120 acres, worth $100 an acre, has obtained the proceeds of the Congressional Land Grant, amounting annually to about $14,000. During the session of 1879-80, out of 308 students in attendance, two were taking lectures in what the Calendar calls "The College of Agriculture."

(33) *Nebraska.*

The University of Nebraska, situated at Lincoln, has obtained the Land Scrip, but as yet none has been sold. Out of about 300 students in attendance, a baker's dozen are returned as "agricultural."

(34) *Oregon.*

Corvallis College, as the State Agricultural College is called, being situated at Corvallis, is gradually getting under way, but possesses no new feature, whilst its establishment in this new State has been so recent as to render it of little value for our purpose. The most of the lands forming the endowment are still unsold.

(35) *California.*

The University of California, situated at Berkeley, has obtained the proceeds of the Land Scrip grant, amounting to the munificent sum of about $45,000 annually, has a valuable farm of 200 acres, farms it well, has an excellent professor of agriculture, pays him handsomely, imports famous agricultural lecturers from the east to give courses of lectures every year, which are well attended and much appreciated, and does in fine, everything that a university could do to make its college of agriculture, with its excellent curriculum, both attractive and successful; and the result is, that, in the session of 1876-77, which is the one the report of which I have before me, out of 305 students in attendance, not a solitary name is enrolled in that "college."

I have given you, gentlemen, a brief sketch of all the agricultural colleges of the United States, and in now leaving them you will allow me to point out five conclusions which doubtless you have already drawn, and these are: that whilst there are many details about each and all of these institutions which are very valuable as precedents, yet:—

1. Had it not been for the Land Scrip Act of 1862, the most of them would never have been in existence.

2. The Agricultural Departments of the universities have been total failures.

3. Where the Act, in its entirety, has been carried out, and a "liberal and practical education of the industrial classes in the several pursuits and professions of life," given by the establishment of "Industrial Universities" or "Agricultural and Mechanical" colleges, the union has been found to be simply an adhesion not an amalgamation, and agricultural education has been very partially if at all successfully imparted.

4. That those institutions alone have been successful which have been purely "Agricultural" Colleges, and they can be counted on the fingers, and,

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5. That the most successful of all, for instance, those of Michigan and Massachusetts have been so, in so far as they not only adhered closely to agricultural subjects, and the sciences relating to agriculture, but also in so far as they excluded the merely literary from the purely technical studies, and in so far as they exacted a fair share of daily labour, and thus made the theoretical and practical go hand in hand.

As I have already said, with a few solitary exceptions, neither Asia, Africa, Australia, or South America affords us any precedents, and I need trouble you with no more dry summaries and statistics, but pass on to consider now "a posteriori"—

WHAT SHOULD BE THE SYSTEM OF AGRICULTURAL EDUCATION PURSUED; WHAT SHOULD BE THE SUBJECTS TAUGHT; AND WHAT APPLIANCES ARE NEEDED TO TEACH THEM IN A CANADIAN AGRICULTURAL COLLEGE.

But upon the very threshold of the subject, ere we can make any application of the precedents which we have for some hours been considering, there are two questions to be solved. Our subject, "Agricultural Education," is a two-fold one, having on the one hand an intimate relation to education, and upon the other just as intimate a relation to agriculture. And in order that an exact application of any of these precedents may be made, it would be necessary that the system of primary education and the economic condition of Agriculture should be, at least, somewhat similar to our own. Is this the case in any of the countries mentioned, except in the United States? Most undoubtedly it is not. In England, no general system of primary education was begun until 1868. In Scotland, though in 1870 an extended system of primary education was introduced, yet her parish school system educated almost every unit of the population, whilst in Ireland, a public school system has long been established. But in all three countries the economic condition of agriculture is much different from our own. In the two former, the profits are divided between the landlord, the tenant farmer, and the labourer, whilst in the portion of the latter in which this statement does not hold true—and it is about three-fifths of the whole—the sharers are the landlords, and the tenants who are identical with the labourers. And the tenant farmers are in all three capitalists as well as the landlords. In our Province, on the contrary, the profits are in the vast majority of cases shared only by one class, and that class includes in itself landlord, tenant farmer, and labourer. Hence the professed object of the Royal Agricultural College at Cirencester is to train, not so much farmers as we understand that term, but stewards, factors and managers of farms. In Ireland again this is one of the professed objects of the Institution at Glasnevin, whilst the training at the model agricultural schools is to suit the peasantry of Ireland whose holdings average, perhaps, one-tenth the size of ours. In no similar Institution within the compass of the United Kingdom could we find a model for ourselves, if it were for nothing but the fact that the economic condition of agriculture in the two countries is almost wholly dissimilar. Whilst not a system of peasant proprietorship in the technical sense of that term, ours is as far removed from the landed proprietorship of Great Britain on the other. The dissimilarity which is true of the mother country in this respect, though in different ways, is true of all the countries of Europe. In Norway and Sweden, the system of primary education cannot be compared with our own, whilst the economic condition of agriculture is very much different. In 1872 out of 252,776 owners no less than 226,022 were proprietors of less than 50 acres; and out of 295,983 given as tenants 185,693 were simply agricultural labourers with small cottier tenancies. When in the Swedish and Danish agricultural colleges we saw that the sons of the peasants did the manual labour and the pupils of the higher school looked on, it was enough to show us that we were studying a system that furnished no precedent to us as a system at any rate. It is unnecessary to dwell on Russia where the serfs were emancipated only within the last two decades, and which is to-day the chosen home of absolute government, except to say that her agricultural primary schools are amongst the most practical in existence and admirably suited to the agricultural condition of the country, though not to ours. In Austro-Hungary again the peasants became free allodial owners only in 1848; and out of 2,486,358 owners of land in 1875, no less than 2,348,110 farmed less than thirty acres.

In the north of Italy, France and the Netherlands, peasant proprietorship is rapidly becoming the almost universal rule as it has for a long time been in the ascendant, and it is well known that the peasant proprietors of France have had more to do than any other class in causing the rapid recovery of the nation from her disasters, and with the French law of descent the tendency is to still smaller holdings. In none of those countries is primary education so far advanced as in ours, and the farming as it is on a much smaller so it is on a more primitive scale. Spain and Portugal are nowhere, and Germany through all her States presents almost a complete contrast to us. Her system of primary and technical education is perhaps the best in the world, and the relation between the two is well worthy of our consideration, and perhaps imitation; but the feudal system is still prevalent, and the social condition of the peasantry as well as their relation to the other parts of the community, is almost totally different to that of our own farmers. Over three-fourths of Europe, we may confidently say, the word "estates" typifies the agricultural condition of affairs; over all this Province the word "farms" is symbolical of ours. In Europe, agricultural schools will train peasants, agricultural colleges turn out stewards and managers of farms; few if any would pretend to turn out at once the peasant proprietor holding his own plough and the manager controlling his own business. Yet that is what we must do, and hence, if for no other reason, no European system of agricultural education could be as a whole, copied by us whilst many of the features and details of each should be most admirable precedents for our guidance.

I have already given you my opinion of the system and its result in the United States, and need not repeat it. In that country the system of primary education, and the economic condition of agriculture most nearly resemble our own.

And now let us take ten minutes of our time yet, ere we enter upon the discussion of the real question, to consider *our system of primary education, and its results, and what the economic condition of agriculture in our Province really is.* What our system of primary education is I need not explain to *you*, gentlemen; you know it as well as I do. Let us rather consider its results. Those have, for a good few years back, not been at all, in my humble judgment, satisfactory. It is a very grave question whether we are not fostering what is euphoniously called higher education at the expense of the more elementary. Whilst the utmost extent of the most liberal education should be placed within the reach of the poorest in the land—as it is our proud boast is the case in Ontario—yet it must never be forgotten that a very large proportion of the producing classes cannot, from their circumstances, take advantage of it. The vast majority of them must graduate at the public school. If such be the case, I am strongly of the impression that the curriculum for those pupils should not only differ in degree, but in the comparatively higher stages of the public school course, where any difference can alone come in, it should differ in kind as well. I hold strongly that no graded system can, in a Province like ours, begin, for the children of every class of citizens at the alphabet and end in the University degree. And any such graded system, though beautiful to look upon, able to be handled like a vast brain-training factory, exciting to the master hands at the helm, and the foremen of the various departments, must yet bear as its legitimate fruit results such as thoughtful men are already beginning to discern in our midst—intellects packed but not trained, individuality repressed and originality slain, the main end of education blurred over if not forgotten in making the aim of a pupil's school life the passing one vast series of examinations, a false life ideal inculcated not directly but indirectly, and a miscellaneous medley of youths, whose natural place is the plough, the bench, the forge, or the mine, pitchforked into professions already full to overflowing, there to engage in a struggle in which by this process of "unnatural selection" there is not even the national satisfaction arising from being assured of the "survival of the fittest."

It is unnecessary to say that I do not think the results of our system of primary education quite satisfactory, but we deal only here with the system as to its results on the education of the agricultural class of the community, and then only in the relation thereto of a system of agricultural education. For such a system there is laid a good foundation by that of our public school system, if well administered. I will attempt hereafter to show

how I think it might be improved, but in the meantime pass on to *consider the economic condition of agriculture* in our Province.

In order to do so it will be necessary to take a retrospective glance at the history of agriculture in Ontario. It may roughly be divided into four periods. In the first place, there is the preliminary period from the settlement of the Province until about 1826, during which period agricultural progress was represented by a few frontier forest clearings. In the second place, there was a period of establishment from 1826 to 1854, during which period, roads, railways, canals, schools, churches, the separation of Church and State, the inauguration of municipal institutions, were the steps of political progress; whilst the clearing of the forest and the making our products, especially our wheat, well known were the steps of our agricultural one. In the third place, there was what I might call a period of rapid growth at the expense of vital force, extending from 1854 to, say, 1866. The growth was rapid because of the demand caused for our products by the Russian and American wars, and the facilities of exchange with America owing to the Reciprocity Treaty; and it was at the expense of vital force, because these circumstances conspired to make us take the products off the land without making a return to keep up its fertility. The fourth period, from 1866 to the present time, may be called that of young manhood, characterized by the growth of native manufactories, and the placing of our agricultural productions on the world's market, more fully than ever in competition with all the world. And this fourth period is also noted for the fact that almost all the richer land in the Province has for the last decade been taken up. We are to-day therefore competitors on the world's markets with all the rest of the world. In that competition we have to meet the productions of the vast prairies of the west and northwest, placed by advantageous through rates on that market at almost as little cost as our own; we compete with the vast capital of England, using the ryot labour of India, and the cheap labour of Europe operated by large capital under special feudal advantages; and we do all this under the disadvantages of a decreasing fertility of soil and a gradual change of climate (agriculturally, for the worse)—in a word, we compete as a country under the full operation of the law of diminishing return, which is:—that in order to obtain a certain additional increase from the land a greater proportionate amount of additional capital must be applied thereto. Within a quarter of a century the problem has completely changed. Then it was one of labour and the wages of labour; now there is added thereto one of capital and the profits of capital. And if the competition spoken of is to be successful, the history of agriculture in every civilized country shows that it can only be done in three ways—applying to the land immediately a large amount of capital; using the most improved processes of agriculture, whether those that increase the absolute amount of produce or decrease the expense of obtaining it; and lastly, by diffusing throughout the great mass of agricultural producers the utmost possible agricultural knowledge and skill, and the greatest amount of general and technical education. The first of those remedies is difficult to apply from the fact that the farmers have the next generation to set up, and very many have mortgaged their lands for improvements already made; but partial equivalents would be the growing of cattle instead of corn, taking advantage of the Drainage Act, and a stricter rotation of crops. But lying through and under it all is seen the absolute necessity, if we would grapple with the problem successfully, of diffusing the greatest amount of agricultural knowledge, skill and education through the great mass of agricultural producers. To handle capital one must needs be a man of business; to know the markets of the world and be acquainted with all advancements of agriculture the world over, requires both knowledge and intellectual training. To compete successfully as proprietors of small holdings possessing small capital, against cheap labour used by large capital, is now requiring and will henceforward require all the energy, knowledge and skill of our agricultural producers. The times are changing and we must keep pace with the change. The watchword of agricultural progress in Ontario to-day should be educate! educate! experiment! experiment! And both are now going on as rapidly as in any country that can be named. By our agricultural societies and exhibitions, by our grange societies when rightly conducted, by our agricultural periodicals and agricultural departments of newspapers, and by this Commission itself, the work of education is going on. But besides

these general means it is well to have a more special one that will train a succeeding generation of farmers as well educated for their business as any other class of the community is for its occupation. Many of this generation are so, but not a sufficiently large proportion, and the better educated professionally, the more is the farmer anxious that his sons who are to follow his occupation should be so as well. Bearing in mind then our primary system of education, the economic condition of agriculture in Ontario, the necessities of the future and our means of meeting them, let us apply the precedents we have cited

AND CONSIDER A SCHEME OF AGRICULTURAL EDUCATION FOR OUR PROVINCE.

I would suggest the following:

1. *The teaching of an agricultural text-book in all the public schools, especially in those of the rural districts.* In the latter as well, there might be taught a farm arithmetic specially prepared, the elements of farm book-keeping, of farm mensuration and land measuring. Those would begin in their proper place in the next to the highest division in the school, and be continued through the highest. They would not exclude other subjects, though nine-tenths of the three thousand rural school teachers of the Province and every School Inspector will bear me out when I say, that a rural public school which teaches thoroughly reading, writing, spelling, arithmetic, grammar, geography, and the elements of history to the majority of its pupils has fulfilled its vocation without being troubled with "other subjects" except they be in the practical line I have indicated. This agricultural text-book would be elementary in its character but would discuss—soils; the preparation of the land for crops; the succession of crops; the cultivation of crops; the improvement of soils and lands; the different breeds of farm animals; the breeding, rearing and feeding them; the implements of the farm; the general economy of the farm; the general business of the farm; and the relation of the various sciences to agriculture generally. In order that teachers should be able to teach the subject the third class ones would have those subjects placed on the course for their examination; the second class be taught them in the Normal Schools; and the first class allowed to spend three months of their last session free of expense at the Provincial Agricultural College. The same privilege might be accorded to those of the second who wished to do so as well. To have educated farmers is a material benefit to the State; what shall be taught in the public schools in order to render the latter eligible for State aid is a proper subject of direction by the State; and I submit that whilst a liberal education to all classes of the community is the proper object of the schools, yet the training of the future producers to be the better producers is not an unwise subsidiary object worthy of consideration by the State.

2. *Agricultural Middle Schools.*—I have already said that secondary education, in my humble judgment, whilst liberally assisted by the State should not be established by it. Those middle or high schools, if you would like so to call them, would be somewhat of a cross between the agricultural academies of Germany and the farm schools of France. There might be as many as could be established in the Province, but half-a-dozen would be sufficient for a commencement. That would give one to each of about eight counties. For arrangement I would suggest that each school be on a farm of 100, 150, or 200 acres —one of 150 would be best—and have about 40 resident pupils, working half and studying half-time, thus giving 20 steady workers all the time. Let the course of study be one of one, two or three years as the pupils needed it, and the subjects arranged on the method of the Provincial Agricultural College but extended on the practical side and curtailed to the elements and the business on the theorectical side. On each such middle agricultural school there would require to be a farm-house about three or four times the ordinary size. For establishment, it would cost in land, stock, implements and buildings at the outside about $25,000. I would have subscribed in those eight counties, with all the cities, towns or villages in them, 500 shares of $50 each and allow every share to be paid for in tuition, that is to say, each shareholder to have the right of having, say, one or two sons educated free at the school for a full course. And the shares would be

largely taken up by tradesmen, merchants, manufacturers, and others desirous of having some of their sons farmers as well as by farmers themselves. The staff would consist of a farmer and two trained assistants—one of whom would understand gardening—an agricultural teacher, who would be director, and an assistant. The net profits of the farm, that is the gross profits after the legitimate expenses of the farm itself as a farm are subtracted, and the amount received from the pupils should keep the boarding-house, the outside tuition fees meet the small miscellaneous expenses, and the expenses of the staff would alone have to be met by the State. Those should not be more than $2,500. If the Government gave only a proportion of the sum each County Agricultural Society, or each County Council for that matter, just as they now aid both public and high schools by grants, might increase the usefulness and efficiency of such schools by similar grants. The management might be placed under trustees appointed partly by the County Agricultural Societies or County Councils and partly by the shareholders. All the schools would be under Government inspection. If the student received a maximum rate of ten cents and a minimum of nothing per hour according to skill, application and knowledge, all this could be done, and board and washing not cost more than from $20 to $50 per annum. And the farm should be one of the prize farms of the eight counties and kept up to that point. Such is a brief outline of a proposed Middle Agricultural School.

3. *Prize farms, recommended by the County Agricultural Societies and registered with the Bureau of Agriculture*, whose proprietors were willing to receive pupils who should work like their own sons, but pass regular examinations on specified practical subjects conducted by the teachers and examiners of the Provincial Agricultural College where the examinations should be held semi-annually. In that case, the matter of expenses would be one of private arrangement between the parents and the proprietors of the farms, who would be required to guarantee assistance to the young men in teaching them the practical subjects necessary to pass such examinations.

4.—*The Provincial Agricultural College.*

Let us first of all suppose that no such institution is in existence, and see from our introductory consideration of the subject and the many precedents we have cited, what should be the leading features in such a College. Let us enumerate a few of them after premising :—

I. The institution must be practical as well as theoretical. Experience and the condition of agriculture in the Province imperatively demand it. To do this there must be a farm as well as a college.

II. It must be simply an Agricultural College and must exclude purely literary studies on the one hand and outside technical studies on the other. The failure of industrial universities and agricultural and mechanical colleges in the neighbouring Republic to teach agriculture shows that.

III. The students must labour through all the course.

Taking those three points as a foundation, let us now consider *seriatim* the various headings under which we have considered the Agricultural Colleges of the United States.

1. *The object.*—It should be two-fold : in the first place, the giving of a higher general and technical education to those about to engage in farming, and in the second place, to train farmers. Similar to those, as we have already seen, are the two objects included in all technical education.

2. *Location and Buildings.*—The institution would require to be situated in a well-farmed district of the Province and on a good farm, having, if possible, two or three different varieties of soil. The buildings would be, first of all, those relating to a college, secondly those belonging to a farm, and thirdly those required by the peculiar combination of the two. In erecting the college buildings, I would much prefer the European plan of having, as far as possible, one building, and that should include lecture and class rooms,

library, reading rooms and parlours, museum, laboratory, professors' studies, and dormitories, and because it is a boarding college, in a separate building if possible, the dining rooms, lavatories, laundries, storerooms, matrons' and servants' apartments. The farm buildings would include barns, stables, sheep-pens, piggeries, and poultry-houses ; and the peculiar buildings would comprise greenhouses, propagating houses, garden shops, carpenter and blacksmith shops.

3. *The Staff: Departments and Course of Study.*—The two things cannot be considered separately, and the latter may be considered in the first place. What then shall be the subjects taught? As a *business*, farming, as we have already seen, requires a knowledge of farm arithmetic, farm mensuration, land measuring and levelling, practical mechanics, farm bookkeeping, a knowledge of business forms, the relation of agriculture to the other industries and businesses of the country, the elements of the law of real and personal property, and an ability to write well and understand the English language. As a *trade* farming requiries a definite course of apprenticeship during which the pupils may acquire the knowledge and skill requisite in the performance of the various farm operations. As an *applied science*, it is necessary that the pupil should be taught the rules of practice of the most improved system of farming as practised by the most intelligent farmers, and the laws as derived from those rules of practice considered as the principles of the science, and these fall naturally into

(1) The principles relating to the treatment of the soil, its amelioration and recuperation by the use of manures; the varieties of farm crops, their succession, and the cultivation of the soil for them.

(2) The different varieties of the farm animals, the principles or rules of practice of the most improved systems of breeding, rearing and feeding them.

(3) As closely connected with the last, the structure and physiology of those same farm animals, and the commoner diseases to which they are subject, with the commoner remedies for those diseases.

(4) What may be called the principles relating to the mechanics of the farm, including the laying of it out, fencing, the principles of construction of the buildings, the architecture of each and all the farm buildings, and the varieties and principles of construction of the various farm implements and machines.

And now, lastly, as an *applied science* in the second and common acceptation of that term, we find that various well-known sciences touch agriculture at every point and a knowledge of them will throw light upon many points relating to the best and most approved methods of farming ; and along the line of a more perfect acquaintance with their various applications to agriculture may we expect the line of progress of agricultural knowledge to move in the future. Thus, standing in close relation both to the soil and to the plant, is Chemistry. And in all its parts of inorganic, organic, agricultural, and analytic, it is usually counted an important study in such institutions. Again, Geology and Physical Geography as showing how the soil is formed and explaining its different varieties are of value. Closely connected with the plant is, of course, the study of Structural and Physiological Botany ; whilst the various kinds of grasses, cereals and roots, their growth and diseases, can be studied under that partial form of Systematic Botany which is often called Economic Botany. In order to understand the structure and place of the farm animals, an outline of Zoology is requisite, as it also is in the study of the kinds, structure and habits of the insects beneficial and injurious to agriculture, which can be studied under the head of Entomology. Closely connected with agriculture is the climate, studied under the head of Meteorology ; and lastly, a more extended knowledge of the structure, physiology and diseases of the farm animals is given under the head of Veterinary Anatomy, Physiology, and Pathology. All that I have mentioned are, in my humble judgment, indispensable in the curriculum of an Agricultural College for Ontario. Thereon a few points have to be considered, such as :

(*a*) *Should "mechanical studies" be encouraged?*

The experience of the United States is sufficient to show, even if common sense did

not, that the two things cannot be taught together. Either one or the other must suffer, and whilst teaching the mechanical so far as it relates to farming, an Agricultural College should "stick to its text" and teach only what relates to agriculture.

(*b*) *Should this institution teach Horticulture or not?*

Now this question is an important one, but I am inclined to answer it in the negative. Insofar as Horticulture can go hand-in-hand with farming, it ought to be taught; but not so far as to profess to turn out gardeners as well as farmers. In the first place, the country is not so thoroughly populated, our towns and cities are not so large, nor the proportion between the urban and rural population sufficiently high, as to create an urgent demand for market gardeners; whilst in the second place, it would be attempting too much in the way of technical instruction in one and the same institution. A knowledge of the varieties of the standard vegetables and flowers, the best methods of cultivating, propagating and preserving them, would be of advantage to every farmer, and such a knowledge should be given. It would assist in cultivating a taste for the beautiful as well as the useful which would be of advantage in many a rural home, keep many a country youth within the parental halls, and foster a love for country pursuits, where bleak walls, unadorned surroundings, and gardens full only of weeds, if existing at all, drive many to find in towns and cities what they lack at home.

(*c*) *Again, should there be given a literary education at all, and if so, how far should it go?*

This will depend upon the standard of admission. Suppose we make that our standard for entrance into the high school. Then any student graduating at the Agicultural College should be able to pass at any rate the English course at the high school intermediate examination, as we call it. For he must be able to think, speak, and write on any of the agricultural topics of the day. And a few should be able to be agricultural teachers as well. But as we can always count on many well-educated young men, even graduates in arts of regular colleges being within the halls of such a technical institution, we may leave them out of account. There must be in the curriculum then, English grammar, English composition, English literature, and I should add, political economy, the elements of the law of real and personal property, and of municipal law. But classics, modern languages, moral and mental philosophy, and such studies should, I think, be left out. And the experience of the colleges we have considered bears out my contention. In this connection I would also say that whilst a preparatory class to such an institution, with such an admirable public school system as ours, would be a palpable absurdity, yet what may be called a review class under one of the masters would be needed, as so many of our young farmers of eighteen or twenty would come to such a college very "rusty" on all public school studies, and would need to take a thorough and speedy review of them ere beginning other book work.

(*d*) *Shall it teach Specialties or not?*—Now, I would advocate having all those specialities on the experiment-farm connected with the college, but not taught therein. There are, for instance, bee-keeping, the flax industry, beet root sugar manufacturing, sorghum manufactory, cheese and butter factory system, and many such specialities, on which a course of lectures by some expert might be invited and given, in addition to the subjects of the regular course; but I do not think it would be wise to put them there. If the principles of mixed farming are taught, an outline of specialties is all that can fairly be asked. The tendency is always to overload a curriculum, and certainly the one indicated is already full enough. Such is a proposed course of study, and let us now see into what departments and sub-departments it naturally falls:

I. AGRICULTURE.

1. Field Department.
2. Live Stock Department.
3. Horticultural Department.
4. Mechanical Department.

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II. Science.

1. Natural History.
2. Chemistry and Allied Sciences.
3. Applications to Agriculture under the name of Scientific Agriculture.

III. Veterinary Science.

1. Veterinary Anatomy, Physiology and Pathology.
2. Veterinary Surgery and Practice.

IV. English.

1. English Grammar and English Composition.
2. English Literature.
3. Political Economy.
4. Elements of Law of Real and Personal Property and of Municipal Law.

V. Mathematics.

1. Farm Arithmetic.
2. Farm Mensuration.
3. Land Measuring and Levelling.
4. Mechanics as applied to Machines.
5. Farm Book-keeping.
6. Business of Farming, and Business Forms generally.
7. Mechanical Drawing and Rural Architecture.

Such would be the Departments and Sub-Departments, and now for a full staff. I would not propose such a staff at starting but when all was completed; and all those subjects under a regularly well-drawn out scheme were being systematically and thoroughly taught:

1. *President*, teaching say the Business of Farming, Political Economy, Elements of Law of Real and Personal Property, of Municipal Law, English Literature, etc.
2. *Field Director*, as 1st Professor of Agriculture.
3. *Live Stock Director*, as 2nd Professor of Agriculture.
4. *Horticultural Director*, as Professor of Horticulture.
5. *Mechanical Director*, as Professor of Mechanics.
6. *Professor of Chemistry*, taking Chemistry and allied Sciences, and acting as Chief Chemist.
7. *Professor of Natural History*, taking Botany, Zoology, Entomology, and Meteorology, with applications to Agriculture.
8. *English Master.*
9. *Mathematical Master.*

So much for the teaching inside; but that is not all the work, for there must not be forgotten *Agriculture as a Trade*, requiring a *Course of Apprenticeship*, wherein the pupils are expected to be turned out perfected in the operations of a farm, such as ploughing, driving, sowing, drilling, mowing, reaping, etc. Like all trades, farming requires at least four years of constant practice, and I do not believe that this can be obtained at such an institution; but with a fair amount already obtained it is to be expected that the best styles and methods would be engrafted on what was already got. And this would require

10. *Field Foreman.*
11. *Horticultural Foreman.*
12. *Live Stock Foreman.*
13. *Mechanical Foremen* (two in number).

Besides there would be needed

15. *An Assistant Chemist.*
16. *A Bursar or Financial Agent.*

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Such is an outline of the course of study, the departments of instruction, and the staff of a complete Provincial Agricultural College.

4. *The Terms and Sessions.*—Such a course as the one indicated would require at least three years to complete it. In each of those years there might be two sessions, the one beginning in October and ending in March, the other beginning in April and ending at end of August. These times would suit our Province best, and accord best with the aims of the institution.

5. *Library, Laboratory, and Museum.*—A library of about 10,000 volumes would be requisite, containing every known agricultural work, and books of reference on all the general and technical subjects already indicated. The laboratory should be such as to enable a large number of students to be at work, as also the chemists and Professor of Chemistry. And it should be a physiological as well as a chemical laboratory. The Museum would be filled with specimens of agricultural productions of all kinds; grains, cereals, and roots; of insects, beneficial and injurious to vegetation, in all the stages; animals; and models of machines and implements.

6. *The Boarding Establishment.*—Though connected with the College, this should be handled as a separate business, and should be under the control of the President and his staff, on the principle of the most approved English schools.

7. *The Farm and Character of Farming.*—The size of the farm would depend on the size of the college. But it should be large enough to allow the students to do the work of it under proper superintendence. If the college be large, say, accommodating 150, then the farm would have to be larger than the ordinary farms of the Province, and should be broken up into two or three farms, the accounts and management of each of which should be kept separate, and each should be of its kind, a model farm. Connected with it should be an experimental farm. The character should be what is known as mixed farming, with a leaning to stock farming—such being the wants of the Province to-day.

8. *Stock.*—All the ordinary varieties of horses, cattle, sheep, pigs, and poultry should be kept on the model farm, but many kept only for purposes of education, should be so charged. The profitable and suitable varieties of each for this climate should be bred; and the business of stock breeding kept distinct from that of farming. Of course, on the experiment side, would be carried on, with those same varieties, many experiments as to crossing, fattening, etc.

9. *Implements and the Mechanical Department.*—All the latest improvements in implements and machines could not be kept on the farm, though the best of both should be on hand. But models, showing those improvements as they come out, should be in the museum; and I have no doubt that arrangements could be made with the Dominion Government to that effect. The architectural plans of buildings, fencing, and all permanent improvements should all be studied as well.

10. *The Horticultural Department.*—As I have said, this should be a department of the farm. Ample scope for the cultivation of every kind of vegetable would be given in supplying the college boarding-house; of the propagating and cultivation of flowers and shrubs in decorating the grounds and carrying out the plan of the landscape gardener; and greenhouses, propagating houses and perhaps, vineries would be needed. As regards *Arboriculture* I would rather be inclined to treat that as one of the specialties and have it taught only on the experiment farm.

12. *The Labour System.*—This is a very important question and the experience drawn from all the precedents quoted shews that manual labour, such as is absolutely requisite for acquiring the trade of farming, is a necessary part of such a training, as an agricultural college seeks to impart. Hence the necessity for a large farm and the labour performed by the students. We need not specify the number of hours or anything of that sort, as we are dealing only with principles and not details. And along with labour, to render it effectual, must go a monetary allowance for labour, if worth anything at all. It should be divided into four kinds:—

1. That which is simply for teaching the pupil for which no pay should be given.
2. That which is given to the pupil requiring skill that he is acquiring which should be partly paid.

3. That given to the pupil not requiring skill for which he should be fairly paid.
4. That given to the skilled pupil requiring skill for which he should be well paid.

Again the pupils should be as carefully classified into divisions and years, outside when undergoing their apprenticeship, as they are inside when undertaking the studies in the class-room ; and the various kinds of work indicated given them according to proficiency and standing. The maximum, judging by the precedents, should not be above ten cents an hour.

13. *Rules and Regulations.*—This is a matter of detail for which ordinary schools and colleges afford precedents. It may simply be said that the college and the boarding-house rules and regulations would require to be separate. A high sense of honour with a rigid moral tone in the pupils and good example on the part of the various members of the staff would be worth an octavo volume of rules and regulations.

14. *Revenue and Expenditure.*—Taking the last first, there would be four main branches of expenditure :—

1. The salaries of the Staff.
2. The Expenses of the Farm in all its departments.
3. The Expenses of the College proper.
4. The Expenses of the Boarding-House.

The first should be met by the interest of an endowment fund. The second should be paid out of the proceeds of the farm and stock-breeding establishment, and those proceeds should likewise meet the extra expenditure necessary in keeping stock for educational purposes, as well as one or two instructors for that purpose. The expenses of the boarding-house cannot be fully met by the payments of the board by the students if the practice of paying them for their labour be followed. That practice I deem absolutely requisite, so that a bonus to the boarding-house would be yearly needed. And that, with the expenses of the college proper, would require to be met by an annual grant from the State. For a college of 150 resident pupils and say 50 non-resident, let us see what that would be, placing down now both revenue and expenditure :—

EXPENDITURE.

1. Salaries of Staff	$15,000
2. Expenses of Farm (including keeping up extra stock and paying extra instructors)	5,000
3. Paying for Labour of Pupils or its equivalent Bonus to Boarding House	4,000
4. Expenses of College proper	4,000
5. Expenses of Boarding House	15,000
	*$43,000

REVENUE.

1. Interest on Endowment Fund	$15,000
2. Proceeds of Farm	5,000
3. Proceeds of Board	15,000
4. Fees	4,000
5. Legislative Grant	4,000
	$43,000

Or leaving out all cross entries, the account would stand somewhat thus :—

EXPENDITURE.

1. Salaries of Staff	$15,000
2. Expenses of College proper	4,000
3. Bonus to Boarding House (or to students' labour)	4,000
	$23,000

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REVENUE.

1. Interest on Endowment	$15,000
2. Fees	4,000
3. Legislative Grant	4,000
	$23,000

I am not counting an Experimental Farm in, remember, I am keeping "The Experiment-Station" as something distinct. The fees I am counting at $20 a year for residents of Ontario, $50 for non-resident, and $10 a session for winter pupils, and the total is on the basis of 150 resident and 50 non-resident pupils. The salaries are on the basis of $2,000 per annum for the President, $1,500 for the Professors, $1,000 for the Masters, and $600 for the foremen; and that everything beyond the salary, except house rent, if the houses are there, be paid by these officers. I am likewise counting the salary of two officers to the Experimental Station.

15. *General Management.*—All the Agricultural Colleges of the United States are directly under a Board of Trustees or Regents who report to the State Legislature. The practice in Europe, when under the State at all, varies, but in the majority of instances the institutions are directly under the control of a Minister of the State. I would divide the practice and have a Board of Trustees having only advisory powers, leaving the executory in the hands of the Minister, who should, in all his dealings, act directly with his officers under him, and only receive the suggestions of the Trustees. I am well aware of the objections to this method, in hampering the hands of the Minister in charge, but for many reasons, which need not be enumerated, consider it the more advisable plan. The President of the institution should be responsible to the Minister for every department of the institution, and the Minister is responsible to the Legislature, which is again responsible to the people. On the Advising Board of Trustees would be representatives elected, acccording to a specified plan, from every organized body of agriculturists in the Province.

Considering the subject in the light of all the precedents given, the nature of the work to be done, the primary education of the Province, and the economic condition of agriculture therein, such would be in a complete shape as a standard to be wrought up to our Provincial Agricultural College. And to complete the system of agricultural education so imperfectly sketched, it needs but to add:

5. Diplomas and Degrees granted by the University of Ontario, after examination on the subjects laid down in the curriculum by examiners (outside of the College teachers) appointed by the University Senate; such examinations to be conducted at the Provincial Agricultural College on papers sent up for the purpose.

We are now ready to

IV. SKETCH THE ESTABLISHMENT, PROGRESS, AND PRESENT BASIS OF THE ONTARIO AGRICULTURAL COLLEGE AND COMPARE IT WITH ANY MENTIONED OR WITH THE STANDARD LAID DOWN.

I will not detain you long, gentlemen, considering this branch of the subject, for, in the first place, you are all acquainted with it, and in the second place, my esteemed friend and successor in the Presidency of the Institution—Mr. Mills—has already very clearly described the present basis and working of the Institution.

During the winter of 1870, the Hon. John Carling, at that time Minister of Agriculture for Ontario, commissioned the Rev. W. F. Clarke, Editor of the *Ontario Farmer*, to visit some of the Agricultural Colleges of the United States and report on them, at the same time drawing up a scheme for the establishment of an Agricultural College in Ontario. Mr. Clarke's report forms an appendix to that of the Commissioner of Agriculture for the year 1870. A farm at Mimico, seven miles from Toronto, was first purchased, but, on the advice of many experts, whose reports form an appendix to that of the Commissioner of Agriculture for 1872, that farm was sold and the present one at

Guelph purchased in the fall of 1873. Additions to the farm-house, already built, were at once commenced, and a Commission issued to several prominent agriculturists and educationists in order to have a scheme matured. That Commission, known as the "Provincial Farm Commission," reported in January, 1874, and their report forms an appendix to that of the Commissioner for the year named. On that report, partially adopted as a basis, the institution was founded. It defined the objects of the institution, gave to it its technical name, described the buildings required to be erected, the departments into which the institution should be divided, the educational standard for entrance, the staff (but not the course of study), gave some rules and regulations, and recommended that until the farm, college and buildings were brought into shape, which would take a few years, no definite course of study should be adopted, but the work of what they called "the preparatory term" of the institution's existence should be at once commenced. The Professor of Agriculture at Cornell University—Henry McCandless, Esq., was appointed Principal, and the institution opened in May, 1874. Difficulties as to management having arisen, the Principal resigned, and I was sent up to take his place. A scheme of organization, a curriculum of study, and a course of apprenticeship was submitted to the Honorary Council, at that time an advisory body connected with the institution, by them accepted with modifications, recommended to the Government, and by it accepted. With a few minor changes, it is the same as that which is contained in the Calendar of the College at the present time In April, 1875, C G. Roberts, Esq., of Cirencester, England, was appointed Principal, but in a month resigned, owing to ill health. During the summer of 1875, Mr James Laidlaw, now M.P.P for South Wellington, acted as Farm Superintendent; and in January, 1876, the present incumbent of that office, Mr. William Brown, was appointed. During the following four years the work went quietly on, and the results are thus summarized in a report I had the honour of making to the Commissioner of Agriculture at the close of last year.

"And now, before concluding, it may be well to give a summary of the work that has been accomplished during the five years of what was called in the Report on which the place was established—the preparatory stage. When established it was expressly stated that the objects were 'the training of young men in the theory and practice of improved husbandry,' and 'conducting experiments tending to the solution of questions of material interest to the agriculturists of the Province.' In order to accomplish these objects the Stone Farm was to be made suitable for the purposes indicated, during the preparatory stage, by the labour of the students, who were to be organized, during that time, into a school. Let us glance at what that implied. In order to make the farm a model and experimental farm, a large amount of wet, uncultivated pasture land, covered often with underbrush and logs had to be broken up; a large portion of the farm required to be drained ere it could be worked; the part already cultivated had to be cleared of weeds; the whole of the fields needed to be re-modelled, re-fenced, put into right shape, and all placed under definite rotation, all the farm buildings had to be improved, and many new ones, consequent upon peculiar necessities, had to be erected; a complete horticultural department, with orchards, lawns and gardens, was to separate, lay out, and plant; the College buildings were to plan and be added to the old farm-house; and the College itself, in all the departments of instruction, was to be thoroughly organized. Such was the work to be done in this preparatory term During its five years, one hundred and eighty-four acres of uncultivated pasture land have been reclaimed or brought under the plough; one hundred and sixty-two have been cleared; over two hundred and ninety-two, have been laid with twelve thousand one hundred rods of drains, until few wet spots exist; a plan of the farm has been drawn up, and the fields remodelled according to it, have assumed a regular rectangular shape; eighteen hundred and eighty rods of various kinds of fencing have been built to accomplish the readjustment; many improvements and alterations have been made on the outbuildings to suit them for their peculiar purposes, and by those improvements they have been made more convenient of access, economical for feeding, and suitable for general use; whilst, of the buildings necessary, there have been erected a carpenter's shop and experimental barn, a gardener's shop, greenhouses, and forcing-houses, a poultry-house and pig-pen; the thirty acres in front have been laid out, and put

into orchards, lawns, gardens and shrubberies, through them drives and walks have been cut, graded and gravelled; shade and experimental forest trees have been planted, and the foundation of a complete horticultural department well and thoroughly laid; forty acres have been cleared and laid aside as an experimental farm, and seventeen of them already used for that purpose, besides ten cut up into some one hundred plots; the old farm-house has gradually assumed the outline of a college building, for on it has been placed a mansard roof, and to its north side have been added two wings, 53x42 and 50x40 respectively, and to the south side one wing 50x40; so that it only requires one additional wing to that side to make the whole a fine range of college buildings, 240 feet in length and 42 feet in width, capable of accommodating within its walls one hundred and twenty resident pupils, besides the necessary class-rooms, sitting-rooms, reading-rooms, library and museum. On this farm, during the five years, not only have the improvements sketched been accomplished, but there have been grown the usual cereals, grasses and roots, and those so cultivated that the land has proved a profitable investment, and at the same time an invaluable lesson for students. In the yards, they have been gradually breeding from small beginnings into six breeds of cattle, five of sheep, three of pigs, and two of poultry, until now the flocks are acknowledged to be amongst the best in the Province, and the herds are obtaining considerable proportions, and, in the opinions of the best judges, commendable excellence. In the orchard and gardens, the lawn and shrubberies, there have been planted, or annually sown or grown, for the purposes of use, beauty or instruction, some seventy-six varieties of standard and forty-two of small fruits, sixty-four of shrubs, eighty of plants and flowers, and twenty-four of vegetables, whilst at the same time the varied methods of cultivation have been acquired with constant practice by all the students. On the experimental fields and plots there have been carried on during the last three years, some four hundred and twenty distinct experiments with varieties of fall wheat and spring wheat; of barley and oats; of peas and corn; of grasses and clovers; of potatoes and carrots; of mangolds and turnips; of different modes of cultivation and different manures; of various kinds of fodder, and different breeds of cattle, sheep and pigs. And in all those departments of work, the practical instruction of the pupils has been going on. And this leads naturally to the last remark, that in the College buildings mentioned there has constantly, during the five years, been a full quota of students, and the course of study pursued by them has been completely drawn up, and the intellectual work founded thereon thoroughly organized. Around the subject of agriculture have been grouped the various sciences which treat of the plant, the soil, and the animal; all that explains the structure and the diseases of the latter; and all the practical studies that will be required to be applied by the students in performing their own business, or sustaining their varied relations as citizens in the general community. And in order to carry out that course of study a staff has been appointed, thoroughly arranged, and the duties of each member of the body clearly defined. The facilities at hand for successful teaching are not what they ought to be, but their number is constantly increasing. The library and reading-room, the laboratory and dissecting-room, the class-rooms and museum are being gradually filled with books and periodicals, furniture and appliances, implements and apparatus, grains and grasses, insects and plants, fossils and minerals; whilst the farm itself, with its six breeds of cattle, five of sheep, three of pigs, and ten of poultry, its latest implements, and its varied departments, all furnish a series of appliances which, in the hands of able and conscientious masters, are capable of being used with effect in the intellectual development of any number of students in the general and technical knowledge and skill requisite for success in their chosen profession. And the number of students is constantly increasing: in our first year it was thirty-one; this year it was one hundred and sixty-two. During those five years, the names of three hundred and thirty students have been entered on the roll. There have left the halls, after remaining a shorter or longer time, two hundred and thirty-eight, and of that number one hundred and seventy-two are known to be following agriculture, horticulture, or the veterinary profession, besides others of whom we have no trace, who may be doing so as well. On the model farm, on the experimental farm, in the horticultural, mechanical and live stock departments, on the College buildings, and in the College itself, progress, continued and marked progress, has been the rule

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throughout this preparatory stage of existence of the Ontario Agricultural College and Experimental Farm."

Having thus sketched the establishment and progress, let us now look at the present basis of the Provincial Agricultural College. Mr. Mills has already given it to you in detail, let me give in a general way, following the same plan as I have pursued with all other agricultural colleges described,

An outline of the present position of the Ontario Agricultural College.

The Ontario Agricultural College is situated on a farm of 550 acres, a mile south of the City of Guelph, in the County of Wellington. The College building, of magnesian limestone throughout, is 240 feet in length, of an average depth of 42 feet, and is of two stories and a basement. The centre portion has an additional story. It contains the usual public lecture rooms, library, reading-room, museum, and at the present time, a small laboratory. Connected with it, at the rear, are the dining-rooms, kitchens, laundry, matron and servants' apartments. The staff is composed of:

1. A President.
2. Professor of Agriculture.
3. Professor of Science.
4. Professor of Veterinary Science.
5. Mathematical Master.
6. Farm Foreman.
7. Horticultural Foreman.
8. Mechanical Foreman.

I. The Course of Study, which is one of two years, includes the following subjects:

First Year.—*Practical Agriculture, Veterinary Anatomy, Veterinary Materia Medica, Physical Geography, Chemistry, Botany, Zoology, English and Mathematics.*

Second Year.—*Agriculture and Horticulture, Veterinary Pathology, Veterinary Surgery and Practice, Agricultural Chemistry, Economic Botany, Entomology, Meteorology, Book-keeping, Levelling and Surveying, English Literature, and Political Economy.*

And these are arranged under the departments of

1. Agriculture.
2. Science.
3. Veterinary Science.
4. English and Mathematics.

Connected with the course of study in the class-rooms is, outside on the fields and in the yards, barns, stables, and shops:—

II. The Course of Apprenticeship, which is divided into

1. The Field Department.
2. The Live Stock Department.
3. The Horticultural Department.
4. The Mechanical Department.

The terms of admission to the regular course is the educational standard requisite for entrance into the high schools of the Province. The Academic year is divided into two sessions, the winter one beginning on the 1st of October and ending on the 31st of March; and the summer session commencing about the 16th of April, and closing on the 31st of August. The library is still very small, as are also the laboratory and the museum. The boarding-house, when fully completed, as it will be in a month, will accommodate 140 pupils, and that number have already, I understand, entered. It is directly under the charge of the President, assisted by the Mathematical Master. The farm is all under cultivation, except four groves of woods, which are purposely left upon it. The farming is that which is generally known as mixed farming. More attention has been paid to the actual farming and stock breeding than has been given to them in any other agricultural

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college in America. There are herds of the improved Shorthorn, Ayrshire, Hereford, Devon, and Polled Angus breeds of cattle; flocks of the Cotswold, Border Leicester, Oxford Down, and Southdown breeds of sheep; and the improved Berkshire and Small Suffolk breeds of pigs. The latest implements and machines are used, including a steam thresher and steam pulping apparatus. The horticultural operations are subsidiary, but on a sufficiently large scale; the kitchen garden covering six acres, and the flower gardens, lawn, and shrubberies extending over other twenty-five. The mechanical department, which is also subsidiary, has confined itself hitherto to permanent improvements, in the shape of fencing, draining, and building, with repairs and setting up of all implements and machinery. The students labour on a daily yearly average at least five hours a day—that is, the whole day during the summer months, half the day during the spring and autumn months, and a shorter time during the winter ones. Thus, leaving out the evenings, half the day, counting the whole year round, is taken up with the course of apprenticeship, and the other half with the course of study. The students are allowed for skilled labour at a maximium rate of 10 cents per hour. The rules and regulations need not be enumerated.

The whole expense is borne directly by the Provincial Legislature, there being no endowment fund. The cost of yearly maintenance is about $22,000; and at the close of this year, the Province will have expended on capital account, in the shape of a farm, buildings, and other permanent improvements, very nearly $200,000. The proceeds of the farm and stock have hitherto been spent in building up the farm. Fees have only been charged for a short time, students from the Province now paying a tuition fee of $25 per annum, and from outside the Province, $50 per annum. The management of the outside is under the charge of the Farm Superintendent and Professor of Agriculture, that of the inside under the President, and the financial management of the whole under the Bursar. There is no Board of Trustees, or Regents, or any other advisory body; but the whole institution, and each and all of the officers are directly under the charge of the Commissioner of Agriculture, who is directly responsible to the Government, the latter to the Legislature, and that, of course, to the people. In conclusion, allow me, in no boastful spirit, to point out that the Ontario Agricultural College excels in its basis any other on the Continent of America, and in any part of Europe but Germany, in these five cardinal points—points which we have seen lie at the foundation of the success that has been achieved by any in existence in teaching simply agricultural education.

1. It does not attempt anything but strictly agricultural education.
2. It is not a mechanical or general industrial college.
3. It is not in any sense a literary institution, with a leaning to agricultural subjects.
4. It places as much importance on a course of apprenticeship as it does on a course of study.
5. It makes manual labour a stern reality as well as a name, causing its students to perform the work of a farm of 500 acres.

It is deficient in many of the appliances for teaching, far behind many of the other institutions we have described in its equipment, and inferior to the most of them in the number of its teachers, but its foundation is fairly good, and its progress, whilst already gratifying, is, I may be allowed to say, along the line that experience shows us can alone lead to permanent success. But it is very far from being in any one of its departments perfect, or up to the standard I have sketched, and this leads me to ask you to consider in the last place

VI. The Pathway of Future Progress Under its Permanent Organization.

I say permanent organization, because last session the institution was chartered, and the full limit of accommodation for resident students has now been reached. The preparatory stage of its existence is over, and the period of manhood has been entered upon. What may have been sufficient for the institution in the past will be altogether insufficient for it in the future; and, with your permission, I will, at the risk of being thought egotistical,

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here place on record my opinions regarding the direction that permanent organization should take, even at the risk of wearying you, gentlemen, with details. And in considering it, the order already laid down may be followed, and under consideration there come, therefore, first of all:

1. *The College Buildings.*—I produce the plan kindly lent me this morning by the Public Works Department. By it you will notice that there is being now built the middle south wing, an additional storey to the centre, and a three-storey building to the rear. The completion of the first two will give a building 240 feet long, averaging forty-two feet deep, and two storeys and a mansard in height. It would have looked better had another storey been added to the height, but with the erection of a centre tower, and smaller ones at the four angles, the main building may be said to be complete. On the ground floor there would be, when everything is in order, the business offices, reception room, parlour, two class rooms, and the apartments of the resident master. On the first floor there will be the private rooms of four professors, the library, reading-room, and museum, with dormitories for thirty-six students. On the third floor would be dormitories for seventy-two pupils, and on the last floor of the main building, as also the tower, dormitories for sixteen students, containing a tank, and with an elevated observatory. The changes that might be recommended in the present arrangement are the total exclusion of all families from the College building, making the second floor of the main building, now occupied in this way, the private studies of the professors; the ground floor of the north wing, the private apartments of the resident master, and the second floor dormitories for eighteen additional students. Around the class room of the second floor of the south wing galleries might be run, which would double the capacity of the room for a museum, and the present dining-room in the north centre wing could be fitted up a students' parlour and sitting-room. By using the museum in part as a small class room, there would then be given four lecture rooms. To make this main building complete the south wing could be extended to the eastward in an elliptical shape for, say, eighty feet, and this turned into a laboratory for the chemist, his assistants and students. It would be practically four stories in height, and would be of sufficient capacity for both a chemical and physiological laboratory, where four chemists and eighty students could be at work simultaneously. The north wing should also be extended in a similar manner to form a public convocation hall, and a corridor would connect it with the present one. The cost of these additions, leaving out the alterations of the present summer, and the fitting up of the laboratory, I estimate, would reach $12,000. Now, at the back should be the kitchens, dining-rooms, wash-rooms, bath-rooms, sculleries, laundries, matron's and servants' apartments, connected with the present building by a covered passage way, and in a portion of the space between the main and rear buildings might be placed the boilers and engines for the steam-heating apparatus. It is difficult to get anything torn down after it is built, yet it would be best to tear down all the back buildings, and build anew in common stone rubble work, on an improved plan, with the latest improvements. You will see in this plan that Mr. Tully, the Government architect, drew for Mimico such an idea carried practically into effect. The difference between pursuing this plan and the present one of patching, I estimate, counting in the cost of the three-storey building now being put up, at the cost of $3,000 only, The cost of this back building, with all improvements, would be $14,000, and that includes steam and gas fittings, kitchen ranges, and laundry and bath-room fittings. As the old buildings are there, it is to be feared that however willing the Government may be to carry out such a plan, they will patch rather than build. The same boilers that heat the buildings could be used in making gasoline, and the engines attached to them could, by means of underground wire ropes, work all the machinery in the farm buildings. Water must be procured, either from the River Speed, or from additional wells, and pumped into elevated tanks, and a sewer from the building to the river will need to be built. Placing the cost of the last two at $4,000, the total cost of the buildings yet to be erected, ere the College buildings are complete, is placed, you will see, at $30,000. This, I think, is the outside figure, but the fittings and specimens for laboratory and museum may be counted on as requiring about $8,000 more. With a little

alteration about the outside and principal entrance of the main buildings to improve its appearance, we would then be in possession of one of the most complete agricultural college buildings on the continent, though not as fine a building by any means, as a score of the American States can boast of.

2. *The Students—from whence they come, and how admitted.*—These will be of four main classes.

1. Sons of farmers who desire to become farmers.
2. Sons of residents of villages, towns, or cities, who have the same desire.
3. Sons of residents of the sister Provinces.
4. Sons of residents of Britain.

The first two classes must always find the doors open, though the second would do well on entering to have served one or two seasons on the farms I have described, or in the middle Agricultural schools. It is unlikely that any other of the Provinces will find themselves rich enough to establish such an institution, and it might be advantageous, if the institution be not too full, not only to admit all of this class who signified their intention of staying in Ontario, but also a certain specified number who were sure of settling in their own Province. In that case, terms might be arranged whereby, on condition of a grant being voted by any Legislature of a sister Province, a certain number of students should be admitted. To all of the fourth class good high fees might be charged, whilst like the second named, its members would be all the better of taking the course on the farms, or at one of the middle agricultural schools. A practical question that will require immediate attention, is, whether for admission, a pledge of settlement in Ontario shall be exacted. A large proportion of the graduates of the Agricultural College may find their way to our own North-west, where many are already settled. The terms of admission will require to remain as they are, but it might be well to have a junior and senior examination, the latter coming up at least, to the standard required for third-class certificates, and passed by all entrants from the native population. Examinations are now held, at entrance, on the details of practical work for classification, and these examinations it would be well to have for entrance, and require all who could not pass them to fall into a farm preparatory year, taken either at the institution or at the middle agricultural schools. There would thus be both an educational and a technical standard for admission to the regular course.

3. *The Course of Study, Departments of Instruction, Course of Apprenticeship, and the Staff.*—There is such an interdependence between these four subjects, that it will be more profitable to consider them together. By a comparison of the present curriculum with the one given as a standard, it will be seen that there are a few new subjects of study suggested, but not many. The principal changes would be three in number :

1. Changing the course from one of two years to one of three.
2. Dividing the subject of Agriculture into four divisions, and thereby rendering the teaching more practical and detailed on that most important subject.
3. Systematizing the Course of Apprenticeship by classifying the pupils into divisions in their work as well as in their study.

My own opinion at the commencement, as embodied in my recommendations given in the Commissioner's Report of 1874, was, that the course should be one of three years ; but the change to two was made—and at the time, perhaps, wisely made—by the Honorary Council's recommendation. The precedents quoted, and all my experience, go to show that the longer time under the permanent organization would be the better. It will be remembered that in examining the definition of the term, "Applied Science," as given to Agriculture, it was shown that in the first place it meant a collection of the rules of practice of the best and most intelligent farmers, used as forming the principles of a science, and it was also pointed out that to many students nothing more could be given of the science of

Agriculture than would thus be indicated. This, in its real sense, is the meaning of the term "Practical," as contrasted with "Scientific" as applied to agriculture in the curriculum. Now, in order to the thorough teaching of this subject, I would suggest the division gradually of the subject of agriculture into the four parts which have been already named in the standard laid down, and the advisability of appointing additional professors to each division. In the meantime the division of work between

1. The 1st Professor of Agriculture taking the Field and Live Stock Departments; and
2. The 2nd Professor of Agriculture taking the Horticultural and Mechanical Departments:

Or as such a division would be unfair in practice, and almost impossible so far as the second is concerned, the work might be distributed as follows:

1. The 1st Professor of Agriculture taking the Field and part of the Mechanical Departments.
2. The 2nd Professor of Agriculture taking the Live Stock and part of the Mechanical Departments.
3. The 3rd Professor of Agriculture taking the Horticultural and part of the Mechanical Department.

Each of those might last a few years, until the standard laid down was reached, which you will rememember, was,

1. The 1st Professor of Agriculture taking the Field Department and experiments connected therewith in the Experiment station.
2. The 2nd Professor of Agriculture taking the Live Stock Department and the experiments connected therewith in the Experiment Station.
3. The 3rd Professor of Agriculture taking the Horticultural Department and the experiments connected therewith in the Experimental station.
4. The 4th Professor of Agriculture taking the Mechanical Department and the experiments connected therewith in the Experiment Station.

This might be reached about 1885. In the meantime a teacher of horticulture, or the second professor named is urgently needed; and an arrangement of duties with this end in view could be made on his appointment. Nothing need be said about any of the other departments of instruction. The additions to each that are suggested in the standard fall naturally into their places and would come gradually. The special course for farmers' sons during the winter session is one of the best features of the curriculum, and would require broadening under permanent organization, provision being made for non-resident pupils, who would board in the town and simply attend lectures It would be unnecessary to cause all those students to take the regular course, but an arrangement of subjects could be made whereby practical Agriculture in the four divisions named, and all studies relating to the business of farming, could by them be mastered in two winter sessions. And, lastly, courses of lectures on special subjects closely pertaining to agriculture, such as the management of cheese and butter factories, bee keeping, flax industry, etc., might be invited from experts in those subjects. The thorough organization of the course of apprenticeship, on the basis of College divisions, is indispensable when there are so many in attendance. But it is a matter of detail, and must be left to those in charge of that department. The members of the staff, with the full number of them has already been given in considering the full equipment of a Canadian Agricultural College.

4. *Terms; Sessions; Diplomas; Degrees; Library; Laboratory; Museum.*—Two sessions in each year, composed of two terms each, seem to suit our Province, and the wants of the institution. Certificates of attendance might be given by the College authorities, but I think it would be better were the affiliation with the University of Ontario, already suggested, carried out, and all diplomas and degrees given by it. Diplomas might be granted however as certificates of attendance, to all taking a special course, by the

authorities in charge of the College, on due examination and attendance. The matter of building the laboratory has already been suggested, and before fitting it up it might be well to ask the present professor of chemistry to visit, say, Michigan Agricultural College, Illinois Industrial University, and one or two other places noted for their agricultural laboratories, and report. The subject is a very important one, and all the more so as this laboratory will not only be for an agricultural college, but for the agricultural experiment station of Ontario as well. It has already been suggested that the upper class room be utilized for a museum, and it can be half filled already, though when galleries are run around as described, the accommodation will be doubled. Still, however, it will readily be filled, and without much exertion. The library is a very poor affair at present—containing something over 400 volumes. There should be from 8,000 to 10,000. Of course the formation of a good library is the work of years, yet the addition of very many agricultural and technical text books, and books of reference is urgently needed, whilst the beginnings of a general library have yet to be made.

5. *Boarding Establishment.*—In such an institution this is an absolute necessity. The distance from the town, and the working of the farm by the students necessitating early rising, are the two main reasons. A comparison of the methods adopted in the various American institutions sketched, would lead us to the conclusion that some such system as the one now in operation is the best. It is a difficult matter, more so than in many other boarding schools or colleges, because of the union of work and study. The rules and regulations require to be few in number, but strictly adhered to, and to be of such a nature as to foster a high sense of honour and self-reliance in the students. It should be kept practically and financially separate from the college proper and the farm. Instead of making a detailed grant as at present, for all the various items of a boarding institution following the example of our public institutions, it would, in my judgment, be more advisable to allow all sums credited for "labour," which are now debited against the cost of board and washing, to be paid for under a direct grant as "Labour" or "Bonus to Boarding House," and cause all the expense of board and washing to be borne by the students. The object to be aimed at is to make the boarding establishment self-sustaining. I cannot speak with certainty, but I should suppose that this year the students will pay in for balance of board bills over $4,000. The board and washing is charged them at cost, and they are credited with the value of their labour at so much an hour, according to returns. It might be well to begin by leaving out the items, and voting a lump sum of say another $4,000, and thus keep the boarding-house distinct from the college. But I am anticipating the question of expenditure.

6. *The Farm and Character of the Farming.*—From what I have already stated in the general plan sketched, you will readily understand the changes that I would now suggest. I produce the plan of the farm. Ultimately it would be to the advantage of the institution were Stone, Gibson, and Hamilton bought out, and the whole block owned by the Province. That would require an expenditure of about $15,000, and that block I would divide into four Home Model Farms, as follows, in round numbers:

1. Home Model Farm of 100 acres—Fields Nos. 1, 2, 3, 4, and 5.
2. Home Model Farm of 150 acres—Fields Nos. 6, 7, 8, 9, 10, 11, and 12.
3. Home Model Farm of 50 acres—Fields Nos. 16, 15, and part of 14.
4. Home Model Farm of 200 acres—Fields Nos. 19, 20, 21, Stone, Gibson, and Hamilton.

(*a*) Experiment Farm Station—Fields Nos. 17 and 18.
(*b*) Breeding Establishment "paddocks"—parts of fields Nos. 13 and 14.
(*c*) Horticultural Experiment station—part of field 13.

If it should be decided not to buy out the parties named, then 19, 20, and 21, containing about 65 acres should be sold, and there would then be three Home Model Farms of 50, 100, and 150 acres respectively. So much of the regular stock as was just would be

apportioned to each of these farms, the barns—as gradually rebuilt—erected, not as one large barn, but as a separate barn for each of the farms; each one would be under a different rotation; the books of each kept separate, and placed in the library, for the inspection of all the students at the beginning of each week. The division is quite practicable, and the following are a few of the reasons for the suggestion :

(*a*) It would be more in keeping with the farms afterwards handled by the students. As a model farm, the present one is largely useless, because its size precludes the possibility of handling it—so long as it is worked as a whole—in a manner calculated to teach the students the business of farming as they will individually be obliged to undertake that business.

(*b*) Such a division would enable a better systematized classification of the students in the course of apprenticeship to be accomplished.

(*c*) It would lead to a healthy rivalry amongst the divisions of the students working each farm respectively.

(*d*) It would enable a more extended series of rotation of crops to be undertaken.

The farming, as stated, will have to be, as at present—mixed farming, with a leaning to stock. In order to complete the permanent improvement of the farm in fencing, draining, &c., something about $12,000 will be needed.

7. *The Stock.*—How far the business of stock breeding should be carried on in such an institution is one of the disputed questions in the solution of which the following considerations may be of value.

(1) The different breeds of cattle, sheep, and pigs must be kept (and of horses also ought to be kept) for simply educational purposes.

(2) Unless the expense of keeping them is charged directly to education, it must be met by selling their produce, and that necessitates breeding, which indeed, is a part of the education.

(3) There must always be a few breeds which are unprofitable, and the expense of keeping these can be met from the profits of keeping, breeding, and selling the more profitable ones.

(4) The results of crossing the various breeds will always be an important work of an agricultural experiment station, and this is that as well as an agricultural college.

(5) It would be unfair to charge any one of the Home Model Farms with the cost of breeding thoroughbred stock, as it is for purposes of education.

The conclusion reached is, I take it, simply this : that stock must be kept, and must be profitable, and hence a small stock-breeding establishment is a necessity. It has been a success in the past and promises to be a still greater one in the future, under good and skilful management. But it will be observed that the stock-breeding establishment and the farm are two different things, just as farming and breeding thoroughbred stock on any extensive scale are two different things, and the two should be kept as distinct as possible, and above all should they be kept financially separate. This can be accomplished ; but the method of doing it, the quantity of stock, the number of each breed, and such things are matters of detail to be solved by those in charge. Here again an expenditure of another $11,000 is urgently needed We will pass on to

8. *The Buildings on the Farm.*—No new farm buildings, in the proper sense of that term, have been built since the Government took possession ; but many improvements have been made on the old ones. These were valued by the previous proprietor at $20,000, and, doubtless cost that, as they are all, except the barns proper, built of magnesian limestone. But they were the buildings not so much of a farmer as of a stock-breeder—Mr. Stone, the previous proprietor, keeping usually in them herds and flocks, worth from $40,000 to $60,000. Even for that purpose they are now far behind the age, being defficient in ventilation, light, convenience for feeding, and can in no sense

whatever, be pointed to as model buildings. I would suggest that the barns be moved intact as a whole, and quite a number of the sheds and stables gradually taken down by the students, and the materials used in building elsewhere; and in so building due regard should be had to having one set, and each set a different plan of model buildings for each of the *home model farms*, as well as another distinct set, on the most approved plan, for the stock-breeding establishment—cattle, stables, sheep folds, and piggeries being of the best. For the latter, and three other sets, using the old materials and barns, I estimate the cost at $19,000. This includes all fittings for the stock-breeding establishment. Besides these which may be called farm buildings, in the proper sense of that term, there would be the buildings of the *experiment station, the mechancial*, and the *horticultural departments*, to which might be added three or four model cottages for the farm and stock assistants, of whom four at least would require to be kept on an average. This brings us to

9. *The Departments of the Farm.*—These you will remember were the *field, the live stock, the horticultural and the mechanical.* The changes suggested regarding the first two, to bring them to the standard, have been given. I have already given the reasons on which are formed my opinion that horticulture should be taught simply as a department, and not as the co-equal of agriculture. The complete equipment of this as a department, however, would involve the erection of a greenhouse, a vinery, another propagating house, a gardener's house and a lodge: the planting of two orchards, the commencement of a nursery, and a horticultural experiment station, and the planning of the whole 40 acres, (the present 30 acres with part of field 13), by a skilful and competent landscape gardener. Without that plan it is impossible to estimate the cost, but my own figure of $13,000 will be found to be somewhat of a close approximation. The mechanical department would have under its charge when everything was complete and in order—

1. The repairs on the college buildings.
2. The repairs on the farm buildings, and those of all the farm departments.
3. The permanent improvements carried on throughout the whole farm such as, for instance, fencing and draining.
4. The construction and repairs of farm implements and machines.
5. The construction of many appliances for laboratories, museum, gardens, stables and shops.

For its complete equipment would be required, two carpenter's and one blacksmith and wagon-maker's shop, with a full set of tools and appliances. The one carpenter's shop is at present in operation. The cost of the others in erection and fittings, may be placed at $3,500. We pass now, to merely mention:

10. *The Labour Question.* This has been treated by us as an essential question, in laying down our standard for a Canadian agricultural college, and was so treated in the establishment and development of the present Ontario Agricultural College. The reasons for thus taking it as a *sine qua non* have been given, but they may be summed up as follows:

In the first place farming is with us a trade, and skilled labour is an essential element therein; in the second place, only by taking part in the daily work, which should be an exemplification of the lectures, can the theoretical be thoroughly mastered as the practical and both joined in the technical; in the third place, it prevents a good habit when learned being lost, or if not already acquired gives opportunity for learning it; in the fourth place, it stamps out any false notions of the indignity of labour; and in the fifth place, it has formed one of the main reasons, as we have seen, for the success of any successful agricultural schools or colleges. Now in any institution, in order to the solution of this question care will in the future require to be taken

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(*a.*) In correct classification of all students during the course of apprenticeship into divisions according to qualification.
(*b*) In giving responsible and skilled work to the higher divisions, and the less responsible and the less skilled to the lower.
(*c*) Classification of the work of all the departments of the farm.
(*d*) Payment according to actual results, well judged and accurately inspected, at a rate not higher than ten cents an hour for the very best.
(*e*) No payment for any work that is educational in its nature.
(*f*) All classes of work carefully scheduled in value according to skill, responsibility, etc., as well as classified, and payment made according to schedule.
(*g*) Strict record of all work of each and every student, and of all allowances to each and every one for any work, kept in the books of the institution.

If these rules be strictly attended to the question will solve itself and its solution will do a great deal to ensure the permanent success of the institution.

11. *General Management.*—In Britain, these institutions are under the control of Boards, but then they are not supported by the State. In Ireland, they are under the Board of Education, for they are but a part of the educational system and are supported by the State. In Norway, Sweden, Russia and Austro-Hungary the State controls directly; in Denmark, the controlling body is the Royal Danish Agricultural Society; the majority of the French Farm Schools have a local Board; the practice varies in Germany, but in that home of autocracy the results are the same; whilst Portugal, Italy and the Netherlands have institutions receiving advice from Boards, but under the executive power of the State. All the agricultural colleges of the United States, without exception, are under Boards of Trustees or Regents, and these are vested with executive as well as advisory powers. Such are the precedents. In our own case the State has direct executive and advisory control, the institution being directly under the Commissioner of Agriculture. Now our plan has the great advantage of direct responsibility, and has hitherto been successful, largely owing to the fact that both Ministers successively in charge, the Hon. Mr. McKellar and the Hon. Mr. Wood, as well as the Premier, have taken pains and trouble with the management of the institution. At the commencement there was an Advisory Board known as the Honorary Council which did much good service in establishing and organizing. Its most active members were the Hon. D. Christie, Mr. James Young, now M.P.P for South Brant, Mr. Stephen White, of Charing Cross, Mr. James Laidlaw, now M.P.P. for South Wellington, and Professor Buckland. A Board of Trustees having advisory powers only would, in such a purely technical institution, seem to be of great value, especially if the members of the Board were partly educationists and partly practical farmers, elected, say in part, by the County Agricultural Societies or other organized bodies of farmers, and appointed in part by the Administration. It is impossible for a Minister, who has fifty other things to superintend, to give to such a place the close personal attention that its importance demands. It is at present under the Treasurer. That gentleman is not only Finance Minister, but is supposed to be intimate with all the agricultural societies and systems, the deaf and dumb, blind and lunatic institutions and systems of management, plans of prison and reformatory work, and charities and charitable institutions everywhere in the Province. A more indefatigable worker and one better up in the details of all his work, it would be difficult to find, yet it is asking too much to demand that he shall also be "*au fait*" in all the details of an Agricultural College. The only wonder is that he is so much at home therein as he is. Yet it would certainly seem that the advice of such a body as the one mentioned would be of great value. But in our Province, at any rate, the practical working of such Boards has been found to be very expensive, and they have gradually assumed an executive as well as an advisory voice, thus hampering instead of assisting the action of the Minister in charge. Looking at the matter from all points, however, I think that such a Board, appointed under certain conditions and restrictions having simply an advisory voice, would be of great service.

Again, at present, the President has charge of the College proper; and the Professor

of Agriculture of the Farm and its departments, and there is thus a double responsibility to the Minister in charge. It arose from the fact that it was difficult to obtain any one man who could take charge of the studies of a college and the practical working of a farm at one and the same time; and I recommended the plan myself. But it is a mistake, though from the good sense of all concerned in this case, any evil consequences have been minimised. The heads of the different departments of study and apprenticeship should, uniting in council, frame plans, systems, and practical rules, but one man only should be responsible to the Government for every department of the institution, call that man by what name you like. At present, by seniority of appointment, it would be the farm superintendent. Of course, over many departments, his would be only a nominal control, still it would be control. There must be a senior partner to every firm, a general manager for every railway, a general for every army, and a president to every college. And, in conclusion, there are but two ways to get the general manager of such an institution. Either he must be imported from countries where similar technical colleges have been some time in existence, or he must be selected at home and trained for the purpose. The former plan in this case is doubtful, because of the difficulty of finding any other country, the social and educational position of whose farmers is similar to ours, or in which the economic condition of agriculture and the system of primary education is the same as our own. The latter is the safest. But the poor fellow, whoever he may be, must get a chance to be trained. He must handle his own institution till he understands what is needed; but he must visit others, reside at them, study their systems, master their details, and then create his plans and carry them out. I speak decidedly on the matter, gentlemen, for I was unable myself to get away for a single week to obtain that training whilst occupying a position in the institution, and was therefore again and again at a loss respecting plans and questions continually recurring in connection with permanent organization and establishment. Managers of agricultural colleges, like managers of anything else, are not created but made.

12. *Revenue and Expenditure.*—And now in the last place we come to, the consideration of the "sinews of war." In examining a scheme for a Canadian Agricultural College, the matter was fully discussed, and it remains for us how best to suggest the means by which the present College can in revenue and expenditure reach that standard. The very first question, at the outset, is suggested by the first item of the revenue, and that is the question of

(*a*) *Endowment.*—The State has been already very liberal towards the Agricultural College. But, in order to make a permanent success of the institution, her liberality requires to be shown in the direction of endowment. From the brief *resumé* of the similar institutions in the United States previously given, you will have recognized that the foundation of their success has been in the direction of their being liberally endowed. That endowment has come from the action of the Federal Government, and when the Education Bill, now before the Senate, passes, as it will this fall or winter, the moneys arising from the sales of all public lands within the border of the United States, will henceforth form a fund for educational purposes. As a first lien upon that fund will be the support of all the Agricultural Colleges in the Union up to $30,000 per annum, the balance going to the support of the Public Schools. It will form the most munificent gift ever made by a nation towards the education of its people; and the design is that it should go towards the education of the "Industrial Classes," and thus leave Colleges and Universities to be endowed by private benefactions, towards which end a tidal wave is and has for some time been setting in from all quarters of the United States. In the European Agricultural Colleges that are under State control, the endowment of chairs, scholarships, or appliances by private benefactions is a regular custom, and the land and buildings have frequently been the gift of some wealthy and influential landowner; but, except in Russia, none of them have been endowed on such a scale as those in the United States. But in Europe, wealth has accumulated for centuries in a few hands, and private endowments have always been the custom, and state endowments the

exception. In a new country like our own, wealth is more evenly distributed, and when anything of the kind is done towards a system of education, it is best accomplished by the state which represents the whole community, setting aside a portion of the national assets for the purpose. The States have recognized that fact and acted accordingly, and in an endowment for the support of the University of Toronto, and Upper Canada College and in our Common School Lands, so have we. But, unlike them, our recognition has been mainly towards the "highest" education; shall we follow them and endow the so called lower?" Though the Federal Government, in our case, has nothing to do with education, yet the United States Congress, standing in almost an analogous position, is acting in the manner described; and it would be a graceful thing, to say the least, for our central Government to follow their example. Before our Pacific Railway, however, and other public works, even more indispensable, have been built, I am afraid the possibility of liberality on the part of the Federal Government will be gone, and provincial liberality may as well, at once, carry on what it has begun. In reporting to the Government for three years, I have suggested the setting aside of some of the townships on the proposed route of the Canada Pacific Railway, through Ontario, for the basis of an endowment. And, as the Lake Superior section is now pretty sure to be built by the Pacific Railway Syndicate, the suggestion may be carried into effect. It has been represented to me, in answer to this suggestion, that our wild lands now in Ontario, are of too uncertain a value to be of definite service in any endowment schemes, whilst the handing over of lands for such a purpose, if of value, is attended with many practical difficulties and dangers. The experience in the United States shows that these fears are groundless, but for the sake of those of our friends who are troubled with them, I would make the following suggestion. Let the townships mentioned be left alone in the meantime, and used later on, if necessary, for the further endowment, as in the neighbouring Republic, of all "education for the industrial classes," and let the *Drainage Debentures* be set aside as a fund for the endowment of the Agricultural College. The money already used in this way is money set aside for agricultural improvement, and as the municipalities so benefited gradually repay it, let it still be kept for that purpose. I only make the suggestion, and do not enter into details. Of course, I do not mean only the five per cent. Drainage Debentures, but a sufficient amount of the Drainage Municipal Rent Charges added thereto, as would make up an annual given sum. Of course, if the Province could see its way clear to hand over all the surplus spent in the way of Drainage for the purpose of supporting a system of agricultural education, so much the better, I would only rejoice. But if a portion sufficient to net about $14,000 per annum were now set aside for the endowment of the Agricultural College, it would be a handsome act on the part of the Provincial Legislature, and would give an impetus to the institution, such as little else could do.

Reversing the order of things, and taking the expenditure first, the estimated expenditure on maintenance account for this year was thus stated in the Estimates of the Province for 1880:

	No. of Officers and Employés.	$ c.	$ c.
SALARIES.			
President, Professor of Natural History, English and Mathematics, and Resident Master	1	2,000 00	2,000 00
Professor of Agriculture and Farm Superintendent	1	2,000 00	2,000 00
Professor of Chemistry and Practical Chemist	1	1,000 00	1,000 00
Professor of Veterinary Science	1	600 00	600 00
Assistant Mathematical and Resident Master	1	500 00	500 00
Bursar and Storekeeper	1	500 00	500 00
Physician	1	300 00	300 00
Foreman of Field and Live Stock Department	1	600 00	600 00
Foreman of Horticultural Department	1	600 00	600 00
Foreman of Mechanical Department	1	600 00	600 00
Matron and Housekeeper	1	300 00	400 00
Engineer	1	400 00	500 00
Assistant Engineer for 6 months	1	150 00	150 00
Janitor and Messenger	1	150 00	150 00
Temporary assistance	.....	100 00	100 00
	14	9,800 00	10,000 00
EXPENSES OF COLLEGE.			
Meat, fish and fowl	.....	2,150 00	2,800 00
Bread and biscuit	.....	1,000 00	1,300 00
Groceries and butter	.....	2,150 00	2,900 00
Laundry, soap and cleaning	.....	200 00	200 00
Medicines and medical comforts	.....	50 00	.....
Women servants for boarding-house, 12	10 in 1879	1,110 00	1,300 00
Fuel	.....	1,600 00	1,600 00
Light	.....	300 00	300 00
Furniture and furnishings	.....	400 00	500 00
Repairs and alterations	.....	400 00	650 00
Maintenance of chemicals	.....	100 00	100 00
Advertising, postage and stationery	.....	600 00	600 00
Unenumerated	.....	600 00	600 00
		20,460 00	22,850 00
EXPENSES OF EXPERIMENTAL FARM.			
Experimental Department	.....	600 00	900 00
		21,060 00	23,750 00

Eliminating from this the $900 which belongs to the *Experiment Station*, and leaving the details with which we have nothing to do, the expenditure of the institution this year would be :

1. Salaries of the Staff	$ 8,750
2. Expenses of College and College Buildings proper	2,700
3. Expenses of the Boarding House	11,450
4. Expenses of the Farm and Stock Breeding Establishment	4,500

The revenue from the fourth item is used directly in meeting the expenditure, but it should be counted in our statement, and the revenue this year will be about as follows :

1. Legislative Grant	$22,950
2. Balance of bills for board and washing after crediting amounts for labour paid by the students	3,000
3. Proceeds of Farm and Stock Breeding Establishment, say,	4,500
4. Fees	1,000

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There is a seeming discrepancy, but it will be found doubtless that the most of the proceeds of the farm will be used in adding to capital account, as many of the herds and flocks are as yet incomplete. Now, taking those figures as a criterion, you will readily understand my suggestions. Stated briefly, they are:

(*a*) That the salaries of the staff should be paid by the proceeds of the endowment.

(*b*) That the boarding-house should be managed as a separate establishment, and should be made to pay its own way; and that in lieu of making an appropriation towards it, one should be made towards "allowances for labour," which is in reality what is now done.

(*c*) That as soon as the capital expenditure of $10,000 towards *live stock* is made the stock breeding establishment is complete; and when the $12,000 towards the *permanent improvement* of the farm is made the farm is complete; and then the proceeds of the farm and the stock-breeding establishment should not only pay all expenses but yield an annual revenue which should almos pay "allowances for labour."

(*d*) The proceeds of the Horticultural Department should pay the expenses of that department when the proposed capital expenditure has been made; but those of the Mechanical Department, which are not legitimate expenses of the farm, will be either expenses of the College proper or permanent improvement capital account, and should be so charged.

(*e*) That within eight years the full standard be reached, and thus gradually year by year the estimate be changed, until in 1888 it stands as given in the proposed plan of a Canadian Agricultural College. Thus, for instance, the grant from the Legislature for 1881 would be (on the basis of 1880):—

1. Salaries of staff	$8,750
2. "Bonus to boarding-house" in lieu of "allowances for labour"	6,000
3. Expenses of College and college building proper	3,000
Total	$17,750

(*f*) That a definite plan of all the buildings, fields, gardens and grounds, as they are expected to be when completed, be drawn up; that a scheme of permanent organization, the course of study and apprenticeship, and the size of the staff under it be matured; that an approximate estimate of the money requisite to make such plans a reality be prepared; and then that the amount of capital thus proposed to be expended be divided up into appropriations for each of the next eight years.

Thus I have striven to show how in all the points named at the commencement, the present Agricultural College in Ontario is to be gradually worked up to the standard sketched out for the Canadian Agricultural College, that is in the matters of the college buildings, the course of study and apprenticeship, the departments of instruction and the staff, the terms, sessions, diplomas, degrees, and the standard of admission; the library, laboratory, museum, and boarding establishment; the farm and character of farming, the live stock and the department of the farm; and the questions of the labour system, general management, revenue and expenditure.

And now, in conclusion, gentlemen, the work I had sketched out for myself at the beginning in considering this question of *Agricultural Education* is done. We have defined Agricultural Education, seen how it was to be imparted, and examined the relation of the State thereto. We have considered what subjects should be taught in an agricultural school or college from the nature of the end to be attained, and in order to be in a better position to solve the question, have passed under review the various agricultural schools and colleges at present existing in the various countries of Europe and North America. We have examined in a general way the plans followed in these institutions, contrasted our own condition agriculturally and educationally with those of the countries in which they exist, and from that as a basis have sketched a system of agricultural education for our own Province, and drawn an ideal plan of a Canadian Agricultural College, and lastly, we have sketched briefly, the history, progress, and present basis and condition of the Ontario Agricultural

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College, and striven to show how under its charter of last session it would be able to work up to the ideal plan previously drawn.

Though hours have passed since I commenced, and the subject must have wearied you almost beyond endurance, I will ask for your attention for half an hour more whilst I strive to briefly add to the subject of *Agricultural Education* that of—

II. AGRICULTURAL EXPERIMENT STATIONS.

If it be true as we have before asserted that Agriculture is a science, then the subject matter must be the facts not only of observation but of experiment. Without entering into any elaborate argument it will be sufficient to say that progress in Agriculture can be obtained only through continued experiment. Every farmer knows that he or his neighbours in his particular locality are obliged to try, as they say, different kinds of grain and roots, and discover which is the most suitable. And what is true of every individual farmer is likewise true of the whole Province. Varieties of seeds, modes of cultivation, species of rotation, varieties of artificial manures, that are of value in other countries may be of no use with us at all. The climate is different, and the soil may also be different. And what is true of the plant is likewise true of the animal. Breeds of cattle suitable for one country may fail, and do fail, in another. Hence the necessity of long and continued experiment. In older countries the work is undertaken by the richer land-owners as well as by the State, but on this side of the Atlantic that class of the community does not exist, and if there be any value to be obtained by long continued, extensive, and expensive experiments in agriculture, that can only be realized by State action. Every intelligent farmer will experiment, but the capital requisite to do so on a scale that will be national in its effects, no farmer in a country like ours can command. And if we are to keep pace with other countries in our competition on the world's markets we must experiment, and the more so as all other countries are beginning to do so on an extensive scale, and that by means of these stations.

History of Agricultural Experiment Stations.

The first farmer's station for agricultural experiments was established at Möckern, a little village near Leipsic, on a farm of sixty acres. It belonged to the Leipsic Agricultural Society, but the station was assisted at once by all the Saxon Agricultural Societies under the leadership of Councillor Renning, their secretary, and was soon taken under the charge of the State Dr. Emil Wolff, now Director of the station at Hohenheim was appointed Chemist, and Mr. Baehr, the manager of the farm, was instructed to superintend all the practical details of experiments. There were a farm-house, some barns, and some improved stock at the inauguration. Two or three rooms were fitted up as a chemical laboratory, a small glass house was built for vegetation experiments, and in this way the first agricultural experiment station in Europe was established. Their growth on that continent, however, has been a rapid one since then. In 1857 there were 11; in 1862 there were 19; in 1867 there were 30; in 1872 there were 62; and in 1877 over 80 were in existence, distributed as follows :—

Great Britain	2	Switzerland	2
Holland	1	Italy	13
Belgium	2	Austro-Hungary	7
France	2	Russia	2

Germany, as follows :—

Prussia	28	*Mecklenburg-Schweirin*	2
Bavaria	6	*Saxe-Weimar*	2
Saxony	6	*Saxe-Meiningen*	1
Würtemburg	2	*Anhalt*	1
Baden	2	*Oldenburg*	1
Hesse Darmstadt	1	*Alsace-Lorraine*	2
Brunswick	1		
		Total in Germany	55

The two in Britain are the one of Messrs. Lawes and Gilbert at Rothamstead, and the other of the Aberdeenshire Agricultural Association, near Aberdeen. The first of these is on the farm of Mr. Lawes, where extensive experiments at a cost of $15,000 per annum have been carried on since 1845 at his own cost. The laboratory and experimental grounds, with an endowment fund of £100,000, have been placed in trust by Mr. Lawes "to remain forever devoted to the investigation of agricultural science." The work is being carried on now mainly under the superintendence of Dr. J. H. Gilbert. The second has been four years in operation and is carried on by the Association named, under the superintendence of Thomas Jamieson, F.C.S., Chemist to the Association. Besides these there are four agricultural laboratories at work—the first at London under Dr. A. Voelcker, managed by the Royal Agricultural Society; the second at the University of Glasgow under Professor Anderson, controlled by the Highland and Agricultural Society; the third at Rothamstead; and the fourth at Cirencester. In 1868, France sent M. Goundeau to visit and report on the German stations, but the war breaking out soon after retarded operations, and so the French ones are too recent to merit notice. In 1870 the Italian Minister of Agriculture and Commerce sent Professor Alphonso Cassa to visit and report on the German stations, and the thirteen in Italy have been established since then. In addition to the two mentioned as existing in Russia, there are carried on agricultural laboratories at eight of her universities, and at her three Agricultural Colleges and at thirteen of the German universities are the same agricultural laboratories found. But the model for all the experiment stations on the Continent of Europe has been found in the German ones, and to those we may turn for the information we want.

A.—The German Agricultural Experiment Stations.

Germany is the home of these experiment stations; it was there they originated, there they have been fostered, there they have received the most careful support, and there they have given the most successful results. The twenty-fifth year of the existence of the first station was celebrated at Möckern in September, 1877, and to the celebration came almost all the directors of the German agricultural experiment stations. To each of those guests was presented a book written by Professor Nobbe, of Tharand, which contains all the historical and statistical information necessary regarding these stations. From that work the following table has been compiled. Before giving it allow me to say that in Germany no agricultural seeds, no artificial manures, and no feeding stuffs can be sold without the Government mark as to quality. That is given by these stations. In 1877 there were kept busy:—

1. In analyzing artificial manures 33
2. In proving purity and genuineness of agricultural seeds .. 29
3. In testing quality of feeding stuffs..... 27

The table gives the name of the station and the State in which it is situated, the year of its establishment, the number of its directors and assistants, its income in merks, and the particular subjects of agricultural research to which its attention was directed:—

No.	NAME.	Year of Formation.	No. of Directors.	No. of Assistants.	State Yearly Income. (Merks.)	Principal Subjects of Agricultural Research.
	Amhalt.					
1	Cothen	1864	1	1	7700	Physiology of animals and plants.
	Baden.					
2	Karlsruhe	1859	1	2	.....	Vine culture and wine.
3	"	1872	1	1	2400	Control of seed market.
	Bavaria.					
4	Munich	1857	1	3	12000	Analysis of artificial manures and foods, and physiology of animals and plants.
5	"	1866	1	4	21000	Breeding.
6	"	1875	1	1	3500	Cropping.
7	Augsburg	1865	1	1	3500	Control of seeds and manures.
8	Weihenstephan	1877	1	.....	4600	Dairying.
9	Triesdorf	1974	1	1	7500	General agriculture.
10	Bayreuth	1867	1	.....	1050	Manures, foods and seeds.
11	Speier	1877	1	1	7700	Analysis of wine specially, and vineyard plants.
12	Wurzburg	1877	1	2	2300	Manures and vineyard plants.
	Bremen.					
13	Bremen	1874	1	3	17400	Reclamation of waste lands.
14	Leipzig	.....	.....	.....	.....	
	Braunschweig.					
15	Braunschweig	1862	1	2	10000	Chemical technology.
	Elsass-Lothringen.					
16	Rufach	1874	1	1	6000	Physiology of plants and wine products.
	Eachen-Meningen.					
17	Eisfeld	1872	1	.....	600	Control of artificial manures.
	Hessen.					
18	Darmstadt	1871	1	1	9800	Manures.
	Mecklenburg.					
19	Rostock	1875	1	2	16800	Physiology of plants and cropping.
20	Raden	.....	.....	.....	.....	
	Oldenburg.					
21	Oldenburg	1871	1	.....	3800	The soil.
	Weimar.					
22	Jena	1861	4	4	2500	Agricultural chemistry, and physiology of plants and animals.
23	Zwatzen	.....	.....	.....	.....	
	Saxony.					
24	Debelar	1872	1	1	1962	Soils.
25	Tharand	1869	1	2	6515	Physiology of plants.
26	Dresden	1862	1	1	3000	Physiology and pathology of animals.
27	Pommitz	1854	1	3	17770	General agriculture.
28	Mockern	1852	1	3	14892	Feeding of cattle.

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No.	NAME.	Year of Formation.	No. of Directors.	No. of Assistants.	State Yearly Income. (Merks.)	Principal Subjects of Agricultural Research.
	Wurtemburg.					
29	Hohenheim	1865	1	2	12000	Feeding of cattle, and analysis of feeding stuffs.
	Prussia.					
30	Popplesdorf	1868	1	2	4200	Chemistry, and physiology of plants.
31	"					
32	Bonn	1855	1	1	10000	General agriculture.
33	Geiseenheim	1872	2			Vine culture.
34	Wiesbaden	1868	1	2	7150	Chemistry of wine and the vine.
35	Marburg	1877	1			Control of seeds.
36	Attenorchen	1857	1	1	8250	Soils, climate, physiology of plants.
37	Munster	1879	1	2	13100	Seeds, manures, foods.
38	Kiel	1874	1			Seeds.
39	Bremervorde	1876				
40	Hildesheim	1870	1	3	12400	Beet-root sugar manufacturing.
41	Gottingen	1857	1	2	8310	Feeding of animals.
42	"	1876	1			Seeds.
43	Kiel	1874	1			Seeds.
44	Halle	1862	1	4	3500	Pathology of plants.
45	"	1855	1	4	31600	Cropping; manures; feeding and feeding stuffs.
46	Breslau	1875	1		1000	Seeds.
47	Proskau	1872	1	2	1500	Pathology of fruit trees.
48	"	1869	1	3	11400	Feeding and physiology of animals.
49	Breslau	1877				
50	Zabikowo	1872	2	2	6575	General agriculture.
51	Regenwalde	1863	1	2	7000	Soils, and physiology of plants.
52	Berlin	1874	1	2	15300	Distillery.
53	Dahme	1856	1	3	12300	Physiology of plants; seeds; manures.
54	Dantzig	1876	2	2	12900	Seeds.
55	Konigsberg	1875	1		6050	Technology of plants.
56	Insterburg	1858	1		6000	Chemico-technological subjects.

The figures given as income do not include everything, for many of them receive grants from agricultural societies and all of them obtain a revenue by charging for analyzing fertilizers, feeding stuffs, etc. From the reports of a few before me for 1874, I find that Hildesheim got 9,300 merks for analyzing, and 900 from agricultural societies; Münster 333 and 1,860 respectively from same sources; Insterburg 1,710 and 1,200; Regenwalde 540 and 1,620; Bonn 5,400 and 4,350; and Halle 18,000 from analyses alone.

Dr. Nobbe, in the book mentioned, passes under review the subjects pursued and solved or partly solved in the German agricultural experimental stations. Allow me to give you a bare enumeration of them grouped together, remembering that the Doctor is not responsible for the arrangement, nor that of the preceding table. It will show us pretty clearly the multiplicity of agricultural subjects on which experiments are to be made, and give us at the same time some idea of the work before us in any Canadian agricultural experiment station:

I. Sources of nourishment for the plant.

1. Atmosphere.
2. Water.
3. Rocks and influence of the atmosphere and water upon them.

[*Mr. Johnston.*]

II. Arable land.

1. Formation of soils.
2. Physical and chemical characteristics of soils.
3. Analysis of soils.
4. Amelioration of soils.

III. Physiology of plants.

1. Nourishment of plants.
2. Mineral substances and their compounds found in plants.
3. Roots in their action on the soil.
4. Growing plants in solutions.
5. Organs of plants above ground in relation to the air.
6. Genesis, metamorphosis and characteristics of the organic products of plants.
7. Influence of physical agencies on plants.
8. Germination of plants (and control).
9. Development of the organs of plants.
10. Production of vegetable matter.
11. Reproduction of plants.
12. Diseases and malformations of plants, (*parasites, fungi, insects*).
13. Chemical composition of agricultural plants.

IV. Artificial manures.

1. Stable manures (solid and liquid), and composts.
2. Manures from closets and sewers.
3. Guano and similar manures.
4. Offal from the industries.
5. Phosphates.
6. Gypsum, chalk, marl, and substances from ponds and rivers.
7. Manure salts.
8. Other fertilizers in the market.

V. Field experiments.

1. Cropping and different methods of cultivation.
2. Varieties of agricultural seeds of all kinds.
3. Methods of utilizing manures, and effects of each kind on each variety of seed, and of each method of application.
4. Rotations of cropping.

VI. Animal food and digestion.

1. Components of the feeding stuffs.
   (*a*) Cereals, (*b*) vegetables, (*c*) hay, (*d*) grass, (*e*) fermented food, (*f*) roots and tubers, (*g*) offal from the industries, etc.
2. Control of feeding stuffs.
3. Digestion and digestibility of food.
   (*a*) Hay *vs.* straw, (*b*) green fodder *vs.* dry, (*c*) fermented *vs.* steamed fodder, (*d*) offal of the industries, etc.

VII. Parts and secretions of the animal body.

1. Blood, flesh, bones and fats.
2. Wools, horns, hair, skin.
3. Milk, saliva, excrementitious matter.

[*Mr. Johnston.*]

VIII. Animal production in relation to food and external circumstances.

1. Increase and expenditure of constituents,—(1) in general, (2) of nitrogen, (3) formation of fats.
2. Nourishment and diet in relation to production of manures.
3. Rearing and keeping of farm animals.
4. Feeding and fattening of them.

IX. Conception and breeding.

X. Technology:—(1) Forestry, (2) Vine culture, (3) Making of wine, (4) Beet root sugar, (5) Flax industry, (6) Cheese and butter factories, (7) Brewing, (8) Distilling, (9) Bee-keeping, etc., etc.

XI. Chemical Analysis.

B.—Agricultural Experiment Stations in the United States.

(1) Experiments on the farms attached to the Agricultural Colleges.

On the majority of these farms a greater or less number of experiments are annually conducted. The more prolific of them in published results are Michigan (which stands first) and Pennsylvania which has three experimental farms in connection with her Agricultural College. Except, however, in Michigan, no long and continued series of experiments have been carried on, and even those on one subject. In all these institutions the experiments have been desultory, and none of them aim at carrying out to any idea the main end of an agricultural experiment station.

(2) Connecticut Agricultural Experiment Station.

This was established by an Act of the State Legislature in March, 1877, "for the purpose of promoting agriculture by scientific investigation and experiment." Its objects as set forth in its announcement are described as follows :—"The station is prepared to analyze and test fertilizers, cattle food, seeds, soils, waters, milks, and other agricultural materials and products ; to identify grasses, weeds, and useful or injurious insects ; and to give information on the various subjects of agricultural science for the use and advantage of the citizens of Connecticut."

During 1879, there were made analyses of 117 samples of fertilizers, of 33 specimens of feeding stuffs, of 8 samples of seeds, and of 13 samples of river and well waters. During that year its revenue was $5,000 from the State Treasury, and $422.35 of receipts from the laboratory. It is simply an agricultural laboratory at New Haven, on the same plan as the one of the Royal and Agricultural Society at London under Dr. Voelcker, but on a much smaller scale.

(3) North Carolina Agricultural Experiment Station.

This was established in 1878, and on the same plan as the last.

(4) Cornell University Experiment Station.

This was established in February, 1879, and is on a far wider and better plan than the Connecticut one. It has been but two seasons in existence, and the first report published this year gives the subjects of experiment which have been made on the field, in the stable, and in the laboratory. It is under a Board of Control composed of the members of the faculty of agriculture in Cornell (five in number), and a delegate each from the State Agricultural Society, State Grange, State Dairymen's Associations, Western New York Farmers' Club, Central New York Farmers' Club, Elmira Farmers' Club, American Institute Farmers' Club, and the Ithaca Farmers' Club. This year the State granted to it

$10,000 "for the purpose of promoting agriculture by scientific experiment and investigation."

C.—Agricultural Experiment Stations in Ontario.

(1) The Experimental Farm connected with the Provincial Agricultural College at Guelph.

For four years in reality has this been in operation, and the results are before you in Mr. Brown's able reports to the Government for three out of the four. It is really an *Experiment Station.* But to make it even more distinctively so I would make the following suggestions :

(*a*) That the Experiment Station be separated, theoretically and financially, from the Agricultural College.

(*b*) That the laboratories of the College, when built and equipped, be used as the laboratories of the Experiment Station ; that the Professor of Chemistry be appointed Head Chemist, with two assistants, whose salaries, and the increase of his, would be chargeable to the experiment station to which their work would belong. Not only they, but the senior students could be analyzing soils manures, and foods, examining and naming all grasses, weeds, insects, plants, etc., attending to chemical results of field experiments, and experiments with feeding stuffs, etc.

(*c*) That the four Professors of Agriculture, as they be severally appointed, become Directors of the Experiment Station, and conduct experiments in their respective departments of Field, Live Stock, Horticultural, and Mechanical.

(*d*) That the first Professor of Agriculture be appointed Head Director of the Experiment Station, with an additional salary above the others, in due proportion to his additional responsibility, having under him, as the staff of the station, the other three professors of agriculture, the chemist and two assistants, the veterinary surgeon, and say, besides, a couple of foremen.

(*e*) That the expenses of the station, which would be about $4,500 per annum, be paid by a direct annual grant from the treasury of, say, $4,000, and receipts from the laboratory, say, of $500.

(*f*) That in order to full equipment the necessary laboratory accommodation be provided, additional stock purchased, the barns, stables, folds, and pens gradually built by themselves ; and fields Nos. 17 and 18 thoroughly under-drained, and divided into plots for experimental purposes.

(*g*) That arrangements be made for procuring every five or six years, by means of experts or otherwise, all new varieties of cereals and roots used in the world.

(*h*) And that a plan of the Experiment Station, as completed, be at once drawn up ; the cost estimated, and spread over the next five years in appropriations from capital account.

The subjects that would present themselves for solution are very fully given in the *resumé* of the work of the German Stations, and do not require to be repeated. Such a selection as the wants of the Province more immediately dictate, and as they are required, can easily be made.

(2.) Other Experiment Stations in the Province.

When the eight middle Agricultural Schools suggested came into operation an Experiment Station could be attached to each. But without waiting for them I would like to see established Experiment Stations in at least the following districts :—

(1) The Ottawa district.
(2) The St. Lawrence "
(3) The Lake Ontario "
(4) The Victoria "
(5) The Niagara "
(6) The Lake Erie "
(7) The London "
(8) The Owen Sound "

These would include fairly all the climatic variations in the Province, but they could be multiplied as necessary. They would all be in connection with the main station at Guelph. Not only the middle Agricultural Schools, but the farms selected as previously suggested could be made on a smaller scale still, Agricultural Experiment Stations; while any intelligent farmer who chose to carry on experiments in a particular branch could be affiliated with the central station. Were it not so late, and were you not so wearied, gentlemen, I might sketch a plan of the equipment, location, and expense of those district and minor affiliated experiment stations, but some other time must be chosen for that purpose.

We have now sketched the history of the inception and progress of Agricultural Experiment Stations, looked at their work in the land of their birth, and the beginning of their transplanting to this western continent; we have seen what are their aims and objects, and the manner in which they strive to attain them; and we have pointed out in outline in what way those aims and objects can be accomplished by the same agencies in our own Province, and how those agencies are to be moulded into shape to achieve that accomplishment. And with that our work as laid down at the commencement is done, for we have added to a pretty full consideration of the subject of *Agricultural Education*, a brief and hasty sketch of that of *Agricultural Experiment Stations*.

WM. JOHNSTON.

PROFESSOR BROWN'S EVIDENCE.

Professor BROWN, a member of the Commission, having been invited to give evidence, said: I am Professor of Agriculture and Farm Superintendent at the Ontario Agricultural College, Guelph, and have charge of the outside departments, including the farm, the stock, the garden, and the mechanics' shop. I also lecture on practical agriculture.

CHEMICAL APPLIANCES.

I feel the want, in my experiments, of the assistance of the chemist. We have a good man, but he has not the appliances for such work. I want to press the suggestion that whosoever is professor of agriculture should have the assistance of the chemist. Unless something is done, the series of experiments may be spoiled. There must be a thorough analysis of soils, manures, and such like.

INSTRUCTION DEPARTMENT.

Mr. Mills asked me to explain with regard to the instruction department. When a boy is received, he is sent to me to ascertain what he can do in regard to farm work, and we class them as we find their capabilities. We find whether he can clean a horse or drive one, or whether he can do anything with him. If he can't clean a horse he is passed to the instruction department, as we think it sound that if a man cannot prepare his team for work he has no right to use it. I am unable to do justice to all the students, by want of time and opportunities to repeat lessons, and therefore have no doubt that there will have to be some extension of the instruction department, which is at present limited to two years. In the matter of ploughing alone, it requires more time. The point is, that we are not complete in regard to the instruction department. We have one team set aside, and we find it doing so well that we want another The mechanical department is doing a great deal of good work, and show the boys how to handle tools and execute repairs, and so I would like to see it recognized as an instruction department to a certain extent—just what the average farmer should know in handling tools. [I am of opinion that there should be a professor of horticulture and botany in the place. We have good teachers in botany, but we want one to go with the boys into the field from the class-room, and make them acquainted with grasses, plants of all kinds, and to be able to identify them, and this could all be done by one practical man. I agree with the previous witness (Mr. Johnston).

Mr. Johnston—Professor Brown.]

that this man should have charge of arboriculture. I would like to see our veterinary surgeon a resident. We would thus be better able to give the lads more lessons in the handling of stock.

Practical Instruction.

While part of my duty is to lecture, I try to make the lectures practical. I think a practical lecture is worth ten thousand inside lectures. After explaining the points of an animal I make every student do the same thing. He is cross-questioned by his own fellows as well as myself. Very many of our boys want to become good judges at agricultural exhibitions, and I think we should fit them for that work, but unless we have opportunities of repeated lessons, and grinding in the points of animals, we will not obtain that. Unless we have a three years' course we will not be able to do this.

Want of Text Books.

I have now to speak, at the direct request of the students, of the great want of text-books. We want a set of text-books. I think this is absolutely necessary. I think these books should be as guides to the students. In view of this want, I present a list of text-books suitable for this Province. We have text-books on the pure sciences. If I am lecturing on any special department, I would like to place a hand-book on that subject in the hand of the student. My list, which I think should be prepared by men selected by Government, runs as follows :—

Agricultural Text-Books for Canada.

1.—The Cultivation of Grain Crops.
2.—The Cultivation of Pastures and Green Fodders.
3.—The Cultivation of Root Crops.
4.—The Garden and its Crops.
5.—The Growing of Fruit.
6.—The Cultivation of Trees.
7.—The Botany of the Farm.
8.—The Chemistry of the Farm.
9.—Soils and Geology.
10.—The Mechanics of the Farm.
11.—Road and Fence-making.
12.—Farm Drainage.
13.—Physiology and Diseases of Farm Animals.
14.—Insects injurious and beneficial to Farm Crops.
15.—Manures.
16.—Food and the Fattening of Farm Animals.
17.—Cattle and their Management.
18.—Sheep and their Management.
19.—Horses and their Management.
20.—Swine and their Management.
21.—Poultry and their Management.
22.—Bees and their Management.
23.—Management of the Dairy, and the making of Butter and Cheese.
24.—Agricultural Mathematics and Book-Keeping.

The Government might offer a sum for each, and a royalty to the best man in the Province for the MSS. of each of these text-books. Ontario would then have the honour of possessing the only systematic set of agricultural text-books in the world.

I think this list covers our field. I have had occasion to speak about the want of time, or rather the shortness of the course, and of the desirability of the Government extending it to three years, but even then, I think we should have more time. The professors of agriculture, of botany, of veterinary science, should have more opportunities of taking students to inspect stock or investigate any other subject in their charge.

[*Professor Brown.*]

More Time Necessary—Suggestions.

At present we have not time to do many things we would like. We should be able to take students out more, to *impress* the lectures of the class room. I think the Government should set the example, and erect labourers' cottages. This would help to make ours a model farm. At present we have no such cottages. There should be some system of obtaining seeds from all parts of the world. I think our College should act as an immigration agent to the extent of offering one-fifth of its space to students from Europe, at a fee of $250 a year. This would attract a desirable class. I endorse what Mr. Johnston says as to the division of the farm in the future—at least I think there should be a general farm, an experimental farm, and a model farm. On the general farm have crops of all kinds. The experimental farm would be devoted to experimenting on food for stock, etc., and the third would be a model farm where everything should be model. It should be very much under the management of third year students. I am of opinion that farming could be made more productive by having (1) text-books applicable to each division compiled; (2), by publishing a first-class agricultural periodical; (3), by making the reading of agricultural text-books a lesson at the public schools; (4), by the extension of the prize farm system lately adopted by the Agricultural and Arts Association of Ontario. I think the book-keeping of an average farmer could be done in one form. If you complicate the system you fail. From my own experience in England and Scotland, and the management of a large number of farms, I would recommend a simple journal with three days to the page, and double money columns as a farm journal and ledger, in which the farmer could every evening note down for example where the man has been ploughing for a certain crop, etc., and that all his notes should be made up once a month in spaces left for that purpose between each month, so that at the end of the year he would only have to sum up the twelve pages and classify. I have been able to keep such a book with my own work. My plan would be as follows:—

Ledger Branches.

I.—Household.
II.—Horse Labour.
III.—Manual labour paid for.
IV.—Manual labour not paid for.
V.—Permanent improvements (capital account).
VI.—Rates and taxes.
VII.—Crops laid down and harvested.
VIII.—Sales.
Inventory and valuation.

The cottages I spoke of should be built as models. The Government should build a residence for the Professor of Agriculture as a model farmer's house. We give the boys some instruction on the analysis of soils, but it is not enough. They get as much practical instruction as the professor is able to give them without all the necessary appliances. I am not prepared to say that students should be able to tell the component parts of the soil. There is no particularly practical value in a farmer being able to analyze his own soil. An average farmer would never be able to analyze soils correctly. I do not use any text-books, but I would if they were suitable. I would like every student to have a book to check his teacher, and read ahead of him. It enables a boy to take his notes more readily. I believe the MSS. for these books could be got for $10,000. I think the same books would do for the College and the public schools. It would pay a farmer better to get analysis of soils done than to do it himself. But a farmer should be able to test soils and say whether there are certain regulating materials in them. I am in favour of arranging with certain farmers near the College where lads who had never been on a farm, might spend some time before coming to us. I think it is of much more importance, a farmer should know a grass from a weed than that he should be able to analyze soils. I do not know of any first-class farming periodical in this country.

WM. BROWN.

[*Professor Brown.*]

Sitting to take oral evidence, held at Belleville, October 18th, 1880. Present—Messrs. Aylsworth (Chairman), and Dymond.

MR. J. W. JOHNSON'S EVIDENCE.

John W. Johnson was called and examined :—

I am Principal of the Ontario Commercial College, Belleville. In the course of a year about fifty farmers' sons pass through the institution. We give a purely commercial education.

Agricultural Accounts.

Incidentally my attention has been turned to the mode of keeping agricultural accounts. From communication with farmers I have some knowledge of farm accounts. I know few farmers who keep accounts. One gentleman keeps accounts that professedly show profit and loss in the different separate operations of the farm. I know he is satisfied with the system. I think he obtains actual information as to the state of his affairs.

A System Proposed.

I have endeavoured, on that information, to frame a system of accounts for farmers. I have found it easy to do this. I have never lived on a farm nor had any practical knowledge of its working. The system on which my informant keeps his books is by double entry. The plan is to start with an inventory of assets and liabilities. In one book we have on one side the Day Book, in which is recorded every transaction as it occurs, and on the other side the Journal, where the entries are prepared for the Ledger; as for instance:—

DAY BOOK.		JOURNAL.	
Paid cash for seed, as under, Fields Nos 1 and and 2, 32 bushels, at 75c. per bushel..	$24 00	Fields Nos. 1 and 2 Dr.	$24 00
Field No. 3, 16 bushels, at $1.00 per bushel...	16 00	Field No. 3 "	16 00
Field No. 4, 8 bushels, at 50c. per bushel.....	4 00	" No. 4 "	4 00
Field No. 5, corn and potatoes.....	5 00	" No. 5 "	5 00
	$49 00	To Cash.....	$49 00

Explanation.

We are supposed to have a farm of fifty acres, divided into seven fields and one orchard. The object is to ascertain what the gain and loss may be from each crop, from the stock and other operations, and household expenses. We open an account in the ledger with each of the fields, or where the same crop is sown in two fields; we combine them in one account, and charge on the crop costs for seed and labour, and give it credit for all it produces, thus ascertaining the net gain or loss from each crop.

The Balance Sheet.

At the end of the year a balance sheet is taken off and we ascertain the loss and gain from various accounts, close these up for loss and gain account, and take an inventory of the property, and the balances, shewing assets and liabilities, are brought down for use in the succeeding year. We make every year carry its own profit and loss irrespective of

the effect of its operations on future years. I put in a set of accounts prepared on the plan above suggested. (See accounts appdened.)

General Labour Account.

To meet the difficulty of charging miscellaneous operations going on concurrently with specific operations, an account, called "General Labour Account," might be opened chargeable to Loss and Gain Account.

Charges for Permanent Improvement.

I would charge improvements, such as under-draining or stumping, to real estate account, if the owner of the farm. A tenant farmer would only undertake such improvements as would be recouped to him during the term of his holding, by the effects on the farm's productiveness, and these must be charged to "General Labour Account."

Manure Account.

I have no manure account. I would credit the stock with manure, and whether produced on the farm or purchased, charge it to the proper account according to the application made of it. In case of the treatment of land as, for instance, summer fallow or very liberal manuring, I would not charge it to the first subsequent crop but to General Labour Account. That would add to the expenses of the particular year in which the work was performed. I would not charge a particular crop with such labour. I would only charge the crop with the labour directly incidental to that crop. If I applied a special manure or did anything specially to benefit one crop I would charge it to that crop or current account. I have no doubt the students who leave my College could keep these and even more complicated accounts than those I have exhibited. I have not given any particular attention to agricultural education.

J. W. JOHNSON.

DAY BOOK AND JOURNAL OF FARM ACCOUNTS.

TOWNSHIP OF THURLOW, APRIL, 1880.

DAY BOOK.

	$ c.	$ c.
John Roblin this day commences to keep a set of books by double entry, for the purpose of recording the business of his farm, and to determine yearly his gains and losses, and assets and liabilities.		
INVENTORY OF PROPERTY.		
Real Estate, 50 acres, as under:—		
Field No. 1 .. 8 acres.		
Field No. 2 .. 8 "		
Field No. 3 .. 8 "		
Field No. 4 .. 4 "		
Field No. 5 .. 4 "		
Field No. 6 .. 8 "		
Field No. 7 .. 6 "		
Orchard, garden and buildings 4 "		
50 acres, valued, including buildings, at $75 00 per acre	3750 00	
Household furniture	520 00	
Plant, as under	890 00	
Two teams $400 00		
One reaper 100 00		
One mower 75 00		
Two ploughs, at $15 30 00		
One harrow 15 00		
Two sets harness, at $25 50 00		
Two whiffle trees, at $2 50 5 00		
One waggon 75 00		
One buggy 100 00		
One cultivator 10 00		
One horse-rake 24 00		
Sundry implements 6 00		
$890 00		
Live stock, as under	215 00	
Five cows 150 00		
Ten sheep 50 00		
The hogs 15 00		
Cash	525 00	
Farm produce, being oats, hay, flour, &c., on hand	320 20	
Field No. 6, for value of timothy and clover seed in ground	10 00	
		$6230 00

JOURNAL.

			$ c.	$ c.
Real estate	Dr.	(1)	3750 00	
Furniture	"	(1)	520 00	
Plant	"	(1)	890 00	
Live stock	"	(1)	215 00	
Cash	"	(2)	525 00	
Farm produce	"	(2)	320 00	
Field No. 6	"	(3)	10 00	
To Capital		(1)		6230 00
Carried forward			$6230 00	$6230 00

TOWNSHIP OF THURLOW, APRIL, 1880.

Day Book.	$ c.	$ c.
3rd.		
Paid cash for seed as under :—		
Fields, Nos. 1 and 2, 32 bushels barley, at 75c	24 00	
Field No. 3, 16 bushels wheat, at $1 00	16 00	
Field No. 4, 8 bushels oats, at 50c	4 00	
Field No. 5, Indian corn and potatoes	5 00	
		49 00
11th.		
Credit John Thompson	9 00	
" Wm. Wilson	9 00	
For 9 days' labour each, on fields Nos. 1 and 2		
		18 00
16th.		
Credit John Thompson	4 50	
" Wm. Wilson	4 50	
With 4½ days' labour each, on field No. 3		
		9 00
19th.		
Credit John Thompson	2 25	
" Wm. Wilson	2 25	
For 2¼ days each on field No. 4		
		4 50
23rd.		
Credit John Thompson	4 50	
" Wm. Wilson	4 50	
For 4½ days' each on field No. 5		
		9 00
28th.		
Paid cash for garden seed, Ohio corn for green feed, vetches, millet, etc.		6 00
Paid cash for labour on orchard and garden		9 00
30th.		
Paid John Thompson on acc't	10 00	
" Wm. Wilson "	10 00	
		20 00
The milk from our 5 cows is arranged to be taken by the "Allan Cheese Factory" at the rate of 8c. for a gallon of 10lbs.		
May 5th.		
Received from "Allan Cheese Factory" for milk delivered in April, cash		15 70
29th.		
Paid John Thompson, acc't. in full	10 25	
" Wm. Wilson " "	10 25	
		20 25

Journal.		$ c.	$ c.
Forward		6230 00	6230 00
3rd.			
Fields Nos. 1 and 2 .... Dr.	(3)	24 00	
Field No. 3 "	(3)	16 00	
" " 4 "	(3)	4 00	
" " 5 "	(3)	5 00	
To Cash	(2)		49 00
11th.			
Fields Nos. 1 and 2 .... Dr.	(3)	18 00	
To John Thompson	(4)		9 00
" Wm. Wilson	(4)		9 00
16th.			
Field No. 3 Dr.	(3)	9 00	
To John Thompson	(4)		4 50
" Wm. Wilson	(4)		4 50
19th.			
Field No. 4 Dr.	(3)	4 50	
To John Thompson	(4)		2 25
" Wm. Wilson	(4)		2 25
23rd.			
Field No. 5 Dr.	(3)	9 00	
To John Thompson	(4)		4 50
" Wm. Wilson	(4)		4 50
28th.			
Garden and orchard Dr.	(4)	6 00	
To Cash	(2)		6 00
Garden and orchard .... Dr.	(4)	9 00	
To Cash	(2)		9 00
30th.			
John Thompson Dr.	(4)	10 00	
Wm. Wilson "	(4)	10 00	
To Cash	(2)		20 00
May 5th.			
Cash Dr.	(2)	15 70	
To Cows	(5)		15 70
29th.			
John Thompson Dr.	(4)	10 25	
Wm. Wilson "	(4)	10 25	
To Cash	(2)		20 50
Carried forward		$6390 70	$6390 70

TOWNSHIP OF THURLOW, JUNE, 1880.

DAY BOOK.	$ c.	$ c.
June 1st.		
Paid Cash for groceries	7 50	
" " dry goods	17 00	
		24 50
30th.		
Have clipped and sold for cash, 60lbs. wool, at 30c.	18 00	
Sold for cash, 10 lambs, at $2 50	25 00	
		43 00
Have harvested from field No. 6 20 tons hay assumed to be worth $10 00 per ton		200 00
Paid for harvesting hay		7 00
July 31st.		
Have harvested and threshed from fields Nos. 1 and 2, 560 bush. barley (average 35 to acre), for which I have been offered and have accepted for October delivery, 75c. per bush.		420 00
August 5th.		
Have harvested, threshed, and sold 240 bush. wheat for cash, from field No. 3, at $1 20	288 00	
Put into barn for use from same field, 20 bush. wheat, at $1 20	24 00	
		312 00
Credit John Thompson, 4 days, fields Nos. 1 and 2	4 00	
Credit Wm. Wilson, 3 days, fields Nos. 1 and 2	3 00	
		7 00
Credit John Thompson, 3½ days, field No. 3	3 50	
Credit Wm. Wilson, 3½ days, field No. 3	3 50	
		7 00
15th.		
Paid for threshing barley, fields Nos. 1 and 2, 560 bush. at 5c.	28 00	
Paid for threshing wheat, field No. 3, 260 bush. at 6c.	15 60	
		43 60
Have harvested and threshed from field No. 4, 160 bush. oats assumed to be worth 50c. a bush.		80 00

JOURNAL.	$ c.	$ c.
Am'ts. forward	6390 70	6390 70
June 1st.		
House expenses ..... Dr. (5)	24 50	
To Cash ..... (2)		24 50
30th.		
Cash ..... Dr. (2)	43 00	
To Sheep ..... (5)		43 00
Farm produce ..... Dr. (2)	200 00	
To field No. 6 ..... (3)		200 00
Field No. 6 ..... Dr. (3)	7 00	
To Cash ..... (2)		7 00
July 31st.		
Farm produce ..... Dr. (2)	420 00	
To Fields Nos. 1 and 2 .... (3)		420 00
August 5th.		
Cash ..... Dr. (2)	288 00	
Farm produce ..... (2)	24 00	
To Field No. 3 ..... (3)		312 00
Fields No. 1 and 2 ..... Dr. (3)	7 00	
To John Thompson ..... (4)		4 00
" Wm. Wilson ..... (4)		3 00
Field No. 3 ..... Dr. (3)	7 00	
To John Thompson ..... (4)		3 50
" Wm. Wilson ..... (4)		3 50
15th.		
Fields Nos. 1 and 2 .... Dr. (3)	28 00	
Field No. 3 ..... (3)	15 60	
To Cash ..... (2)		43 60
Farm produce ..... Dr. (2)	80 00	
To Field No. 4 ..... (3)		80 00
Carried forward	$7534 80	$7534 80

TOWNSHIP OF THURLOW, AUGUST, 1880.

DAY BOOK.	$ c.	$
30th.		
Paid cash for harvesting oats, field No. 4	5 00	
Paid cash for threshing oats, field No. 4	4 80	
		9 80
Received from "Allan Cheese Factory" cash in settlement to date		62 80
Sept. 15th.		
Have harvested from field No. 5 120 bush. corn, assumed to be worth 70c.	84 00	
150 bush. potatoes assumed to be worth 40c.	60 00	
		144 00
Paid John Thompson cash in full of acc't.	7 50	
Paid Wm. Wilson	6 50	
		14 00
Paid for labour on field No. 5		19 00
Paid for dry goods, as per bill, of Foster and Reid		47 50
30th.		
Have harvested from 3 acres of orchard 468 bbls. apples which I have sold for cash to a Montreal buyer, at $1 25		585 00
Paid for picking and barrelling the above apples		50 00
Oct. 29.		
Received cash for barley, as per agreement recorded July 31st		420 00
Nov. 30th.		
Received from "Allan Cheese Factory" cash in full for season		47 10
Paid "Allan Cheese Factory" for butter and cheese got during the season for house use		15 20
Dec. 15th.		
Sold 40 bush. oats for cash, at 48c.		19 20
1881. Jan. 20th.		
Sold 20 bush. potatoes for cash, at 50c.		10 00

JOURNAL.	$ c.	$ c.
Am'ts. forward	7534 80	7534 80
30th.		
Field No. 4 ..... Dr. (3)	9 80	
To Cash ..... (2)		9 80
Cash ..... Dr. (2)	62 80	
To Cows ..... (5)		62 80
Sept. 15th.		
Farm produce ..... Dr. (2)	144 00	
To Field No. 5 ..... (3)		144 00
John Thompson ..... Dr. (4)	7 50	
Wm. Wilson ..... (4)	6 50	
To Cash ..... (2)		14 00
Field No. 5 ..... Dr. (4)	19 00	
To Cash ..... (2)		19 00
House expenses ..... Dr. (5)	47 50	
To Cash ..... (2)		47 50
30th.		
Cash ..... Dr. (2)	585 00	
To Garden and orchard ..... (4)		585 00
Garden and orchard ..... Dr. (4)	50 00	
To Cash ..... (2)		50 00
Oct. 29th.		
Cash ..... Dr. (2)	420 00	
To Farm produce ..... (2)		420 00
Nov. 30th.		
Cash ..... Dr. (2)	47 10	
To Cows ..... (5)		47 10
House expenses ..... Dr. (5)	15 20	
To Cash ..... (2)		15 20
Dec. 15th.		
Cash ..... Dr. (2)	19 20	
To Farm produce ..... (2)		19 20
1881. Jan. 20.		
Cash ..... Dr. (2)	10 00	
To Farm produce ..... (4)		8 00
" Field No. 5 ..... (3)		2 00
Carried forward	$8978 40	$8978 40

TOWNSHIP OF THURLOW, JANUARY, 1881.

DAY BOOK.	$ c.	$ c	JOURNAL.	$ c.	$ c.
			Am'ts. forward	$8978 40	$8978 40
20th.			20th.		
Paid Subscription to church for one year		20 00	House expenses ..... Dr. (5) To Cash ..... (2)	20 00	20 00
March 31st.			March 31st.		
Paid Conger Brothers their acc't. for groceries to date	14 90		House expenses ..... Dr. (5) To Cash ..... (2)	18 90	18 90
" Subscription to "Weekly Globe"	2 00				
" Subscription to "Farmer's Advocate"	2 00				
		18 90			
Paid Taxes for 1880	27 00		House expenses ..... Dr. (5) To Cash ..... (2	138 10	138 10
" J. B. Graham for 1 suit clothes for self and 2 for the boys	53 00				
" Geo. Wallbridge for groceries in full to date	42 50				
" John McKeown for boots and shoes	15 60				
		138 10			
Credit Farm Produce Acc't. with horse keep, oats, hay, etc., used		210 00	Horse keep ..... Dr. (5) To Farm produce ..... (2)	210 00	210 00
Credit Cows with milk used in house		30 00	House expenses ..... Dr. (5) To Cows ..... (5)	30 00	30 00
Charge Cows as under—					
For Pasture—Field No. 7.....	25 00		Cows ..... Dr. (5)	95 00	
" Garden feed—Garden and orchard	10 00		To Field No. 7..... (6)		25 00
" Hay, straw, etc.—Farm produce	60 00		" Garden and orchard.... (4)		10 00
		95 00	" Farm produce ..... (2)		60 00
Charge Sheep as under—					
For Pasture—Field No. 7	5 00		Sheep..... Dr. (5)	15 00	
" Hay, etc.—Farm produce	10 00		To Field No. 7 ..... (6)		5 00
		15 00	" Farm produce ..... (2)		10 00
Give Farm Produce Acc't. credit for stuff used for house.....		65 00	House expenses ..... Dr. (5) To Farm produce .... (2)	65 00	65 00
Write off from the value of plant 10 per cent. for wear and tear		8 00	Loss and gain ..... Dr. (6) To Plant ..... (1)	89 00	89 00
				$9659 40	$9659 40

TRIAL BALANCE.

1st April, 1881.

Folio.		Dr.	Cr.
1.	Capital		$6230 00
1.	Real Estate	$3750 00	
1.	Furniture	520 00	
1.	Plant	801 00	
1.	Live Stock	215 00	
2.	Cash	1503 70	
2.	Farm Produce	395 80	
3.	Field No. 6		183 00
3.	Fields Nos. 1 & 2		343 00
3.	Field No. 3		264 40
3.	Field No. 4		61 70
3.	Field No. 5		113 00
4.	Garden and Orchard		530 00
5.	Cows		60 60
5.	House Expenses	359 20	
5.	Sheep		28 00
5.	Horse Keep	210 00	
6.	Field No. 7		30 00
6.	Loss and Gain	89 00	
		$7843 70	$7843 70

LOSS AND GAIN STATEMENT.

1st April, 1881.

Folio.		Losses.	Gains.
3.	Fields Nos. 1 & 2—		
	16 acres sown in barley		$343 00
3.	Field No. 3—		
	8 acres sown in wheat.....		264 40
3.	Field No. 4—		
	4 acres sown in oats.....		61 70
3.	Field No. 5—		
	4 acres sown in corn and potatoes		113 00
3.	Field No. 6—		
	8 acres grass.....		183 00
6.	Field No. 7—		
	6 acres pasture.....		30 00
4.	Garden and Orchard—		
	4 acres		530 00
5.	Cows—		
	5		60 60
5.	Sheep—		
	10		28 00
5.	House expenses.....	359 20	
5.	Horse keep	210 00	
1.	Plant—		
	10 per cent. written off for wear and tear	89 00	
	Net gain	955 50	
		$1613 70	$1613 70

ASSET AND LIABILITY STATEMENT.

1st April, 1881.

Folio.		Assets.	Liabilities.
1.	Real Estate—		
	50 acres, including buildings	$3750 00	
1.	Furniture—		
	Contained in house	520 00	
1.	Plant—		
	As per list of a year ago, less 10 per cent. written off for wear and tear	801 00	
1.	Live Stock—		
	As per list of a year ago.....	215 00	
2.	Cash—		
	In bank, $1490 ; in hand, $13.70	1503 70	
2.	Farm Produce—		
	Various crops, unsold and unused, now in barn	395 80	
1.	John Roblin's capital one year ago..$6230 00		
	Gain, as per Statement 955 50		
	1st April, 1881		7185 50
		$7185 50	$7185 50

LEDGER OF FARM ACCOUNTS.

CAPITAL.

Dr.					Cr.		
1880.			$ c.	1880.			$ c.
April 1.	To Balance	(6)	7,185 50	April 1.	By Sundries	(1)	6,230 00
				"	" Loss and gain	(6)	955 50
			$7,185 50				$7,185 50

REAL ESTATE.

1880.				1881.			
April 1.	To Capital	(1)	$3,750 00	April 1.	By Balance	(6)	$3,750 00

FURNITURE.

1880.				1881.			
April 1.	To Capital	(1)	$520 00	April 1.	By Balance	(6)	$520 00

PLANT.

1880.				1881.			
April 1.	To Capital	(1)	$890 00	March 31.	By Loss and gain	(5)	$89 00
				April 1.	" Balance	(6)	801 00
			$890 00				$890 00

LIVE STOCK.

1880.				1881.			
April 1.	To Capital	(1)	$215 00	April 1.	By Balance	(6)	$215 00

CASH.

Dr.				$ c.	Cr.				$ c.
1880.					1880.				
April 1.	To Capital		(1)	525 00	April 3.	By Sundries		(2)	49 00
May 5.	" Cows		(2)	15 70	" 28.	" Garden and Orchard		(2)	6 00
June 30.	" Sheep		(3)	43 00	" "	" " "		(2)	9 00
Aug. 5.	" Field, No. 3		(3)	288 00	" 30.	" Sundries		(2)	20 00
" 30.	" Cows		(4)	62 80	May 29.	" "		(2)	20 50
Sept. 30.	" Garden and Orchard		(4)	585 00	June 1.	" House expenses		(3)	24 50
Oct. 29.	" Farm produce		(4)	420 00	" 30.	" Field, No. 6		(3)	7 00
Nov. 30.	" Cows		(4)	47 10	Aug. 15.	" Sundries		(3)	43 60
Dec. 15.	" Farm produce		(4)	19 20	" 30.	" Field, No. 4		(4)	9 80
1881.					Sept. 15.	" Sundries		(4)	14 00
Jan. 20.	" Sundries		(4)	10 00	" "	" Field, No. 5		(4)	19 00
					" "	" House expenses		(4)	47 50
					" 30.	" Garden and orchard		(4)	50 00
					Nov. 30.	" House expenses		(4)	15 20
					1881.				
					Jan. 20.	" " "		(5)	20 00
					Mar. 1.	" " "		(5)	18 90
					" "	" " "		(5)	138 10
					April 1.	" Balance			1,503 70
				$2,015 80					$2,015 80

FARM PRODUCE.

1880.					$ c.	1880.				$ c.
April 1.	To Capital			(1)	$320 00	Oct. 29.	By Cash		(4)	$420 00
June 30.	" Field, No. 6			(3)	200 00	Dec. 15.	" "		(4)	19 20
July 31.	" "	1 and 2		(3)	420 00	1881.				
Aug. 5.	" "	3		(3)	24 00	Jan. 20.	" "		(4)	8 00
" 15.	" "	4		(3)	80 00	Mar. 31.	" Horse keep		(5)	210 00
Sept. 15.	" "	5		(4)	144 00	" "	" Cows		(5)	60 00
						" "	" Sheep		(5)	10 00
						" "	" House expenses		(5)	65 00
						April 1.	" Balance		(6)	395 80
					$1,188 00					$1,188 00

FIELD, No. 6

GRASS.

DR.			$ c.				CR. $ c.
1880.				1880.			
April 1.	To Capital	(1)	10 00	June 30.	By Farm produce	(3)	200 00
June 30.	" Cash	(3)	7 00				
1881.							
April 1.	" Loss and gain	(6)	183 00				
			$200 00				$200 00

FIELDS, Nos. 1 AND 2.

BARLEY.

1880.				1880.			
April 3.	To Cash	(2)	$24 00	July 31.	By Farm produce	(3)	$420 00
" 11.	" Sundries	(2)	18 00				
Aug. 5.	" "	(3)	7 00				
" 15.	" Cash	(3)	28 00				
1881.							
April 1.	" Loss and gain	(6)	343 00				
			$420 00				$420 00

FIELD, No. 3.

WHEAT.

1880.				1880.			
April 3.	To Cash	(2)	$16 00	Aug. 5.	By Sundries	(3)	$312 00
" 16.	" Sundries	(2)	9 00				
Aug. 5.	" "	(3)	7 00				
" 15.	" Cash	(3)	15 60				
1881.							
April 1.	" Loss and gain	(6)	264 40				
			$312 00				$312 00

FIELD, No. 4.

OATS.

1880.				1880.			
April 3.	To Cash	(2)	$4 00	Aug. 15.	By Farm Produce	(3)	$80 00
" 19.	" Sundries	(2)	4 50				
Aug. 30.	" Cash	(4)	9 80				
1881.							
April 1.	" Loss and gain	(6)	61 70				
			$80 00				$80 00

FIELD, No. 5.

CORN AND POTATOES.

1880.				1880.			
April 3.	To Cash	(2)	$5 00	Sept. 15.	By Farm produce	(4)	$144 00
" 23.	" Sundries	(2)	9 00	1881.			
Sept. 15.	" Cash	(4)	19 00	Jan. 20.	Cash	(4)	2 00
1881.							
April 1.	" Loss and gain	(6)	113 00				
			$146 00				$146 00

DR JOHN THOMPSON (Hired Man).

1880.			$ c.	1880.			$ c.
April 30.	To Cash	(2)	10 00	April 11.	By Fields, Nos. 1 and 2	(2)	9 00
May 29.	" "	(2)	10 25	" 16.	" Field, No. 3	(2)	4 50
				" 19.	" " 4	(2)	2 25
				" 24.	" " 5	(2)	4 50
			$20 25				$20 25
1880.				1880.			
Sept. 15.	To Cash	(4)	$7 50	Aug. 5.	By Fields, Nos. 1 and 2	(3)	$4 00
				" "	" Field, No. 3	(3)	3 50
			$7 50				$7 50

WM. WILSON (Hired Man).

1880.				1880.			
April 30.	To Cash	(2)	$10 00	April 11.	By Fields, Nos. 1 and 2	(2)	$9 00
May 29.	" "	(2)	10 25	" 16.	" Field, No. 3	(2)	4 50
				" 19.	" " 4	(2)	2 25
				" 23.	" " 5	(2)	4 50
			$20 25				$20 25
1880.				1880.			
Sept. 15.	To Cash	(4)	$6 50	Aug. 5.	By Fields, Nos. 1 and 2	(3)	$3 00
				" "	" Field, No. 3	(3)	3 50
			$6 50				$6 50

GARDEN AND ORCHARD.

1880.				1880.			
April 28.	To Cash	(2)	$6 00	Sept. 30.	By Cash	(4)	$585 00
" "	" "	(2)	9 00	March 31.	" Cows	(5)	10 00
Sept. 30.	" "	(4)	50 00				
1881.							
April 1.	" Loss and gain	(6)	530 00				
			$595 00				$595 00

COWS.

Dr.				Cr.			
			$ c.				$ c.
1881.				1880.			
Mar. 31.	To Sundries	(5)	95 00	May 5.	By Cash	(2)	15 70
April 1.	Loss and gain	(6)	60 60	Aug. 30.	" "	(4)	62 80
				Nov. 30.	" "	(4)	47 10
				1881.			
				Mar. 31.	" House expenses	(5)	30 00
			$155 60				$155 60

HOUSE EXPENSES.

1880.				1881.			
June 1.	To Cash	(3)	$24 50	April 1.	By Loss and gain	(6)	$359 20
Sept. 15.	" "	(4)	47 50				
Nov. 30.	" "	(4)	15 20				
1881.							
Jan. 20.	" "	(5)	20 00				
Mar. 31.	" "	(5)	18 90				
" "	" "	(5)	138 10				
" "	" Cows	(5)	30 00				
" "	" Farm Produce	(5)	65 00				
			$359 20				$359 20

SHEEP.

1881.				1880.			
Mar. 31.	To Field, No. 7	(5)	$5 00	June 30.	By Cash	(3)	$43 00
" "	" Farm produce	(5)	10 00				
April 1.	" Loss and gain	(6)	28 00				
			$43 00				$43 00

HORSE KEEP.

1881.				1881.			
Mar. 31.	To Farm produce	(5)	$210 00	April 1.	By Loss and gain	(6)	$210 00

FIELD, No. 7. Cr.

PASTURES.

1881.			$ c.	1881.			$ c.
April 1.	To Loss and gain.....	(6)	30 00	Mar. 31.	By Cows	(5)	25 00
				" " "	Sheep	(5)	5 00
			$30 00				$30 00

LOSS AND GAIN.

1881.				1881.			
Mar. 31.	To Plant.....	(5)	$89 00	April 1.	By Fields, Nos. 1 and 2....	(3)	$343 00
April 1.	" House expenses.....	(5)	359 20	" "	" Field, No 3	(3)	264 40
" "	" Horse keep.....	(5)	210 00	" "	" " 4.....	(3)	61 70
" "	" Capital.....	(1)	955 50	" "	" " 5...	(3)	113 00
				" "	" " 6.....	(3)	183 00
				" "	" " 7..... . .	(6)	30 00
				" "	" Garden and orchard....	(4)	530 00
				" "	" Cows.....	(5)	60 60
				" "	" Sheep	(5)	28 00
			$1613 70				$1613 70

BALANCE.

1881.				1881.			
April 1.	To Real estate...	(1)	3750 00	April 1.	By Capital	(1)	$7185 50
" "	" Furniture	(1)	520 00				
" "	" Plant	(1)	801 00				
" "	" Live stock	(1)	215 00				
" "	" Cash	(2)	1503 70				
" "	" Farm produce	(2)	395 80				
			$7185 50				$7185 50

REMARKS OF MR. HUGH McDIARMID ON AGRICULTURAL EDUCATION AND FARM BOOK-KEEPING.

Forwarded in Answer to Questions from the Commissioners.

Agricultural Education.

Agricultural education may be promoted by (1) the dissemination of works written in a popular style, by practical farmers accustomed to work every kind of land under every discouragement. The so-called *hints* how to cultivate every imaginable kind of crop on every kind of soil, written by the owners of highly manured garden patches, are very good in theory but not safe guides in practice.

(2) By provision being made for payment of the expenses of competent lecturers, who would deliver addresses in one or more sections of every municipality.

(3) By all pupils in the fourth and fifth classes being instructed in the elements of Agricultural Chemistry and Book-Keeping. These should be subjects which candidates for Teachers' Certificates should possess a knowledge of, and be able to instruct their pupils in them, especially during the winter months when the older pupils attend school.

(4) By the publication of *facts* respecting the kind of soil, treatment, kind of seed and yield, rotation of crops, kind of grain and root crops suitable for the various portions of the Province. The whole to be written in such language as to be easily understood by the general reader.

Farm Book-keeping.

1. Any complicated system of keeping accounts deters farmers from having a correct record of their receipts and expenditure; should a day-book be kept, posting will be apt to fall in arrears and at last be given up as a "bad job."

For the average farmer there should only be one book having one page for "Receipts" and the opposite for "Expenditure," or headed "Received," and "Paid Out," and a portion allotted to "Debts due to him" and "Debts owed by him." The accounts should be balanced monthly. The terms usually employed in book-keeping should be sparingly used, such as "Debit, Credit, Bills Receivable and Payable, etc."

Attempts made to keep separate accounts of the cost and what realized of the various products of the farms will only lead to confusion. These, when required, can be picked out of the general account.

Attention should be directed to the keeping of an estimate of the value of the work performed by the family in addition to that for which a consideration has been given, together with the cost of what of the product of the farm and dairy may be used for the support of the family and servants, also that used for the feeding of domestic animals.

2. Single entry should by all means be adopted.

3. I have never known a farmer to take stock annually, and have no doubt but that it would be the means of removing a good deal of groundless anxiety, as farmers are apt to take a contracted view of their standing. The advantages, however, to be derived from following the course indicated by giving him an idea of his present worth, are that he may be able to expend more in needed improvements, or curtail his expenses. Besides by comparison of the state of his accounts for several years, he should be in the possession of sufficient data to enable him to know what branch of his calling will be the most profitable to follow.

[*Mr. McDiarmid.*]

4. Estimates as nearly as possible to be made of the cash value of all assets divided into real estate and personal property the latter subdivided into—

(*a*) Contents of house.
(*b*) Bills receivable and debts due him.
(*c*) Implements, including carriages, etc.
(*d*) Domestic animals.
(*e*) Dairy products.
(*f*) Farm products.
(*g*) Miscellaneous.

The liabilities and expenditure could be embraced into two classes, viz.:—

(*a*) Domestic.
(*b*) Farm { Animals. Seed. Implements.

HUGH McDIARMID.

Lodi, June 30th, 1880.

SIMPLE FORMS FOR FARM ACCOUNTS.

MEMORANDUM.

PREPARED, AT THE REQUEST OF THE COMMISSIONERS, BY Mr. ALEXANDER MACTAVISH, MATHEMATICAL MASTER AT THE ONTARIO AGRICULTURAL COLLEGE, GUELPH.*

INSTRUCTIONS.

The farmer will find it advantageous, in keeping a faithful record of his transactions to adopt some such system as the following :—

1. *Draw a Plan of the Farm.*—On this plan let every lot be accurately delineated, numbered, and size given. Let it also correctly show the location of buildings and other important objects on the farm.

2. *Drainage Map.*—The farmer will find it convenient to have a second plan upon which is delineated (in red lines) the under-drains on the farm, and upon which may be delineated additional (red) lines from time to time, as the under-drainage is extended.

3. *Cropping Map.*—A third map, viz., a cropping map, will be found useful. This is a map upon which is entered the rotation of cropping on the farm. It is important that fields be subjected to a regular system of rotation, and a rotation map shows at a glance under what crop any field should be at any time.

On the first day of the agricultural year make inventories of stock, grains, farm implements, etc. Then open the following accounts :—

1. Real Estate Account.
2. Purchase Account.
3. Sales Account.
4. Labour Account.
5. Notes Payable Account.
6. Notes Receivable Account.
7. Cash Account.
8. Individual Account.
9. Memorandum Account.

* Mr. Mactavish has a plan of farm book-keeping, under the title of "Experimental Accounts," intended to show the results of the separate operations on a farm during the year. The above however, is submitted as a guide to the ordinary farmer, whose opportunities for maintaining a more elaborate system of book-keeping are limited.

How to Keep Accounts.

Real Estate Account.—On the first day of the agricultural year, enter on the Dr. side of this account the value of the estate, including cost of farm, buildings, fencing, drainage, etc, and to this add such permanent improvements as are made from time to time. . . . . At the close of the year, enter on the Cr. side the estimated value of the estate, and the difference shows the increase or decrease in the estate for the year.

Purchase Account.—Enter in this account all articles bought, with the month, day of month, year, name of him from whom purchased, articles, and cost.

When payment is made, mark paid, and credit Cash Account with the amount.

Sales Account.—Enter all articles sold in this account, with the month, day of month, year, name of him to whom sold, articles sold, and cost. When payment is made, mark paid, and debit Cash Account with the amount.

Labour Account.—Keep a separate account with each labourer, enter his name, the date upon which he commenced work, and the price per month agreed upon, in their respective columns; write the month that he is at work in the month column, then check each day he works, and enter the amount due in the money column. When payment is made, mark paid, and enter a statement of the fact on the Cr. side of Cash Account.

Notes.—Enter all notes received in the Notes Receivable Account, and all notes given in the Notes Payable Account. In each case, enter also the following particulars.

(*a*) When made, or when taken.
(*b*) To whom given, or from whom received.
(*c*) Time to run.
(*d*) Amount of Note.
(*e*) Rate of interest.
(*f*) Total amount due.
(*g*) When due.

When payment is made of notes received, mark paid, and enter a statement of the facts on the Cr. side of Cash Account. When payment is made of notes given out, mark paid, and enter a statement of the fact on the Cr. side of Cash Account.

Cash Account.—Enter on the Cr. side of this account: 1st. The amount of cash on hand at the commencement of the agricultural year. 2nd. All money received, as it is received during the year, stating the source from whence received, with date of receiving. Enter on the Cr. side of this account, all money paid out, stating also when, and for what paid. The difference between the Dr. and Cr. sides should always show the amount of cash on hand.

Individual Account.—When we have a running account with any individual, merchant, blacksmith, grocer, tailor, shoemaker, etc., enter the name of the individual in one of the individual accounts, and on the Dr. side of such account enter all items given him with their values, and on the Cr. side of the account enter such items as are received from him, with their values. The difference between the Dr. and Cr. side shows his or our indebtedness.

To Determine the Profits of the Year.

Draw up inventories at the close of the agricultural year similar to those made at the commencement of the year, then

1st. Determine the amount by which any inventory is greater than what it was at the commencement of the year.

[*Mr. Mactavish.*]

2nd. Determine the amount by which any inventory is less than what it was at the commencement of the year.

3rd. Determine the amount by which the value of the estate has increased during the year.

4th. Determine the amount we still owe on Purchase Account.

5th. Determine the amount still due us on Sales Account.

6th. Determine the amount we still owe on Labour Account.

7th. Determine the amount of our own notes still outstanding.

8th. Determine the amount of other persons' notes still in our possession.

9th. Determine the amount of interest due us on money lent by us.

10th. Determine the amount due us on individual accounts.

11th. Determine the amount that we still owe on individual accounts. Then add together 1st, 3rd, 5th, 8th, 9th, 10th, and from this sum deduct the sum of the 2nd, 4th, 6th, 7th, 11th, and the difference shows our net profits for the year.

Add the net profits of the year to our net worth at the commencement of the year, and we have our net worth at the commencement of the second agricultural year.

Forms for keeping accounts on the plan above described are submitted herewith. (*See Forms appended.*)

A. A. MACTAVISH.

[*Let there be 30 pages thus ruled.*]

188 . INVENTORY OF..... .....

Month.	Day.		$	Cts.

[*Let there be 5 pages thus ruled.*]

188 . DR. REAL ESTATE. CR.

MONTH.	DAY.		$	CTS.	MONTH.	DAY.		$	CTS.

[*Let there be 20 pages ruled similar to this.*]

188 . PURCHASE ACCOUNT.

Month.	Day.	Of Whom Bought.	Items.	Amount.		Paid.
				$	Cts.	

[*Let there be 25 pages ruled similar to this.*]

188 . SALES ACCOUNT

Month.	Day.	To Whom Sold.	Items.	$	Cts.	Paid.

[*Let there be 9 pages ruled similar to this.*]

LABOUR ACCOUNT.

Commenced Work.		At per Month.		Name.	Month.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total.	Due for Month.		Paid.
Month.	Day.	$	Cts.																																			$	Cts.	

[*Let there be 8 pages ruled similar to this.*]

NOTES PAYABLE ACCOUNT.

When Made.			To Whom Given.	Time to Run.			Amount.		Amount when Due.		When Due.			Paid.
Yr.	Mon.	Dy.		Yrs.	Mos.	Dys.	$	Cts	$	Cts.	Mon.	Dy.	Yr.	

[*Let there be 8 pages ruled similar to this.*]

NOTES RECEIVABLE ACCOUNT.

When Taken.			From Whom Taken.	Time to Run.			Face.		Rate.	Total Am't Due.		When Due.			Paid.
Yr.	Mon.	Dy.		Yrs.	Mos.	Dys.	$	Cts.		$	Cts.	Mon.	Dy.	Yr.	

[*Let there be 50 pages ruled similar to this.*]

DR. CASH ACCOUNT. CR.

MONTH.	DAY.	FROM WHOM REC'D.	FOR WHAT.	$	CTS.	MONTH.	DAY.	TO WHOM PAID.	FOR WHAT.	$	CTS.

[*Let there be 50 pages ruled similar to this.*]

DR. INDIVIDUAL ACCOUNT WITH..... CR.

MONTH.	DAY.	ITEMS.	$	CTS.	MONTH.	DAY.	ITEMS.	$	CTS.

[*Let there be 20 pages ruled similar to this.*]

188 . MEMORANDUM.

Month.	Day.	

ONTARIO AGRICULTURAL COMMISSION.

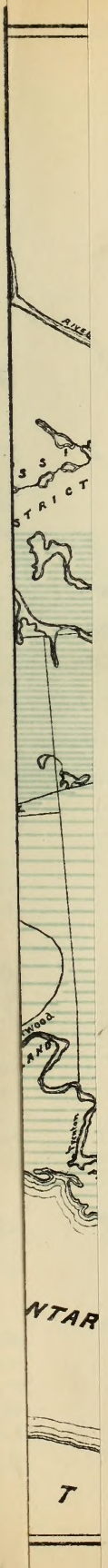
APPENDIX Q.

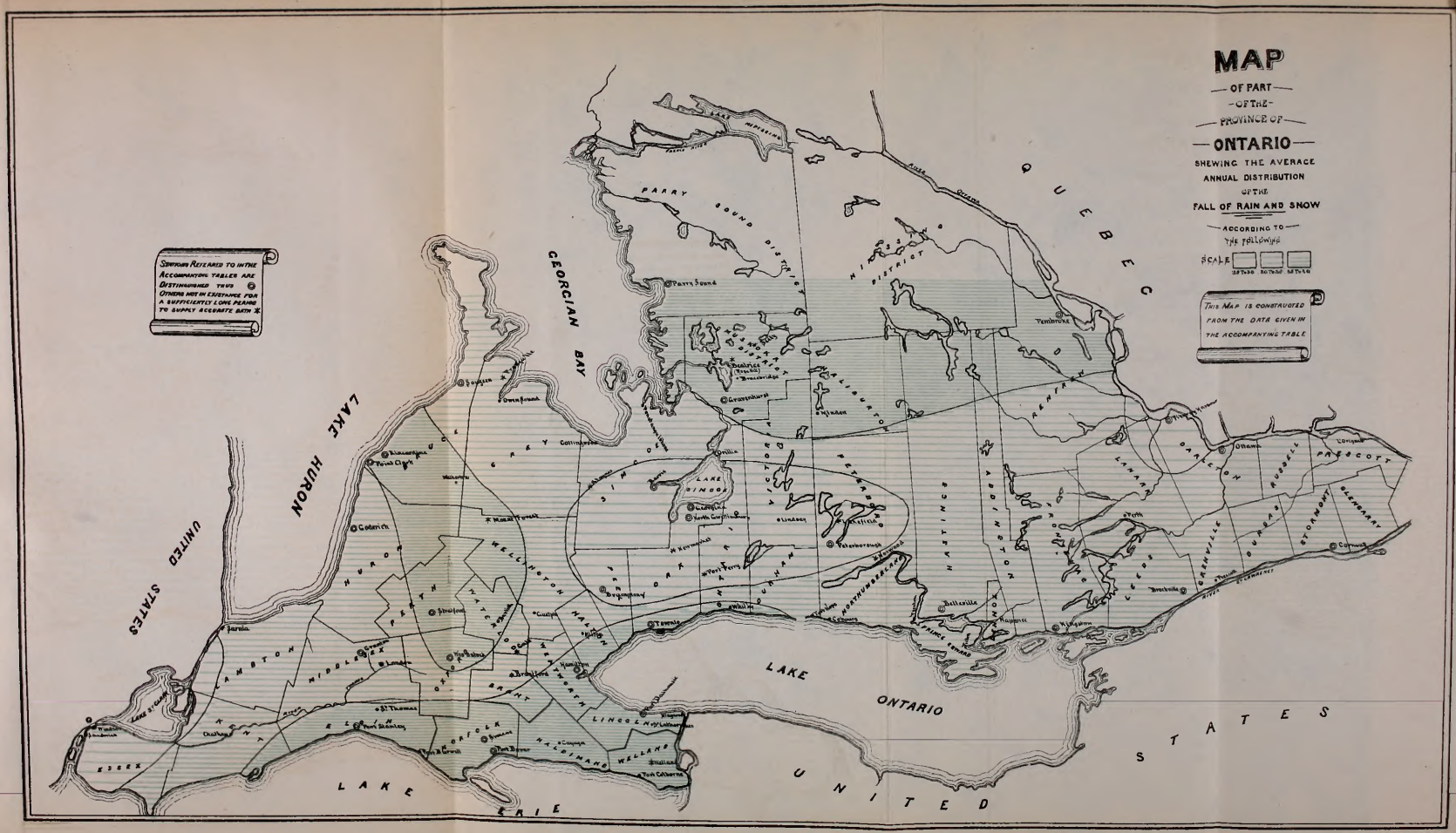
EVIDENCE

RELATING TO

Meteorology in connection with Agriculture,

WITH A MAP.


NTAR



THE BURLAND-LITH CO. MONTREAL

ONTARIO AGRICULTURAL COMMISSION.

APPENDIX Q.

EVIDENCE

RELATING TO

Meteorology in connection with Agriculture,

WITH A MAP.

Sittings to take oral evidence, held at Toronto, August 17th, 1880. *Present*—Messrs. E. H. Hilborn (Chairman), Hon. S. C. Wood, and A. H. Dymond.

MR. T. H. MONK'S EVIDENCE.

T. H. Monk, Toronto, was called and examined.

To Mr. Hilborn.—I am a clerk in the meteorological service, in the employ of the Dominion Government. I have been in that position for a little over five years. During that time I have noted weather changes and other meteorological phenomena, and examined returns made by others.

Stations in Ontario—Definition of Climate.

My principal duties have been in connection with the correspondence with stations, of which we have in Ontario about fifty. The climate of a country is the condition of that country with respect to weather. The term "climate" is usually understood to mean the sum total of the changes in the atmospheric pressure, temperature, humidity of the air, amount and distribution of the rain and snow fall, the prevalence of certain winds, the condition of the sky with respect to clouds, whether clear, fair, or cloudy, etc., in any district or locality.

Changes of Climate and Causes—Local Influences.

Owing to the influence of the topographical features of a country, the climate is subject to various modifications according to the locality. For example, the climate of Ontario, generally speaking, is much influenced by the vast bodies of water by which it is partly surrounded. Out west there are considerably lower temperatures in winter, and very much higher temperatures in summer than here. The capital of the State of Iowa, for instance, has a very much lower temperature in the winter than Toronto, and higher in the summer. The contiguity of the lakes tends to make our climate partake more of an insular, than a continental character. Except in the north and north-east, the heat in summer and cold in winter are moderated by their influence.

The Climate of the Ottawa Region.

In the region of the Ottawa, the extremes of temperature are much greater than at places in the vicinity of the lakes, and naturally, within certain limits, the farther we go from the lakes, the less their influence is felt.

Variations in Rainfall.

The rainfall varies both in the amount and distribution according to the locality. As far as can be seen from the statistics of the weather, published by the Dominion Government, we find that, at those places bordering immediately on the lake, the total amount of moisture deposited in the shape of rain and snow is greater than at places farther inland, but in the northern part of the Province it increases again.

Influence of the Forests.

This may be due to the fact that the forests exercise an influence in some way. I have here a map by means of which I have tried to explain this matter, but the observations are taken at so few places that the figures cannot be depended upon as representing the rainfall with strict accuracy throughout the whole district.

Proportion of Snow to Rain.

We consider ten inches of snow equal to one inch of rain. The marks on another map, which I produce, show where the stations are situated at which observations have been taken for more than four years.

Divisions of the Province.

It is usual, in speaking of the rainfall and snowfall, to divide Ontario into four districts, the west and south-west, the west and north-west, the north-east and east, and the central. There is a great difference between the rainfall of Toronto and the district in which it is situated. From this we see the influence of locality.

Records of Observations.

The records of meteorological observations for Toronto extend over thirty-nine years, —of the rain and snow fall over thirty-six years.

Table of Rainfall.

I will show you some tables of the variation in rainfall from year to year, from which you will see that it is necessary that observations be taken for a number of years.

TABLE

Showing Aggregate of Rain and Melted Snow in Inches for each Month and for the Year, from 1843 to 1871, inclusive.

The months of incomplete years are not included in the general means.

Years.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
1843.	5.715	5.915	3.195	3.195	1.570	4.595	4.605	4.850	9.760	4.010	4.885	1.850	50.175
1844	5.495	1.430	3.870	1.515	5.670	3.535	2.815	.. ...	.....	.....	.....	.....	.....
1845.....	.....	.....	.....	3.440	2.300	3.715	2.195	1.725	6.245	1.760	1.505	0.470	.....
1846.....	2.935	4.610	2.195	1.430	4.375	1.920	2.895	1.770	4.595	4.189	5.845	1.815	38.565
1847.....	2.885	3.280	1.270	3.270	2.040	2.625	3.355	2.140	6.665	4.390	3.155	1.865	36.940
1848.....	2.955	1.855	2.190	1.505	2.520	1.810	1.890	0.855	3.115	1.550	2.160	4.400	26.805
1849.....	2.095	2.160	1.755	2.825	2.115	2.020	3.415	4.970	1.480	5.965	2.915	1.800	36.515
1850.....	1.770	3.545	1.865	4.830	0.545	3.345	5.270	4.355	1.735	2.085	2.955	3.140	35.440
1851.....	2.055	2.840	1.650	2.415	3.090	2.695	3.625	1.360	2.665	1 710	4.555	2.145	30.715
1852.....	3.090	1.950	5.030	2.930	1.125	3.160	4.025	2.695	3.630	5.280	1.975	6.005	40.895
1853.....	1.040	2.290	1.790	2.725	4.420	1.550	0.915	2.575	5.140	0.855	2.695	2.855	28.870
1854.....	2.020	3.260	2.705	2.955	4.630	1.460	4.805	0.455	5.375	1.495	1.245	2.310	32.715
1855.....	2.855	3.950	3.295	2.190	2.655	4.070	3.245	1.455	5.585	9.565	4.850	4.795	41.550
1856.....	1.360	0.970	1.620	2.790	4.580	3.200	1.120	1.680	4.105	0.885	2.325	3.420	28.055
1857.....	2.180	4.220	1.465	3.045	4.145	5.060	3.475	5.265	2.640	1.060	3.925	4.105	40.585
1858.....	1.552	2.670	0.937	4.652	6.367	2.943	3.072	3.800	0.735	1.797	4.279	2.697	32.591
1859.....	3.089	1.285	4.154	2.647	3.410	4.085	2.611	3.990	3.525	0.910	5.253	4.715	39.764
1860.....	1.610	3.210	1.122	1.312	1.815	2.136	4.336	3.405	1.959	1.618	2 759	2 712	27.994
1861.....	2.745	3.785	2.835	2.309	3.430	2.329	2.635	2.955	3.607	1.993	4 614	1.240	34.475
1862.....	2.855	2.490	4.410	2.255	1.427	1.007	5.344	3.483	2.344	2.734	2.735	2.985	34.069
1863	3.182	3 650	1.827	2.370	3.573	1.662	3.408	2.208	1.235	2.522	3.656	3.670	32.773
1864	3.795	1.347	1.990	3.983	4.070	0.570	1.332	5.060	2.508	3.321	4.215	4.755	36.946
1865.....	1.920	2 490	4.940	4.172	4.005	2.005	2.470	1.990	2.450	3.155	1.085	2.247	32.929
1866...	1.552	2.520	2.635	1.675	2 820	2.720	5.390	4.457	5.657	2.470	3.183	4 310	39.419
1867.....	4.200	2.668	3.957	2.867	3.220	0.885	1.965	2.440	1.226	1.970	1.925	2.768	30.091
1868	1.460	3.320	3.080	1.520	7.670	2.217	0.510	1.562	4.239	1.565	5.580	1.505	34.278
1869..	1 867	4.135	2.485	3.015	2.805	4.373	4.610	4.273	4.027	1.192	3.560	3.300	30.642
1870.....	5.542	2.530	6.995	2.155	1.150	8.090	1.896	3.422	6.794	2.690	0.904	4.020	46.188
1871..'	5.224	2.340	4.082	3.448	2.302	3.340	1.255	2.800	1.290	1.185	3.105	2.360	32.731
Means....	2.724	2.788	2.795	2.648	3.281	2.810	3.092	2.976	3.633	2.416	3.318	3.109	35.615

TABLE

SHOWING DEPTH OF SNOW IN INCHES IN EACH MONTH AND IN THE YEAR, FROM 1843 TO 1871, INCLUSIVE.

The letter S denotes that Snow fell, but that the amount was inappreciable.

Years.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
1843.....	14.2	14.4	25.7	0.1	..	..	..	..	..	2.5	1.2	8 1	66.2
1844	24.9	10.0	14.0	S.	..	..	..	..	..	12.0	8.0	4 2	73 1
1845.....	22.7	19.0	2.8	1.5	..	..	..	..	..	S.	5.0	4.7	55.7
1846.....	6.0	46.1	2.3	1.3	..	..	..	..	..	S.	0.4	6 0	62 1
1847	7.5	27.3	4.2	4.0	..	..	..	..	..	S.	S.	6.8	49.8
1848.....	7.1	10.8	9.7	0.5	..	..	..	..	..	0.0	1.4	16 5	46.0
1849	9.2	19.2	2.3	1.7	..	..	..	..	..	S.	1.0	9.6	43.0
1850	5 2	23.1	11.2	1.1	S.	..	..	..	..	0.0	S.	29.5	70.1
1851	7 8	2.4	8.8	1.2	0.5	..	..	..	..	0.3	6.7	10.7	38.4
1852.....	30.9	13.0	19.5	9.4	S.	..	..	..	..	0.0	2.0	20.1	94.9
1853.....	7.5	12.6	7.1	1.0	S.	..	..	..	..	S.	2.7	22.3	53.2
1854.....	7.5	18.0	2.8	2.7	..	..	..	..	..	S.	1.3	17 2	49.5
1855.....	23.3	21.8	18.1	1.6	0.9	..	..	..	..	0.8	3.0	29.5	99.0
1856.....	13.6	9.7	16.2	0.1	S.	..	..	..	..	0.1	9.5	16.3	65.5
1857	21.8	11.7	11.3	12.9	S.	..	..	..	..	0.2	6.9	9.0	73 8
1858	4.0	26.7	0.2	0.1	..	..	..	..	..	S.	4.0	10.4	45.4
1859.....	16.4	8.3	1.0	1.2	..	S.	..	..	..	S.	0 6	37.4	64.9
1860.....	8.7	18.8	2.4	0.3	..	..	..	..	..	S.	1.9	13.5	45 6
1861..	20.6	29.7	7.1	6.9	0.5	..	..	..	..	S.	3.2	6 8	74.8
1862.....	27.4	23.1	13.5	0.2	..	..	..	..	..	0.5	5.3	10.4	85.5
1863 . ..	20 6	22.0	11.4	1.6	0.1	..	..	..	..	0.0	0.1	7.1	62.9
1864.....	26.3	9.5	3.7	3.5	..	..	..	..	..	S,	4.5	27.1	74.6
1865.....	14 8	16.8	18.9	2.0	..	..	..	..	..	4.5	1.1	5.2	63.3
1866..	10 3	16.9	7.2	S.	..	..	..	..	..	S.	2.2	15.5	52.1
1867.....	42.0	13.4	33.4	7.2	S.	..	..	..	..	0.0	0.9	13.6	110.5
1868.....	14.6	32 8	4.2	5.3	..	..	..	..	..	2.0	4.3	15.5	78.7
1869.....	9.8	39 7	15.0	0.5	S.	..	..	..	..	2.3	10.2	7.1	84.6
1870	21.3	20.1	62.4	0.1	..	..	..	..	..	0.0	3.1	15.9	122.9
1871.....	43.6	23.0	13.0	1.3	..	..	..	..	..	0.0	4.5	14.2	99.6
Means....	16.88	19.31	12.22	2.39	0.07	..	..	.	..	0.87	3.28	14.14	69.16

HIGHEST AND LOWEST TEMPERATURES.

The part of the Province in which the temperature is lowest in the winter is the north and north-east, in the vicinity of Ottawa and along the Ottawa River, for example. We have not had observations taken for any length of time higher up the river than Pembroke. In the region of the Ottawa also the highest temperature in summer prevails. There the climate is far more continental than in any other part of the Province; that section of the country being far away from the lakes, the climate is very much the same as in some of the Western States.

TEMPERATURE AT FITZROY HARBOUR, PEMBROKE, SIMCOE AND HAMILTON.

In 1878 the temperature at Fitzroy Harbour was 30.07° below zero, and at Pembroke 25° below; while the highest temperature in the summer was 99.08° at Fitzroy Harbour and 97.03° at Pembroke. In the south and south-west the lowest temperature was at Simcoe, 14 degrees below zero, and the highest temperature at Hamilton, being about the same as at Ottawa.

EFFECT OF LARGE BODIES OF WATER.

Large bodies of water do not get heated up so rapidly as the land, and they cool the air while it is passing over them; but as soon as the air gets a little distance inland, it becomes heated up by the land it is passing over.

[*Mr. Monk.*]

Temperature in the Western States.

We have an example of this in the Western States, where we get temperatures of 107° and 108° in the shade, in the summer.

Rainfall in July, Spring, and Fall.

Taking the Province as a whole a greater amount of rain falls in July than in any other month in the year; but the wettest months in the year occur in the spring and fall when the showers are more frequent. The larger amount falling in July is probably due to thunder storms in which the rain falls heavily for a short time.

Rainfall in September and November in Toronto.

In Toronto the month in which the aggregate of rain and melted snow is greatest is September, in that month it amounts to as much as 3.72 inches. The month in which it is next highest here is November, when it amounts to 3.3, and the next highest month is May with 3.2 inches. There is a great variation here in the amount of rainfall. I believe that on one occasion in June is was over 8 inches, and on another occasion in the same month it only amounted to a little over half an inch.

Distribution of Rainfall.

With regard to the distribution of rain throughout the Province I may remark that there is apparently a district in the neighbourhood of the comparatively high table land on which Stratford, Granton, and Mount Forest are situated, where the total deposit of rain and snow is somewhat greater than at neighbouring places.

Meteorological Report for 1878.

If we turn to the report of the Superintendent of the meteorological service for 1878, the last published, we find that apart from the data respecting the rainfall for the various stations in the Province, there is given on page 208 a table from which we can obtain the average rainfall for certain districts for eight or more years.

Average Fall of Rain and Snow.

I have added to this the data regarding the fall of snow, obtained from this as well as the earlier reports, and I find the average total fall of rain and snow to be as follows:—

In the west and south-west, and west and north-west districts	33·1	inches	per annum.
In the central district	27·5	"	"
In the north and north-east	29·5	"	"
And throughout the whole of Ontario	30·9	"	"

Number of Rainy Days.

From the same sources of information I find the average number of days on which rain fell to have been as follows:—

In the west and south-west	93
In the north and north-west	92
In the central	86
In the north and north-east	91
And in the whole of Ontario	91

[*Mr. Monk.*]

Number of Snow Days.

And the days on which snow fell to have been

In the west and south-west	49
In the north and north-west	65
In the central	50
And in the north and north-east	57
While throughout the whole of Ontario the number was	54

Rain and Snow Fall in Toronto.

From the published records of the Magnetic Observatory I find the average rainfall, not including snow, in Toronto for the past 39 years to have been 28·7 inches, being eight inches more than the average for the Province for eight or more years. The rain and snow fall together amounted to 35·8 inches, being nearly five inches more than for the whole Province. The average number of days on which rain fell was 110, or 19 above the average for the Province, and the average number of days on which snow fell was 63, or above.

Comparison with England.

The rainfall in Ontario compares very favourably with that in England both in amount and distribution. In England the effect of locality on the rainfall is well seen; for we find that in the west it is very much greater than in the east.

Rainfall in West England.

Buchan, who is an authority on that matter, says that the average rainfall in the west is from 80 to 150 inches, and in some years it is higher. Thus, at Seathwaite, in Cumberland, it was 183½ inches in 1861, and at the Stye 224½ inches in 1866. Away from the hills, however, still in the west, it is from 30 to 45 inches,

Rainfall in East England.

In the east of the island and in the principal agricultural districts it is from 20 to 28 inches, very much lower than Ontario. It should, however, be borne in mind that while in Great Britain it is considered a very heavy rain if an inch falls in one day, it is not so here.

More Frequent Rains in England.

Rain falls more frequently in England than it does in this country.

Heavy Rains in Canada.

Here we have had as much as three inches and a half in a day. In August, 1878, 3·45 inches fell in a very short time, and in September of the same year there was another heavy rain causing great floods throughout the country.

Effects of Weather on Agriculture.

It is probable that we shall find the weather affecting agriculture principally by means of the changes in temperature, moisture in the air, and the amount deposited in the shape of rain, snow, or dew, the direction and force of the wind, the state of the sky, whether clear, fair, or cloudy, and the amount of sunshine depending upon it.

[*Mr. Monk.*]

Temperature of Crops.

It is well known that, other things being equal, unless the temperature remains above a certain point for a certain period, crops will not come to perfection. Both this point and the duration of the period vary with different crops.

Variation with Different Crops.

It is comparatively seldom that wheat will come to perfection in the district near Hudson's Bay above James' Bay, whereas oats seldon if ever fail. It is the same way on the west coast of Scotland. But the degree of perfection at which crops arrive is influenced very largely by the changes in the temperature during the whole period from the time of germination onwards.

Effects on Spring Wheat and Fall Wheat.

We have had illustrations of this during the present season the disastrous effects on spring wheat being due almost entirely to the rapid changes from warm to cold weather during the spring and summer. Again, the killing of the fall wheat at the commencement of the spring was due to the same cause. If the weather had remained steadily cold or warm the effect would have been different. It should, however, be noticed that in many places the fall wheat was not destroyed, which shows the necessity of obtaining information as to the influence of locality.

Temperature of the Soil.

It must not be forgotten that the soil plays an important part here. We have had no observations taken in Ontario with reference to that matter; but they have been taken elsewhere. In 1867 the Marquis of Tweeddale placed a sum of money at the disposal of the Scottish Meterological Society, of which he was president, for the purpose of observations which might tend to the elucidation of the temperature of the soil.

Observations.

The result of observations taken at various places was as follows:—At a depth of three inches in *drained* soils the temperature exceeded that of the air, during the month of July, to the extent of 2·4 degrees on the mean of four stations, whereas on *under-drained* or *badly-drained* soils the temperature was less than that of the air by 0·7 of a degree. In heavy soils it was 2·1 degrees; but when the soil was heavy and under-drained it was ·5 of a degree below. These results were obtained when the thermometers were sunk under the ground under a crop of old grass; but in ground where nothing grew, which remained just as it had been dug, the temperature of the soil was still more in excess than that of the air. It is inferred from observations of the wind in connection with these observations of the soil, that the higher temperatures of the soil serve somewhat to counteract the chilling effect of the cold winds in lowering the temperature of the soil.

Temperature of Soil in Summer.

Observations taken in the month of January show that the reverse conditions prevail then, so that it has been proved that in summer the soil is considerably warmer than the air resting on it, and in the winter considerably colder. Again, the amount of heat radiated from different kinds of soil has its effect, for certain soils cool down much more rapidly than others.

Glashier's Experiments.

Experiments by Mr. Glashier show that if the relative cooling power of long grass

be represented by 1,000, that of snow will be 657, garden mould 472, sand 454, stone 380, and gravel 288.

Data Required.

With regard to temperature, then, we must obtain the following data if we wish to know its influence on crops, assuming, of course, that we have crop records at the same time:—

1. Highest temperature in each month
2. Lowest temperature in each month.
3. Monthly range.
4. Greatest daily range.
5. Mean of all the highest.
6. Mean of all the lowest.
7. Mean daily range.
8. Mean temperature.
9. Number of times when the maximum temperature exceeded certain points.
10. Number of times when the minimum temperature was below certain points.
11. Number of times when the mean temperature was above or below certain points.

As well as a general statement regarding the steadiness or the reverse of the temperature at any period throughout the month.

More Numerous Observations Needed.

Records must be obtained from as many places as possible ; in fact, means should be provided for taking observations in every township throughout the Province.

Instruments Required.

To obtain an accurate knowledge of the amount of vapour present in the atmosphere is rather a difficult proceeding ; and it is not probable that even if reliable instruments were supplied, the time and care would be generally given to taking the necessary observations. The instruments which are generally used throughout the world for this purpose are what are called the wet and dry bulb thermometers. The bulb of one of these is left in the ordinary condition, and that of the other is kept saturated by water drawn to the bulb by capillary attraction, the difference between the readings of the two instruments giving the data for calculating what is known as the "pressure of vapour."

Great Care Necessary—Results that may be Noted.

Great care is required in the taking of these observations and in working out the results. We can, however, approximately attain our object in various ways, such as by noting the presence or absence of dew on clear, calm nights, by recording fogs, mists, etc. The hygrometric observations are only taken at the principal stations, and very little use has been made of them so far.

Direction of the Wind.

The amount of moisture present in the air also depends to some extent on the direction of the wind, the west and north-west winds being notably dry, while the east and south-east are vapour-bearing winds. It is impossible to tell the exact influence of rain on vegetation ; but we know that if it is less in amount than usual, vegetation does not thrive ; if more, it is liable to cause serious damage to the crops. It is, therefore, necessary to know how the crops have grown during certain periods, and what the rainfall has been during the same periods.

[*Mr. Monk.*]

Details of Observations as to Rainfall.

The observations required with respect to rainfall are, the depth of rain, the time of the beginning and ending of it, and the direction of the wind during the rain. The object of taking observations of the direction of the wind would be, that by having records from each locality one could judge as to what wind would be most likely to be accompanied by rain, while the wind may be blowing from the west, over a large section of country, something in the locality may divert it into a south-west wind, and if it could be shown that this was a general thing it would be of great importance to the farmers to know it.

Weather Probabilities.

If the stations at which observations were taken were as numerous as it is desirable they should be, we would then be able to give a very much better idea to the farmer of the probabilities of the weather. The object of the Dominion service is to let people know, as far as possible, the probabilities of the weather for the next twenty-four hours. These predictions are published at ten o'clock in the morning, and consequently may not be seen by the farmer in time to be of any use to him.

Effect of Destruction of Forests.

Great stress has been laid on the destruction of forests as influencing the fall of rain. I do not think there is much doubt upon the subject. We are all aware of instances of damage being done by the wholesale destruction of forests. But there has been a dispute as to this very question. It is maintained that the amount of rainfall is not affected by the destruction of the forests; but I venture to say that, at any rate, its distribution is; and this is one of the questions that we should be able to settle definitely by means of the observations proposed. I doubt whether any country is more satisfactorily situated for this purpose than Ontario.

Important to Agriculturists.

It is the number of times when rain falls that appears to be the point on which the whole question turns; but it is not this alone, it is the duration of the fall, and the amount. Therefore we should proceed to ascertain, in addition to what I have pointed out before, the number of days when the rainfall has exceeded, say, for example, one quarter inch, one half inch, three quarters of an inch, one inch, etc., and the average time it has taken in falling at the various depths.

Rainfall in Relation to Wooded and Unwooded Districts.

This is a point which, I believe, has never attracted attention before, and I consider it the most important of all, from an agricultural point of view; for there appears to be little doubt that the rain falls more heavily in open districts than near forests, and it is probable that the duration of the fall is less than near wooded districts. It falls also less frequently in unwooded districts. Heavy showers of rain of short duration do much less good than light continued rains, for the former have not sufficient time to soak into the ground, and therefore drain away rapidly. The heavy rains, besides damaging crops, often give rise to disastrous freshets. There is, therefore, a field here for investigation, which should prove very productive of valuable results.

Farmers' Bulletins.

I have shown that it is important that we should obtain a knowledge of the direction of the wind during rainfall, and that it is also to be desired that the prevailing winds

for each day be noted, in order that we may thus have data from which to obtain a knowledge of the kind of weather accompanying winds from different directions in various localities. This knowledge has been turned to account in the United States, where they state on the farmers' bulletins, issued every month, the kind of weather which may be looked for in different localities, when the wind is from a certain direction. Such a knowledge as this amounts to giving the farmer the data from which he can ascertain the probable weather for himself. How valuable this information would prove during the harvesting season, the farmer alone can tell.

Daily Record Necessary—Sunshine as Affecting Crops.

To complete the returns it is only necessary that the kind of weather prevailing during the day, or certain portions of the day, should be recorded, so that we may obtain some idea regarding the duration of sunshine. It may be mentioned here, as illustrating the necessity for information on this point, that wheat is found to require more sunshine for its proper development than any other grain, barley next, and oats least of all. In order to make an intelligent practical use of this information, reports of the condition of the crops should be obtained from as many places as possible.

Records of Farm Operations Required.

I have not prepared a definite form showing how the data required are to be obtained; but it is sufficient for the present to state that the date of sowing, the condition at stated intervals, and the ultimate degree of the perfection of the various crops, should be noted according to some uniform plan, in order that the returns may be made strictly comparable.

A Monthly Weather and Crop Report Wanted.

The aspect of the fields, the soil, drainage, etc., would also have to be taken into account. The presence of blight, rust, or any other disease might be reported on the same form or separately. The result of a comparison of the record of crops and the weather should be made available in the shape of a monthly weather and crop report to farmers throughout the Province.

Knowledge as to Localities Useful.

A practical benefit to the farmer from such investigations, would be that a knowledge of the influence of locality would be obtained, from which we should be in a position to judge of the capabilities of certain localities. This information is only usually to be obtained by an extended experience occupying a considerable period of time. In many places every new-comer has to find out the peculiar advantages or disadvantages for himself.

Misconceptions to be Removed.

Then these reports would prove perhaps as good immigration pamphlets as could be found; for an accurate knowledge of the kind of weather which prevails, as well as the class of crops which thrive best in any locality, could easily be gained from them. As our climate is so often subject to abuse, and as we have at present, in a shape to be appreciated by the general public, very little information at hand to prove that this abuse is not merited, this is by no means an unimportant feature. The climate of different localities should be compared with that of those places which have similar weather conditions in Europe, etc. People in England imagine our climate is much colder than it is, and that the fall of rain is less than in the agricultural districts of England.

[*Mr. Monk.*]

Periodical Condition of the Crops.

To the farmers generally, the monthly weather and crop report would prove an accurate guide as to the state of the various kinds of crops from month to month, and afford them a knowledge of the extensive failure or otherwise of any crop, and thus place them in a better position to know what steps to take for the future.

Effects of the Climate on Plants and Animals.

Not the least important advantage would be that an opportunity would be given to deduce from the data to be obtained, by comparison as before stated, with the information respecting the climate of other countries, a knowledge of the plants and animals which would thrive here, a knowledge which can only be gained at present by repeated experiment. If these experiments do not succeed, the climate may be blamed without reason. There are breeds of cattle, sheep, etc., which it would be most desirable to stock the country with. As an illustration I might refer to Saxony sheep.

Saxony Sheep—Plants.

When I was here some time ago, I saw some samples of Saxony wool. Now, it strikes me as probable that the sheep bearing that wool could be profitably kept in Ontario, because as far as I can learn at present, I see no reason to believe that there is any great difference betwen the climate of Saxony and that of some parts of this Province. There are many plants, the growth of which, if it could be shown that the climate was favourable, might prove a vast benefit to the country.

Blight—Rust.

Apart from these considerations, there are many scientific questions which require investigation, such as the manner in which the weather affects blight, rust, etc., and the soil of the localities in which these diseases or conditions prevail most extensively, as the growth and spread of diseases which may affect crops of any kind. It is only by obtaining such information that we place ourselves in a position to study and overcome, if possible, their effects.

Probable Causes of Rust.

As rust seems to occur on all kinds of soil, many adopt the view that its dissemination is to be ascribed to meteorological conditions, and that it is brought on by damp and hot weather, or by great and sudden changes of temperature. It seems to be pretty well understood, now that it is disseminated, I will not not say caused, by the wheat being in rather a weak state perhaps, a heavy rain falling, and very hot weather coming afterward, causing the sap to rise suddenly in the wheat. The cells being weak, they burst, and that leaves a kind of *nidus* for this fungus, the rust. If this be so, it shows the necessity for drainage.

Township Reports.

The information which I propose should be gathered would be of no service whatever for the purpose of weather predictions from day to day. For that purpose you would require to have telegraphic communications from a large district of country. In order to obtain the information for studying the influence of the weather on crops, there should be reports from as many places in the Province as possible—perhaps from every township, or at least from stations not more than ten miles apart.

[*Mr. Monk.*]

System in Denmark—Simple Process.

In Denmark, they have the rain stations at every ten or eleven miles, and I do not see any reason why we should not have them in Ontario within every ten miles, as the observations would take very little time, and need not be taken till the last thing before retiring at night. Then if the farmer who took the observations, would note on the same form which he used for them, anything noticeable in connection with his crop, we should be able to learn a great deal that would be of use to the agricultural community.

Agricultural Meteorology—Guelph College.

In connection with the subject of agricultural meteorology, I have some suggestions to make with respect to its study by the students at the college in Guelph. At present, observations are taken there with a barometer and thermometer twice daily, at seven a.m., and two p.m. These are of very little service, as they do not give the mean temperature of the day. So far as I am aware there are no observations taken with reference to the temperature of the soil. I think you will agree with me that it is necessary that a student of agriculture should have as thorough a knowledge of the manner in which the weather affects the soil, crops, etc., as it is possible to obtain.

Instruction to be Given.

In pursuance of this idea it will be seen that the study of climatology at the college must necessarily be placed upon a better footing. Not only should the student be thoroughly acquainted with the method of taking the ordinary observations, and acquire, through practice, the art of taking them correctly, but he should be made practically acquainted with the temperature of different soils, both drained and undrained. It would be well, therefore, that in addition to having the ordinary weather observations taken regularly, thermometers be obtained for taking the temperature of the soil at various depths down to three or six inches, and that the records of these thermometers be carefully studied by the students. The study of storms, their progress, etc., and the way in which they influence the general weather conditions of the Province, should have a prominent place in the *curriculum* of the college. I also think it would be well that the students should gain a practical experience regarding the method of making returns, and a knowledge of the defects which sometimes occur in them. They would thus be placed in a better position to advance the science of climatology, by becoming intelligent observers when they leave the college. It would not be necessary that the Observations taken at the college should be such as are taken at a high class station like the Toronto observatory; the observations which should be taken would be such as the highest and lowest temperature of the day, the depth of the rainfall, the number of days of rainfall, the temperature of the soil, etc.

Apparatus Already on Hand.

To Mr. Dymond.—I believe the Dominion Government, at the request of the late President of the Agricultural College, sent some instruments to the institution on condition that observations should be taken, and that afterwards it was the wish of the President to purchase the instruments from the Government, and they were purchased. I understand the instruments were sold to the college at cost price, on the condition that returns should be forwarded to the head office here in Toronto; but they never were forwarded. I think, however, that if the importance of the study of meteorology were fully recognized, the observations would be taken fully and accurately.

Hours for taking Observations.

The observations are usually taken, at stations of a similar class to the Agricultural College, at seven o'clock in the morning, two in the afternoon, and nine at night. With

regard to temperature, if you take an observation at seven o'clock, one at two, and one at nine o'clock, double the last observation, add the whole together, and then divide by four, you obtain the mean. You can obtain the mean from the self-registering thermometer. I think that an arithmetical mean, taken from the maximum and minimum thermometers at the Agricultural College, would be sufficiently accurate for agricultural purposes.

Plan of Dominion Government.

The plan adopted by the Dominion Government for obtaining observations includes the lending of instruments to those who will forward observations, and who are likely to do so permanently. The returns are made weekly and monthly. It would be just as important to teach the student of agriculture what relation the atmosphere bears to agriculture, as to teach him the influence of different soils. Considering that the science of meteorology is made so prominent a study in England, on the Continent, and in the United States, I think it has not received the attention that it should have at the Agricultural College.

Observations at Lansing.

To the Chairman.—I believe that at Lansing, Michigan, they pay special attention to taking the observations of the weather. I am not certain whether they take observations of the soil; I think not. If the student of agriculture were taught meteorology, as he might be, he would know more about the effect of different winds, and the weather that accompanied winds from different quarters.

Amount of Sunshine.

To Mr. Dymond.—It would be important to know the amount of sunshine to which different fields were exposed. On the west coast of Scotland wheat will not ripen, because the sky is nearly always obscured by clouds: but on the east side, where the clouds disperse, it can be raised, although the temperature is lower perhaps on the east side than on the west. The object of taking observations is not that the man who takes them may keep the knowledge he thus gains to himself, and experiment with it for his own benefit alone, but that that knowledge may be disseminated amongst the farming community.

A Series of Observations Necessary.

It would be of great service if, by taking observations, you could assist a man in coming to a conclusion as to what crops he could grow best in certain localities. In order to give him this knowledge, however, it would be necessary that observations should be taken for some time. If, then, it were found by a series of observations for a certain time, that it would be better to sow a certain crop earlier than it had previously been sown, that would be a very valuable piece of knowledge gained.

Grain Growing in Siberia.

Grain is grown in Siberia, which is one of the coldest countries in the world. The ground there is ordinarily frozen; but it thaws out in the summer to a sufficient depth to allow the people to get in their crops, and these come to maturity before it becomes frozen again. It is not the temperature alone, therefore, on which the ripening of grain depends. Wheat requires the most sunshine of any cereal; I think barley next, and oats the least of all for their development. The Dominion Government has so far paid no attention to agricultural meteorology. The instruments necessary for taking the temperature of the soil have been so greatly improved that I could not tell you the best at the present day. There are no stations in Ontario where the temperature of the soil is taken —none in Canada that I am aware of. The temperature should be taken at depths of half an inch, an inch, etc. You would require four or five thermometers for each place at which observations were taken, one for each kind of soil. I think good instruments cost about three or four dollars each.

[*Mr. Monk.*]

Uniformity of Instruments.

It is necessary that meterological observations of any sort should be taken with instruments which are exactly alike. The thermometers in use in the Canadian service are compared at Kew, and the records of these instruments are strictly comparable. The instruments for the observation of rainfall should also be exactly alike. It is necessary to have the same kind of instruments and the same method of recording observations. The mouths of the instruments for taking the rainfall should all be of the same diameter or area.

Present Method of Recording Observations.

The method of recording the rainfall at present employed throughout the Dominion is as follows:—A rain-gauge, having a mouth whose area measures *exactly ten square inches*, is supplied. The depth of the rain is found by dividing the cubic inches of water by ten. A glass measure is supplied for measuring cubic inches. When snow falls the depth is measured in several places, and the mean of the whole taken. Ten inches of snow are calculated to represent one inch of rain. The reason for having the mouth of the rain-gauge exactly the size mentioned is that unless this is the case, the glass measures would require to be graduated differently, or else special tables must be compiled for giving the depth of rain, corresponding to the cubic contents received by the gauge. The circular form of the gauge is considered the best, as the amount of water received in one of this shape is not influenced by the direction of the currents of air. You can, of course, obtain an approximate idea of the fall of rain by exposing any vessel with perpendicular sides and flat bottom, and measuring the amount of water received, by a foot rule; but for scientific purposes a rain gauge constructed on the plan adopted by the Canadian service is the best. The funnel shaped mouth of the gauge prevents any loss by evaporation.

Reasons for Advocating the Study.

In advocating the study of meteorology at the Agricultural College I have in view the education of a number of men in the science who, after a time, would make observations all over the Province in the sections in which they were resident. I think there are now about 50 places at which observations are taken in Ontario; but some of these are a long distance apart.

The Educational Department.

The system was first started about ten years ago. Some time prior to that Professor Kingston made arrangements with the Educational Department of the Province of Ontario to have a number of observations taken at various high schools.

Chief Stations.

There is a chief station at Toronto, and one at Woodstock at which observations are taken at stated times and paid for, besides four or five other stations at which observations are taken and telegraphed for the purpose of predicting the weather probabilities. There are, in the total number of stations, about 20 or 25 that are voluntary. I think there should be at least one station in every township; if we could have more than that so much the better, because they would be a check upon one another.

Stations in England.—Cost in Ontario.

In England they have 1,700 stations. It seems to me that the whole of the observations throughout the Province, and everything connected with them, including what might be done in Guelph in the way of instructing students, might be accomplished in the way I recommend, at a cost of about $5,000 per annum, providing instruments were supplied. At present the maximum and minimum thermometers cost about seven dollars apiece; but I think for agricultural purposes they might be got from good instrument makers and be verified in England at a cost of three or four dollars each, if a large number were taken at a time.

[*Mr. Monk.*]

A screen would be required for the thermometers but I do not think that anything else would be needed at the common stations, though it would be necessary to have an instrument showing the direction of the wind in every township. Such instruments would cost about a dollar each. Each station might be furnished with instruments at a cost of about $20 or $25. I think it is most desirable that the observations should be voluntary, because it has been found that it is very much better unless they are well paid for. Such observations would only occupy about five minutes a day.

Simplicity of the Work to be Done.

The observations are so simple that they could almost be taken by a child. I do not suppose that we should be able at once to find persons willing to take them in every township; but I think that we should gradually be able to obtain voluntary observers in every township. About half the observations at present taken are voluntarily made. Some of the stations forward the reports weekly, some monthly, and some forward them by telegraph every day. The observations at the stations that I propose should be forwarded at the end of every month. The amount of rainfall, the temperature, the direction of the wind, and the kind of weather are all that I think should be noted for agricultural purposes, except that at certain stations where there were capable persons, I think that the temperature of the soil at certain seasons should be reported. The $5,000 a year which I propose should be voted would be for classifying the observations, making out a weather and crop report, and issuing that to farmers. The crop report need not necessarily be made by the same person who takes the other observations.

Thunder Storms Noted.

At the Toronto Observatory and all the other observing stations, thunder storms are regularly entered, but they have not been classified as such yet. Whenever rain is accompanied by a thunder storm there is a special mark to show it. Sometimes the observers note whether the storm has been a heavy one or not.

Rainfall on High Lands or Low Lands.

On high lands a greater amount of rain necessarily falls than on low lands. The rainfall in some parts of England does not amount to more than 20 inches per annum, and that appears to be quite sufficient to bring the crops to perfection, distributed as the rainfall is in that country. In no place in Ontario have we as low a rainfall as that. The amount of rainfall is not so important as its distribution and its retention for a sufficient length of time in the soil. The soils from which it evaporates most quickly, such as sandy soil, require more frequent rains—not greater amounts—than loam or garden mould.

The Cereals and Temperature.

The growth of such cereals as are produced in Ontario does not depend so much on having the best mean temperature as on having the temperature remain above a certain point for a certain period, and the shorter that period the higher the temperature would require to be. It is found that if the temperature remains about 65° for a reasonable period wheat crops and the like will ripen very well.

The Gulf Stream.

The fact of the temperture being higher in the western portion of Europe than it is in Ontario, in the same latitudes, is entirely owing to the influence of the gulf stream. When you go eastward you lose the effect of that influence, and the climate becomes more continental in its rigour, so that in Russia, in the same latitudes, you will find about the same temperature prevailing as on this Continent.

Effect of Atmospheric Electricity.

The effect of a greater or less amount of atmospheric electricity upon a growing crop is a

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question which is being studied in France ; but I am not aware what the results have been so far. We have no observations on electricity whatever. That is a most important point that we have not been able to pay much attention to hitherto. The expense of taking such observations, providing of the necessary instruments, etc., would not be as great an obstacle in the way, as the necessity of having the observations made by experts with great carefulness. I think that such observations might be left to gentlemen of great scientific attainments.

Agricultural Climatology in France.

With respect to progress in agricultural climatology, France is probably in advance of other countries. In 1877 she had 1200 stations established to enable her people to study the influence of the weather on agriculture, and they were rapidly progressing towards obtaining records from each of the 3,600 communes.

The System in Germany and Other Countries.

Besides the general meteorological system in Germany, special investigations are carried on in Bavaria, Prussia, and other parts. Austria also has a full complement of stations. Switzerland has devoted her attention to the matter. Denmark, as I have before stated, has a rain station to about every ten miles, and in England there are no less than 1,700. Sweeden and Norway have been obtaining reports for some years. On this continent, besides the well known signal service, there are very few States in the Union that have not their own services for the special study of agricultural climatology. Among these may be mentioned Michigan, Minnesota, Wisconsin, Iowa, Missouri, etc.

THOMAS H. MONK.

REPORT TO THE COMMISSION, BY MR. T. H. MONK.

Toronto, *November 1st, 1880.*

Hon. S. C. Wood, *Chairman, etc.*

Sir,—In accordance with the instructions of the Ontario Agricultural Commission, I have investigated the question as to the amount and distribution of the fall of rain and snow, in the Province of Ontario, and beg respectfully to submit the results herewith.

The Data Used.

The data used in compiling the accompanying table and map, were derived from the published reports of the Meteorological Service of the Dominion of Canada, which are, so far as I am aware, the only publications at present existing, which contain results in any measure sufficiently accurate to be used in comparing the average amounts for the different localities. It should be mentioned, that data for other places, not mentioned in my table, are given in these reports, but I have only used the results of observations, which have been continued for a period of four years or more. It will be noticed, that ten of the places named—Barrie, Belleville, Cornwall, Goderich, Hamilton, Pembroke, Peterborough, Simcoe, Stratford and Windsor—are those at which, through the co-operation of the Department of Education for Ontario, with the Meteorological Service, observations have been carried on at the high schools.

What the Table Shows.

The table shows the average monthly and annual "total precipitation,"—rain and snow fall (ten inches of snow being considered equal to one inch of rain), and the average annual number of days of rain and snow, at 30, or more strictly speaking, at 29 places in the Province, the highest and lowest number in each column being distinguished by figures of a different type.

[Mr. Monk.]

TABLE

SHOWING the average Monthly and Annual Total Precipitation, as well as the average annual number of days of Rain and Snow, at various places in the Province of Ontario, compiled from the data published in the Annual Reports of the Meteorological Service of the Dominion of Canada.

Name of Place.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.	No. of Days of Rain.	No. of Days of Snow.	No. of Years Observation.
	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches			
Barrie	2.94	1.53	2.99	1.59	1.86	2.62	2.38	2.17	2.94	2.86	2.38	2.72	28.98	90	72	10
Belleville	3.93	2.96	4.10	2.50	1.91	2.57	2.57	1.70	2.98	3.14	3.32	3.15	34.83	92	48	8
Brampton	*2.16*	1.81	3.12	1.84	2.35	1.69	2.89	1.79	3.37	2.48	*1.82*	2.75	28.27	83	57	8
Brockville	3.87	2.66	3.82	1.92	2.28	2.03	3.44	2.52	2.73	3.42	2.77	3.43	34 89	102	58	8
Cornwall	2.52	1.98	3.12	2.07	2 29	2.04	3.19	2.13	3.01	2.83	2.75	2.21	30.15	90	61	10
Fitzroy Harbour	2.46	1.62	2.40	1.46	*1.63*	1.64	2.43	2.45	2.38	3.34	1.98	2.37	*26.16*	92	57	7
Georgina	2.70	1.51	3.34	1.84	1.87	2 50	2 69	*1.61*	2.70	2.66	2.16	2.49	28.07	106	73	10
Goderich	3.07	*1.45*	2.86	1.77	2.78	2.44	2.57	2.16	3.44	3.57	2.76	3.09	31.96	111	70	10
Goderich Lighthouse	4.36	2.20	4.28	2.42	**3.50**	2.39	2.95	2.30	3.85	4.35	3.66	**4.06**	**40.32**	108	64	4
Granton	3.55	2.06	4.34	2.44	3.00	2.77	2.71	2.90	2.64	3.77	2.99	3.22	36.39	98	68	6
Gravenhurst	3.34	2.02	3.25	2.12	3.10	2.05	2.91	2.44	4.48	4.52	3.01	4.01	37.25	94	66	8
Hamilton	4.00	1.91	**4.49**	2.26	1.92	2.24	3.62	2.25	3.60	2.65	3.12	3.43	35.49	85	48	10
Kincardine	**4.91**	1.80	3.83	2.09	2.48	2.26	3.05	1.90	4.31	3.99	3.42	3.67	37.71	93	63	7
Kingston	3.16	2.68	4.22	1.86	1.98	1.84	3.43	1.76	2.76	3.36	3.33	3.30	33.68	119	67	5
Little Current	2.39	1.89	*1.62*	1.55	2.91	2.10	2.83	2.80	3.48	3.71	3.13	*2.01*	30.22	65	34	7
North Gwillimbury	2.79	1.47	3.57	1.67	1.73	2.19	2.04	1.82	2.53	2.62	2.39	2.31	27.13	*59*	50	10
Ottawa	4.10	2.98	3.28	*1.19*	2.09	1.85	*2.01*	1.88	3.00	3.00	2.49	3.83	31.70	88	68	5
Parry Sound	2.97	1.81	3.65	1.71	3.46	1.78	2.26	3.40	4.23	**4.86**	3.25	3.06	36.44	112	63	4
Pembroke	2.47	1.62	2.49	1.78	2.95	2.76	3.65	3.07	**4.56**	4.04	3.32	2.56	35.27	82	52	7
Peterborough	2.42	2.00	2.77	2.13	2.18	2.03	2.73	2.10	3.31	2.56	2.08	2.26	28.57	80	56	10
Point Clark	3.93	2.19	3.10	2.47	3.23	2.56	3.12	2.18	2.39	4.01	**3.71**	3.27	36.16	109	78	8
Port Dalhousie	2.47	1.71	4.23	2.58	2.35	*1.47*	3.10	1.81	3.00	2.11	2.39	2.11	29.33	106	37	4
Port Dover	2.82	2.58	3.60	1.98	2.01	1.64	3.61	2.81	2.72	3 03	2.79	2.59	32.18	110	42	5
Port Stanley	3.12	**3.05**	3.93	2.49	2.46	1.84	**4.11**	2.91	2.89	3.35	2.70	2.32	35.17	**122**	53	5
Saugeen	3.46	1.58	3.09	1.86	2.42	2.24	2.15	1.80	3.58	4.10	3.37	2.60	32.25	110	**80**	5
Simcoe	3.61	1.99	4.04	2.35	2.46	2.70	3.65	**3.73**	2.85	2.99	2.82	3.24	36.43	84	*29*	9
Stratford	3.65	2.09	3.80	2.58	3.04	2.47	3.26	3.17	3.49	3.64	3.23	3.71	38.13	90	64	10
Toronto	2.90	2.67	3.00	**2.71**	3.09	2.75	3.20	2.96	3.67	2.53	3.31	3.05	35.83	110	64	39
Windsor	3.33	1.93	3.04	1.92	2.40	**2.84**	2.84	2.40	*1.69*	*1.95*	2.67	2.77	29.78	82	34	10
Woodstock	2.97	2.06	3.68	2.32	2.46	2.58	3.61	3.28	2.92	3.34	2.68	3.17	35.07	110	70	9

The large black figures represent the highest, and the figures in italics the lowest numbers in each column.

The Map.

The accompanying map illustrates as definitely as possible, with the data at command, its annual distribution throughout the Province. [*See map attached to evidence.*]

Inadequate Materials.

The results scarcely repay the amount of work and care necessary for their production unless indeed, they serve to show how utterly inadequate are the data obtainable, to enable anyone to point out the peculiar features of any special locality. While the map illustrates very broadly the districts where the fall of rain and snow is above, or below, the average for the whole Province, there might be places within the districts marked where the results would differ so much from those shown, as to alter the average for the whole district. It is almost impossible to construct a scientifically accurate hyetological map of Ontario with such meagre information. Instead of 30 places at which observations are taken, we should find 300, or perhaps 3,000 nearer the number required. At present we have to draw too much upon imagination, and our knowledge of the topographical features of the country to fill in the blanks.

Differences in Reports.

As an illustration of the difficulty of deducing information which would prove of value, from the data obtained, I have given the total precipitation at the lighthouse, as well as at the high school, at Goderich. It will be seen that there is a difference of over 8 inches per annum. This result varies but little if we take the same period for each station. It would appear that about one half of this is made up in rain and the other half in snow, more than 3 feet more of snowfall being recorded at the lighthouse than at the high school. There is not very much difference in the number of days of rain and snow at these places.

Days of Rain and Snow.

The number of days of rain and snow are given in the table, but the figures are not strictly comparable, as, indeed, appears evident upon inspection. The reason for this is, that at some places it is called a rainy day when rain falls, but the amount is insufficient to be measurable, at other places no notice is taken of such small amounts of rain. The "instructions to observers," issued in 1878 will probably alter this in future.

Want of More Complete Information.

It was my intention to have sent you maps showing the distribution of the rainfall for each month, but I found, after constructing them, that they would probably mislead those who saw them. I had also intended to have prepared maps showing the variations in temperature, or, rather, the average number of days when the highest, the lowest, and the mean temperature, was above or below certain points during each month; but after considerable labour it was found that, for the reasons given above, the results would be of little value.

Comparison of Mean Temperatures.

It is obviously misleading to compare the mere annual, or even the mean monthly, temperature of one place with another, because the extent of the variations during the month or year could not be shown; and while at one place, or in one district, there might be little change during any period, and the *mean* temperature of that period be below that of another place, in the latter we might have extremes of heat and cold, which would give a higher *mean* for the same period.

[*Mr. Monk.*]

A More Thorough System Needed.

The result, therefore, of the investigation shows unmistakably that if we wish to have anything approaching an accurate knowledge of the climate of Ontario, something must be done to encourage the taking of observations of the weather throughout the Province. It is almost useless, for any scientific or useful purpose, to attempt to compare our climate with that of other countries under present circumstances. A strong effort should therefore be made to place us upon a better footing in this respect.

Yours respectfully,

THOMAS H. MONK.

Sitting to take oral evidence, held at Toronto, October 26, 1880. *Present*—Messrs. John Dryden, M.P.P., (Chairman), E. Byrne, W. Brown, F. Malcolm, A. Wilson, T. Stock, W. Whitelaw and A. H. Dymond.

"MOSES OATES'" EVIDENCE.

James Gordon Mowat was called and examined.

To Mr. Dymond.—I am a weather prophet, and, as such, am known as "Moses Oates." I have given considerable attention to meteorology for about fourteen years, and am an observer of the meteorological service at Galt. My attention has been chiefly directed to the temperature of various districts, variation of temperature, rainfall, snowfall, and the causes of these. There is no peculiarity in the Ontario climate, except that there is not the same difference here between high and low lands with respect to rainfall that there is in Europe, where high lands, as a rule, have a much greater rainfall than low lands.

Fruit Growing Districts.

In fruit growing countries sunshine and rainfall have a greater effect upon the quality of fruit than the mean temperature of the year. The vine flourishes best where there is a great deal of sunshine, and where the rainfall is not great during the season of vegetation. Moisture, combined with heat, is injurious to the grape. I am not aware what is the difference with respect to other fruits between a rainy and a sunshiny district, although I have no doubt there is a difference. The peach and the grape are cultivated largely in the Niagara District, on account of its high temperature and comparative exemption fron low extremes. That district is generally from three to four degrees warmer than the north shore of Lake Ontario in the neighbourhood of Toronto, and frequently in the middle of the day, is ten or fifteen degrees warmer. This is partly owing to the fact that there the south-west wind passes over land, while the south-west wind coming to Toronto passes over the cooler surface of Lake Ontario. The country between Lake St. Clair and Lake Erie is, in my opinion, superior in many respects to the Niagara District for the production of wine, owing to its smaller rainfall and greater heat, its warmer springs and longer season of vegetation. Many parts of the shores of Lake Huron are also very suitable for fruit culture. The extremes of temperature are fewer there than in either the neighbourhood of Windsor or in the Niagara peninsula. There are instances found in the meteorological reports in which the thermometer has descended to over ten degrees below zero in Hamilton, when in the Huron district it was not below zero. There is a difference of at least two degrees in autumn in favour of Goderich over Toronto, although there is very little difference in the latitude. At Kincardine the mercury very rarely falls below zero.

[*Mr. Mowat.*]

The Effect of Swampy Lands.

Swampy lands affect the temperature very much. Dundas, for instance, is under the influence of two peculiarities affecting temperature. It is in a deep valley, and the cold air from the surrounding plateau rushes into it, but possibly a more important factor in producing its low temperature is a swamp in its neighborhood, causing in the one year for which I have a comparison, two degrees lower temperature than the annual mean of Hamilton. Stratford has also swamp, and it is slightly lower in temperature than it would be in normal conditions. Newmarket has a large swamp in its vicinity which produces an abnormal deficiency in heat. Its distance from Toronto is about the same as that of Brampton, and its height above the sea certainly no greater, yet while the latter averages only a fraction of a degree lower than Toronto, Newmarket's temperature is two or three degrees lower. Newmarket shows a lower summer temperature than almost any other station in Ontario, and this is owing to the large swamp in its neighbourhood. The following figures for 1876 will illustrate the peculiar temperature of Newmarket:

Mean Temperature 1876.

	April.	May.	June.	July.	August.	Sept.	October.
Toronto	38°.2	51°.5	65°.5	68°.8	70°.2	57°.5	42°.8
Newmarket	35 .8	50 .9	63 .9	68 .1	68 .4	55 .9	41 .1
Brampton	37 .3	52 .7	69 .3	70 .8	72 .2	56 .1	42 .6

Lowest Temperatures, 1876.

Toronto	17°.0	30°.4	44°.2	46°.2	45°.0	38°.5	23°.0
Newmarket	—1 .0	25 .2	42 .0	37 .2	34 .0	32 .0	15 .4
Brampton	12 .0	33 .0	51 .0	54 .0	52 .0	41 .0	24 .0

To Mr. Byrne.—The water in swamps being very shallow, it heats very quickly and evaporates very rapidly, and thus produces coolness. Deep water has not that effect. Of course swampy lands are more liable to be affected by early and late frosts than drained lands. I attribute the extraordinary prevalence of summer frosts in the neighbourhood of Newmarket entirely to the swamps, which chill the atmosphere for miles around.

The report for 1878, the latest issued, shows a greater difference in the mean temperature of Newmarket, as compared with either Toronto or Brampton, than the figures above given. Other places in the neighbourhood of swamps might also be cited, to show the great effect of wet lands in reducing the temperature.

To Mr. Dymond.—The fitfulness of frosts is due to the varying character of the soil, and its vegetation, the presence of even slight hills or hollows, the nearness to or distance from forests or swamps, etc. A district bordering on a large body of water like a lake is often exempt from frosts to which interior districts are liable. I don't think small lakes two or three miles in length have nearly so much effect in ameliorating the climate, owing

to their shallowness. In North Gwillimbury, which lies on Lake Simcoe, the minimum temperature of some months of summer is generally very high—often as high as 55 or 60, when Windsor is only 45 or 50 deg. Very much depends on purely local causes, as the character of the soil, depressions or ridges of land, matters which should be studied by agriculturists.

European Comparisons.

The climate of Ontario—the south-western part—corresponds very closely, not with Norway, Sweden, or Russia, as has been represented, but with Roumania. Roumania is more its counterpart, both as regards summer and winter heat, than any other country in Europe. The mean temperature along a line drawn from the Danube through Bucharest to Moscow corresponds very closely at all seasons with the climate of Ontario on a line drawn from Windsor to Pembroke on the Ottawa ; Pembroke, however, having a warmer summer than Moscow. Hungary, again, has a climate corresponding in its mean temperature to the south-western part of Ontario, known as the Lake Erie and Niagara District, and produces some of the finest wines in the world—wines that rival the very best wines of France. There are very few stations, out of 200 or more, the reports of which I have looked over, in Germany and Austria, which show a higher temperature in summer than some parts of the Province of Ontario. Many parts of Northern Italy, at similar elevations to Ontario stations, show a temperature in midwinter only six or seven degrees higher than Southern Ontario, and a summer temperature very nearly the same. The growth of the vine is very successful in all the countries I have named—Roumania, Bulgaria, Southern Russia, Hungary, and northern Italy, and so far as climatic conditions are concerned, there is no reason why southern Ontario should not rival the best wine districts in the world, in many classes of wines. We have a longer duration of summer temperature than most parts of the Rhine. Windsor has had a temperature during the five years, 1874 to 1878, inclusive, of 63½ deg. in September, and 73 deg. in July, the heat of which latter month at Windsor is very little lower than its temperature at Oran in Africa, at Marseilles in the south of France, and only a few degrees lower than at Jerusalem and several other places in Syria.

To Mr. Brown.—For at least three decades after 1841, the average snowfall steadily increased, and the number of days on which snow fell also greatly increased. The average depth of snow on the ground at one time has, I think, been diminished. The rainfall in the second or third quarters of the year decreased till 1871, but lately, I think, the rainfall in this part of Ontario has been increasing in those quarters—that is, during the last six or seven years. The causes of this increase are probably not due to anything peculiar to the Province, but have their origin outside of the earth. A peculiarity of the Province in the distribution of its precipitation is that the district east of Lake Huron and north of the Grand Trunk Railway shows a snowfall very much greater than the country lying south of the Grand Trunk. For instance, Windsor in 1879 shows a snowfall in January of five and a half inches, Kincardine of forty and a half inches, and Owen Sound of forty-three inches. The total snowfall at Windsor, in that year, was thirty-two inches, while at Kincardine it was 154 inches, and at Owen Sound 159 inches. What falls as rain over South-Western Ontario often falls as snow over these high lands. Parry Sound is not affected so largely in the same way. The explanation of the difference I have mentioned is that the westerly winds passing over Lake Huron take up a large amount of moisture, which, coming in contact with the colder land east of Lake Huron, is condensed into snow, and occasionally the north-west winds in that section of country bring a fall of six or eight inches of snow, while south, in the neighbourhood of Galt and Brantford, no snow whatever falls. I think meteorology can be made useful to agriculture by the temporary establishment of a number of stations, especially near swamps, on high and low levels close to each other, and on different soils. Farmers could keep records themselves, and give the results of their observations on the effects of different soil and altitudes to the public. With respect to forecasting the weather, I am of opinion that before many years, the weather bureaux will be able to forecast the leading features

[*Mr. Mowat.*]

of the coming seasons almost as accurately as they now do the weather twenty-four hours in advance, and thus be of great service to the agriculturist. The effect upon temperature of the clearing of forests is generally thought to be an increase of extremes of temperatures and a decrease of rainfall. In the north of Italy at one time the forests were cut down over large districts, and the result was that maize could not be grown successfully, owing both to the decrease of the rainfall and the greater extremes of temperature; but when the trees were replanted, the cultivation of maize was again successfully prosecuted.

To Mr. Malcolm.—The clearing of forests does not prevent frosts so much as the draining of swamps and marshy lands. Drainage is the real secret of improving the temperature of a district. I believe the draining of a swamp will moderate the climate for many miles around it.

J. G. MOWAT.

ONTARIO AGRICULTURAL COMMISSION.

APPENDIX R 1.

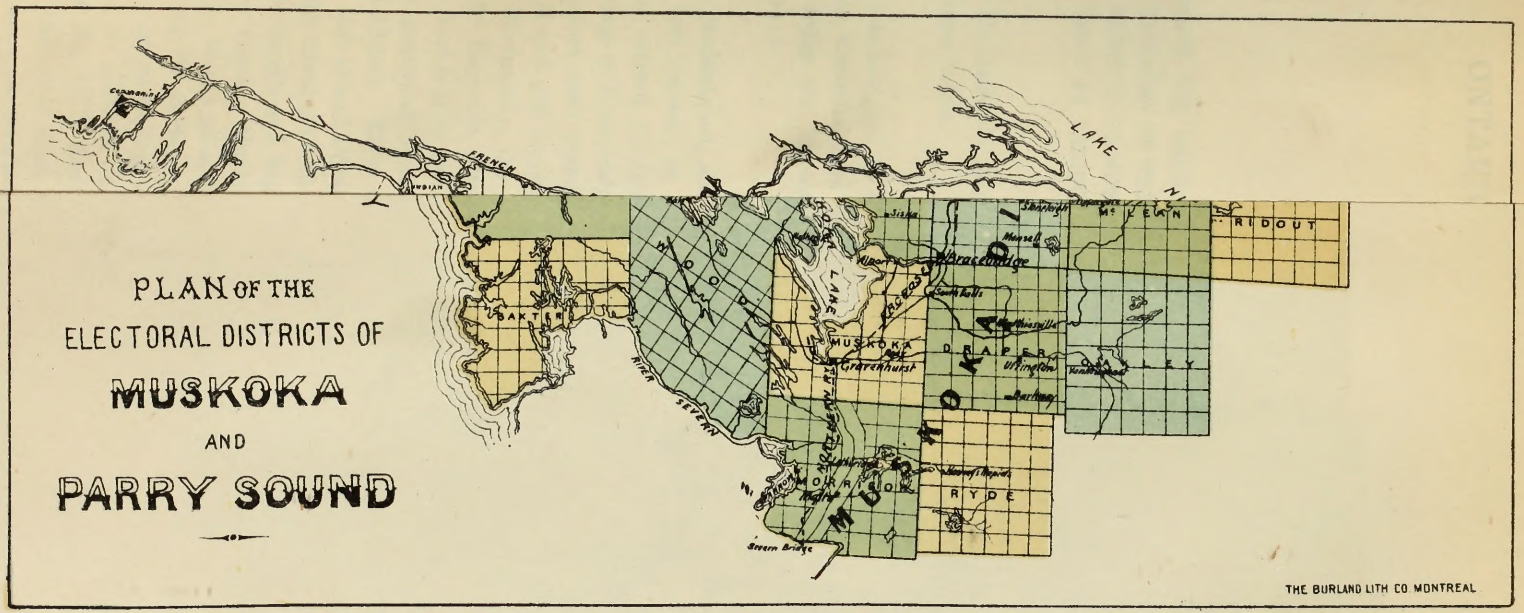
REPORT

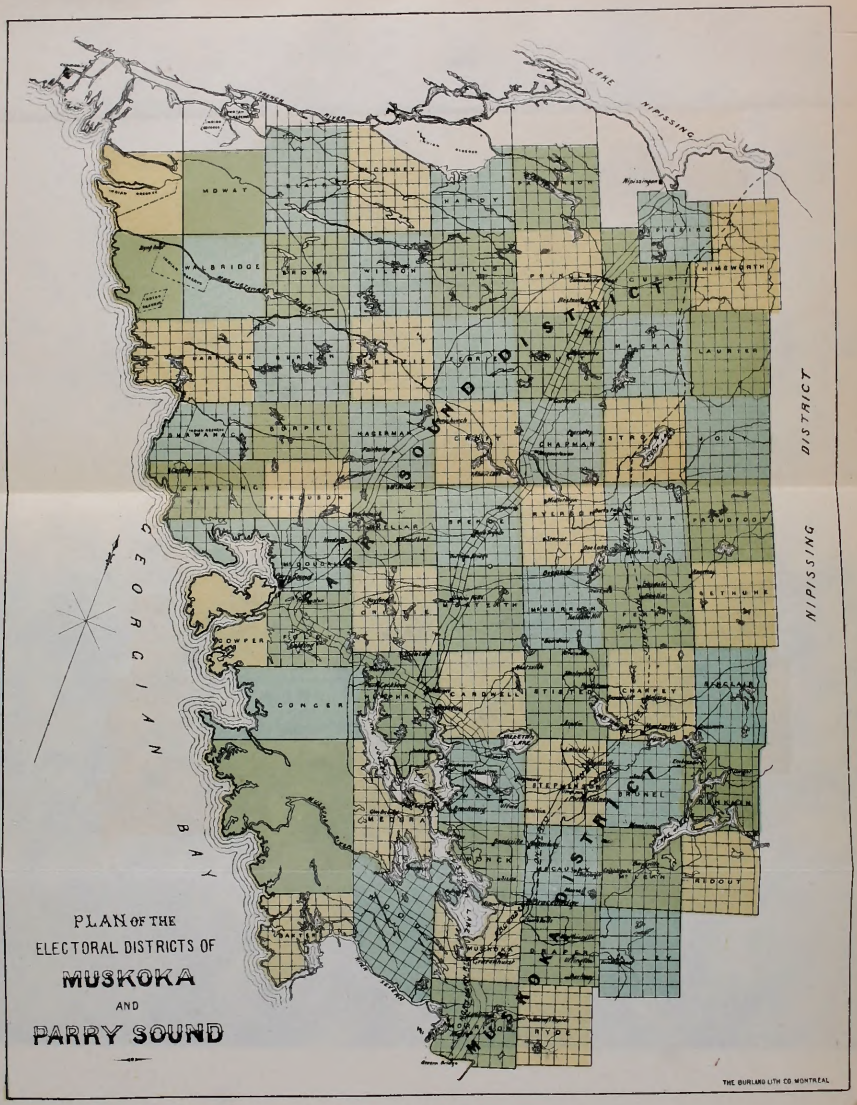
OF MESSRS. WM. BROWN, EDWARD STOCK, AND A. H. DYMOND, ON THEIR VISIT—AS MEMBERS OF THE ONTARIO AGRICULTURAL COMMISSION—
TO THE ELECTORAL DISTRICT OF

MUSKOKA AND PARRY SOUND

AND ON THE

EVIDENCE TAKEN BY THEM AT VARIOUS PLACES WITHIN THE DISTRICT.


PLAN OF THE
ELECTORAL DISTRICTS OF
MUSKOKA
AND
PARRY SOUND
LAKE
FRENCH
RIVER
SEVERN
MUSKOKA
PARRY SOUND
DRAPER
RYDE
MORRISON
McLEAN
RIDOUT
SAXTON
THE BURLAND LITH CO. MONTREAL



PLAN OF THE
ELECTORAL DISTRICTS OF
MUSKOKA
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PARRY SOUND

THE BURLAND LITH CO MONTREAL

APPENDIX R 1.

REPORT

OF MESSRS. WM. BROWN, EDWARD STOCK, AND A. H. DYMOND, ON THEIR VISIT—AS MEMBERS OF THE ONTARIO AGRICULTURAL COMMISSION—TO THE ELECTORAL DISTRICT OF MUSKOKA AND PARRY SOUND, AND ON THE EVIDENCE TAKEN BY THEM AT VARIOUS PLACES WITHIN THE DISTRICT.

To the Honourable Samuel Casey Wood, Chairman of the Ontario Agricultural Commission.

SIR:

The undersigned, to whom was specially delegated—by a resolution passed at a meeting of the Commissioners held 22nd June, 1880—the duty of visiting and making inquiries within the Electoral District of Muskoka and Parry Sound, beg leave to report as follows:—

THE ROUTE FOLLOWED.

The undersigned, accompanied by Mr. George Eyvel, shorthand writer to the Commission, left Toronto, by Northern Railway, on the morning of Tuesday, August 24th 1880, and arrived, *via* Gravenhurst, by steamer, at Bracebridge at 3 p.m. They opened their sittings at Bracebridge at 4 p.m., and concluded at a late hour the same evening. Six witnesses were examined, representing the five Townships of Muskoka, Macaulay, Draper, Monck and Stephenson.

On Wednesday, the 25th, at 8 a.m., the Commissioners started, by hired stage-waggon, for Baysville, fifteen miles distant, but, owing to the roughness of a portion of the road, from four to five hours were occupied in the trip. At Baysville, after inspecting some matters of local interest, the Commissioners sat to take evidence, the session ending at 10 p.m. Eight witnesses were examined, representing the three Townships of McLean, Ridout and Brunel.

On the morning of Thursday, the 26th, the Commissioners left Baysville (having sent their stage-waggon and baggage forward by road to Huntsville) by a steamer owned and worked by Captain Huckins, of Toronto, on Trading Lake (or Lake of Bays), reaching the portage, twenty miles distant, at the northern angle of Trading Lake, during the forenoon. Here the portage (three-fourths of a mile) was crossed to Peninsula Lake, where a row-boat was in waiting to convey the party to the residence and fine farm of the Rev. R. N. Hill, at Hillside, on the opposite shore of the Lake. After a very thorough inspection of Mr. Hill's farm and crops, the party rowed across to a portage connecting Peninsula Lake with Fairy Lake, where boats were in waiting to take them to Huntsville, that place being reached at 6 p.m.

The same evening a sitting was held, at which three witnesses were examined, representing the three Townships of Franklin, Sinclair and Chaffey.

On Friday, the 27th, Mr. Stock was compelled to leave for home. The remaining Commissioners sat at 9 a.m., to examine two more witnesses, the Township of Perry being represented by one of them. At 10.30 a.m. the Commissioners started for Bracebridge (twenty-six miles) to meet the steamer leaving Bracebridge at 3 p.m. for Port Carling, where they arrived at 5.30 p.m.

On Saturday, the 28th, a sitting was held at Port Carling, seven witnesses being in attendance, representing the two Townships of Medora and Watt. On the evening of the 28th the party proceeded by steamer to Rosseau, where they remained over Sunday, the 29th.

On Monday, the 30th, a sitting was held at Rosseau at 9 a.m., six witnesses, representing the two Townships of Humphrey and Cardwell, being examined. The same afternoon—the stage-waggon and team having meanwhile arrived by steamer—the party started for Maganetawan, thirty-four miles north of Rosseau, on what is known as the Nipissing Road. The latter, from the point at which it leaves the Rosseau and Parry Sound Road at Ashdown, until the village of Spence is reached, was, at many places, in urgent need of repairs. It was, consequently, 11 p.m., before the party reached Maganetawan.

At 8 a.m., on the morning of the 31st, a sitting was held at Maganetawan, at which seven persons gave evidence, representing the four Townships of Croft, Chapman, Spence and Lount.

The road between Maganetawan and McKellar, the next appointed stopping place, being reported as very rough, and some interesting information being obtainable by taking another route, the waggon and baggage were sent off early, and the party, accompanied by Mr. Best, Crown Lands Agent, and others, started, at 1 p.m., *via* the Maganetawan River and Lake Ah-mic, in two boats for the head of the lake, a distance of some twelve miles. On the way the large and fertile clearing of Mr. Wm. Holditch was visited, and his thoroughbred cattle and sheep were inspected. The head of Lake Ah-mic was reached at 5 p.m., and a walk of three and a-half miles brought the party to the Great Northern Road, running from Parry Sound to Commanda Creek. Proceeding on foot towards Parry Sound for another six or seven miles, they arrived at a point where their driver was in waiting to convey them for the rest of their journey to McKellar, which place was reached at 10 p.m.

At 9 a.m., on the 1st September, a sitting was held at McKellar, attended by five witnesses from the three Townships of Hagerman, McKellar and Ferguson.

After visiting some gardens owned by settlers, and noticing the very satisfactory condition of the produce of those lots, the party continued their journey to Parry Sound, sixteen miles, reaching that place at 6 p.m.

On the morning of the 2nd September, a sitting was held at Parry Sound, and six witnesses were examined from the four Townships of Foley, McDougall, Carling and Ferguson. This concluded the sittings in the Electoral District, and at 5 a.m. on the 3rd September, the party left Parry Sound by steamer, reaching Toronto, *via* Collingwood, the same night.

THE WORK DONE.

The trip thus extended over eleven days including Sunday, and covered about two hundred miles within the Electoral District. Nine sittings were held and fifty witnesses were examined, twenty-seven townships being directly represented. It must be explained, however, that many of the witnesses were able to speak from actual personal knowledge of townships other than those with which, by settlement, they were personally identified. This fact lessens, to some extent, the regret the Commissioners feel that they could not devote more time to the inquiry, and visit a larger area of country. It will be seen by the foregoing statement that they were closely employed day by day, being anxious to make every effort, by personal observation and otherwise, to accomplish the object in view when the trip was resolved upon. They desire here to speak gratefully of the judicious and complete arrangements made for their journey and for holding their meetings, by the parliamentary representatives of the District, Messrs. A. P. Cockburn, M.P., and J. C. Miller, M.P.P., conjointly with other gentlemen whose assistance had been invoked by the members above named. Every appointment was punctually kept, and—with two exceptions satisfactorily explained—every notified witness was on hand when wanted. Many of these persons came long distances—some on foot—to meet the Commissioners, and, it may be further remarked, that, in no single instance was any request for payment of expenses preferred.

The large number of tourists who have of late resorted to the District have evidently had an excellent effect on the hotel-keeping interest, the accommodation provided in many of these remote places being very superior to much that is at times met with in parts longer settled.

THE WITNESSES.

The notified witnesses had all been selected by the parliamentary representatives or persons consulted by them, with the sole and special object of obtaining reliable information from actual settlers of the progress of agriculture in, and the agricultural capabilities of, the District. The inquiry was conducted in as informal and conversational a manner as was consistent with order and despatch; and the information sought, even as to personal experience and condition, was given freely by all. It was of course inevitable that, among so many persons, an occasional exaggeration of statement would occur. Without desiring invidiously to indicate particular instances of this nature, the Commissioners will, in giving their conclusions, make such allowances for a too florid habit of speech as, in their judgment, may be necessary. They feel bound to say, however, that, as a whole, the witnesses appeared to be a most intelligent and respectable body of men, desirous of giving true and correct information only. Frequently, as the investigation proceeded, they were careful to correct or qualify statements which, on consideration, they felt might have been too hastily made, and assisted the Commissioners by checking, through communications with each other, the opinions or facts brought out in the course of the examination. On the most important points, too, witnesses living widely apart were singularly in accord, both as to the merits and disadvantages of the country in an agricultural sense. It is on a review of the testimony as a whole this report is founded.

The personal history and condition of the witnesses were widely different—the substantial British or Canadian farmer or yeoman, the Old Country mechanic or merchant, the farm labourer who had begun literally without a dollar, and the squatter of indescribable antecedents, were all represented.

GEOGRAPHICAL FEATURES.

The limits of the Electoral District of Muskoka and Parry Sound accord with the terms of the Representation Act by which the District was originally defined. It is popularly known under the general name of the Free Grant District, and has, since 1868, when the first Free Grant Act was passed, been largely resorted to by settlers who have availed themselves of the privileges offered by that measure. Previous to 1868 there were a few squatters in the country, but, practically, settlement began in that year. The most southerly line, it will be observed, is along the base of the Townships of Morrison, Oakley, Draper and Ridout, while on the north the District extends to the waters of Lake Nipissing and the French River. Its eastern boundary line is the Bobcaygeon road, while along the whole of its western coast it is washed by the waters of the Georgian Bay. Its area is stated to be 5,500 square miles, or 3,520,000 acres.

At the present time it is penetrated on the south by railway only to Gravenhurst, in the Township of Muskoka, at the foot of Muskoka Lake, but, by the construction of the projected Ontario and Pacific Junction line, *via* Bracebridge and Huntsville, to the south-east shore of Lake Nipissing, and the connection of that road with the Canada Pacific or Canada Central, not only will the eastern half of the District be intersected for its whole length from south to north, but an outlet will be had, either to the south by way of Toronto, or to the east by way of Ottawa, Montreal and Quebec.

On the west the harbours of the Georgian Bay are points of access to the grand water navigation of the Upper Lakes, and, by that means, communicate with the whole western and southern coast line of Ontario, with the United States, and, *via* the Gulf of St. Lawrence, with the European markets. Parry Sound, with its fine harbour, is the seat of a large lumbering industry, and the resort of a considerable number of vessels in connection therewith.

The two important lakes, Muskoka and Rosseau, united by a lock at Port Carling, give for some fifty miles means of access to the very heart of the District, while the Muskoka River is also navigable to Bracebridge.

Main Colonization Roads extend from Bracebridge northward *via* Huntsville to the Township of Strong; from Rosseau, at the head of the lake of that name, to Commanda Creek *via* Maganetawan; from Rosseau to Parry Sound; and from Parry Sound to Commanda, where the Northern road joins the one from Rosseau. Besides these main lines, branch colonization roads have been constructed in all directions, and the numerous lakes and rivers, in many instances navigable in summer for fifteen to twenty-five miles at a stretch, afford favourable opportunities for local communication, which will be gradually developed as settlement proceeds.

It must not be supposed, however, that the colonization roads are in such a state in all cases as to invite travel over them, or to conduce to the absolute comfort of the visitor to these regions. Some of the chief roads, and portions of others, are in excellent

condition, but in many places the work of repairs has failed to compensate for the wear and tear, and even a very liberal expenditure by the Ontario Government has been unequal to the task of keeping them in order. It appeared to the Commissioners that a more regular system of oversight and earlier attention to minor repairs, by parties locally interested, would be both beneficial and economical, but the true remedy is to be looked for in municipal incorporation as early as that can be attained, bringing with it the dependence of the settlers for good roads on their own organized efforts, as in older parts of the Province. A class of people will always be found who prefer an occasional dole or picking from the public treasury to the larger and wider benefits derived from self-reliance and the efforts it inspires. But the better portion of the settlers will reap an early return from any exertions they may themselves put forth, to render a region of great natural beauty, as accessible as possible to the tourist and pleasure seeker; to invite new comers to their midst, and to give easy opportunities for the wool and cattle buyers to visit them as purchasers of their products.

TOPOGRAPHICAL FEATURES.

While full of attractions to the tourist it would be hard to find a country more repellent at first sight to the agriculturist than the District of Muskoka. The railway approaches it through gorges of Laurentian rock; the lakes are dotted over with rocky islands and surrounded with rock-bound shore; belts of Laurentian rocks cross the District, and masses of the same rock intrude themselves abruptly from the soil. But there are, on the other hand, comparatively few boulders or loose stones, nor does the rock underlie the soil in such a manner as to impair its fertility, of which more will be said hereafter.

The face of the country consists chiefly of rolling downs or ridges, intersected in all directions by lakes, rivers and streams, while in the flat land, along the banks of the latter, the beaver meadow is a conspicuous object. The whole land is, except where cleared, covered with timber, mostly the harder woods, interspersed with pine. It presents an aspect rugged and broken, but the wealth of its forest vegetation precludes the idea of barrenness or sterility.

Pure water abounds everywhere, and can be had by well-sinking at a very moderate depth in any situation.

THE CLIMATE.

According to Mr. Murray (see Geological Survey 1854), the head-waters of the Muskoka River are 1405·85 feet above the sea level or 827·85 feet above Lake Huron; and those of the Maganetawan 1097·34 feet above the sea level, or 519·34 feet above Lake Huron; while Lake Nipissing is given as 647 feet above the sea level, equal to less than 100 feet above Lake Huron. The climate is eminently favourable to vigorous animal life. Returns obtained by the Meteorological office from three stations in the district show the average highest temperature to be from 90 to 95 degrees of heat, and the average lowest temperature to be from 25 to 30 degrees below zero; the average mean temperature being 42 degrees.

The summers are cooler than in the more southerly parts of Ontario, and the air in

winter is so dry and bracing as to diminish greatly the sensation of cold. The effect of the atmosphere on vegetation will be noticed further on.

THE SOIL.

The soil of Muskoka is, even where free from rock, extremely variable, both in kind and quality. A clay, or clay loam, with a strong subsoil, is often abruptly interrupted by sandy loam or sand. A few extracts from the evidence taken by the Commissioners will, however, give the best and truest picture of its character.

Mr. E. G. MUNTZ (*Township of Muskoka*).—"My land is totally different from that in my immediate neighbourhood, as mine is a light loam with a sandy subsoil lying at the mouth of the river."

A portion of this land is an alluvial deposit and very fertile. Of the district in which Mr. Muntz is settled, Mr. Murray in his report (page 67) says: "The river (here) passes through rich alluvial flats producing abundance of good-sized elm, soft maple, ash and other trees, among which there is scattered a considerable quantity of fine white pine."

Mr. SPRING (*Draper Township*).—"The low land is a clay bottom and the high land is a sandy loam. * * * About fifty per cent. of the land in my section is fit for the plough."

Mr. H. SPENCER (*Monck Township*)—"Of the 200 acres belonging to myself I could altogether bring 125 under the plough. * * * My land is principally clay, the township also is principally clay, but along the banks of the river it is sandy; the rock generally runs in parallel ridges."

Mr. WM. PARKER (*Stephenson Township*).—"The land is generally light sandy loam. * * * The soil on the rocky land is deep and rich, only broken up here and there. The high land is covered with hardwood, and the rotting of the leaves enriches the soil."

Mr. TOOKEY (*Macaulay Township*).—"Of the 200 acres there is about 70 per cent. of good land. Generally the soil is a heavy sand loam not much inclined to clay."

Mr. JOS. GILMOUR (*Ridout Township*).—"My soil is a sandy loam with a subsoil of the same character. * * * On one of my lots there is probably about one-half acre of rock. * * * I and my family have 700 acres in a block, and of this 500 acres will make good farming land, such as would be rated as second-class land in older parts of the country."

Mr. HIGGINS (*McLean Township*).—"My soil is generally a sandy loam, getting heavier as the land recedes from the river."

Mr. WATTIE (*Brunel Township*).—"My soil is a sandy loam, my farm being principally flat, low land, though I have some rock. The average of good land on each 100 acres in my township would be about one-third, that is of the land that could be ploughed. The remainder could be utilized by seeding it down for permanent pasture."

Mr. COLE (*Ridout Township*).—"Some of my soil is sandy loam with clay subsoil, some a clay loam and some clay to the bottom."

Mr. MONAGHAN (*Chaffey Township*).—"Members of my family have altogether

410 acres, of which 300 are tillable ; my soil is a sandy loam. * * * The land in Middlesex, Ont. [whence the witness had removed to Muskoka], retains its productiveness longer than the land here, but does not yield such large crops of the coarse grains and potatoes."

Mr. WINTER (*Sinclair Township*).—"I think that about two-thirds of the land in the township is fit for cultivation. My land compares very favourably with that in East Gwillimbury, where I farmed for seven years, and King," (County of York, Ont.)

Mr. POLLOCK (*Perry Township*).—"The soil (of my farm) is a sandy loam with some clay on the shore of the lake. The land (in Perry) is rather uneven, the good land going in patches. There is not much rock in the township and it does not interfere with the operations of the farmer so far as we have cleared up our land. * * * With the exception of wheat I can raise better crops here than in Fenelon," (Victoria Co., Ont.)

Mr. HILL (*Franklin Township*).—"The soil (of my farm at Peninsula Lake) is principally clay loam and the subsoil quite stiff. There is no rock that is a serious impediment to cultivation, though I have about thirty acres of stony land. My land is better than the average in the County of Leeds, where I formerly resided."

Mr. DAVIDSON (*Watt Township*).—"More than one-half of my land (400 acres) is cultivable, and throughout the whole township about 75 per cent. * * * My soil is a clay, not very heavy, and where there is no rock is as good as any in Canada."

Mr. TROUTEN (*Watt Township*).—"Some of my land is pretty rough, but there is a good deal of good land ; there are also 70 or 80 acres (in 200) clear of stone. The soil is generally a pretty stiff white clay."

Mr. BELEY (*Humphrey Township*).—"All my land borders on the lake shore ; the low land, as a rule, being heavy, and the high land light. My land is considerably broken by rock."

Mr. WILSON (*Watt Township*).—"My land is very much broken by rock, but I can utilize it for grazing purposes."

Mr. ROBINSON (*Cardwell Township*).—"Some of my land is broken by rock and stone, and the Rosseau River runs through my farm ; the soil is a clay loam, though it is more sandy than the land described as a clay loam in the front townships."

Mr. E. SIRETT (*Humphrey Township*).—"Of the 547 acres I now own, 400 acres are fit for cultivation. The soil is a strong rich clay loam with very little sand."

Mr. WILLIAM HOLDITCH (*Croft Township*).—"The general character of the soil in my township is a clay loam, but there is also some light sandy loam on my farm. * * The soil in Croft and Chapman is rather heavier than in the townships to the north ; Lount, Ryerson and Strong for instance. * * * The country is considerably broken by rock, though not so much as the Townships of Monck, Wood and Macaulay.

Mr. IRWIN (*Chapman Township*).—"I have 100 acres in the Village of Maganetawan, which is good land, and 200 acres out of the village, which is considerably broken, though the soil is good."

After expressing an opinion strongly in favour of the land on the Maganetawan for farming, the witness said :

"East of this there is a good tract of country, but on the whole the land between here and Rosseau is practically worthless for cultivation. North-east of here, in Armour, Strong and Machar, there is good land for farming and stock-raising purposes."

Mr. Pearce (*Chapman Township*).—"As a chemist I have looked to some extent into the quality of the soil here, and I consider it would raise all the usual crops excepting wheat. There is a fine section of the country in the Townships of Joly, Strong and Armour, not much broken by rock. I have 100 acres of land, every foot of which I can plough with the exception of two acres. On the other 100 acres I have perhaps 20 acres of flat rock. I think that 70 per cent. of the land in this township is tillable. There is some excellent land in the vicinity of Stony Lake. I have ridden four miles there without seeing a stone."

Thomas Fowke (*Lount Township*).—"The Township of Lount is similar to Chapman—some parts of it are sandy, but where I am it is a clay loam on top. The soil is splendid, but we have a good deal of rock."

Rev. H. Diermann (*Residing at Maganetawan*).—"There are some splendid tracts of land northward to Lake Nipissing, and some very rough land."

Mr. George Kelcey (*Hagerman Township*).—"One-third of the soil [of his 500 or 600 acres] is light, and two-thirds clay. About 25 per cent. of the land is rough and rocky, but fully one-half of this would be suitable for pasture, and part of it could be ploughed. * * * The rocks are mostly in bluffs, the soil being deep and good right to the edge of the rock. There is very little flat rock. Twenty to thirty miles from where my farm is, in the Townships of Mills and McConkey, there is plenty of good land lately come into the market for settlement, that is to the west of the Commanda road, between it and the Georgian Bay."

Mr. W. Hurd (*McKellar Township*).—"My soil is a clay loam; the land throughout the township is of that character."

Mr. Ww. Shaw (*Ferguson Township*).—"My land is a heavy clay, though the greater part of the Township of Ferguson is a light sandy soil."

Mr. John Armstrong (*McKellar Township*).—"I am familiar with the townships to the north of this, and know that many of them contain large tracts of good land fit for settlement. * * Beginning at Parry Sound, for ten miles around, 50 per cent. of the land is fit for cultivation, the soil being a light loam, in some places rather inclined to be sandy, that is, in the Township of McDougall, and part of the Township of Ferguson. In McKellar the soil is very varied, parts of it being as fine a clay loam, with heavy clay bottom, as can be found; about 60 to 75 per cent. of it being fit for agricultural purposes. Hagerman and Croft are about the same. Mills and McConkey, two new townships, are reported to be better than McKellar, having less broken land and more good soil. Very little of it has been localized or settled yet. The line of good land is to the north-east from Parry Sound, and then a little to the north-west again."

Mr. McFarland (*Carling Township*).—I hold 200 acres of land, of which 40 are under cultivation, and 150 cultivable. The soil is mostly a heavy clay, though I have some which is lighter. * * * A good deal of the land in the Township of Carling is rather rough and broken, most of the soil being rather light. I would rather have one acre of land here than five in Lanark [where he once lived], only the proportion of good land here is not so great. The soil in Lanark is very shallow, but wherever we have soil in Muskoka it is deep, the rock only cropping up in places."

Mr. Wilcox (*Foley Township*).—"My farm is on the Horseshoe Lake, inland ten miles from Parry Sound. The land in the township is broken, but there are some very good farms; all kinds of soil can be found on the same farm and almost in the same field."

Mr. Badger (*MacDougall Township*).—"Some of my soil is a sandy loam, some is

rather light, and some is clay; that is about the description of all the land in the township."

The foregoing statements—the general correctness of which was confirmed by personal observation, so far as it could be had—will convey to the mind of any agriculturist a very fair idea of the character of the soil of Muskoka. That, while the prevalence of rock is in a great many places too profusely manifested, and in others, if not so plentiful, it is quite sufficiently intrusive, is admitted by all. But, while this diminishes the actual amount of the cultivated area it does not seriously interfere with, or impair, the cultivation of the portion clear of rock. Moreover, as a perusal of the evidence shows, some of the roughest portions are well adapted for pasture. We shall have occasion in our further remarks to notice this fact more particularly. No doubt exists in the minds of the Commissioners that, while, in the area of country visited, there is a fair proportion of agricultural land, it is to be found in larger quantities, and of a superior quality, in many of the more northerly townships at present but little known. At a short distance to the south, south-east and south-west of Lake Nipissing, a district very favourable for settlement undoubtedly exists. It has been the object of the Commissioners to discover, as far as they are able, to what uses a district of this character can be most profitably applied, and for what branches of agriculture it is best adapted. It may be well, however, to notice in the first place, one matter in connection with the soil and its productiveness, to which attention was more than once directed during the inquiry.

LIMESTONE DEPOSITS.

The apparent absence of lime from the soil is, it will be observed, frequently referred to by the witnesses, and various conclusions are drawn from this assumed deficiency. It would be hard, however, in the face of actual results—as shown both in the crops and animals of Muskoka—to believe that lime could be wholly wanting. Certain it is, however, that there are no beds of fossiliferous limestone to be found, unless it be at the extreme northern and southern limits of the District.

When at Bracebridge the Commissioners observed a scow unloading lime, brought in tow of a steamer from Rama, *via* Gravenhurst. Rama is twenty miles from Bracebridge, and the nearest point to the southern limits of Muskoka, whence lime, the product of the ordinary limestone beds, can be obtained. The cost of the lime, delivered at Bracebridge, is twenty-five cents per bushel.

For either mechanical or manurial purposes an unlimited supply of lime can be had from this source. On Lake Nipissing are some small islands known as the Manitous, where are also, it is well known, fossiliferous limestone deposits. These are referred to by Mr. Murray in his report of 1854 (page 114), already quoted.

On the western side of the District no difficulty need be experienced in bringing in lime *via* Parry Sound, in lumber vessels returning empty from Ontario lake ports.

The Commissioners are fully aware that in the absence of railways, or smoother roads than many yet constructed, the general use of this or other imported manurial agents must be limited to a few accessible points; but they are looking at Muskoka, not as it is to-day, but as it may be at no distant period when the many means of internal communication have been utilized and improved.

Nor is it correct to say that lime in a certain form is not found in considerable quantities in the territory itself. In the southern and eastern portions (but those, it may be parenthetically remarked, most accessible by railway from Rama on the south and Nipissing on the north, the sites of fossiliferous limestone beds) no limestone in any form was observed, and a diligent search by Mr. Murray (*see* Report, 1854, page 91) on the Muskoka River was also, he states, unsuccessful in this respect. But in the western part of the District, particularly along the line of the Maganetawan, large quantities of crystalline limestone are found, obtruding themselves—as is their wont in various portions of the Laurentian formation—at intervals among the gneiss and quartz rocks.

The Commissioners first met with lime procured from this crystalline limestone, on the Nipissing road, south of Dufferin bridge, at a place where some masons were at work on a new building. These men described it as "very strong," and said "it would take up twice as much sand as lime from ordinary limestone." Their supply was obtained from the neighbourhood of Commanda Creek. Mr. Fowke, a witness from Lount, mentioned that he had burned a considerable quantity for sale at a profit. Another witness claimed that it was to be found in the Township of Watt. This limestone was also seen by the Commissioners near the head of Ah-mic Lake, on their way thence to Dunchurch, on the Northern road. Traces of kilns temporarily employed in lime-burning, were observed at other points in that neighbourhood.

Referring to the crystalline limestones of the Laurentian system, Sir Wm. Logan, in in his report (1857), p. 48, says:

"The crystalline limestones of the Laurentian series are quite as good for all the economic purposes to which carbonate of lime is applied as the earthy limestones of the fossiliferous formations. It is from the latter, however, that is obtained nine-tenths of the material used throughout the country, for the very good reason that more than nine-tenths of the works of construction, both public and private, are raised upon the fossiliferous rocks, and for such present works these rocks, therefore, afford the nearest sources of supply. Thus the inhabitants are well acquainted with the aspect of fossiliferous limestones, and can easily recognize them; but very few of them understand the nature of the highly crystalline calcareous beds of the Laurentian series. Hence it is that settlers in the back townships, who have dwelt many years upon these rocks, have been accustomed, when in want of lime for the manufacture of potash or the construction of their chimneys, to send to the fossiliferous deposits for it—the distance being sometimes thirty miles—when it might have been obtained at their own doors. In following out the calcareous bands of the gneiss district in 1853, therefore, especial pains were taken to point out their character to the settlers wherever exposures were met with; and in visiting some of the same localities last season, I had the satisfaction of finding lime-kilns erected and lime burnt in four of them.

"The fossiliferous rocks, in a large part of Canada, maintaining an attitude approaching horizontally, give a much more even surface than the corrugated series coming from beneath them, and this combined with a generally good soil, renders them more favourable for agricultural purposes. It is over them, too, that the River St. Lawrence maintains its course, affording an unrivalled means of exit for the produce of the land, and of entrance for the materials that are to be received in exchange. It is only a natural result of these conditions that the area supported by the fossiliferous rocks should be first settled. This area, however, constitutes only between 60,000 and 80,000 square miles, while the whole superficies of Canada comprehends 330,000 square miles, or about five times the amount.

"Four-fifths of Canada thus stand upon the lower unfossiliferous rocks, and it becomes a question of some importance, before it has been extensively tested by agricultural ex-

periments, to know what support this large area may offer to an agricultural population. An undulating surface, derived from the contorted condition of the strata on which it rests, will, more or less, prevail over the whole of this region; but the quality of its soil will depend on the character of the rocks from which it is derived.

"These rocks, as a whole, have very generally been called granite, by those travellers who, with little more than casual observation, have described them without reference to geological considerations. The ruins of granite are known to constitute an indifferent soil from their deficiency in lime, and hence an unfavourable impression is produced in respect to the agricultural capabilities of any extended area when it is called granitic. Such soils are, however, never wanting in those essential elements, the alkalies, which are abundant in the feldspars of the granite.

"In the reports of the survey, the Laurentian rocks have been described in general terms as gneiss, interstratified with important masses of crystalline limestone. The term gneiss, strictly defined, signifies a granite with its elements, quartz, feldspar and mica, arranged in parallel planes, and containing a larger amount of mica than ordinary granite possesses, giving to the rock a schistose or lamellar structure. When hornblende instead of mica is associated with quartz and feldspar, the rock is termed syenite, but as there is no distinct specific single name for a rock containing these elements on a lamellar arrangement, it receives the appellation of syenite gneiss. * * *

"In no part of the area included in this report is hornblende completely absent from the gneiss, and sometimes it predominates over the mica. Hornblende contains from ten to fifteen per cent. of lime, so that the ruins of the rocks of the area, such as they have been described, whether gneiss, greenstone, syenite or porphyry, would never give a soil wholly destitute of lime. Of this necessary ingredient, the lime, feldspars would be a more abundant source. Different species of them, from andesine to anarthite, may contain from about five up to twenty per cent. of lime, and the range of those Canadian varieties, which have been analyzed by Mr. Hunt, is from seven to about fifteen per cent.

"The personal exploration, which is the subject of the present report, has shown, for the first time, that these lime feldspars occur in this Province, and probably in other regions, in mountain ranges belonging to a stratified deposit, and not in disseminated or intrusive masses. The breadth of these, displayed in the district examined, demonstrates their importance; and the fact that the opalescent variety of labradorite was ascertained by Dr. Bigsby to exist, *in situ*, on an island on the east coast of Lake Huron, while the name of the mineral reminds us of its existence at the eastern extremity of the Province, sufficiently points out that the lineal range of the lime feldspars will be co-extensive with Canada. We may therefore anticipate a beneficial result from their influence upon the soils over the whole breadth of the Province.

"The ruins of the crystalline limestone constitute a most fruitful soil, so much so that the lots first cleared in any settled area of the Laurentian country usually coincide with its range.

"In these limestones phosphate of lime is sometimes present in great abundance, and there is scarcely ever any large exposure of them examined in which small crystals of the phosphate are not discernible to the naked eye."

Sir Wm. Logan has thus indicated how easily a too unfavourable impression may be created, and how, in a region reported to be absolutely wanting in lime, it may be found not only in the original rock, but, by attrition and disintegration, may be scattered over a considerable area and mixed with the surrounding soil.

Professor Panton, of the Ontario Agricultural College, having, at the request of the Commissioners, analyzed a piece of the crystalline limestone referred to, reports as follows:—

"I have no difficulty in identifying the rock fragment to be a piece of crystalline limestone, a mineral of common occurrence in some parts of the Laurentian strata of Canada. This fragment contains particles of mica scattered throughout the mass. A small crystal of apatite occurs in one part of the specimen examined. The fragment bears

a more or less weathered appearance, and seems to be part of a boulder and not from rock *in situ*.

"The presence of this crystalline limestone imparts fertility to the soil, which results from the disintegration of the gneissoid rocks characteristic of the Laurentian serics, and becomes of economic value in soil which might otherwise be very deficient in lime. On subjecting it to intense heat the specimen gave a strong lime. The lime derived from this kind of limestone, I have no doubt, would be of great service for building purposes."

How far it may be easy or profitable to quarry the crystalline limestone in large quantities is a question worthy of more thorough investigation than the Commissioners could give to it. In view of the demand for lime for so many economical purposes they respectfully recommend that special attention should be given to these deposits in order that their actual practical value may be correctly ascertained.

Before quitting this branch of the subject it may not be improper to allude, in passing, to the question generally of importing other manurial agents in bulk. The evidence taken elsewhere favours the opinion that the use of salt and gypsum—popularly styled land-plaster—is likely to be greatly extended, particularly in relation to the very crops most commonly raised in Muskoka. Parry Sound is in constant communication with such western ports of Lake Huron as Kincardine and Goderich, seats of the salt industry, and salt could be brought to Parry Sound in empty lumber craft at nominal rates, if only a little coöperation and enterprise were to be called into play.

Mr. Strain, a merchant of Parry Sound and Reeve of Foley, in his evidence, says: "If farmers have to pay $1.25 for salt per barrel it is their own fault, as I am certain that arrangements can be made to bring it in for 80 cents per barrel." A barrel weighs 280 lbs. Salt in bulk can be bought at the works for $2.60 to $3 per ton, or equal to about 45 cents per 280 lbs. It is not at all improbable, therefore, that Mr. Strain was quite within the mark when he fixed 80 cents as the probable cost of a barrel of salt if proper efforts to secure a large sale were made. By the car load (or 12 tons) it should be comparatively cheap at Bracebridge, if brought *via* the Grand Trunk, and Hamilton and North-Western Railways, the freight to Bracebridge being about $28.

Gypsum is found in Ontario solely at Paris or Cayuga, or is imported from the northern part of New York State to Port Hope or Toronto. Its cheapest route would probably be—for Parry Sound—*via* the Buffalo and Lake Huron to Goderich, and thence by water; while the railway route from Caledonia *via* Hamilton and North-Western Railway to the eastern part of the District is direct, as well as that from Toronto or Port Hope *via* Midland or Northern, if the foreign article be preferred. The freight per car load would be the same as that for salt.

PROGRESS MADE, AND AIDS OR HINDRANCES THERETO.

Although a few squatters were to be found in Muskoka twenty years ago, it is only since 1868, when the first Free Grant Act was passed, that the District has been really opened for settlement. The Free Grant Act, as amended from time to time, may now be said to provide substantially as follows:

> Every person, being the head of a family (*i.e.*, a married man with not less than one child), is entitled to a free grant of 200 acres, or any unmarried male person, not less than eighteen years of age, to a free grant of 100 acres, of land available for farming purposes, on condition:

1st. That within five years from the date of location not less than 15 acres shall be cleared and under cultivation—two acres being the smallest amount to be cleared and cultivated annually; that a habitable house shall be built, not less than 16 feet by 20 in size, and that the settler shall reside on his location continuously.

2nd. That a locatee on 200 acres may purchase an additional 100 acres at 50 cents per acre.

3rd. That, at the end of five years the patent shall issue absolutely, all settlement duties having been performed.

4th. The right to all pine timber on the lands, and minerals, is reserved by the Crown; but the settler may cut and use as much pine as he needs for his own buildings or improvements; and on all pine cut by the lumberman after the patent has issued to the settler, the latter receives 25 cents per thousand feet board measure, or $3 per thousand cubic feet.

5th. No location can be seized for debt, or sold by the locatee, pending the issue of the patent.

Except under special arrangements, no lands are sold in the Free Grant townships to settlers other than those claimed under the preëmption clause.

This legislation, while it has had the effect of attracting to the District a population now estimated at about 30,000 souls, naturally invited in the first instance the class of persons who were the least likely to give signs of rapid progress. One of the witnesses who described his means on entering upon his location as "exactly fourteen pence, a little pork and flour, a wife and six children," was a representative man in this sense. When it is considered that every foot of ground has had to be cleared with the axe, and that even in more favoured regions the seasons will not always befriend the husbandman, the wonder is that so much has been accomplished.

In many instances the Commissioners remarked that the clearing appeared to be small in proportion to the land held by the settler, or the time he had been located. In too many cases, no doubt—the bare settlement conditions having been once complied with—the settler has been contented to adopt a "rest and be thankful" attitude. But, a certain acreage once cleared, he has often found, it may be assumed, that the work of cultivation and that of clearing press heavily upon him, and the latter has consequently been deferred or allowed to cease altogether. To some, too, the attractions of the lumber shanty with its attendant wages, or a job of Government road work, have been too strong to be resisted.

It was, however, the universal testimony of the witnesses, that the most successful of the settlers without capital, were those who had worked steadily and continuously on their farms at any temporary sacrifice, or submitted to any privation, rather than make a little money by chances only secured by neglecting their holdings.

The general effect of the Free Grant policy has therefore been to people Muskoka, but to people it to a great extent in the way least likely to show early large results. The causes of individual success or failure have been found, however, more frequently in the man than in the circumstances. Persons of the most unlikely antecedents have frequently proved most successful. The whole thing generally turns on the settler's adaptability to

the life he has chosen. The situation is a novel one to everybody. The mechanic or merchant may know little or nothing even of the rudiments of agriculture, while a very sharp overturning of preconceived habits and ideas await the trained agriculturist. The tinge of romance given in many descriptions of the bush-settler's life is dispelled by the first day's chopping. Why so many men in Muskoka have succeeded without capital or previous training, is, because they have been men of the right stamp—frugal, industrious, persistent and courageous. And it has been most gratifying to the Commissioners to observe symptoms in every direction of steady prosperity. The best proof of a farmer's progress and good judgment is to be found, less in the condition of his house than in the state of his outbuildings. In these, new erections or enlargements were to be seen almost everywhere.

It has, moreover, been the good fortune of the District to receive accessions to its population from many persons of some means as well as experience, and the good effect of their presence is everywhere observable. Such men as Mr. Muntz, of Alport, the Rev. Mr. Hill, of Peninsula Lake, Mr. Sirette, of Rosseau, Mr. Ashdown, Reeve of Humphrey, Mr. Holditch, of Maganetawan, Mr. Harstone, of Ilfracombe, and Mr. Pollock, of Perry, represent the class now referred to. Such persons, by their enterprise and spirit, have been nothing less than public benefactors.

The lumbering operations in the District have also been a most important factor in relation to its progress. Previous to 1871 they were limited to a few scattered points on the Georgian Bay coast line, or to the extreme north-west (or French River) section. In 1871 the first extensive sale of limits took place, and nearly all the townships in Muskoka proper were placed under license.

The evidence shows that, except during the recent period of depression, a brisk demand has existed for hay and oats, just the products most easily raised during the initial stages of a settler's struggles. Oats, which have averaged 50 cents a bushel, and hay ranging from $8 per ton upwards—some $9 to $10 being probably the average price paid—and that too without the cost of hauling, have been handsomely remunerative. It is doubtful whether many of the present prosperous, but once almost penniless, settlers in Muskoka, could have held out against the vicissitudes of their lot but for the demand thus created at their very doors.

On the other hand it must be admitted, that from a purely agricultural point of view this trade has its very serious disadvantages. It has meant the clearance off the farm of everything most likely to maintain its productiveness; of a gradual drain upon and reduction of the quality of the land, and a most wretchedly parsimonious and improvident method of keeping stock. Had all the oats and hay sold been fed to cattle and sheep, and the latter sent to market, they would have largely enhanced the value of the farm and brought a good return in the shape of drovers' cheques besides.

The comment, however, of many a settler on this will be, that he had no stock to feed nor the means to buy stock. The lumberers' purchases have been in fact a pioneer's resource, and, as a most fortunate aid to him, may still be so regarded. But the time has come in not a few places already, and will come ere long in many others, when the lumberer and settler have parted, or will part, company.

Muskoka, although a pine country, is not so in the same sense as the Ottawa Valley

and some other sections of Canada. In certain townships the pine is very scarce, in others more plentiful, but, except in a few places, it is not grouped in pine forests but scattered among the hard-wood timber. It is being rapidly cleared out, and at no distant day will be found in only a few of the settled portions of the District in paying quantities. Hence the settler is, perforce, considering what he shall do with his produce, and this fact is both a suggestive and hopeful one. It is the duty of the undersigned to assist him to solve that problem.

AGRICULTURAL PRODUCTS.

The recent show of Muskoka products at the Toronto Industrial Exhibition, for which the District was indebted to the praiseworthy and public spirited efforts of two gentlemen, Messrs. Mann and Parrish, of Huntsville, and the further display provided by Mr. Hamilton, Immigration Agent at Bracebridge, at the Provincial Show, evidently caused some astonishment. Thousands of people went away with—to them—the newly received information that Muskoka was something better than a wilderness. But the Commissioners are able to state, not merely that these displays were fair and honest, but that they failed in some respects to do justice to the productions represented. The merits of the District in regard to the several cereals, grains and vegetables, will be discussed in detail. Meantime it may be observed that, while the District is specially adapted for some crops, or products, and less favourably suited for others, there is nothing that Ontario can produce which will not, under good management, grow in Muskoka. With results before them obtained by what may be at all events designated primitive methods of cultivation, and with farm stock vigorous, healthy and thriving under some patent disadvantages, it is not possible to doubt that much may, under a better system, be done to make Muskoka a fair agricultural country.

FROSTS.

One of the subjects to which attention was frequently directed, in the course of the inquiry, was the effect of summer frosts on vegetation in the District. The evidence in this respect generally went to show that, while frosts had been experienced in the early summer in the District as well as in older parts of the Province, they had never proved a serious drawback until last year, when a severe frost about the middle of August did great injury and reduced many of the poorer settlers to a condition that demanded public relief. This year again harm, although to a less distressing extent, had been done by a frost at about the same date. The effects of the latter were seen by the Commissioners on their way from Bracebridge to Baysville on Indian corn and potatoes, but not so severely elsewhere, while, at many places, there were no traces of frost whatsoever. Discussing the matter freely with the witnesses, they all agreed that the frosts were singularly local rather than general in their influences. In the most exposed situations where the action of the winds is felt, the summer frost does little mischief; in the immediate vicinity of large bodies of water the air seemed to be mellowed by their influence, and the summer frosts are nearly harmless; but in sheltered inland spots or on the low lands they have been very pernicious. The opinion appeared to be that as the clearings were enlarged and the air had more play, summer frosts would be less frequent, while a knowledge of their local peculiarities, already mentioned, is a partial safeguard to the settler by giving him warning to plant in

the more favourable or more dangerous spots the crops best adapted for them. The risk of such visitors did not seem to have a seriously discouraging effect, at all events on the minds of any of the persons examined.

THE GRASSHOPPERS.

During the eleven or twelve years the District has been settling up, one destructive visitation of grasshoppers, over a considerable area, has been experienced. This was about the year 1873 when their ravages were very serious, and, to the poorer settlers who suffered from them, nearly ruinous. While an opinion was expressed by some witnesses that they had been of late increasing somewhat in numbers, and one person had suffered from them recently rather severely, no one admitted them to be an enemy to be especially dreaded. The visitation of this pest has not been confined, we believe, to Muskoka. In Lanark, grasshoppers have more recently done great damage and are still watched with some anxiety. Their breeding grounds are chiefly in the dry and sandy soil of uncultivated pasture lands, and the more rapidly these are broken up the more remote is the danger of their attacks. A wet season and the assaults of a parasitical insect of a very deadly nature, are the best immediate protection apparently against their too overwhelming increase of numbers.

WHEAT GROWING.

The question whether the District is or is not suited to the growth of wheat, would be of great importance of it were likely that, to any large extent, its population would be dependent on that cereal. But the undersigned may at once say, that even if it should prove that a considerable portion of the territory was adapted for wheat growing, they would advise attention primarily being given to other branches of agricultural industry in preference to wheat culture. Still it is none the less interesting to ascertain whether sufficient wheat can be profitably grown for home consumption.

As a means of simplifying the inquiry we shall notice the evidence relating to wheat in sections, as each was represented at the various sittings in the District.

At Bracebridge the Townships of Muskoka, Draper, Macaulay, Monck, and Stephenson, were respectively represented. The map shows them to be a group of townships occupying the heart of the southern portion of the District, or Muskoka proper.

Messrs. Muntz (Muskoka), and Spring (Draper), the two first witnesses, are not growers of wheat, not because wheat cannot be grown, but because their farms are not in a state of cultivation at present to make it profitable or expedient to grow wheat. Mr. Spring, however, grew two good crops of fall wheat for two years in succession.

Mr. Spencer (Monck), has grown the Scotch and Redfern varieties of spring wheat for several years, crops varying according to quality of soil and method of cultivation from 27 to 10 bushels per acre. He "believes the failure of the crop to be due more to mismanagement than to the quality of the soil."

Mr. Parker (Stephenson), had got 20 bushels per acre of spring wheat from pasture land, but has tried wheat growing only on a small scale.

Mr. Tookey (Macaulay), grows both fall and spring wheat, but prefers the latter, as the fall wheat is liable to be "heaved out" with frost. With the selection of the proper

soil, Mr. Tookey believes, from his experience, fair crops of wheat may be grown in Muskoka.

This evidence certainly is not unfavourable to the capacity of the section referred to for wheat growing, as the means for its proper cultivation become developed. Both in a positive and negative sense, this view appears to be affirmed by the witnesses. That fall wheat may, as in other parts of Ontario, suffer from certain causes, is quite natural, and these may make it the more precarious crop. But, while the advisability of growing fall wheat may be open to consideration, no reasonable doubt can be felt that spring wheat may be grown in these five townships with fair success.

The next group of townships, with Baysville for their centre, are McLean, Ridout, and Brunel, lying east of those previously visited.

The two witnesses from Ridout had both grown wheat. With Mr. Gilmour spring wheat had not been successful, having suffered from blight. Of fall varieties, the Deihl had yielded 15 to 20 bushels per acre until last year. "It had been rather poorly put in."

Mr. Cole had done well with both spring and fall wheat until the last few years. But as Mr. Cole has been "cropping for eighteen years without manure," some failures in his crops will hardly surprise any experienced agriculturist.

From McLean, Mr. Kenney is not specific as to spring wheat, and attributes the failure of fall wheat to the want of proper artificial manures.

Mr. Langford gets from 10 to 30 bushels of spring wheat to the acre. "I tried fall wheat one year, but it rusted."

In Brunel, Mr. Wattie has raised fall and spring wheat at the rate of 15 bushels to the acre, and only gives up wheat growing because of the labour (in the absence of machinery) its threshing entails.

It may here be remarked that the acre spoken of, in all cases, means an acre dotted with stumps which, with few exceptions, still encumber the ground, so that not only is the acre diminished in area by perhaps one-fourth or one-third, but cultivation is greatly impeded and must be very imperfect. Taking these facts into account it would be unfair to assert that, in the three abovenamed townships, wheat may not be grown with moderately good success.

The four Townships of Franklin, Sinclair, Perry and Chaffey, north and east of the last group, are the next in order.

Mr. Monaghan, of Chaffey, has not tried wheat, and does not regard the country as adapted for wheat growing, but said his neighbours grew fine crops, and in one instance within his knowledge, a particularly good sample had been raised.

Mr. Winter, from Sinclair, speaks of wheat as a "moderately successful crop."

Mr. Pollock, from Perry, says:—"Neither spring nor fall wheat have been what we would call a success in the front townships, though spring wheat is sufficiently productive to pay. I have not given up growing fall wheat, though I am doubtful if it would turn out a paying crop. The trouble with wheat is that the straw does not stand up well, but crumples before it ripens. I believe the use of salt and lime would remedy the evil, though I have not tried them. The average yield of spring wheat would be about ten bushels to the acre, but I believe it would increase under thorough cultivation."

Mr. Hill, from Franklin, who has been already more than once alluded to, has a farm

of 220 acres cleared, on the shore of Peninsula Lake, fine rolling land, with a pretty strong clay loam soil, and a stiff sub-soil of clay. He said:—"I have grown very fine crops of wheat, both fall and spring. Fall wheat suffered from winter-killing two years; the result on one occasion being due, in my opinion, to too rapid growth in the fall, and in the other to there being so much snow that the crop was smothered. About 30 bushels per acre is the maximum yield of fall wheat, and 20 bushels the average. Spring wheat will average 20 bushels per acre when the land is perfectly prepared, though sometimes it is a failure. * * * To-day I showed Professor Brown samples of wheat grown on my farm, and that gentleman stated he had examined 200 samples of wheat grown in Ontario, and had seen none so good as wheat grown on my farm." The witness correctly described the remark just quoted. The crop of spring (Red Chaff) wheat was a magnificent one, the stalk long, firm and bright, and the ears well filled.

Messrs. Monaghan, Winter, and Pollock, have all previously farmed in the older sections of the Province. Their opinions, no doubt, are largely founded on a comparison with earlier experience of wheat growing under more favourable conditions. These are entitled to great respect, so far as they may apply to the general policy of growing wheat on a large scale in the townships they represent, but it is clear that in this group also wheat has been and can be successfully cultivated.

The Townships of Watt and Medora were next visited. They lie, it will be observed, respectively to the east and west of Lake Rosseau.

Mr. Davidson, from Watt, had found fall wheat a failure from rust and winter-killing. Spring wheat (Fyfe variety) did very well last year, but was a failure this year. He regards it as unreliable, and puts the average at from 10 to 12 bushels per acre. He admitted, however, that mismanagement might have more to do with failure of crops than the soil.

Mr. Gregory, of Medora, gave very similar evidence.

Mr. Dovey, a very practical man, and formerly a gardener, said:—"I have sown Red Chaff wheat, and it did fairly well when it was cultivated. I have tried fall wheat but it was not a good crop, owing, I believe, to the fact that the land was not properly drained or cultivated; the soil also requires the addition of lime to enable it to grow good crops of wheat."

Mr. Trouten, from Watt, while not regarding fall wheat growing very favourably, had never had a failure with his crop. He regarded spring wheat as more reliable.

Mr. Trouten, in his evidence, probably describes pretty accurately the real state of the case in Medora and Watt as to wheat growing. Wheat may be grown, and, with proper drainage and cultivation, both fall and spring wheat might be good crops. Success under present conditions is exceptional as to fall wheat, but spring wheat may be grown with fair certainty of a moderate average.

The next townships, grouped, Humphrey and Cardwell, lie to the northward of Medora and Watt. In Humphrey, Mr. Beley had such poor success with one crop of spring wheat, he had not tried another, nor had he tried fall wheat at all.

Mr. Wilson, of Cardwell, has grown fall wheat very successfully; one year it yielded 30 bushels to the acre.

Mr. Robertson, Reeve of Cardwell, had grown wheat five years, realizing 25 bushels to the acre of fall, and 20 to 25 bushels of spring wheat.

While complaining of mildew, which he attributed to the want of drainage and of larger and more airy clearings, Mr. Ebenezer Sirett, of Humphrey, believed fall wheat would be a profitable crop in most seasons. With spring wheat he had been very successful, an average of 20 to 30 bushels per acre being obtained. The soil of his farm is a strong clay.

Mr. Ashdown, Reeve of Humphrey, thinks there is no difficulty in raising wheat on and properly cultivated.

Notwithstanding the failure of one experiment mentioned, it must be conceded that both fall and spring wheat may be successfully grown in Humphrey and Cardwell.

At the next place of meeting the group of townships consisted of Croft, Chapman, Spence, and Lount, lying in the centre of the Northern (or Parry Sound) portion of the District.

Mr. Holditch, of Croft, has had good crops of both fall and spring wheat, getting about 20 bushels to the acre.

Mr. Irwin, of Chapman, had grown spring wheat, averaging 20 bushels to the acre for some years. He had seen good samples of fall wheat, but grows none, having an idea that, until the country is more cleared and open, it may not succeed.

Mr. Pearce, also from Chapman, a chemist by profession, argued theoretically that, in the absence of lime, wheat could not be cultivated successfully.

With Mr. Fowke, of Lount, both fall and spring wheat had done very well.

In this group, while all due weight is given to the objections raised, it must be allowed that wheat can be grown profitably.

Coming westward, the next group of townships is Hagerman, Ferguson, and McKellar.

Mr. George Kelcey, of Hagerman, says:—"I sometimes manage to raise good crops of fall wheat on new land, but it does not pay to raise it on old land, as there seems to be something lacking in the soil. * * * I think lime is the element the wheat requires; the wheat comes up well, but just when it is coming out in head it begins to fail, and in many of the ears the lower grains are large and plump while there are scarcely any in the top at all. Crystallized lime is common in the neighbourhood, and, although I have not tried it on the soil, I noticed that a few heads which grew near the kiln were excellent.

Mr. Hurd, of McKellar, reported that spring wheat did very well with him, and there was a good deal grown throughout the township. He expected this year to have over 20 bushels to the acre. He gives a preference to other cereals, however, for he says:—"I am of opinion that the soil requires more lime to make it permanently suitable for wheat cultivation. A great deal of the straw breaks off at the second joint from the ground, owing, I believe, to the weakness of the stalk."

Mr. Shaw, of Ferguson, does not think wheat a safe crop, owing to the want of a sufficient quantity of lime.

It is somewhat remarkable that in one of the nearest points to the crystallized lime deposits the alleged want of lime should be most strongly urged. But, as to Ferguson and Hagerman, the absence in the soil of silica and perhaps some other necessary ingredients

in the wheat plants, seems to be pretty clearly made out. In M'Kellar the evidence is more favourable.

The last group to be considered in this connection, are Carling, Foley, and McDougall, on the Georgian Bay coast line.

Mr. McFarland, of Carling, has nearly given up growing fall wheat, owing to loss of crops by winter-killing, rust and mildew. He also complained of lack of lime in the soil. Still he had got some good crops of wheat, getting 20 bushels to the acre. There is no difficulty, however, it seems, felt by Mr. McFarland in raising spring wheat, the maximum yield of which has been 23½ bushels to the acre.

Mr. Willcox, of Foley, says:—"Crops of all kinds do well except wheat, and the land is becoming better adapted for wheat all the time.' Salt, however, had been used with very obvious advantage on his wheat crop.

Mr. Badger, of McDougall, says:—"Neither fall nor spring wheat can be grown with any satisfaction, although it may do so after we are able to cultivate the land well."

This section seems to be less favourable than some others for wheat growing, although the evidence from the several townships differs in its character considerably. The just inference probably would be that, while spring wheat may, in exceptional cases, do well at present, cultivation and treatment of the soil is needed to make the raising of either spring or fall wheat an actual success, and that, meantime, the latter is not a profitable crop.

It is not necessary to discuss this subject as one affecting the status of the District as a wheat growing competitor in the world's markets, with the older wheat growing counties of Ontario or the Western States. In that sense, for sufficiently obvious reasons, it never will be a wheat producing country.

But with abundance of cheap land the production of anything that will yield an average crop can hardly fail to be advantageous. To import so prime a necessary of life as flour is to tax by adding freight and commission to the original market value, the raw material of industry, without any compensating benefits, while, on the other hand, the encouragement of local milling operations must be beneficial. Hence the conclusion is arrived at, that wheat growing to the extent of supplying the local demand in Muskoka should be encouraged, wherever it can be conducted with reasonable success.

That success can only be obtained (1) by the site for the growth of wheat being judiciously selected, and (2) by reasonably skilful treatment and cultivation.

Nor will this new region, scarcely yet reclaimed from the original forest, suffer much in this respect by comparison with older settled portions of the Province.

The undersigned have before them at this moment the returns of the average yield of wheat per acre from forty-six townships in the wheat-growing counties of York, Simcoe, Ontario and Grey. The returns of course are limited to lands actually sown with fall and spring wheat. The average yield of the former is 19 bushels, and of the latter 12 bushels, to the acre. From the liability of fall wheat to casualties, and the very general failure of spring wheat of late years, the foregoing is, probably, rather a favourable exhibit than otherwise. It is obtained, too, from counties where agriculture is carried on upon methodical, if not always scientific, principles. The land is cleared up, cropped with some regard to rotations, manured with more or less attention to the

crops to be raised and the condition of the soil, and, in many instances, at least partially drained. In all cases the plough and harrow have free course and have done their work.

In Muskoka the stumps still dot the ground, manure is scarcely applied, drainage is practically unknown, and, from the first operation of breaking up the soil to the final harvesting of the crop, many of the simplest essentials to success are wanting. Yet, in face of all this, many good crops of wheat have been raised, and, in the opinion of the undersigned, only proper management of the land is necessary to enable the settlers of Muskoka profitably to grow all the wheat needed for their home consumption.

OATS, BARLEY, PEAS AND RYE.

Oats.

No difference of opinion can possibly exist, after hearing the evidence taken by the Commissioners, as to the adaptability of the soil of the District for the growth of oats. The crops seen in all directions, the samples brought by some of the witnesses, and others since exhibited at the Toronto and Provincial Exhibitions, all prove this fact. While the general average yield, as given by the witnesses, may be put at from 30 to 40 bushels per acre, the opinion was expressed, founded on partial experience, that, with proper cultivation, that amount might be much exceeded. In some instances 50 or 60 bushels per acre, or even more, had been obtained. The straw in most of the fields visited was long—in some as much as five feet in height—and the whole plant presented, wherever examined, a thrifty and vigorous appearance. "Always a sure crop," was the answer everywhere given to a question as to the growth of oats.

Barley.

The cultivation of barley has been hitherto on a rather limited scale. In fact the local demand by the lumbermen and hotel-keepers for oats, and the good crops of that cereal almost invariably obtained, have had the effect of preventing to some extent attention being given to other grains. But wherever barley has been grown it appears to have succeeded well. About 30 bushels to the acre was mentioned as the annual average, the acre being in this as in other cases a "stumpy" acre.

The Commissioners are of the opinion, from the evidence before them, that nothing but fairly good cultivation is needed to insure the production in the District of barley of a fine quality and in a paying crop.

Peas.

The growth of peas was found to be very general, and the crop, with a few drawbacks, appeared to be a certain one. From the statements regarding the yield made by the witnesses, the District, with its "stumpy" land and inadequate cultivation, makes, in the matter of peas, a very fair show beside older counties. The returns from York, Simcoe, Ontario and Grey, already alluded to in connection with wheat growing, give an average yield of peas in the townships whence returns have been made on this head, of a fraction over 20 bushels to the acre. By a reference to the evidence it will be observed that in the District in most cases this amount has been exceeded, and in very few has it fallen below 20 bushels per acre.

Rye.

The quantity of rye hitherto grown in the District has been very small, but views favourable to its larger cultivation were freely expressed by several persons. As a fall crop it is urged that it might with advantage in many cases be substituted for wheat, being more hardy and less likely to suffer from winter-killing than the wheat plant. It will grow too on soil that will hardly support other grain crops. Rye bread is both a wholesome and nourishing diet, and where a prejudice exists against using rye flour alone, it can be mixed with a portion of wheat flour to suit fastidious appetites. The evidence of some of the most intelligent witnesses will be found to be very strong indeed in favour of the cultivation of rye.

The fact is thus established that the District is peculiarly well adapted for the cultivation of the coarse grains, particularly those which will have to be depended upon in order to establish a profitable stock-raising, feeding and fattening industry. This will have to be borne clearly in mind when the Commissioners come to discuss that branch of their inquiry.

INDIAN CORN.

The accounts given of the cultivation of Indian corn were somewhat variable, as from the nature of the crop might be expected. Where planted early and in a favourable situation it has frequently succeeded well. Mr. Muntz, whose farm is on the Muskoka River, "had raised corn to some extent, and succeeded in ripening it some years, but in others he could not." He added, "Throughout the Muskoka District generally it ripens fairly well, and may be looked upon as a successful crop." Mr. Spring (Draper) on the other hand, was of opinion, "corn cannot be regarded as a certain crop." Mr. Gilmour (Ridout) spoke of Indian corn "as usually a successful crop, but last year it was too early, and was cut off by a June frost." He thinks corn is a pretty safe crop. The frosts were only local in their effects. Two years ago he had averaged 70 to 80 bushels of corn in the ear to an acre (equal to 35 to 40 bushels shelled). Mr. Cole, who comes from the extreme eastern end of Trading Lake, also speaks of corn as a sure crop with him, and a yield similar to that obtained by the previous witness. Mr. Dovey (Medora), whose farm is situated in the neighbourhood of Lake Rosseau, says, "I have been growing corn successfully ever since I came in, and have about five acres this year. My crops have never been injured by the frost. The average yield of corn on my farm has been from 30 to 40 bushels per acre." Mr. Beley, whose farm is near the head of Lake Rosseau and on the lake shore, says, "I have grown very little Indian corn, as I do not consider it a sure crop." Mr. Wilson, of Cardwell, however, whose experience generally is much the same as Mr. Beley's, and whose land is also close to the lake shore, says, "I grow corn on my farm, and regard it as a sure crop." Mr. Fowke, of Lount, the most northerly township represented in the inquiry, speaking of the August frosts of 1879 and 1880, said, "Potatoes and corn suffer most; in fact, though corn sometimes does well, it cannot be considered a successful crop so long as these frosts prevail." Mr. Willcox, of Foley, in the most westerly part of the Parry Sound District, says, "If corn is planted early it matures well and is generally a good crop;" but Mr. Badger, of McDougall, the township immediately north of Foley, says, "I have grown corn, but could not recommend it as a safe crop."

The deductions from these rather contradictory experiences and which are the more valuable because they show the perfect independence of the witnesses of each other, and the desire of each to tell the simple truth, appear to the undersigned to be:—

1st. That Indian corn must be regarded as one of the natural productions of the District.

2nd. That in certain situations or where no exceptionally unfavourable event (such as frost in August) occurs, it may be grown successfully.

3rd. That, having regard to the value of the crop either in a green state for fodder, or, if harvested, both as fodder for cattle and food for man, as well as its beneficial effects as an agent in the clearing and cultivation of the soil, the plainting of Indian corn in the District may be properly encouraged, always provided the places for its cultivation, on any considerable scale, be selected with the view of providing, as far as practicable, against the effects of such casualties as those above referred to.

ROOT CROPS.

Turnips, Mangolds, Carrots, etc.

The general reputation of the Province of Ontario as a country peculiarly adapted for the growth of root crops, is well maintained in the District. The season was not sufficiently advanced to permit of the Commissioners seeing any fully developed specimens of roots, and the same remark applies to the exhibits at Toronto and Hamilton, already alluded to. But from the condition, not only of roots submitted for inspection by witnesses, but rom an examination of crops in the field at two-thirds or three-fourths of their growth, the testimony given in this regard was fully confirmed.

Turnips grown on newly cleared land appear to yield from 300 to 400 bushels to the "stumpy" acre, while one witness, Mr. Muntz, had got as much as 1,000 bushels from a clean acre by proper cultivation. Other witnesses related very similar experiences, and to obtain 500 to 600 bushels is not by any means uncommon.

The cultivation of mangolds does not seem to have made so much progress as that of turnips, although no reason was given for this apparent preference for the latter. In view of the greater certainty, in some respects, of the mangold crop, increased attention to its growth would probably be found profitable.

Splendid crops of carrots, both of the red and white variety, were seen at many places, and the evidence was universally favourable to their extensive cultivation.

The turnip in this District does not escape the ravages of the fly, but the liability of the plant to be attacked by that pest is not shown to be greater there than elsewhere. One witness, speaking of a seven years' experience, said:—"I have been very successful in growing turnips, though they have been attacked by the fly several years. I had four splendid crops out of seven, and the other three, though materially injured, were not complete failures." The only known preventative for the fly on turnips is a rapid growth. Anything that will give vigour to the plant in the early stages of its existence, will tend to avert the injury the fly inflicts where it gets the upper hand. The use of gypsum (land plaster) has been strongly commended by witnesses before the Commission on several occasions as highly advantageous in this sense.

In roots, as in coarse grains, the Commissioners have no difficulty in pronouncing a very favourable opinion of the capabilities of the District.

POTATOES.

The yield of potatoes is, this year, very large, and is generally good both as to quantity and quality. Leaving out of calculation any very extraordinary and exceptional instances, a crop of potatoes may be put down as ranging from 150 to 300 bushels per acre—from 150 to 200 being probably a safe average. The Early Rose appears to be the most popular. To plant very early may put the potato plants in peril from an occasional frost in June, if they are too far advanced to recover from its effects. On the other hand, by cultivating those sorts which attain perfection most rapidly, they may be planted later and yet be matured before the occurrence of the autumn frosts at the usual period.

GARDEN PRODUCE.

All the ordinary garden vegetables are cultivated successfully in the District, and, where properly treated attain a very large size. Some cabbages, squashes, melons and tomatoes seen in gardens visited by the Commissioners would have stood a fair chance of carrying off first prizes at a Provincial Exhibition, and this not in one or two particularly favoured localities, but at points most widely distant and under very varying conditions. Of all these necessaries of life the settler in the District can, with ordinary effort, obtain a bountiful supply.

OTHER CROPS.

The hop grows freely, and may be worth attention as a possibly profitable crop. Tobacco is also grown on a small scale and appears to do well. Beans are favourably reported of in many instances. Beets and the smaller roots naturally succeed where the larger root crops are so prolific.

FRUIT.

With the exception of the grape the smaller fruits are indigenous to the District. All the "berries" abound in the woods, and the wild plum is also very plentiful, being cultivated by the settlers and yielding a large crop of fruit valuable for economical purposes. In face of the abundant natural supply, the cultivation of berries is small; but the strawberry, where planted, yields a very good return. For hardy plums it cannot be doubted that the conditions are favourable.

The first apple grown at Port Carling had been divided between a party of visitors before the Commissioners arrived, but was reported to have been a most creditable specimen. Apples grown at Port Sydney, some thirteen or fourteen miles north of Bracebridge, have been seen at the recent exhibitions. They were the Duchess of Oldenburg variety, and showed to advantage. Messrs. Langford and Kenny in their evidence both refer to efforts in this direction. Mr. Foreman, of Port Carling, has a hundred apple trees grown from the seed of an English variety, some of which are doing well. In many other places the settlers have planted apple trees with varying results, want of care to protect the trees from cattle having brought some experiments to an untimely conclusion, while a lack of skill and judgment in management clearly accounted for other failures.

Crab apples have been grown in a great number of instances very success-

fully, the yield this season being enormous. The Transcendant, Montreal Beauty and other varieties were loaded with fine fruit. The crab being a free grower and soon coming into bearing, may account to some extent for its apparent advantage over the apple proper; for it must be recollected that by no possible means could some of the most promising species of apple have attained to a bearing maturity in many of the settlements that have only had an existence for from six to ten years—fruit growing being, necessarily, postponed until much else had been accomplished. The Commissioners do not, however, lay any great stress upon the question of apple culture in the District. That certain descriptions may and will be grown is not doubtful; but the people of Muskoka can probably find other and more profitable outlets for their energies than, in such a region, apple growing on a large scale is likely to be.

The cultivation of grapes, notwithstanding the apparently unfavourable symptom of the absence or disappearance of the wild grape from the forests of the District, is looked upon hopefully by many persons, and the Commissioners think not without good reason. They have been able to discover nothing fatal, but much that is favourable, to grape culture in the soil and climate of the District. The experiments tried so far have been very confirmatory of this view. Although not stated in evidence, the Commissioners believe that the wild grape is actually found growing in the vicinity of Lake Nipissing. The Commissioners hope to find some of the most favourably situated of the settlers seizing opportunities from time to time for practically testing, on a larger scale than hitherto, the capacity of the District as a grape growing section of country.

THE GRASSES.

The important help derived by the early settler from the sale of his hay to the lumberman has been already referred to. The practice of seeding down to clover or timothy with the first grain crop grown upon the newly-broken land, has at once given the new locatee a source of income as above stated, while, pending the gradual decay of the stumps on his new clearing, it has been the most convenient mode of cultivating the soil. Looking, however, to the future as well as to the present, and regarding the sale of any farm produce that can be profitably consumed at home as wasteful in every respect, the Commissioners see, in the rich growth of the grasses in the pasture lands of Muskoka, the most direct and powerful agency for turning its resources and the energy of its population in a right direction. It will be worth while to call attention specifically to the evidence in this respect.

Mr. Muntz says:—"I do not think that pastures ever get burnt up in this part of the country, and they remain as green at this season [end of August] of the year as they were farther south at the end of May."

Mr. Spring.—"I have one piece of timothy and clover which I have cut for ten years, and there is clover there now. This year I got more timothy and not so much clover. * * * My grass has never been 'heaved out' by the frost."

Mr. Parker (after mentioning that he usually seeds down timothy and alsike clover with his second crop), said:—"I have about ten acres of rocky land which I seeded down six years ago, and now I have a very fine field of white clover. I have some meadow which I have mowed four years, and this year I raised one and a half tons of hay to the acre."

Mr. Gilmour.—"I have grown both timothy and clover, but prefer the latter. * * * I also grow Hungarian grass which I cut green and feed to my cows when the pasture [wild] begins to fail. I can get from two to three tons per acre of this fodder."

Mr. Wattie.—"I grow red and alsike clover and keep it in the land for six successive years, principally, I believe, because the clover re-seeded itself. The roots died last winter, and now the young seeds are coming up and I expect as heavy a crop as before. It was the red clover which went out last year. The alsike is doing well. The crop of hay is from one to one and a half tons an acre. * * * I find that pasture does not burn up here in midsummer as it does in the older parts of the country."

Mr. Langford.—"I have been able to grow all the grasses well, in some cases taking seven to eight crops off the land successively of timothy and clover. The clover is good yet. About one ton per acre is the average yield of hay."

Mr. Kenney.—"For seeding down I sow timothy and clover, but I prefer the latter as it survives longest."

Mr. Cole.—"I have about 50 acres in pasture; it has been seeded down ten or twelve years, and the clover is as good as ever."

Mr. Monaghan.—"Some of my land has been continually cropped with clover and timothy for five years, and this year it was better than ever before. Clover, instead of running out in this country, keeps increasing year by year by re-seeding spontaneously; and besides there is so much snow in winter that the frost does not enter the soil, and there is less danger of the clover being heaved out."

Mr. Hill.—"The grasses grow luxuriantly. I sowed the alsike clover with a slight mixture of white clover and timothy. I seeded down land when I first settled (ten years ago). It has not run out yet, and, practically, it amounts to a permanent pasture, for there is no sign of deterioration."

Mr. Davidson.—"I had some clover and timothy seeded down seven years ago, and it was a good crop this year."

Mr. Gregory.—"The oldest pasture I have is seven years old, and it is in better condition than it was four or five years ago."

Mr. Trouten.—"I have been very successful with grasses, and have no difficulty in seeding down; last year the grass was injured a little by the grasshoppers. The oldest pasture I have is five or six years old. The sward is not quite so good now as at first and it is all timothy, the clover having been killed out last year."

Mr. Beley.—"I have put my land down in pasture as much as possible. I use red clover, Dutch clover and alsike, also timothy, blue grass and orchard grass. The red does well for a year or two, but does not last so long as the alsike. I have cut as much as two tons of timothy per acre, but I think one ton is about the average yield." The witness further remarked that red clover appeared to weaken gradually and die out, but that the Dutch clover, although not so rapid in growth, was permanent.

Mr. Robertson.—"I have a meadow eight years old, and this year I raised one and a half tons to the acre upon it. It is comprised of timothy and alsike clover. I have never had a failure of the grasses, though some years they were better than others. I never saw pastures in Halton County six or seven years old."

Mr. E. Sirett.—"I have a piece of timothy which has been cut regularly for eight years, and this year it yielded fully one and a half tons to the acre."

Mr. Irwin.—"I have some timothy mixed with red and alsike clover five years old. The white clover seems to come up naturally in the timothy and fill it up, and it makes splendid sheep grazing." Witness expressed an opinion that clover would not be permanent in ploughed land.

Mr. Hurd.—I have had timothy growing for seven or eight years. I never top dress it or pasture it except for the after grass."

Mr. Shaw.—"I have one field which was seeded down nine years ago and it is splendid pasture yet. The clover lasted seven years."

Mr. Willcox.—"Clover and timothy last eight or ten years in hay and pasture."

Mr. Badger.—"I have clover and timothy which have kept up for eight years."

Ample opportunity was afforded the Commissioners for personally observing the redundancy of growth which characterizes the grass crops of the District, and the reasons why they are, practically, permanent are not far to seek. They may be found: (1) in the comparative mildness of the summers; (2) in the liberal and early snow fall; and (3) in the abundance of moisture in the soil. It is not to be assumed, however, that even in this, one of the simplest departments of agriculture, no improvement, even upon the present highly satisfactory results, can be obtained.

A judicious combination of grass seeds, similar to that described by Mr. Albin Rawlings in his recent evidence before the Commissioners at Toronto, will probably be found to secure, not only a heavier growth, but also a better sward, and a pasturage of even longer duration than at present. In some cases orchard grass has been tried with success, in others it has failed. The evidence is more favourable to the alsike clover than to the red, and, in point of duration, to the Dutch or white clover than either, in combination with timothy. The manipulation of the crop, too, may no doubt be largely improved, and manures applied with great benefit But very careful attention should be paid to the first point above referred to. Mr. Hill has mixed timothy, alsike and white clover, probably a very good plan, but the field for experimenting is as wide as the grasses are numerous. The question is a very interesting one and may well receive careful investigation.

It may be objected that, with the gradual destruction of the forests by clearing, the permanent pastures will also become as scarce as they are in the older sections of Ontario. The disappearance of the forests may affect the snow and rainfall, and, to some extent, the moisture of the soil, although, in a region literally full of water, the process of drying up may be a slower one than it would otherwise be. But tree destruction should be immediately followed by tree re-planting. With the injury done elsewhere in times past by the total clearing of the land, without any provision for a new and cultivated growth of timber, before their eyes, the settlers in this new region will be blindly fatuous, indeed, if they do not learn a lesson by the experience of others and begin re-planting at the very earliest period of their operations. The task is easy enough, need cost next to nothing, and the reward, a few years hence, will amply repay the effort. At present what the whole country has to notice is, that, in its capacity for the production of coarse grains, prolific root crops, and permanent pastures, in an ever-present supply

of pure water, and a most healthy climate, the District appears to be marked out as one well adapted to become the home of a stock raising and stock feeding industry. It is with that fact mainly in view, the Commissioners are especially disposed to regard and to commend it.

COST OF CLEARING.

The cost of clearing is variously stated by different witnesses, the difference being caused by the demand for labour at particular periods or the manner in which the work has been performed. In some instances as low as $13, in others as much as $20 per acre has been paid, and one settler, some years ago, paid $24 per acre. But at present the number of persons willing to contract or hire out for such jobs, is sufficient to secure pretty low rates, and it is probable that from $15 to $16 would be the cost per acre of chopping and clearing the land for the first crop and fencing it with material on the spot. If a clean cedar rail snake fence were used it might reach $18, but a simpler and rougher fence made of logs and poles is usually the first resource of the settler. In this regard the Commissioners cannot help expressing their regret at the fearful wastefulness of the present mode of clearing the land, and the destruction of so large an amount of forest wealth. With the present process, selection and ornamentation is almost impossible, and no local hardwood industries exist as in Kent, Essex and other counties, to remunerate the settler for any special care in his operations. Either local manufactories or a railway to convey the more useful and valuable timber to a market, are needed to counteract the present state of things.

To the settler such an outlet would be an enormous benefit. One wood alone—the black birch—which is stated by Mr. Robert Hay, M.P., to be the best substitute for black walnut, the supply of which is rapidly diminishing on this continent, grows in Muskoka in quantities sufficient to yield an immense revenue, if only it could be preserved from premature destruction.

STOCK RAISING.

If, up to the present time stock raising in the District has not made all the progress, that, with the manifest advantages already detailed in its favour, might have been anticipated, it is because (1) the market for beef and mutton has been limited; and because (2) it was convenient, and in some cases a necessity, that the settler should realize promptly on his crops, by disposing of them to the lumbermen rather than look to more remote, if more profitable returns. If, on the other hand, the number of cattle owned by many of the witnesses seems large in proportion to the size of their clearings, the explanation is found in the presence of bush pastures, the beaver meadows, and also the high rocky lands, where natural grasses furnish a supply of feed, especially for sheep, at certain seasons. The three last named sources are not, by any means, to be overlooked in considering the position of the District as a stock raising one. They have, already, there can be no doubt, exercised a beneficial influence in this respect.

By returns made to the Legislature from official sources for 1878, it appears that in eleven incorporated township municipalities in Muskoka, there were, of cattle, 4,791 head; of sheep, 1,649 head; of horses, 1,222 head; and of hogs, 758 head. Nor have efforts to improve stock of the District been by any means wanting. The evidence taken will best speak for itself in this respect.

At the outset of their inquiry the Commissioners had the pleasure of meeting Mr. Muntz, a gentleman already referred to as an enterprising farmer, from England, residing on the Muskoka River near Bracebridge. They regretted extremely that the duty of keeping appointments made in advance elsewhere, prevented a personal inspection of the fine herd of Herefords in Mr. Muntz's possession. He prefers that breed on the ground that they are hardier than the Shorthorns, and fare better on a somewhat rougher diet than the latter. This opinion is the result of some experience, Mr. Muntz having formerly owned a Shorthorn bull from the Bow Park herd. The particular quality in the Herefords, which gives them favour in Mr. Muntz's eyes, is, however, one that is admitted to characterize the breed, and their introduction into such a country as Muskoka is decidedly to be encouraged without necessarily any depreciation of other stock.

Mr. Muntz has also done something to improve the breed of sheep by using thoroughbred Cotswold and Leicester rams, and it is satisfactory to find that an active demand exists for breeding ewes, by settlers desirous of increasing their flocks of sheep.

Mr. Spring (Draper), who has kept a considerable flock of Cotswolds, formerly kept a Durham bull, and bred entirely from thoroughbreds for three years, to the great improvement of his own and his neighbours' stock.

In Monck, Mr. Spencer knew of no thoroughbred animals, but Mr. Parker, of Stephenson, has Cotswolds, Leicesters, and Southdowns, all well-bred. He always uses thoroughbred rams, and keeps the three breeds distinct.

Mr. Tookey, of Macaulay, has a thoroughbred Devon bull,—which he prefers, he says, for its greater hardiness, to the Durham,—and some fine sheep.

Mr. Monaghan, of Chaffey, has a thoroughbred Durham bull, and Mr. Winter, of Sinclair, one "nearly pure."

Mr. Pollock has a pure-bred bull and a pure-bred Leicester ram.

Mr. Hill, of Franklin, has a thoroughbred Ayrshire bull, and a fine flock of nearly ninety sheep, improved by the use of Leicester rams.

Mr. Davidson said that in Watt a thoroughbred Shorthorn bull was formerly kept, although there is not one at present, and there are no thoroughbreds in Medora, but in Humphrey, Mr. Sirette has a thoroughbred Durham bull which is available on easy terms by all who desire to improve their stock, and Mr. Sirette had been preceded in his laudable efforts by Mr. Robertson, of the same township.

Mr. Ashdown, also of Humphrey, is about procuring some thoroughbred Southdown sheep.

Mr. Holditch, of Maganetawan (Croft), has a thoroughbred Durham bull, two thoroughbred Durham heifers, and some young stock from them besides. He has also a pure Southdown ram.

Mr. Harstone, in a letter which was admitted by the Commissioners, mentions that at Ilfracombe he has a pedigreed Durham bull and 220 head of sheep.

Mr. Willcox (Foley) has some thoroughbred Leicesters.

Mr. Hains, in the same township, has a thoroughbred Durham bull; and Mr. Badger (McDougall) has a bull "as near thoroughbred as possible."

This is no unsatisfactory exhibit, taken at random from the witnesses called, and presenting the progress made in this new and very remote district. Not a few townships

in older sections of the Province might borrow a lesson, in efforts to improve their stock, from these settlers.

It was gratifying to observe, too, that nearly every witness was emphatic in declaring that stock raising was to be the grand object of his future operations; and also, that all had an intelligent perception of the fact that by the use of the pure-bred male alone can radical improvement be effected.

The good so far accomplished, it must be admitted, has been achieved under somewhat discouraging circumstances. There is a fair local demand for beef or mutton; but without competition from outside buyers prices have been, as one witness expressed it, "ruinously low," and the butchers have made little or no distinction between a "scrub," or common, and a well-graded animal. What is needed is, the production of cattle and sheep in such quantities and of such good marketable quality as will attract drovers from the outside, or pay for the collection of the beasts at given points whence, *via* Parry Sound, Rosseau, Gravenhurst or Bracebridge, they may, by water or rail, find their way to the open market, and bring their true value.

With abundant pasture obtainable everywhere, no one need make any serious difficulty of taking a drove of cattle thirty or forty miles, even if the much-desired railway communication does not lessen the necessity for such journeys on foot.

SUMMER PASTURE AND WINTER FEEDING.

During the summer months bush and beaver meadow pasturage may always be secured in abundance; and if the settler goes the right way to work his cultivated fields will soon take the place of the former. The grass of the beaver meadows is invaluable to the poorer settlers as hay, and is in that form a very good winter feed, but does not appear to be a favourite with stock as pasturage. Some difference of opinion existed among the witnesses as to the advisability of relying on bush pasture. That the cattle do well upon it in the summer months there can be no doubt. They resort to the bush with great eagerness, feeding on the young tree shoots and plants in preference to the beaver meadow or even the clover field, and until well into July the woods yield them an ample support.

Mr. Sirett was good enough to have a lot of his fine steers driven in from the woods for the inspection of the Commissioners, and no pasture-fed beasts could have been in much better condition. Nor do grades or even pure-bred cattle appear to lose their reputation, on bush feed, for distancing the "scrub" on a common dietary.

But while invaluable at the commencement of settlement and stock-raising enterprise, the Commissioners do not regard the great advantages of bush feeding as more than temporary. It is admitted that bush pasture falls off from the constant destruction it is thus subjected to. It will be wise, therefore, for the stock farmer to keep this in mind, and annually to provide an additional area of cultivated pasture land. Meanwhile the best course appears to be, to give the cattle the run of a pasture field to which they can have access from the bush. It is a protection against "short commons" if the latter falls off, affords opportunity for giving them salt periodically, and supplies them with a resort, when in the bush, the flies become more than usually troublesome. This plan, as witnessed by the Commissioners in one or two instances, appears to be a successful one.

That the treatment of the cattle in winter falls far short of what both economy and

humanity would dictate, is in some cases too palpably obvious. Straw diet in the stock yard, with scarce a shed for shelter, is treatment as improvident as it is cruel. Yet this is what too many cattle experience. How little they could keep—or starve—the poor creatures upon, seemed to be the boast of some persons the Commissioners met with. If the animals only lived to crawl or be dragged into the woods in the spring, there to be left to recuperate themselves, was the sole object such short-sighted people seemed to have in view. Happily, however, there are many who recognize the fact that the only way to procure a really good beast is to ensure a steady, permanent growth from first to last, with no lapses, and as few checks as possible to its progress.

The fact is, that relying on the wild pasture for six months in the year, and selling his hay and oats to the lumberman, the settler, too often, keeps more cattle than, thus denuded, he can winter. It consequently happens that with the exception of the milch cattle, which are a little more favoured than the rest, the stock go very short indeed. An industrious and intelligent man will remedy this state of things, and must do so if he will compete successfully in the Canadian cattle market. The buyers will soon find out if he persists in fancying that to lay a moderate amount of fat on a bag of bones is all that is needed to make a profitable beast. Proper shelter and warmth will do a good deal to help an animal on low diet, and it will occasionally manage to resist cold successfully if very well fed; but bad feeding and bad housing are a sore injury to Canadian cattle farming elsewhere than in Muskoka.

Sheep will need less warmth than cattle, and with a close yard and open shed do well anywhere with very moderately careful feeding. It is remarked sometimes that the length of the winter militates against sheep farming in the District. But this drawback is more than counterbalanced by

(1) The early pasturage on high lands, immediately on the departure of winter—the sheep of Muskoka often enjoying this natural food before they can be released from the farm-yard in the older counties;

(2) By the abundant supply of hay from grasses wild and cultivated; and

(3) From the dry and extremely healthy atmosphere.

In only a few cases, however, did the witnesses approve of sheep being allowed the run of the bush. The opinion generally expressed, and in which the Commissioners coincide, was, that their rambles should be confined to home pastures and to open lands, or to woods from which the underbrush has been cleared.

CLASSES OF SHEEP AND CATTLE.

The Commissioners do not assume that the raising of thoroughbred animals will be carried to any great extent in the District for some time to come. That will doubtless be confined to a few of the wealthier and more enterprising settlers. In cattle the object will be to supply the butcher and dairy, and in sheep to raise the finest mutton and the most remunerative wool. To obtain the former the best cows to be had should be crossed with a pure-bred Durham or Hereford bull. To use other than a pure-bred male is to throw away the readiest and perhaps the only way of making a profit.

It is true that there are other breeds than the Durham and Hereford, more famous for their milking qualities. But for the double purpose of meat and milk, and especially

the former, in view of the risks of the latter failing, none will equal the classes above mentioned. Then from its birth upwards the young animal must be judiciously treated. Stinginess will be a loss, not a gain. The first summer will of course be spent in the pasture field. In the following spring it will be able to do for itself in the bush till the fall, and, in its third year may again enjoy the liberty and invigorating influences of bush life until late in the summer, when it should be pastured and partially meal fed for a month or two, to get it into condition for the fall market. If not allowed to go back during the two previous winters it should at two and a-half years be just the stamp of animal wanted by the stall feeder for shipment in the following spring.

These are the cattle, and such is the plan the Commissioners believe will at present best suit the character and resources of the District. It is true that by selling cattle early the breeder loses a chance of making large profits, but then it must be recollected that the animals have to be got to market, and must be in a condition to travel on their own legs to their first destination. Settlers in the front townships of the District may, if their supply of feed be ample, and their housings warm enough, perhaps succeed in "finishing off" a few beasts, but that is not the case with the majority. For a time the simpler and shorter the method the better.

For sheep the evidence seems to point most favourably to the infusion of Southdown blood. Perhaps the Shropshires might be better in some respects, but they are scarce in Canada at present, while the Southdown is readily obtainable.

A cross of the Down on the common sheep, or the many partly thoroughbred Leicesters and Cotswolds, would produce a hardy, active sheep, of fair size, with the wool (medium) most in demand and bringing the best price, and superior mutton adapted to the foreign markets.

On the wool question the Commissioners took some evidence from Mr. Bird, a woollen manufacturer of Bracebridge. Mr. Bird's evidence is worth the perusal of all sheep breeders in the District. That the production of wool is not inconsiderable in the District, even now, may be judged from the fact, that, already this season, Mr. Bird has purchased from the settlers 12,000 pounds weight. If the suggestions they have thrown out be adopted, the Commissioners believe that a good trade in cattle and sheep may probably be established between the people of the District and the buyers and feeders of stock in the most southern portions of the Province.

DAIRYING.

At present, whatever dairying exists in the District is carried on upon the farm. Many of the settlers make a fair quality of butter, which meets a local demand. The small number of milch cows kept, the roughness of the roads, and the sparse and scattered settlements, have combined to make any co-operative action difficult. It appears, however, not impossible that a cheese factory may be established at some central point.

In this connection it may be worth while to call attention to the method, which, under the name of the Fairlamb system, has been largely adopted in the United States as an easy and economical mode of co-operative butter making.

Under this plan the cream only is collected, the skimmed milk being left on the farm. A great deal of heavy transportation is thus avoided.

The cost of buildings and plant is also much reduced by the same means. The system was fully explained by Mr. Inglis, of Chicago, a witness before Section 8, and will be found in the printed evidence of the Commission.

Without dwelling longer on this point, the Commissioners may observe that the permanent pastures, the comparative coolness of the atmosphere in summer, and the abundance of pure water, would seem to mark the District as particularly well adapted for butter making.

PIGS AND POULTRY.

The pigs in the District have been considerably improved by the introduction of the Berkshire breed, and many will, no doubt, be raised for local consumption; but, except as an appendage to the cheese factory, hog raising is not likely to be carried on in Muskoka on a very large scale. For raising poultry and eggs, on the other hand, the opportunities would appear to be very good.

DANGEROUS WILD ANIMALS.

No fear need be entertained of wild animals being troublesome to cattle or sheep in the District. Wolves and bears exist, but the former are seldom, if ever, seen, and the latter are not dangerous unless closely attacked. In the summer-time the wolf is never met with at all near the settlements, and if in winter he were drawn nearer by hunger, the stock would then be in a place of safety.

The bear is reported to have a taste for pork, if he can obtain it, which is but seldom, but not to care for mutton, at all events with the wool on. That he does occasionally steal a sheep there can be no doubt, but he lives chiefly on roots and berries, and generally retreats when approached.

The only animal really dangerous to sheep, in this District, as elsewhere, is a domestic enemy, the dog. Many persons keep dogs for hunting purposes, and these creatures, true to their natural instinct, will worry sheep if they get the chance. Hence the necessity, as in the older counties, for protecting the sheep at night.

The deer, it may be remarked, are reported to be more numerous than formerly; the departure of the Indians, the extinction of the wolves, and more stringent game laws, being favourable to their increase.

The Commissioners have now, they believe, discharged their duty, and trust, that without stimulating any rash enterprise, they have presented a view of the Electoral District of Muskoka and Parry Sound, its agricultural resources and capabilities, that will direct closer attention to it than before, from those who have the means, the spirit, the experience and the capital necessary to turn them to the best account.

All of which is respectfully submitted,

WM. BROWN,
EDWARD STOCK,
A. H. DYMOND.

TORONTO, *October 27th, 1880.*

ONTARIO AGRICULTURAL COMMISSION.

APPENDIX R 2.

EVIDENCE

TAKEN IN THE ELECTORAL DISTRICT OF

MUSKOKA AND PARRY SOUND,

BY COMMISSIONERS WM. BROWN, EDWARD STOCK, & A. H. DYMOND.

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BRACEBRIDGE, *August 24th, 1880.*

The Commission met at four o'clock p.m. *Present*—Mr. BROWN (Chairman), Mr. DYMOND and Mr. STOCK.

MR. E. G. MUNTZ'S EVIDENCE.

E. G. MUNTZ was called and examined.

To the Chairman.—I have been a farmer in the district for three years, and have about 1,000 acres of land, of which 100 are under cultivation, and 150 partially cleared. The soil I have under cultivation is a light loam, and the principal crops grown are oats, hay, peas, and roots. I do not intend to grow wheat on the old clearings until the land is in better order than it is. I have raised 1,000 bushels of turnips per acre, upon land which was thoroughly cultivated, the seed being drilled in. The average, on new fallow, would be 400 bushels. The average yield of hay is from one to two tons, and of oats about forty bushels per acre. I keep both Hereford and grade cattle and have tried Durhams, but they do not answer so well as the Herefords, and I have therefore disposed of them. They do not appear to be able to rough it so well as the Herefords, which have succeeded remarkably well with me. They do well on pasture, and I give them no other food during the summer but what they are able to pick up for themselves. The Shorthorn bull I had was a thoroughbred, and from him I raised some grades. He was got from the Bow Park herd, and was supposed to be of the Bates family. I keep common sheep such as are ordinarily found in Canada. They are probably a cross between the Cotswold and the Leicester, with perhaps a small cross of Southdowns far back. I bought a thoroughbred Cotswold ram two years ago, and he made considerable improvement in the size of the sheep. Last year I bought what was represented to be a thoroughbred Leicester, but I don't think it was quite pure. There is always a good demand in this part of the country for breeding ewes, and they bring about $6 if sold for cash, and from $8 to $10 if sold on time. If a man has a farm of 100 acres of which two-thirds are cultivated in the ordinary way, he might keep 200 sheep, but not more, but if his farm is under good cultivation he can keep a considerably larger number. This is supposing he kept no other stock than sheep. There is a good market for wool in Bracebridge, but I find I can do better with my wool in Toronto. The class of wool which I produce is manufactured in the district to some extent. I think it would be an advantage to produce a medium or short wool, rather than the long wool. It is my intention to go more extensively into sheep farming.

To Mr. Dymond.—My farm was in a very bad condition when I took it, and my principal object for the present is to recuperate the part under cultivation. With regard

to the Durhams I did not pay any attention to their milking properties, but looked at them purely from a feeder's point of view, and in that respect they did not come up to my expectations. My predilections in favour of the Herefords is on account of their feeding qualities. I believe the Devons would do equally well with the Herefords in this part of the country. The reason why I am in favour of stock farming is, that if I engage in grain growing I could only raise the coarse grains, and it would not pay me to sell them and lose the manure. The soil of my farm is alluvial, and is not adapted to the growth of wheat unless with the addition of artificial fertilizers. An attempt was once made to establish a cheese factory in the district, but it fell through owing to the unwillingness of the farmers to take their milk to the central depot. About twelve was the largest number of cows kept by any farmer in the district. I do not keep a great amount of permanent pasture; owing to the soil having been so much exhausted I had to break a good deal of it up and put on a dressing of artificial manure. I do not think that pastures are ever burnt up in this part of the country, and they remain as green at this season of the year as they were farther south at the end of May. I am not in favour of turning sheep into the woods, and I am of opinion that land must be cleared and prepared before it can be used extensively for sheep pasture. The Southdown or short wool paid the best—perhaps not the pure Southdown, but such a cross as the Oxford Down or the Shropshire Down.

To the Chairman.—My land is totally different from that in my immediate neighbourhood, as mine is a light loam with a sandy subsoil lying at the mouth of the river. I tried orchard grass once, but it did not appear to succeed well. There has been a slight improvement in the character of the stock during the last three years, but the trouble is first, that the people would not pay the price for the services of a thoroughbred bull, and besides when they have a thoroughbred calf they do not treat it in such a way as to make it a good animal.

To Mr. Dymond.—I raise corn to some extent and succeed in ripening it some years, but in others I could not. Throughout the Muskoka district generally it ripens fairly well, and may be considered a successful crop. From my experience of this country, I am of opinion that the class of stock feeding to which it is adapted is the raising of cattle up to two or three years old and then sending them off to the front townships to fatten up. I believe that here we are too far from the centres of commerce to import our grain, and we cannot raise enough of it to carry on stock feeding otherwise than to the extent I have mentioned.

E. G. MUNTZ.

MR. ALBERT SPRING'S EVIDENCE.

Albert Spring, of the Township of Draper, was the next witness called.

To the Chairman.—I settled in that township twelve years ago upon the land which I now occupy. I have about 800 acres, of which between 90 and 100 are under cultivation. Of the 800 acres probably about one-half is capable of cultivation. The low land is a clay bottom, and the high land is a sandy loam. My plan is to seed the land down with timothy and clover when it is cleared. There is a great deal of pine land in my neighbourhood which cannot be worked well with the plough. The yield of oats would average about 35 bushels, and of hay—of which I raise about 30 or 35 acres annually—about one ton per acre. I have one piece of timothy and clover which I have cut for ten years and there is clover there now. This year I got more timothy and not so much clover. I never put any manure upon it. My grass has never been heaved out by the frost. The object I keep in view in my present system of farming is to get into stock raising more than anything else. I have not sown wheat for three years, because I could not get the land in trim for it; but the first two years I was on the farm I had some good fall wheat. I had not sold much hay until two years ago, and it averaged about $10 per

ton. At one time I had a good stock of sheep, but I have lost some of them and have only a few now. They are mostly Costwolds, thoroughbred I believe. The breeding ewes became very fat, and my opinion is that this brought on the inflammation which killed them. The Cotswolds produce a large quantity of wool, which is very coarse in quality and does not wear well. They are also very hardy, but I think the Leicesters are more so. I have never tried the Southdowns, but I think they would make a good cross with the Cotswolds. I have had ewes which weighed thirty pounds per quarter, clean weight, just from feeding on pasture. My advice to farmers in this district is to cross Cotswold rams with Southdown ewes.

To Mr. Dymond.—I have some cattle, half-bred Durhams and some perhaps three-quarters. I formerly kept a Durham bull, and bred entirely from thoroughbreds for three years. The use of thoroughbred Durham bulls has made a great improvement in the quality of stock in my neighbourhood, farmers being anxious to get the services of such animals and willing to pay the extra price. I prefer the Shorthorn both for milk and beef. I concur with Mr. Muntz as to the adaptability of Muskoka to raising cattle from two or three years old for fattening purposes. The only difficulty is we cannot cultivate the soil sufficiently to enable us to put in as many roots as we require. Muskoka is equal to any other part of Canada in the production of turnips, carrots, and mangolds. I have raised carrots at the rate of 1,000 bushels per acre. Barley can be raised wherever the land can be cultivated; but corn cannot be regarded as a certain crop, though it might be sown for fodder. If cattle were allowed to run about in the woods they would be fat enough in the fall to hand over to other parties to feed them up for beef, and the district is well adapted to that kind of stock raising. I think it would pay to sell Cotswold wool because there is so much of it, and to keep the finer wool for domestic purposes. There is a demand for the shorter wools, but the quantity of coarse wools would far more than make up for the difference in price.

To the Chairman.—I do not think the district of Muskoka could be excelled for grazing. It has also an abundant supply of pure water, which is an element in sheep raising. The crops were never lost from the absence of snow in winter.

To Mr. Stock.—The cost of clearing land is about $20 per acre, including the chopping, clearing and getting ready for crop.

To Mr. Dymond.—Part of the surplus hay is consumed by the lumber industry, and part of it is bought up by tavern keepers in Gravenhurst and other places; and the oats are disposed of in like manner. I sold my crop of oats last year for forty-five cents per bushel. Farmers in the township are doing well, considering the position in which they were when they started. Taking their means into account, I am satisfied the people are doing better than those who settled in the Township of Reach, from which I came to Muskoka. The scarcity of cows is an obstacle in the way of systematic dairying, but a good deal of butter is made and sold to the stores, at from 12½ to 15 cents per pound. About 50 per cent. of the land in my section is fit for the plough. I raised 300 bushels of potatoes to the acre, last year, on sod. I found a market for them at Bracebridge and Gravenhurst at prices varying from 30 to 70 cents per bushel. The Agricultural Societies have not been doing anything in the way of introducing thoroughbred rams. The soil in the township varies very much, just as in other parts of Muskoka.

ALBERT SPRING.

MR. W. H. SPENCER'S EVIDENCE.

Wm. H. Spencer, of the Township of Monck, was called and examined.

To the Chairman.—I have been farming in this district for eighteen or nineteen years, having come directly from the old country here. I own about 200 acres of land, and work 100 more on shares. About 75 or 80 acres of this land is under cultivation. Of the 200 acres belonging to myself I could altogether bring 125 under the plough. I have been growing spring wheat for many years of the Scotch and Red Fern varieties,

and for the last three or four years the yield has varied very much, according to the quality of the soil and the method of cultivation. One year I had twenty-seven bushels per acre, and other years the yield has been as low as ten bushels per acre. My general plan of farming is to raise stock, and especially sheep, as the continuous growing of grain injured the land. Upon one part of my farm I raised eleven crops of grain in succession, and this year the crop of peas upon it looked splendid. Some summer fallowing has been done in my neighbourhood, but I have not done any. I think the land would be considerably the better of it. I have about twelve head of cattle, and about sixty head of sheep. The cattle are the usual mixed Canadian breed. I found that upon an investment of $80 in sheep an annual sum of $47 could be realized—$17 for wool, and fifteen lambs at $2 each—which I consider a very good rate of interest. In winter I feed the sheep principally on pea straw.

To Mr. Dymond.—I came here directly from the old country, where I lived in a farming community, though I was not a practical farmer. I had a little capital when I came here which I invested in clearing, and I followed as well as I could the example of Canadians who were here. My reason for keeping so many sheep is that it pays well, and they keep the land in a good state of cultivation. I find the wool market here better than in Toronto, considering the carriage and the risk of deductions. The rate here is from 25 to 35 cents per pound. My land is principally clay, the township is also principally clay, but along the bank of the river it is sandy. The rock generally runs in parallel ridges. I believe the failure of the wheat crop was more owing to mismanagement than to the quality of the soil, the trouble being that the farmers kept on cropping without giving the land a rest. I notice of late that there has been more variety in the crops. The average yield of peas is about forty bushels to the acre. Sheep do remarkably well on the high land. I allow my stock to have free access to the shade of the bush. The snow gets off the rocky soil early in the season so that the sheep could be turned out about the latter end of April In the winter the sheep are kept where they have access to open sheds and are fed on pea and oat straw. Towards spring they get hay and other food. I find they do very well on that treatment. In previous years when they were fed on grain and other rich food the ewes became too fat and I had bad success with the lambs. I have used land plaster as a fertilizer by way of experiment, but found the carriage cost more than the price of the plaster in Toronto. The effect upon the land was excellent. My cattle are the ordinary Canadian stock, and in my neighbourhood they are pretty much all of that character. There are no thoroughbred animals in the township that I am aware of, though the farmers generally believe the introduction of thoroughbreds would be of great service to them. Suggestions have been made as to the propriety of the Council devoting a certain amount of the municipal funds to the purchase of thoroughbreds.

To the Chairman.—I find no damage to heavy land by pasturing sheep. I sometimes found it difficult to get a proper catch of grass on the heavy land, especially if there had been too long a succession of the same crops. The cattle were raised for the Bracebridge market, and as we have no other market, there is not much inducement to go into improved breeding. The lambs are generally sold in the fall, when they are fat, and the ewes are kept over for breeding purposes. The usual price of lambs in Bracebridge is $2.50. I have bought ewes two or three years old for about $5 each. I consider that the wool and the manure pay for the raising of the sheep, and the lambs represent the profit. I intend to cross the Leicester and the Cotswold, as I think it would be an improvement, especially as the consideration in the local market is the amount of mutton rather than the quality. I consider the land in the Township of Monck the best in the District of Muskoka, and the people are thriving as well as those of any other township. The assessable property in the township in the year 1869 was valued at $22,715, now it is valued at $92,041. Hemlock, which was formerly of little value, is now becoming valuable for its bark for tanning purposes, and the timber when sawn into lumber makes good sheeting and flooring for barns and outbuildings.

WILLIAM H. SPENCER.

The Commission then adjourned until 7.15 p.m.

[*Mr. Spencer.*]

MR. W. PARKER'S EVIDENCE.

Upon resuming, WILLIAM PARKER, of the Township of Stephenson, was called and examined.

To the Chairman.—I have about 300 acres, which I have been farming for eight years. About 70 acres of this land is under cultivation. The land is generally light sandy loam. I have tried wheat only on a small scale, and three years ago I realized twenty bushels of spring wheat per acre from pasture land. Oats, peas, and roots are the principal crops, and I have been keeping all the stock I could, consisting of sheep and cattle. I have tried Cotswolds and Leicesters, and now I have some Southdowns, all of them being well bred. I find that sheep raising pays better than any other branch of farming. After cleaning up a piece of land I generally plant potatoes and turnips and then take two crops of grain, seeding down timothy, clover and alsike with the second crop, and sometimes white clover. The alsike succeeded remarkably well, and along with white clover makes a fine bottom. I have about ten acres of rocky land, which I seeded down six years ago and now I have a very fine field of white clover. I have some meadow which I have mowed four years and this year I raised one and a half tons of hay to the acre. I found that the sheep were very fond of the woods, and they like to eat the young maple, though I give them the run of the pasture. In winter I feed them on oat and pea straw until it is all gone, and do not give them any grain or roots or bran. I do not give them any turnips until the ewes lamb, and I find that they come out all right in the spring. I prefer lambs coming about the middle of April. After yeaning I feed them liberally. My sheep are not liable to any disease except occasionally a slight catarrh in the fall. I had Leicesters at first, but more recently I bought some Cotswolds, and now I have a flock of forty-six altogether. The Leicester is the hardier of the two breeds, and sheep of that variety have paid me better than the others. The Cotswolds are apt to lie around in the shade in hot weather, while the Leicesters, having less wool, are more active in picking up a living,

To Mr. Dymond.—I always use thoroughbred rams, keeping those of each breed distinct. I have no difficulty in selling in the neighbourhood all the thoroughbred sheep I can raise as the people find that they pay well. I tried Southdowns, which I know to be perfectly hardy, but I do not intend going out of the Leicesters, though I might get rid of the Cotswolds. In the winter my sheep have access to an open shed, and I am not in favour of closing sheep in. The Cotswolds are the tenderest of all sheep, and in this climate, where there is frost and rain, the wool freezes up, and the result is that the sheep often suffer from catarrh. I have been conversant with sheep farming in Buckinghamshire, England, and I find that the climate of Muskoka is far healthier for sheep than that of England. They are not troubled with flies, and they are kept clean as there are no burrs. There is no danger from wolves or other wild animals. I keep my land in splendid condition by keeping sheep. In the fall I put them on stubble land, but I intend to begin "folding" the sheep upon the old country plan. The manure from the sheep far more than pays for the labour, and I consider that the lambs and the wool are clear profit. The soil on the rocky land is deep and rich, only the land is broken up here and there. The high land is covered with hardwood, and the rotting of the leaves enriches the soil. I have ten head of pretty well bred cattle—they are Durham grades. People are beginning to use the Durhams freely, and there is no better breed for improving the stock. None of these cattle are sent to distant markets and will not be until we get a railway. The surplus cattle are consumed in the district, but at ruinously low prices. We are thirty miles from the railway at Gravenhurst, and that is too far to drive cattle. There is nothing to hinder the farmers of Muskoka from fitting up beef cattle ready for market, as they can grow coarse grains and roots in abundance. $1.25 per barrel is the lowest price at which we could obtain salt, and we did not use either it or gypsum as a fertilizer owing to the high price. If we had a railway we could get ready 200 or 300 fat cattle

every fall, and I am certain it would pay better to "finish" the cattle here than to send them away to the front at, say, two and a half years old. There are about 500 cows in the township, and I can see no reason why a cheese or butter factory should not do well.

WILLIAM PARKER.

MR. J. TOOKEY'S EVIDENCE.

James Tookey, Reeve of Macaulay, was called and examined.

To the Chairman.—I have been farming in the district twelve years, and have about 200 acres, of which 70 are under cultivation. Of the 200 acres there is about seventy per cent. of good land; generally the soil is a heavy sand loam, not much inclined to clay. I grow both spring and fall wheat, but the former is the safer crop, as the fall wheat is liable to be heaved out by the frost. I produce a surplus of oats, but with the exception of one year, I consumed all the wheat which I raised. I dispose of some potatoes, but I use for feeding purposes the turnips, mangolds, etc., which I raise. The highest crop of spring wheat which I ever raised was about twenty-five bushels to the acre; it was of the Red Chaff variety, and was sown after fall wheat and peas. The land had been manured. Most of the farmers use all their barn-yard manure. 20 to 30 bushels per acre is the average yield of peas, and 20 to 40 bushels of oats; but this year I believe oats will yield from 50 to 60 bushels per acre. The average yield of turnips is from 300 to 400 bushels; potatoes, 200 bushels. I prefer the Devon breed of cattle, as having the life and hardiness suitable to this part of the country. They are much superior to the Durhams. I have a thoroughbred Devon bull. For beef I would choose the Devons and Herefords in preference to the Durhams, as they make more meat off the same feed, and are hardier and more easily kept. Durham grades, when used like common cattle, begin to go down, whereas Devon grades would keep up. I believe, however, that the Durhams have an advantage over others in maturing early, if they are kept pure, and attended to as they are in the other parts of Canada. Stock raising could be conducted by men of capital, for the English market, with great success in Muskoka, as roots and coarse grains grow well, and the pasture cannot be excelled. The best grade of sheep is a cross between the Southdown and the Leicester, as they are a very large and fine sheep, with excellent wool. I got 35 cents per pound for wool of that cross, when I was getting only 28 cents for common wool. In the winter I feed my sheep on pea straw, with a few turnips once a day. I sell my wool in Bracebridge, as I can realize a better price than in Barrie or Lindsay.

To Mr. Dymond.—The cross I alluded to made excellent mutton, similar to the Cotswold or Leicester mutton. Farms sell in Muskoka at from $2 to $15 per acre, according to the improvements and the quality of the soil. A good many of the new settlers have their patents. Many of the farmers have been mechanics in their earlier days, and they do not appreciate the value of good stock, hence they do not encourage the introduction or service of thoroughbred bulls. The hogs are generally bred from a pure Berkshire sow or boar. I raise pure stock for breeding purposes. I generally sell them for $3 when they are a month old. Corn is raised pretty successfully in the township. I am firmly of the opinion that fair crops of wheat can be grown in Muskoka if the right kind of soil were selected and properly treated. I have proved this in my own experience. Wheat should not be sown upon light sandy soil where hemlock is found, but there is an abundance of land in the district where it could be grown if properly cultivated and manured. The quality of wheat grown in this district is generally good. I have had a return of 42¾ pounds of flour from each bushel of spring wheat manufactured at the Bracebridge mills. I am perfectly satisfied that if proper care is taken wheat can be grown here in sufficient quantities to meet local consumption.

JAMES TOOKEY.

[*Mr. Parker and Mr. Tookey.*]

MR. H. J. BIRD'S EVIDENCE.

HENRY J. BIRD, Woollen Manufacturer, Bracebridge, was called and examined.

To the Chairman.—I have been in Bracebridge over eight years, and during that period the quantity of wool has shown a steady increase, especially during the last two years. The quality is, also, somewhat improved of late years. The goods I manufacture are Canadian wool tweeds, yarn, and blankets. For these purposes I prefer a much larger proportion of Southdown or half-bred Southdown wool than I am able to obtain in the district. The class of wool generally useful is a cross of the Southdown on the Leicester or Cotswold. I would give fully 5 cents per pound more for pure Southdown wool than any other kind, and for the cross about three cents. I would not recommend the general adoption of the pure Southdown breed. I use the pure Southdown wool for particular purposes, such as the better class of tweeds with double and twisted yarn. Quite 90 per cent. of the wool produced in this district, and that part of Parry Sound contiguous to it, comes to my factory; about 12,000 pounds this season, thus far, and there is probably 4,000 yet to come in. I have this year been paying from 25 to 30 cents cash for long wool, and 35 cents for Southdown. There is a large number of cotted fleeces in this part of the country, and very much of the wool is brought in in bad condition, owing, I believe, to the fact that many who are farming had not been brought up to the business, or have started farming without sufficient means. I believe the trouble is caused by the sheep getting rapidly into good condition in the spring after being poorly wintered, and thus starting the new wool growing into the old. The Cotswolds are most subject to it.

HENRY J. BIRD.

The Commission then adjourned.

MR. JOS. GILMOUR'S EVIDENCE.

BAYSVILLE, *August 25th.*

The Commission met at 3 p.m. *Present*—Messrs. BROWN (Chairman), DYMOND and STOCK.

JOSEPH GILMOUR, of the Township of Ridout, was called and examined. He said:—

To the Chairman.—I have been farming here over four years, and have 190 acres, of which about 18 acres are fenced and under crop, and some more partially so. The crops I raise are oats, spring wheat, fall wheat, Hungarian grass, timothy, turnips, potatoes, Indian corn and peas. The average yield of oats is from thirty to sixty bushels per acre. I can raise that quantity without difficulty, even when the crop is indifferently put in. The varieties I raise are the Maine oats and the Norway black oats. Spring wheat has not proved altogether successful, owing to its having suffered from the blight. The yield is not more than ten bushels to the acre. I have also tried Treadwell and Deihl fall wheat, the latter yielding from fifteen to twenty bushels per acre until the last year. Fall wheat has been rather poorly put in, and has been winter killed of late years. My soil is a sandy loam with a sub-soil of the same character. Indian corn is usually a successful crop, but last year it was too early, and was cut off by the June frost. As a rule corn is a pretty safe crop. The frosts to which I refer were only local in their effects. Two years ago my corn averaged seventy to eighty bushels per acre in ear. I have grown both timothy and clover, but prefer the latter. I have cut meadows for the third time here and have had good crops. I also grow Hungarian grass, which I cut green and feed to my cows when the pasture begins to fail. I can get from two to three tons per acre of this fodder. Potatoes succeed excellently with me, the crop being about 300 bushels to the

acre. I have tried peas on a small scale and they have been very successful, with the exception of last year, when they were attacked by the grasshoppers. I have raised some of the finest turnips I have ever seen, the crop averaging 600 bushels to the acre in stumpy ground. I keep no sheep but have two cows. On one of my lots there is probably about one-half acre of rock, and though there are some stones I believe the time will come when I can use the reaper and mower freely.

To Mr. Dymond.—I and my family have 700 acres in a block, and of this 500 acres will make good farming land, such as would be rated as second-class land in older parts of the country. I had been farming in Burford, Brant county, for thirteen or fourteen years before coming here. My idea in farming is the raising of grain, though my land will be very good for grazing purposes. It will grow wheat I believe when it is cleared up. Winter killing is not a common experience with regard to fall wheat in Muskoka. I use a good deal of manure, and in Burford used land plaster, and salt has been applied there by some of my neighbours as a fertilizer. I look upon sheep raising as an important branch of industry in Muskoka, among farmers who have clearances of from twenty to fifty acres. I would not like to have sheep running outside the cleared land, owing to the brush, etc. The cattle in my neighbourhood are rather good grades, but we have no pure-bred male animals. The cattle are mostly crosses of common cattle with the Durhams, and we have some very well bred bulls. We can not afford to get thoroughbreds, and Durham bulls are not likely to pay until many of the present settlers are succeeded by men who have more liberal ideas on the subject of farming, and have been brought up to the business. I am not much afraid that the grasshoppers will prove a serious evil here. All the common grasses do very well, and I think sheep farming on a large scale would be profitable. Clearing the land, exclusive of fencing, costs about $15 an acre. In some parts of the district drainage would be of the utmost importance, by increasing the value of such land, as beaver meadows, etc.

To the Chairman.—Q. Supposing a man of capital were going into the country with a view to extensive sheep farming, and that he should clear up, say 200 or 300 acres, would it be possible for him to secure a good sward of grass? Supposing he sowed timothy, would there be a good growth of the natural grass? A. Yes, I should say that in many places such a plan would be very successful. I notice that white clover grows very well, and I have also found traces of red grass, blue grass and spear grass. They seem to thrive well. Grasshoppers have done no harm this year, neither has the fall frost prevented the ripening of the crops with me up to this date.

JOSEPH GILMOUR.

MR. WM. HIGGINS' EVIDENCE.

William Higgins, of the Township of McLean, was called and examined.

To Mr. Dymond.—I am engaged in farming and gardening, and have been in Muskoka eight years, and in this particular locality about two years. I have fifteen acres cleared on my lot, and some new land chopped but not cleared. My farm is on the narrows at the end of Lake of Bays. My principal crop is hay, but I also grow oats, turnips, barley, potatoes, etc. I seed my land down as I clear it, in order to keep it clean. I raised last year 800 bushels of turnips on one and a half acres of stumpy land. My ultimate intention is to go into stock raising, as I believe my land is adapted to that branch of agriculture. I raised one and a quarter tons of timothy to the acre in land covered with stumps. My soil is generally a sandy loam, getting heavier as the land recedes from the river. Vegetables of all kinds succeed well in my garden in the village, especially corn, tomatoes, beans, and vegetables of the gourd family. Cattle can live and fatten here in the fields and woods much earlier than in other parts of the Province. At this season of the year there is abundance of food in the woods for milch cows and young cattle. I approve of feeding cattle ready for market rather than sending them away to

finish as we can grow the coarse grains well. The rocky land seems to be very favourable to sheep raising, as the vegetation is early and abundant. Cattle are turned out to feed about the last of April, and are kept running to the last of October.

To the Chairman.—When my soil is well worked I grow extra crops. I can grow roots and vegetables much better than in the front townships. I have been using principally barn-yard manure, though I put salt and ashes on my garden.

To Mr. Stock.—I have raised fall beef which weighed from 220 to 250 pounds to the quarter.

WILLIAM HIGGINS.

MR. MATTHEW MATTHEWS' EVIDENCE.

Matthew Matthews, of the Township of McLean, was called and examined.

To Mr. Dymond.—I have been farming all my life—for a long time in Wiltshire, England, and for the last seven years in Muskoka. I have from 30 to 40 acres under cultivation; my soil is sandy loam, with some clay. I grow wheat, corn, potatoes, oats, barley, beans, and turnips. I have raised 40 bushels to the acre of spring wheat, on new land. It was of the Fyfe variety. I have hoed in my crop, and I attributed my success then and since to my covering up the seed properly. Too often the grain is left on the surface and the crop is poor. I believe that but for a thunder storm I would have had 50 bushels of wheat to the acre this year. Fall wheat does well three years out of four, and yields 32 bushels to the acre, barley 60, oats 70, corn 50. I raised 70 bushels of oats to the acre the first year I was in the district. They were of the Black Tartarian variety. I am quite satisfied with the result of my experience in Muskoka. My present object is to get my land into permanent pasture, and I am now beginning to raise stock. I believe cattle can be got ready for exportation on grass if they are fed a little meal while on pasture; but they must not be allowed to go into the bush. My cattle are mostly of the mixed Canadian stock; but I intend in time to get a thoroughbred bull. There is no pure-bred male in the neighbourhood that I know of. The exportation of cattle is out of the question until we have a railway. Gravenhurst—30 miles distant—is our nearest railway station, and fat cattle cannot be driven that far.

To the Chairman.—My reason for putting my land into permanent pasture is, that we cannot plough to advantage with so many stones. I do not allow my cattle to go in the bush at all, as that is a cheap and good-for-nothing way of treating them. It would pay better to rent pasture at $3.00 an acre than turn cattle into the bush. I do not think people here are thoroughly alive to the value of good thoroughbred male animals. For beef I prefer a Durham grade, and for dairy purposes I would cross a Durham bull upon a Hereford cow. We have a union agricultural society for Maclean and Ridout, and we hold a show every year. Last year we received $67.60 from the Government. I have been keeping some sheep this last summer, and I find that they do well with me. The class that I have are pure Leicesters. Five years ago I planted three crab apple trees and this year they grew six bushels of fruit, which I consider to be first class.

MATTHEW MATTHEWS.

MR. WM. KENNEY'S EVIDENCE.

William Kenney, of the Township of McLean, was called and examined.

To the Chairman.—I have about 400 acres, of which 21 are cleared and under cultivation. In the 400 acres there will be about 250 acres of tillable land. The timber is generally beech and maple, with pines here and there; and the rest of the land is broken

by rock. The soil is a sandy loam, with a gravel subsoil where there is no rock. There is an abundant supply of good water on the farm. My rotation, as far as practicable, is as follows:—first, wheat or turnips, followed by barley or oats; then potatoes, then peas, then corn, and lastly oats, with which I seed down. For seeding down I sow timothy and clover; but I prefer the latter, as it survives the longest. Fall wheat I consider a failure, but if we could apply salt and lime at moderate rates I am certain the crop would be a paying one. Oats are the most valuable cereal, and produce 40 to 45 bushels to the acre. We have no limestone in this part of Muskoka I believe.

To Mr. Dymond.—Lime costs 50 cents per bushel, delivered at Baysville, and then it has to be teamed home. I believe it would be profitable to buy it at that price to raise wheat for our own consumption, but not for export. I am beginning to raise cattle on a small scale. I keep them in the bush until after haying, as I think bush feeding is profitable until about the middle of July, when the food begins to get dry. In contemplating the raising of stock I have made my bush pasture an element in my calculations. Turnips do well, and I raise about 680 bushels to the acre on new land. I planted a few fall apple trees about three years ago, and this year some of them are bearing, and they all promise well. Two of them are Tetofskys, two are of the Haas variety (fall apples), and two Hurlburts, which are winter apples. They are planted on a northern slope. Strawberries also succeed well.

To the Chairman.—I had been farming on rented land in Brant County, but like many others I found that I was getting no richer, and I came to Muskoka because I believed that it would pay me better to farm on my own land, even under certain disadvantages, than to spend my life in improving land for others. After five years' experience, and looking forward to the prospects of Muskoka, I certainly would not wish to exchange my present for my old position. I would not take a moderate remuneration for my labour here and go back to the old state of things. I do not think there are many in the district who would be willing to sell out at a sacrifice.

To Mr. Stock.—The average price of a farm of 100 acres, with the improvements necessary to secure the title, would be about $500,—these improvements being 15 acres clearing and a house.

To Mr. Dymond.—I am in favour of cattle raising as against sheep raising for the reason that sheep must be fed on cultivated pasture, while bush feed could be utilized for cattle. If I was going into sheep raising I would give the Merinos a trial. Cattle could be driven over the roads to the railway, whereas the transport of grain to the front is a very heavy item of expense. My system would be to go to the front townships, buy calves, and feed them here until they were two years old past, and then fatten them.

WILLIAM KENNEY.

MR. JOHN WATTIE'S EVIDENCE.

John Wattie, of the Township of Brunel, called and examined.

To the Chairman.—I have been farming in Brunel for eight years. I have 484 acres, of which over 54 are cleared. My soil is a sandy loam, my farm being principally flat, low land, though I have some rock. I have been growing timothy hay principally, but have raised spring and fall wheat with an average yield of about fifteen bushels to the acre, but I am not encouraged to continue its growth, owing to the amount of hand labour involved in threshing it, and the quantity I raise is so small that the threshing-machines do not pay. I raise on an average from forty to forty-five bushels of oats per acre of the Black Tartarian variety. Peas are not troubled with the bug or worm. I have not seen better in Muskoka, and the crop is one which yields twenty-five to thirty bushels to the acre. I have never seen finer potatoes or larger crops of them than in Muskoka. I grow the Early Rose and the Black Aberdeen varieties. I grow red and alsike clover, and keep it in the land for six successive years, principally, I believe, because the clover re-

seeded itself. The roots died last winter, and now the young seeds are coming up, and I expect as heavy a crop as before. It was the red clover which went out last year; the alsike is doing well. The crop of hay is from one ton to one and a half tons an acre, and I have no difficulty in selling it to the lumbermen. Oats sell for 50c. per bushel, potatoes for 40c., and hay from $10 to $14 per ton, delivered.

To Mr. Dymond.—If I had the means I would go extensively into raising sheep and cattle, and producing beef, butter, and mutton, as I am convinced that the country is well adapted for those branches of industry. I have fattened a yoke of working oxen on grass, so that one weighed 1,174 pounds—including beef, hide and tallow,—and the other 1,205 pounds, and the beef was the best I have ever seen, and I had long experience as a butcher in the Niagara District. I have never fed these cattle anything but the grass. They were well fleshed all over and the meat was beautifully lined with fat. Selling hay and oats is ruinous to the farm. I am in favour of feeding cattle in the summer and sending them farther south to finish, according to the system practised in Aberdeenshire. The Durhams are generally regarded as the best to cross with for beef, and the Ayrshires for milk, but I would like to cross a Polled Angus male upon the common stock of the country, and I would bring the grades into condition on clover, of which we have an abundance of excellent quality, feeding them the previous winter on timothy, clover, and oat straw, and keeping them in warm stables. It would pay those in the front townships to send up young cattle to feed up in that way. For 50 three-year-olds, 64 acres of such pasture as we have would be required. If these cattle weighed 900 pounds when sent up they would gain on pasture 200 or 300 pounds of beef in a summer. Q. What would a farmer situated as you are charge for grazing 50 head of cattle, say from the middle of May to the middle of October? A. I should say 75c. per month per head.

To the Chairman.—I am also strongly in favour of sheep farming, as the country is well adapted to it, and I would adopt the hurdle plan practised in the Old Country, as being the best for the land. I would begin with pure-bred Leicester ewes.

To Mr. Dymond.—The average of good land on each hundred acres in my township would be about one-third—that is, of land that could be ploughed. The remainder could be utilized by seeding it down and keeping in permanent pasture. Orchard grass I found did very well for making such a pasture. I find that pasture does not burn up here in midsummer as it does in the older parts of the country. I have succeeded splendidly with butter this summer, producing twenty-two pounds per week, of excellent quality, from four cows. I packed it for the winter and can realize eighteen cents for it. With regard to stock-raising, I do not think there would be any difficulty in getting the cattle to the market if we had the right kind. I would not rent my land for less than $3 an acre.

To the Chairman.—My reason for believing that stock-raising would be profitable is that land could be obtained at a cheap rate and easily cleared, and grass, roots and all the coarse grain could be raised abundantly with comparatively little labour. It would also pay for a man to seed down his fields with grass and then rent them for the summer to outside farmers.

JOHN WATTIE.

MR. THOS. LANGFORD'S EVIDENCE.

Upon resuming, THOMAS LANGFORD, of McLean Township, was called and examined.

To the Chairman.—I have 300 acres of which 30 or 40 are cleared, and I grow all the common kinds of crops. I have been in the district nine years. I tried fall wheat one year, but it rusted; spring wheat is an average crop in both old and new land when sown in time. The crop failed oftener on new than old land. The average yield is from 10 to 30 bushels per acre. Oats yield as well with me as in other parts of the district. After hay I take off a crop of oats, then timothy and clover for three years; after that I plough it up and then I sow wheat, giving the land a light dressing of manure. In

the case in which I have followed that rotation I would have had 25 or 30 bushels of wheat to the acre, only that it was broken down by a thunder storm. I then cross plough the land and put in a crop of potatoes. I have been able to grow all the grasses well—in some cases taking seven or eight crops off the land successively of timothy and red clover. The clover is good yet. About one ton per acre is the average yield of hay. I believe that sheep farming is the most profitable here, and I intend going into it. Peas yield about 30 bushels to the acre, oats about 50, potatoes 150 to 300. The grasshoppers have eaten up all my turnips for three or four years back, but this year I have put them in pretty early, and they are doing well. Crab apples do well with me, and I have a young orchard of apple trees of different varieties, which give promise of good success. I grew a few tobacco plants, and they were not injured by the frost. There is abundance of living water in the district, and in every respect I believe the country is well adapted to stock raising on a large scale.

To Mr. Stock.—The grasshoppers have been a yearly plague for the last few years, but this year they were not so bad.

To Mr Dymond.—I farmed in the county of Perth before coming here, and am familiar with the Canadian system of farming. I would like to follow a rotation of crops, but the newness of the land and the season interfered with systematic farming. Frost does not injure my crops any more than those who were close to the lake, perhaps because I cultivate my land well. I believe if we could use lime and salt upon the land they would materially improve the crops.

THOMAS LANGFORD.

MR. Z. COLE'S EVIDENCE.

ZACHARIAH COLE, of the Township of Ridout, was called and examined.

To Mr. Dymond.—My farm is situated at the head of Trading Lake. I am the oldest settler in the neighbourhood, having been here for eighteen years. I have about 500 acres, of which 200 are cleared, and 25 acres are free from stumps and stones. Some of my soil is sandy loam with clay subsoil, some a clay loam, and some clay to the bottom. I have cropped it for eighteen years without manure, and my grain grows too stout yet. My crops are mostly hay, oats, barley and peas, and I have grown an excellent quality of both spring and fall wheat, but the last few years it has been a failure, and I have ceased growing it to any extent. Peas, barley, corn, potatoes and turnips are all sure crops with me. The average yield of oats is 50 bushels to the acre; peas between 40 and 50; barley, 40 to 60; corn, about 35; turnips, 600 to 1,000. I have about 100 acres of hay, mostly timothy. I use a good deal of hay and oats for feeding, and the surplus is bought by the lumbermen. Hay sells at $10 a ton in the stack, and oats at 50 cents per bushel. I generally keep about 400 head of stock, and I make a good deal of butter, as I have fifteen or sixteen cows, most of which are half Durham and half Devon. I bought a thoroughbred Durham bull four or five years ago, and it has greatly improved the stock. I use this bull upon cows that have Devon blood in them. I made about twenty-five pounds of butter per day for five months; which I sold at Bracebridge at an average of 20 cents per pound. My stock is chiefly raised with a view to dairying. I have formerly farmed in the township of Brighton, county of Northumberland.

To the Chairman.—I put manure upon my lighter soils, but some do not require it. I have about fifty acres in pasture; it has been seeded down ten or twelve years, and the clover is as good as ever. One reason why clover lasts so long is, that when it is sown with timothy some of it becomes ripe, and seeds the ground before the timothy is ready. My land is on the lake shore, and is not subject to the frosts in the fall, and very little in the spring. For grazing cattle during the summer I would charge $2 per head per month. Cattle could go to grass far earlier in the spring in my district than in the front townships, as they could live upon it even when they had to paw off the snow to get

at it. My land is upon the lake shore. I am not subject to the frosts in the fall and very little in the spring. I do not know of any better milkers than the Devons, but perhaps if they were mixed with Durhams it would help them a little.

To Mr. Stock.—In the county of Northumberland we used to have to seed down every three years. I have done something in the way of raising hogs. The Berkshires are my favourite breed.

To Mr. Dymond.—The implements I use are the seed drill, mower and horse-rake. I keep about four horses. I only keep sufficient poultry for my own use. I believe that a man who would come to Muskoka and select good land and work it properly could make money; but too many of our farmers spend their time in ploughing new land, when they should seed it down and clear off more. I would advise farmers to pay special attention to cattle raising, as the country is adapted for it. My plan would be to prepare the cattle for market here, as we could finish them here more cheaply than by sending them to the front. Cattle, including calves and milch cows, do well in the bush, and would leave clover pasture to browse on the young basswoods and maples. A great many farmers are succeeding splendidly with sheep. The average cost of clearing, exclusive of fencing, is about $15 an acre. We do not suffer much from wild animals, though at one time the wolves were pretty common. It is safer to pen up sheep at night. I said $2 per head for the season in the place of $2 per month. We raised at the rate of 1,000 bushels potatoes per acre this year. I dug seven bushels in ten minutes from one rod square, and there had been three or four pails taken out before they got their growth. There was no frost till the 12th of October.

ZACHARIAH COLE.

MR. W. H. BROWN'S EVIDENCE.

W. H. Brown, of the Village of Baysville, was called and examined.

To the Chairman.—I have resided here about eight years. I came in from the Township of Burford, looking for a mill site, with a view to the timber interest, as I had been accustomed to saw mill work. Muskoka has far more than realized my expectations from an agricultural point of view, for I was not very sanguine at first. When I came here there were only one or two settlers, and there were none east of this until we went about eighteen miles. At present this section is pretty generally settled, about 80 settlers in Ridout, and 185 in McLean, each representing about 200 acres of land, and the assessment has gone up to $64,000—that would represent a population of 1,500 or more.

To Mr. Dymond.—I have sawn 400,000 feet of lumber at my mill last year, solely for local consumption. The value of property is increasing considerably, perhaps about ten per cent. per annum. The townships in this neighbourhood are pretty well provided with facilities for communication. Ridout township is not settled very much on the southern side, though it has a colonization road running across, and has steamboat communication running along its frontage during the summer season. There is a road to Gravenhurst irrespective of the one to Bracebridge, but it is not in first-class condition. As to the form which the agricultural industry will take in the future, I believe it will always be mixed husbandry, and that people will collect their wealth slowly; many of our settlers began with very small means, and I do not think that for some time they will be able to do much in the way of fattening cattle or anything of that kind, but when a man has enough clearing to raise more than enough for his own use, I believe that sheep raising will pay best. Dairying would also be profitable. I think if it were not too expensive to bring cattle from the front and graze them and then send them back, that would be a good plan. Cattle do well in the bush as there is an abundance of food and good water, and they are not liable to go astray. I think the hardier varieties of apples can be successfully raised in Muskoka. Crab apples yield well. I have a small patch of flax, and I find that it does as well here as in the front townships.

W. H. BROWN.

The Commission adjourned at 9.40 p.m.

MR. E. MONAGHAN'S EVIDENCE.

HUNTSVILLE, *August 26.*

The Commission met at 7 p.m. *Present*—Messrs. BROWN (Chairman), DYMOND and STOCK.

E. MONAGHAN, of the Township of Chaffey, was called and examined.

To the Chairman.—I have been located here for only two years, though I have paid annual visits to the district for the last ten years. I have 300 acres of land, of which 90 are cultivated. Members of my family have altogether 410 acres, of which 300 are tillable. My soil is a sandy loam, and my land quite elevated, though not hilly. It is bounded on the north and west by the Long Lake, as it is called, and I have two islands on the lake. My timber is principally hardwood. I have been successful in growing oats, peas, barley, rye, potatoes, and all kinds of vegetables, but I have not tried wheat; corn I only grow for household consumption. I do not think that the country is adapted to the growth of wheat, though some of my neighbours raise very fine crops of it, and a tenant of mine raised as good a sample of spring wheat as I have ever seen in the front townships. I have farmed for a long time in Middlesex, near the City of London. Oats do well, and I have raised from sixty to seventy bushels an acre, Black Tartarian and White New Zealand oats. Peas yield forty bushels to the acre frequently; no enemies to peas except occasional mildew, caused, I believe, by the moisture of the atmosphere, when they grow very rank, but oats rusted slightly this year. The district is well adapted to the growth of barley, which yields 30 bushels to the acre, though the sample is not always first-class. Potatoes yield abundantly, and though they are subject to the beetle, its ravages are easily controlled; the average production is about 250 bushels to the acre, though I have raised much more than that. The best variety is the Early Rose. I sowed rye for the temporary purpose of seeding down in the fall, but it is a certain crop and yields well. The demand for it is merely local, and it is sold at 75 cents, for the purpose of mixing with wheat to make bread. Last year we had frost on the 15th of August, and this year we had it on the 15th of August, and some on the night of the 25th, but these are exceptional experiences in Muskoka. Some of my land has been continuously cropped with clover and timothy for five years, and this year it was better than ever before. Clover instead of running out in this country keeps increasing year by year by re-seeding spontaneously, and besides there is so much snow in winter that the frost does not enter the soil, and there is less danger of the clover being heaved out of the soil. I keep four horses, cattle, and hogs. Some of my cattle are well-bred Shorthorns, crosses, and some common. I have a Durham bull, which is said to be pure, though I have not the pedigree. My object is to get improved stock, for I believe that unless the people of Muskoka do that, they might as well leave the country. The district is specially adapted to the raising of cattle and sheep; we could turn out good fat cattle for pasture about the end of October without other food. There is no difficulty in growing the coarse grains, and cattle could be winter fed on chopped stuff, hay and roots. The average yield of hay with me is 1½ tons an acre, though others have grown more. I have no sheep, but I intend getting some, as there is more money in them than in cattle. I will get some good common ewes, and use a thoroughbred ram, either Cotswold or Leicester. Cattle for fattening should be good grades, and should be well housed and cared for in winter.

To Mr. Dymond.—The land in Middlesex retains its productiveness longer than the land here, but does not yield such large crops of the coarse grains and potatoes. I came to Muskoka at first because I was suffering from lung disease, and also for the purpose of getting land for my sons, and sold my farm in Middlesex. My health has been re-established since I came here, and I think that under the circumstances my investment has been a good one. It is far better for a man to take a free grant in Muskoka than to rent land in the older counties. Our great want at present is railway communication, as the

local market created by incoming settlers is insufficient. My farm is 31 miles from Bracebridge, or 42 from Gravenhurst, where we have railway communication. We cannot draw produce there for 50 cents per hundred. Oats are generally sold to the lumbermen at 50 cents per bushel. Though we have suffered once in a while from grasshoppers, they do not amount to anything like a plague. I do not think it would pay to feed cattle on wild or bush land, though some people keep their young stock almost entirely in the woods in summer, and they come out in pretty good condition. My objections to the system are the liability of the cattle to stray, the lack of regular salt, and the insufficiency of the food. I do not think it would do to feed cattle in the bush if they were intended to be sent to the front to finish. This is undoubtedly a good country for grazing, as the pasture is good, the water abundant, and the flies not troublesome. The moisture of the climate and the lack of lime are, in my opinion, the difficulties in the way of growing wheat here. The balsam flats of this country, which are depressions between the hills, are peculiarly liable to frost, more so than in the vicinity of the lakes where the cold air is modified by the warmth of the water, or upon the elevated land where the movements of the atmosphere prevent frost. There will be no difficulty in driving the cattle to the railway. The difficulty in the way of stock raising on a large scale at present is that many of the settlers are poor, and have small clearings, so that they are not able to buy stock, but if they had a railway men of capital would come and buy out the present settlers and go into stock raising. The farther back we go the harder it is for the settlers to get along, because they have a less certain market for their produce, while all the necessaries of life cost them more. For instance, salt is only 95 cents a barrel at Gravenhurst, while at Bracebridge it is $1.25, at Huntsville, $2.75, at Emsdale. $3 25, and so on. In the Township of Chaffey, farms of 200 acres, with 25 or 30 acres cleared, can be bought for $500 or $600, or one-half what they would have sold for six years ago. People are discouraged, not having a railroad, and will not invest money in land.

E. MONAGHAN.

MR. JOHN WINTER'S EVIDENCE.

John Winter, of the Township of Sinclair, was called and examined.

To the Chairman.—It is three years last March since I moved into the country, though I have been out and in for about seven years. I have 311 acres, of which 90 are under cultivation. I came from the Township of King, York County, where I had lived for seventeen years. I had thirty acres cleared upon my present farm before I moved in; the remainder has been mostly cleared by myself and sons. My clearing and buildings have cost me about $2,000; cleaning and fencing land costs about $18 an acre. Wheat is a moderately successful crop. The average yield of oats is about 50 bushels to the acre. I generally seed down on the second crop with oats or wheat. There is no difficulty in seeding down in this country. I generally use red clover and a little alsike—three pounds of clover mixed with four of timothy to the acre. Last year my clover was heaved out by the frost; but it had improved during the two preceding years. My soil is naturally dry and not springy. I have planted three bushels of Early Rose potatoes, on one-quarter of an acre, and the yield was sixty bushels. Turnips yield about 500 bushels to the acre; but some years they are taken by the flies. The grasshoppers do not trouble me much. I did not have them at all until last year.

To Mr. Stock.—I have four horses and six cows; the cows are a little improvement on the ordinary Canadian stock, and I keep a Durham bull nearly pure. Corn is not a certain enough crop to be profitable here; peas do far better. Barley is, also, a good crop.

To the Chairman.—I have been farming twenty-nine years in Canada. I also farmed for several years in England, and am familiar with the management of stock. I advise settlers to go into cattle and sheep raising, as they will pay better than trying to grow wheat. If I was fattening cattle I would feed them in the winter with hay and some straw until about

spring, when I would feed them up with a little grain, and turn them out on the grass, giving them some chopped stuff while on the pasture It will not pay to stall feed cattle here; it will cost too much. Under the treatment I have mentioned my cattle will be fit to sell in the fall A steer three years old in the spring put out upon such grass as we have would add to his flesh without receiving any grain. Cows are worth about $30 a piece, and three-year old steers about the same. My sheep are about pure-bred Leicesters, and have done very well. They produce on an average about nine pounds of washed wool, of good quality, at the age of six years. I think that about two-thirds of the land in the township is fit for cultivation. My land compares very favourably with that in East Gwillimbury, where I farmed for seven years, and King. My experience is that we can generally avoid serious consequences from the frost by sowing at the proper time. Oats generally bring 50 cents per bushel when sold to the lumbermen; and hay $8 per ton.

To Mr. Dymond.—I have not attempted apple growing; but small fruits do well, such as black currants and the American gooseberry. My plan of renewing land is seeding it down, sowing in buckwheat and ploughing it down. Oats are the most exhausting crop on the land; but we have frequently sown two crops in succession, the second being as good as the first.

JOHN WINTER.

The Commission then adjourned until Friday, at 8 a.m.

MR. S. POLLOCK'S EVIDENCE.

HUNTSVILLE, *August 27th.*

The Commission met at 8 o'clock a.m. *Present*—Messrs. BROWN (Chairman), and DYMOND.

S. POLLOCK, of the Township of Perry, was called and examined.

To the Chairman.—I have been in the district three years I do not reside on my own land, but work 200 acres in company with a gentleman in Victoria County, and of the latter farm 85 acres have been cleared by my partner since I came to reside on the farm; the remainder was cleared before. The soil is a sandy loam, with some clay on the shore of the lake. I have farmed for eighteen years in the Township of Fenelon, North Victoria. I have grown wheat, oats, barley, and peas. I do not consider that corn would be a successful crop here. Neither spring nor fall wheat have been what we would call a success in the front townships, though spring wheat was sufficiently productive to pay. I have not given up growing fall wheat, though I am doubtful if it would turn out a paying crop. The trouble with wheat is that the straw does not stand up well, but crumbles before it ripens. I believe the use of salt and lime would remedy the evil, though I have not tried them. The average yield of spring wheat would be about 10 bushels to the acre, but I believe it would increase under thorough cultivation. We have heavy crops of oats on both new and old land, the average yield being 30 to 40 bushels an acre, this year. Barley is a successful crop, though I have not grown it much. Peas would yield 15 to 20 bushels an acre. I seeded down 50 acres this spring. My object being to keep the land clean and to sell hay to the lumbermen, as this is more profitable than ploughing the land in its present condition. I seeded down with timothy and not much clover, as it is so difficult to mow among the stumps. Clover grows rank and strong, but I prefer the timothy because it sells for more and is more easily harvested in rough land. Hay averages about $10 per ton at the barn, and the yield is about one ton per acre; this was from timothy We have 16 sheep at present, but intend to increase the stock to 50 or 75, and also the cattle; five milch cows, and seven or eight head of young cattle; a yoke of oxen; and a thoroughbred bull. Settlers were availing themselves of the services of the thoroughbred bull to some extent, but since the introduction of inferior and cheaper animals his services are not so much in demand. The price charged for service is $1

The bull is allowed to run with the other cattle in the pasture, and he keeps in good condition. In the winter the cattle run about the straw stacks and the sheds under the barn. I give them a little hay in the morning in severe weather, but in mild weather I feed them on straw and chaff, the bull taking his chance with the others. In the spring I gave them other food, such as turnips. The only beef I sold was a steer or two, three or four years old in the fall, which had been running in the woods, and then turned on the pasture. There were wintered as I have just described, and would make 400 or 500 lbs. of beef. With regard to sheep I use a pure-bred Leicester ram, and the sheep run on the pasture in the summer, and in the barn-yard with the cattle in the winter, until about lambing time, when they are fed on oats and bran, and kept in good condition.

To Mr. Dymond.—I think the farm, and a few others in the immediate neighbourhood, are better than the average land in the township. The land is rather uneven, the good land going in patches. There is not much rock in the township, and it does not interfere with the operations of the farmer so far as we have cleared up our land. There are none in the township who have larger clearning than we have. Some have 15 to 20 acres, others as high as 50 or 75. The most of the farmers grow enough wheat for their own consumption. Oats and other grains grow abundantly everywhere. I think the principal part of the township has been taken up, though some lots had not been taken possession of. The people who went in had not generally enough means to cultivate their land properly. I found farming in Fenelon profitable, and my only inducement for coming up here was to get land for my sons. I rented my farm in Fenelon. I would advise farmers who have sons to buy them land here, unless they have sufficient money to purchase farms for them in the front townships. Clearing costs $15 per acre, including fencing with timber from the fallow. If I had money I would sooner clear land here at that rate than invest in land in the front townships at $50 an acre. I did not have as much to contend against in Fenelon as here in the way of frosts; but the frosts in Muskoka are local in their effects. With the exception of wheat I can raise better crops here than in Fenelon. Upon hardwood land and high land generally the frost is very little trouble. I would not advise people to keep cattle in the way I have done. I would not do so myself if I had not so much else to do, and a good deal of help to hire. There is a sensible falling off in the cattle when they go out in the spring. The farm is best adapted to sheep and cattle raising. I would breed cattle on the farm, fatten them on coarse grains, hay, and roots, and send them to the front. Even without a railway I would prefer this system, and would drive them to the railway. I would have thoroughly well graded animals. It would be an economical plan to let the cattle run the first year in the woods, but sheep should not be allowed to run in the woods. If a man had 300 acres of wild land, with 100 acres cleared, he ought to be able to keep 20 head of horned cattle and 30 or 40 sheep. Sheep and cattle are almost entirely free from disease in this district. I believe this to be a good butter raising country, but cows are not numerous enough to establish creameries. Should the Ontario and Pacific Junction Railway be built from Gravenhurst to connect with the Canada Central at Lake Nipissing I consider those districts the best opening for immigration and capitalists in the Dominion. In my opinion far ahead of the North-West.

SMITH POLLOCK.

MR. R. N. HILL'S EVIDENCE.

R. N. Hill, of the Township of Franklin, was called and examined.

To Mr. Dymond.—I have been in Muskoka for ten years. I had a very little experience in farming in the county of Leeds before coming here. My farm is on the north shore of Peninsula Lake. I and my sons own 1,200 acres, of which 500 are in Franklin, 200 in Sinclair, 400 in Bethune, and 100 in Brunel. My personal experience is

limited pretty much to the land on the shore of the lake, of which about 220 acres are cleared. All the land has been taken up under the Free Grant Acts. I brought in some capital with me. I agree with Mr. Pollock as to the average cost of clearing land. The soil is principally clay loam, and the sub-soil quite stiff. There is no rock that is a serious impediment to cultivation, though I have about 30 acres of stony land. My land is better than the average in the county of Leeds, where I formerly resided. I disposed of 280 acres of good land in that county, and invested the entire proceeds where I now live. Oats average 40 bushels to the acre, and the grain is of very fine quality. I have done nothing in the way of under-drainage, but I am sure that it would improve the soil very much, and I contemplate doing something in that way in the future. The grasses grow luxuriantly. I sowed the Alsike clover with a slight mixture of white clover and timothy. I seeded down land when I first settled. It has not run out yet, and practically it amounts to a permanent pasture, for there is no sign of deterioration. I gave Professor Brown, of the Ontario Agricultural College, a piece of the soil for analysis. I have grown very fine crops of wheat, both fall and spring. Fall wheat suffered from winter killing two years, the result on one occasion being due, in my opinion, to too rapid growth in the fall, and in the other, perhaps, to there being so much snow that the crop was smothered. About 30 bushels per acre is the maximum yield of fall wheat, and 20 bushels the average. Spring wheat will average 20 bushels per acre when the land is properly prepared, though one year it was a failure. My crops have never suffered from the frosts, though those on the lighter soils do sometimes. The district has only suffered severely from frosts two years within my knowledge. Many of the settlers cleared off their land in the spring, which was a very objectionable system as the crops are liable to be late and to be attacked by the frost. Corn is a good crop on new land well burned. My plan was to seed down with the first crop, so as to allow my clearing new land, and save the trouble of ploughing among the stumps. I am now about adopting a rotation of crops on the older land. I will keep the new land in grass for seven or eight years, or longer if possible, and the farmer should combine his early operations with the feeding of cattle. I have been successful in cattle raising here; never lost sheep or cattle from disease of any kind; but have not given much attention to feeding except ordinary grazing. When I began farming here I used to allow cattle to run in the woods during the summer. In the winter I simply fed hay, straw, and roots when I had them, though I am not satisfied with my practice in that particular. I would like to cut more straw and give it to them with bran, chopped stuff, and roots. I have not sufficient stabling to carry out my idea of feeding in this direction, but I am prepared to make improvements. The grasshoppers have never troubled us seriously in this section. It is my intention to devote my attention chiefly to stock raising. I think sheep will pay well, and as to cattle I do not know whether beef or dairying will pay the better, though I am convinced that both will do well. The question of having a creamery or cheese factory at Huntsville has been agitated recently in the press and otherwise, and I think such a scheme is feasible, and if carried out would be a great advantage to the district. The milk can be easily collected by boats running on the lakes, and also by teams on the five colonization roads leading to the village. We dispose largely of our produce to new settlers, many of whom are coming into the back country. These people bring in some money, but not very much. They are not able to pay ready money for what they purchase. I and my sons have about 25 head of cattle on the three farms, besides five teams. I have a thoroughbred Ayrshire bull. I think on account of our being a distance from the railway perhaps settlers would be discouraged in raising beef stock; though I do not think there would be any difficulty in driving them to the railway. Perhaps, however, the attention of the farmers in the district should be turned to dairying, especially as they are so well situated for that purpose. We keep also between 80 and 90 sheep. I had some well-selected ewes at first, and have been buying thoroughbred rams ever since, Leicester and Cotswold. Sheep raising is a profitable branch of industry. I do not think our situation presents insuperable difficulties in reaching the market with cattle and sheep, except very fat ones. I am perfectly well satisfied with the experiment of coming to Muskoka. One difficulty is the scarcity of cash, which renders it necessary to do a good deal of business by barter.

[*Mr. Hill.*]

To the Chairman.—For summer grazing I would charge $1 per head per month for cattle. My clover is principally Alsike, and though I have been ten years in the country I have still a strong, firm, close bottom of grass, which was seeded in 1870 and was never better than at present. To-day I shewed Professor Brown samples of wheat grown upon my farm, and that gentleman stated that he had examined 200 different samples of wheat grown in Ontario and had seen none as good as grown on my farm. One great want of the district is the settling of capitalists among us, and I am convinced that nowhere could such men find better investments for their money. The crop of oats sown upon new land would pay for the clearing, and if the land was then seeded to grass there would at once be pasture and meadow for stock. I am strongly of the belief that an apprenticeship to Canadian farming is necessary before coming here. Many who have come here with little or no means have secured themselves comfortable homes by dint of energy and industry. Men with $20,000 or $30,000 would do better here than any other class, but those with even $2,500 could do well.

R. N. HILL.

MR. WILLIAM CANN'S EVIDENCE.

William Cann, of Huntsville, was called and examined.

To the Chairman.—I settled here eighteen years ago, and originally came with the intention of hunting and engaging in the fur trade. I am well acquainted with this section of the country, and am convinced that it is best adapted to sheep and cattle raising, especially for the reason that the grasses do well.

To Mr. Dymond.—It is my intention to do something towards improving the stock of the country. I intend getting a thoroughbred Hereford cow and bull, as I think that breed does best here both for beef and milking. I also intend getting some pure Southdown sheep. I think the state of things in this section of country is such as to justify the venture.

WILLIAM CANN.

The Commission then adjourned.

MR. WM. DAVIDSON'S EVIDENCE.

Port Carling, *August 28th, 1880.*

The Commission met at 9 a.m. *Present*—Messrs. Brown (Chairman) and Dymond.

Wm. Davidson, of the Township of Watt, was called and examined.

To the Chairman.—I have been farming in the township of Watt for twelve years. Have about 300 acres of land bordering on Lake Rosseau, of which about 40 acres is more or less cleared. More than one half of my land is cultivable, and throughout the whole township about 75 per cent. The township is considerably broken by water. Have tried fall wheat, but it has proved a failure owing to rust and winter killing from too much snow. Have grown a little Fyfe spring wheat; it did very well last year but this year it was a failure; I do not think it could be relied upon as a regular crop, and it never produces more than 15 bushels to the acre, the average being perhaps 10 or 12. Am a mason by trade, and never tried farming before I came into the woods. Potatoes are a splendid crop, notwithstanding that they were troubled a good deal by the bug. My soil is a clay, not very heavy, and where there is no rock is as good as any in Canada; the average yield of oats is about 30 bushels to the acre, but this year we had between 40 and 50 bushels; peas were also a good crop, and root crops—such as turnips, carrots, and mangolds—also did well. Have four milch cows, some young heifers, and fourteen sheep.

[*Mr Hill, Mr. Cann and Mr. Davidson.*]

Keep a good deal of pasture—my farm being pretty much all seeded down. My usual plan is to put potatoes on new soil, then wheat or oats, with which I seed down with red and white clover and timothy mixed. I had some clover and timothy seeded seven years ago, and it was a good crop this year.

To Mr. Dynond.—I lived in Markham before I came here, but did nothing at farming. I left England twenty-three years ago. If any of my crops have failed it is quite possible it was from mismanagement rather than from any fault of the soil. The grasshoppers troubled us some years, but not sufficiently to cause a failure of the crops, and we do not dread them very much. Last year and this year the people suffered from frost about the middle of August which cut down their potatoes and injured other crops; but as a rule the frost does not do much damage, and is local rather than general; the farmers whose land is close to the lakes do not suffer so much as those who live farther back. Stock does well in the district. I pasture my cattle in the woods until the crops are taken off, turning them out generally about the latter part of April; cows do well in the bush until the latter part of July, when they are put upon the hay stubble; the cattle are generally stabled about the middle of November, after which they are fed straw, except cows that are giving milk, and they are fed some hay; in the fall we give our milch cows some turnips, potatoes, pumpkins, etc.; occasionally we give the other cattle a little hay towards spring, but not often; sometimes they fall off in the winter, but if properly attended to they generally come out all right. At one time we had a thoroughbred Shorthorn bull in the neighbourhood, but not at present. Sheep are kept in the pasture in the summer, and in the winter are fed principally upon pea straw, with a little hay once a day; near lambing time the ewes are sometimes fed a little grain or roots; my sheep are from a cross of a Cotswold ram upon the common ewes. Sheep do exceedingly well in the district and require very little attention.

To the Chairman.—When I came into the district I had exactly fourteen pence in cash, a small quantity of flour and pork, a wife and six children, and never received any assistance. Am well satisfied with my experience of the country thus far. The price of hay is regulated a good deal by the lumber interest, and I have sold it as high as $18 per ton, and as low as $6 or $7 Oats generally sold at from 40 cents to 50 cents per bushel. There is a large tamarack swamp, one half in Monck and one half in Watt, with the river running through it, at the outlet some blasting is required to let the water out and drain the land. I think about $1,000 would be required to do the blasting. The matter has been urged on the Township Council, and at one time I got up a petition with sixty signatures and sent it to the Commissioner of Public Works, and never got any reply. Nearly all the land covered by the swamp is taken up. It would be the best land in the two townships if the rock was blasted out, the river acting as the main drain, besides it is the cause of severe summer frosts in its vicinity, also being dangerous for miring cattle. I hope the Government will give some assistance in draining this swamp; it not being heavily timbered, and being good land, the settlers holding land in the swamp would at once clear it up.

WILLIAM DAVIDSON.

MR. WM. TROUTEN'S EVIDENCE.

William Trouten, of the Township of Watt, was called and examined.

To the Chairman.—I have been settled here ten years, and came from Garafraxa, near Fergus, where I had been farming. I have 200 acres of land, of which 40 or 50 acres are cleared. I cleared the principal part of it myself with the help of my family; some of my land is pretty rough, but there is a good deal of good land; there are only 70 or 80 acres clear of stone. The soil is generally a pretty stiff white clay. When I clear up a piece of land I generally put in potatoes or turnips, and then wheat, with which I seed down, though I sometimes put in a crop of oats. I have four or five acres

which I have cropped with grain crops ever since I came into the country. I manured the land. I have grown fall wheat and it did very well: it has never been a failure. I do not think, however, that fall wheat would ever be very successful in this country. I have sown the Soulis wheat and another kind the name of which I do not now remember. I have not been much troubled with winter killing. My land is not very wet. Spring wheat is a more reliable crop than fall wheat. I have been very successful with grasses, and have no difficulty in seeding down. Last year the grass was injured a little by the grasshoppers. The oldest pasture I have is five or six years old; the sward is not quite so good now as at first, and it is all timothy, the clover having been killed out last year. Turnips yield about 500 bushels to the acre. I have seventeen head of cattle, exclusive of the calves, and only eleven sheep, as I have been killing off some. The bulls in the neighbourhood are mostly grades, and I do not think we will do much in cattle raising until we get thoroughbred males. The raising of common cattle is unprofitable, as we cannot get sale for them, but if we produce good grades I think they could be readily sold at local fairs, or at Bracebridge or Gravenhurst.

To Mr. Dymond.—There are so few good cattle it does not pay buyers to come after them. I do not believe in bush feeding if they have an abundance of pasture, for though young beasts do pretty well in the bush, cows do not come out very fat. There is considerable butter made in the neighbourhood, and the surplus is sold at Port Carling, where there is a very good demand in the summer.

To the Chairman.—We could not rent pasture to people in the south, as we have not sufficient to grow hay for ourselves. My sheep are doing well, and I believe this country is well adapted to sheep and cattle raising, notwithstanding the rather long winters. I never was in any country where grass grew so well as it does here; it grows in great abundance even upon the rocky land. Hay can be grown more abundantly than in Garafraxa, and the pasture is better during the summer.

WM. TROUTEN.

MR. WM. GREGORY'S EVIDENCE.

William Gregory, of the Township of Medora, was called and examined.

To Mr. Dymond.—I have been farming in Muskoka for ten years. I have 166 acres, of which about 34 are cleared. I was not a farmer before coming to the country, but had been engaged in the commission business. My farm is on the River Joseph, and some of my soil is light and some heavy. The land is not much broken by rock, though it is rather rolling in its character. Oats are my most successful crop, though I have grown all the principal cereals more or less. The average yield of oats is about 30 to 35 bushels per acre, and they sell at from 30c. to 50c. per bushel. Neither spring nor fall wheat have been successful with me, and I do not think they could be depended upon as a regular crop; the average yield of spring wheat is, perhaps, ten or twelve bushels per acre, and when the labour of threshing it by hand is taken into account, it is cheaper to buy the flour. Peas have done very well with me, and I have also grown some very good corn. All kinds of garden vegetables grow abundantly. The summer frosts do not prove a serious draw back to me, and I do not think the settlers have suffered severely from them more than two or three times. I have found that I can mature corn, tomatoes, cucumbers, onions and almost all other kinds of vegetables. I have grown 300 bushels of potatoes to the acre, but that is an exceptional experience. The potato bug has been troublesome of late years, but it has not done much injury this year. My plan is to plant some potatoes early, so that I can attend to them, and then plant some late ones, and I am thus pretty sure of a crop. I do not believe in Paris green as it injures the tops of the plants. I keep a small number of cattle and sheep, and find that they succeed well. I generally seed down with the first crop. The oldest pasture I have is seven years old, and it is in better condition than it was four or five years ago. I used to turn my cattle into the bush,

but do not do so now as there is too much time and trouble required in finding them ; I agree, however, with the last witness as to the value of bush pasture, and the assistance it is to the settler. I have had quite a number of sheep die from what appeared to be the rot, but believe it was caused by their lying in damp places near my barn. There are no thoroughbred animals in my neighbourhood, but think our township society might be made the means of importing pure males for the improvement of stock. I am reasonably well satisfied with my lot in Muskoka. I had a little means when I came into the country. I paid for clearing most of my farm at the rate of $18 to $20 for clearing and fencing with a rail fence.

To the Chairman.—I am not yet able to maintain myself and my family by the produce of my farm. There is a disposition among a good many of the settlers to stop clearing when they get enough to live upon, and make no further improvements. A considerable number of the settlers have to work out a portion of the year, and I do not think they would be able to do much until they have cleared enough to keep them. I have never had a failure of the grasses, and this year the clover is turning out capitally. We can always rely upon a good sward of grass. A good deal of the country would be greatly improved by drainage.

WM. GREGORY.

MR. ISAAC DOVEY'S EVIDENCE.

Isaac Dovey, of the Township of Medora, was called and examined.

To the Chairman.—I have been in the township of Medora for four years, and came from Hampshire, England, where I was a market gardener. I have 224 acres, of which 43 are cleared, my land is a clay loam with clay subsoil, and borders on the lake. It is timbered with beech, maple, basswood, a little oak and very little pine, and is slightly broken by rock. I usually plant corn or potatoes on new land, and then seed down with the next crop until the stumps can be taken out. I have been gowing corn successfully ever since I came in, and have about five acres this year ; my crops have never been injured by the frost ; the average yield of corn on my farm is from thirty to forty bushels per acre. I have never planted a crop of any kind in Muskoka which has not done well if sown at the right time, and properly attended to. I have dug a few open drains as the soil was wet below and required drainage. I have sown Red Chaff wheat, and it did fairly well when it was cultivated. I have tried fall wheat, but it was not a good crop owing, I believe, to the fact that the land was not properly drained and cultivated. The soil also requires the addition of lime to enable it to grow good crops of wheat. I have raised 30 bushels of oats to the acre on new and stumpy land, and 50 bushels per acre on land pretty well cleared of stumps—these oats were of the Black Tartarian variety. I seeded down to grass with the oats. The yield of hay is from one to two tons to the acre. I have thirteen head of horned stock, and feed all my corn to the calves. I keep a bull of my own, it is between a Shorthorn and a Devon. I came into the country with a little means, but I could now more than live on the produce of my farm. The average yield of potatoes under good cultivation is about 200 bushels to the acre.

To Mr. Dymond.—I have grown some plums—mostly of the red variety—and have planted some grape vines, and they are looking well ; I think this soil and climate are adapted to the growth of grapes. I allow my young stock to run in the woods, but keep my milch cows in the pasture. I have my bush fenced in so that the cattle do not stray, and they do well upon it, and come in in the fall in good condition. Turnips grow well, but are liable to be cut off by the fly at any time. In the winter I feed my young cattle on straw and hay and a few turnips, if I have them, and my cows upon the best feed I have. I have no sheep, but sheep thrive well here ; a cross between the Leicesters and Southdowns would be the best for the country. I believe that in course of time large numbers of sheep and cattle will be shipped from here to the old country.

ISAAC DOVEY.

Mr. Gregory and Mr. Dovey.]

MR. ARCHIBALD McCALLUM'S EVIDENCE.

ARCHIBALD McCALLUM, of the Township of Medora, was called and examined.

To the Chairman.—I have been in Muskoka ten years. I came from Argyleshire, Scotland, and spent some nine months in the front townships before coming here. My farm does not touch the lake, though it is within a short distance of it. I have 200 acres of land, of which 30 acres are cleared; some of my land is low and some of it is high and rocky, but even the latter yields good crops, and I have cleared some of it purposely for sheep pasturage. I took a crop of corn off the new land and then seeded it down with fall rye. I have two swamps on my farm; about one half of my land, exclusive of the swamps, is tillable, and if the swamps were drained I would have about 140 acres of cultivable soil; on the low land my first crop is generally potatoes or beans, but sometimes I sow oats on the new land. Muskoka is better adapted for grazing than tillage, as there is so much broken land. I was engaged in the grazing of sheep and cattle in the old country from my boyhood, and look forward to that branch of agriculture being developed in Muskoka. I keep as much stock as I can feed during the winter. Clover has been somewhat of a failure this year, but usually it is very successful. The reason that clover pasture and meadow is maintained so long is this country is that it re-seeds itself. I have been successful in the cultivation of peas, oats, wheat, corn, beans, etc.; but believe oats are the surest crop of any, though I have been very successful with peas; barley does well, but it is a little troublesome to harvest. I have fourteen sheep and fifteen cattle, including calves. I brought in two ewes four years ago and I have now fourteen, after having killed six. I killed a yearling wether two years ago, which weighed 124 pounds dressed, it had nothing but pasture and hay; another one which I killed at the same time weighed 116 pounds. We can get good mutton in the fall off the pastures; I never allow sheep to go in the woods. I think the Leicester breed would do very well here.

To Mr. Dymond.—When I came to Muskoka I brought only $96 with me, but I devoted the whole of my attention to the farm. I turn my milch cows into the woods and they give plenty of milk, though it is sometimes troublesome to find them. I believe that if cattle and sheep grazing were carried on here the same as in Scotland, the agricultural resources of the country would be greatly developed. My plan would be to raise stock and then send it south, and in that view I believe that Muskoka would play the same part towards the southern parts of the Province that the Highlands of Scotland do to south Britain. In the Highlands of Scotland they used to drive cattle 140 miles and sheep the same distance, and if they were well treated they did not suffer much; these cattle were pretty fat, but they were "finished" in the Lowlands. I have been very successful with both spring and fall wheat, but the land is so broken that I do not think we should look to wheat as a regular crop.

To the Chairman.—Sheep are entirely free from disease in Muskoka. I killed a lamb 1st November, 1879, that weighed 60 pounds dressed. I took him off the ewe early in August, and nothing after that. Cattle at large in the woods are healthy and in very good condition in the fall.

ARCHIBALD McCALLUM.

MR. P. H. O'BEIRNE'S EVIDENCE.

P. H. O'BEIRNE, of Port Carling, was called and examined.

To Mr. Dymond.—I occupy an official position here. I have made some little efforts towards gardening, and have found the soil and climate very favourable to success. I have grown potatoes, cucumbers, beets, parsnips, carrots, etc., which would compete successfully with those grown in the gardens in the older parts of the Province, where

such crops receive a great deal of attention. I have also succeeded in raising grapes of the Clinton variety, and my strawberries are acknowledged, by those who cultivate that fruit outside, to be a successful crop, both in point of quality and flavour. I have one grape vine which was planted quite small, some years ago, and I got between 50 and 60 pounds of grapes off of it last year, and expect to get a larger quantity this year. I do not think there would be any difficulty in raising any quantity of strawberries. I have raised some apples of the Tetofsky variety ; the first, I believe, that have ever come to perfection in Port Carling, and I believe they could be cultivated profitably with attention. Crab apples are grown with great success. My varieties are the Siberian and the Montreal Beauty. I lay my grape vines down in the winter between pieces of scantling, with boards over them, and they come out in the spring all right.

P. H. O'BEIRNE.

MR. WM. FOREMAN'S EVIDENCE.

WILLIAM FOREMAN, near Port Carling, was called and examined.

To Mr. Dymond.—I have one hundred apple trees grown from the seed, and some of them are doing well; the seed was planted about eleven years ago ; some of the trees have been grafted since they were planted out ; they are of the Colina variety—an English apple, the seeds of which were brought out here and planted in the bush ; they have borne fruit two years and none have been winter-killed. My orchard has a westerly aspect, and is not very well sheltered by the woods. It is close to the lake and the soil is a clay loam, underdrained, and is well cultivated and manured. I believe apple culture would be successful here.

WILLIAM FOREMAN.

The Commission then adjourned.

ROSSEAU, *August 30, 1880.*

The Commission met at 9 o'clock a.m. *Present*—Messrs. BROWN (Chairman), and DYMOND.

MR. B. S. BELEY'S EVIDENCE.

B. S. BELEY, of the Township of Humphrey, was called and examined.

To the Chairman.—I have been living here for over thirteen years. I, at present, possess about 1,500 acres of land, the larger portion of which is let to tenants. About 175 acres are cleared, with about eight acres ready to log. I am farming about twenty acres of clearing at present ; but in previous years I farmed all the clearing I was then possessed of. I farmed an estate of 500 acres for four years in Devonshire, England, before coming to Canada. Hay is my principal crop, besides oats, peas, turnips, and potatoes ; we grow wheat to a smaller extent, it is not so safe a crop as the others. I grew spring wheat one year, but had such poor success with it that I gave it up. I have never tried fall wheat. I do not consider that the country is adapted to wheat culture until farming is managed in a more scientific manner than at present ; and, besides, owing to the high price of oats and other coarse crops they are more remunerative for the present, though, perhaps, in the future, when oats and hay are cheaper, it will pay better to raise wheat. I believe that when our land is free from stumps, and drained where requisite, with a thoroughly good system of husbandry, and lime applied to the soil, wheat will prove just as good and as remunerative a crop as oats or barley. After clearing the land the first crop is usually roots, followed by grain seeded down, or a grain crop

immediately to seed down with; we are not able to follow any rotation of crops yet. We have had fair success in growing oats, the yield being from 30 to 40 bushels per acre. Peas are also a good crop. Oats are sometimes troubled with the rust, but not to any serious extent. Some years ago I grew from 60 to 70 bushels of potatoes from 2 bushels planted; at present the average is from 25 to 35 bushels from the same quantity planted. The Early Rose is the variety chiefly cultivated here. All my land borders on the lake shore; the low land as a rule being heavy and the high land light. My land is considerably broken by rock. The best crop of turnips I have grown was from 500 to 600 bushels per acre. The variety was Yellow Aberdeen, the best kind for this country, as it can be sown later, and keeps nearly as well as the swede, and is of much quicker growth, and is also easier for the cattle to eat—an important point where there are no turnip-cutters and other such machines. The crop is sometimes taken by the flies or grasshoppers, the flies being very bad some years. I believe grasshoppers will come across intervening forests in order to get at the crops. I have grown very little Indian corn, as I do not consider it a sure crop. We are subject to frost, but near the lake shore we are freer from it than elsewhere; or rather the mists from the lake prevent it doing so much injury as on the high ground. I would say that a mile or two from the lake shore the crops are destroyed pretty much every year from the 1st to the 15th of September—that is tender vegetables, etc. I have put my land down in pasture as much as possible. I use red clover, Dutch clover, and alsike, also timothy, blue grass, orchard grass; the red does well for a year or two, but does not last so long as the alsike. I have cut as much as two tons of timothy per acre, but I think one ton is about the average yield. I do not think the original plant of red clover would remain good for five or six years; it appears to me to re-seed itself, but after a time it gets smaller and thinner on the ground and finally disappears. I have noticed fields which were mostly clover when first sown, but, in time, the clover almost disappears; this is not the case with the Dutch clover, which grows spontaneously, though sometimes not so rapidly as is desirable. I have a few sheep and cattle, and I find that cattle make very good beef when taken from the woods; they wander at large in the woods, coming home occasionally to get salt. Among the rocks there are small patches of grass, which the cattle are fond of, they also eat the shoots of trees and undergrowth; even in the winter if we choose to cut down the softer wooded trees the cows will make a living, and improve in milk off the ends of the branches, with the help of a very small quantity of hay. Cattle and sheep are subject to very few diseases in Muskoka. There are a great many beaver meadows in the township, and the grass is generally pretty good. There is generally plenty of water upon them, but the cattle do not care much for the meadows unless the weather happens to be very dry. The cows which feed in the woods produce very good milk and butter, I believe fully equal to that produced on ordinary pastures. The butter may be paler in colour, and certainly the quantity is less, but the flavour is good. I do not pretend to speak with scientific accuracy on dairying matters. Sheep, also, running in the woods round the edges of clearings make very good mutton.

To Mr. Dymond.—The reason that I left England was because I had serious difficulties with my landlord and became tired of tenant farming, and I resolved to go to a place where I could become a proprietor, and came to Muskoka. My idea was to get a large quantity of land, which I have now done, as a sort of family estate for my children, and not for the purposes of speculation. I came here with considerable means. After taking up a free grant, I have gradually acquired the land of those who desired to sell. In some cases I have given very heavy prices, simply because it was to my interest to get certain tracts of land; other parcels I bought very cheaply. Some people have sold because they had no means, and others because they thought they could do better elsewhere. The settlers in my neighbourhood are in a fairly prosperous condition, though during the last few years they have suffered a good deal from bad crops and the hard times. I know of no special cause for the hard times in Muskoka, beyond the general stringency outside, and the lessened volume of the timber business. A good many of the settlers derive a portion of their means from external sources, and if times are hard outside they necessarily suffer, and having less to spend in labour, etc., their loss reacts upon their neighbours; the de-

struction of the crops last year by frost and hail storms in the month of August was another cause. I think that as the country becomes cleared the liability to frost will be lessened. Although the grasshopper is the cause of considerable anxiety to the settlers, I do not think they will prove a serious impediment to successful agriculture. I have only lost three or four crops of turnips by the flies, but I look upon them as a casual crop, chiefly so on account of the rough, careless manner in which they are cultivated. I have no doubt but that with proper treatment, and sowing in the proper season, turnips will be as sure here as they are anywhere in the world except Exmoor. This is a country in which any farmer may thrive by the growth of oats, roots, and grasses, and I may add barley, though I do not grow it myself. Corn cannot be depended upon for ripening in this particular district, and the same remark will apply pretty generally to the whole of Muskoka, always excepting favoured localities protected from early fall frosts by the lakes. The original timothy and clover die out considerably in from five to eight years, and are replaced by the natural grasses. These natural grasses, which succeed so well here, would, I believe, make better pasture for dairy purposes, and very likely a better quality of hay, though not so large a crop. They would not, however, compare favourably with what are termed permanent pastures in the old country, as there are only two or three varieties suitable for the purpose, instead of the fifteen or twenty choice varieties available in the old country. The beaver meadow grass should be cut pretty early, and for sheep I prefer it to timothy, though not to clover and timothy mixed; it is also good for cattle, though not so good as first-class timothy well saved. I have not improved my stock to any great extent, though Mr. Sirett has a very good thoroughbred bull, and people generally avail themselves of its services. Of course I have regularly used the best bull within my reach myself, but hitherto (for reasons which it is not requisite to explain here) it has suited my purpose better to buy, sell and kill according to circumstances than to become a persevering breeder of improved stock. That is why my stock do not as yet show any marked improvement. If Mr. Sirett should dispose of the animal we would be at the mercy of those who keep inferior animals. It is perfectly safe to depend upon the bush as a material element in fattening cattle, as such fodder will always be of importance in a country like this; there would be no difficulty in maintaining a large amount of permanent pasture. We could not have so large an agricultural population here as in the outside townships, owing to the broken nature of the country, but I would say that we could have fifty or sixty per cent. of the number who would do as well as outside. I am sure that stock raising and dairying are the branches of industry that are most suitable to this country. Nothing has been done in the way of co-operative cheese factories or creameries yet, but I believe that they would be practicable and profitable if managed by persons of skill and experience, and if they were once started there would soon be cows enough. Nine-tenths of the English tenant farmers would be very much better off in Muskoka than where they are; these men should come over and stay a while in the country, to see how things are managed before investing their money.

BENJAMIN S. BELEY.

MR. JAMES WILSON'S EVIDENCE.

James Wilson, of the Township of Cardwell, was called and examined.

To Mr. Dymond.—I am President of the Agricultural Society, and have farmed in the district for over ten years. I took up 187 acres under the Free Grant Act, and have cleared about 20 acres. I was born in Scotland, but resided in Boston, Mass., before coming here. I left the United States simply because I preferred living under the British Government. I was brought up on a farm in Argyleshire, but turned my attention to gardening. I came into Muskoka with some means at my disposal. Clearing land and fencing, at the time I came here, cost from $20 to $24 an acre, but it probably costs less now, owing to the reduced rate of wages. My experience as to crops is much the same as

Mr. Beley's. My land is close to the lake shore, and I think land so situated is the most favourable for crop raising. My land is very much broken by rock, but I can utilize it for grazing purposes; that is my intention, though I have not been able to do much in that direction yet. I have ten head of cattle at present and a few sheep. I believe the thoroughbred Durham would be good cattle to improve our stock, though I like the Devons myself as working oxen and for dairy purposes. I find that cattle thrive well on the bush pasture.

Q. Please state what a steer of a given weight will increase in a season on exclusively bush feeding? A. I think that a steer of 400 pounds would gain 200. I have had a common steer of 400 pounds gain 175. Last year I killed a grade that weighed 648 pounds whose weight in spring was 420 pounds. I have used a thoroughbred animal for the improvement of my stock. I think the Durhams are very good, though I like the Devons as working oxen and for dairy purposes. I was pretty seriously troubled with the grasshoppers when I came into this country first. I was here three years before I raised one dollar's worth of grain crop, owing to the grasshoppers and the army worm. The potatoes were injured but not destroyed. I think the absence of lime has a prejudical effect both upon plants and animals. I believe there is lime in the Township of Watt, about ten miles from here, though nothing has been done in the way of quarrying it. I have grown fall wheat very successfully. I have ceased raising it, not because it was a failure, but for the reason that my land is pretty much seeded down, and it is not convenient for me to grow it. One year it yielded about 30 bushels per acre, and the wheat produced 43 pounds of flour to the bushel. Oats do very well here. I have found that after the first or second crop, the Black Maine oats are the best I grow corn on my farm and regard it as a sure crop. Tomatoes always ripen if planted early enough. I had no frosts to injure the tenderest leaf till October 7th, previously the 20th of September has been the earliest and October 11th the latest. Summer frosts are by no means a regular occurrence with me, nor do they do me much injury owing to the position of my land; the mellow, softening influence of the lake being my protection.

To the Chairman.—Q. What proportion of the land in your township would be suitable to lay down in permanent pasture? A. I would rather not answer this question, there being a great deal of the township that I have not seen; besides the rock is so near the surface in some parts that it would not be easy to tell without thorough examination. I have grown strawberries successfully, and have tried apples, but the trees have not fruited yet, though a neighbour of mine had fruit this summer. I resided in the Genesee Valley before coming here. I think the cost of bringing cattle into Muskoka and taking them back to the front would be so great as to make it unprofitable to send them here for pasturage, and, besides, I do not know whether beef from cattle fattened in the bush would be fit for exportation. The butter made from the milk of the cows pastured in the woods was much inferior to that produced on pasture, especially as the better class of bush food —such as young basswood trees—are getting killed out. I am President of the Agricultural Society, but we have not been able to utilize the Society for the introduction of thoroughbred stock. I am in favour of the Society getting some stock, but most of the people wish to have a show, and I am satisfied that our exhibitions are doing a great deal of good.

To Mr. Dymond.—We consume pretty much all the butter we make. Butter has sold here as low as 8 cents per pound; 12½ cents is about the average price, but I would not sell mine for less than 15 cents. In the fall, good butter will bring 20 cents, common 15 cents. The price we get for hay varies from $9 to $20. The average price of oats for the last two or three years has been about 45 cents. The lumbermen can bring in oats pretty cheap by way of Collingwood, and I think that the settlers will eventually have to look elsewhere for a market for their hay and oats than to the lumbermen.

JAMES WILSON.

[*Mr. Wilson.*]

MR. CHARLES ROBERTSON'S EVIDENCE.

CHARLES ROBERTSON, Reeve of Cardwell, was called and examined.

To the Chairman.—I have resided in the township of Cardwell for thirteen years, having come here from the towhship of Muskoka. Previously to that I lived in the county of Halton. There are about 200 acres of land in my present farm, of which about 70 acres are cleared; about 50 acres more of my farm are cultivable. I think that about fifty per cent. of the land in the township could be made available for farming purposes. I am about three quarters of a mile from the lake. Some of my land is broken by rock and stone, and the Rosseau River runs through my farm; the soil is a clay loam, though it is more sandy than the land described as a clay loam in the front townships. I have grown fall and spring wheat, but since the time that the grasshoppers were so troublesome I have not sown any wheat at all. I think the grasshoppers are gradually disappearing, and they were very bad during two seasons only with me. I have grown wheat five years and have realized 25 bushels to the acre of fall wheat, and 20 to 25 bushels to the acre of spring wheat. Oats are always a sure crop, yielding from 35 to 45 bushels per acre. I also grow barley very successfully, getting from 25 to 30 bushels to the acre, the sample being bright and good. Peas are also a good crop, averaging from 20 to 35 bushels to the acre, the varieties being the Golden Vine and the Black Eyed Marrowfat; the Golden Vine is the safest and most productive. I have seen the pea weevil here, introduced, I believe, from bringing in seed from the outside; there were some this year on the Golden Vine pea, but they did not amount to much. The last few years I have almost given up sowing turnips owing to the prevalence of the fly, and I find that an acre of oats is a safer and better crop than two acres of turnips. I have 12 head of cattle and 20 sheep, the cattle are the common cattle of the country. I kept a pure Durham bull two or three years, but found that it did not pay me to keep him, as he was a source of considerable expense, and there were not many cows in the neighbourhood at the time. I do not feed cattle for market except by pasturing them in the woods. About 300 pounds represents the gain of a two-year old steer put into bush pasture in May and taken out in October.

To Mr Dymond.—Buyers are not in the habit of coming around for the purpose of buying cattle. I was a farmer in Aberdeenshire, and upon coming out worked with a farmer in Canada before coming to Muskoka. If the land were cleared I do not think there is any greater difficulty in the way of farming here than in the front townships. Stock raising would be more profitable in Muskoka than wheat raising.

To the Chairman.—I have pastured my cows in the pasture fields the last three or four years, and they produce better butter than when they were running in the woods—one reason being that they were kept quieter. I have not been troubled much with frost, as I raise those crops which the frost does not affect. My land is back from the lake some distance, and is high and rolling. I have a meadow eight years old, and this year I raised one and a half tons to the acre upon it; it is composed of timothy and alsike clover. I have never had a failure of the grasses; though some years they were better than others. I never saw pastures in Halton county six or seven years old.

CHAS. ROBERTSON, *Reeve of Cardwell.*

MR. WM. F. SIRETT'S EVIDENCE.

WM. F. SIRETT, of the Township of Humphrey, was called and examined.

To Mr. Dymond.—I have been farming in the township of Humphrey from my early years. I accompanied by father to this country twenty-six years ago when he came from England. We had some experience in farming in the township of Etobicoke before

coming here. I worked for my father here for about fourteen years, and have been working my own farm for eight years. I have 200 acres of which 18 are cleared. I am still clearing. After clearing, my first crop is generally potatoes or turnips, as the land cannot, as a rule, be got ready early enough for oats or other crops; the next crop is usually oats, but sometimes spring wheat. If the land is dry and rolling spring wheat will generally succeed on new land, but if the land is flat it is not a sure crop. I usually seed down with the first grain crop, cutting the hay until the stumps have rotted, so that they can be taken out, and the land ploughed. In four or five years the land can generally be cultivated pretty well; our pastures generally last that time, and if the seasons are of the average character they do not diminish in richness or growth. We have never suffered severely from drought excepting one year—1870. Oats are always a sure crop, but corn is not, as we are too far from the lake to escape frost. Potatoes if planted about the first of June may be considered a sure crop, but if planted later they are liable to suffer from frost. Our early fall frosts usually begin in September. The only crops which the frost is liable to attack are tomatoes, potatoes and tender garden vegetables. I believe that the townships of Humphrey, Cardwell, Christie, Medora, Monteith, McKellar, Spence, Watt, Ryerson, Chapman, Croft and Hagerman are all well adapted for grazing. The quality of the soil is favourable, and the trees and shrubs which the cattle like are plentiful. I have been over the whole of this county surveying and exploring for timber. I carry on a local lumber business. There is a great deal of pine in the district yet, and the lumbermen will afford a market for the settlers for some time to come. I think a three-year old steer turned out rather thin in the spring would gain one-third by a season's run in the bush. Beef sells in the fall for about five cents per pound dressed; our market being mostly limited to hotels and lumbermen. The want of a ready market is our greatest drawback at the present time. The last two years we have raised stock from thoroughbred male animals, but our full grown stock are all grades. I have always been of opinion that a farmer with means could not go into a better paying business than getting possession of say 100 acres of good cleared land in Muskoka, going out to the front in the spring and buying a lot of three-year old steers for the purpose of feeding by letting them run in the summer and putting them in stall in winter, and turning them out as beef.

To the Chairman.—If a man brought a number of cattle here to graze I do not think he would require any pasture, he could depend on the bush. There is a sufficiency of woods to allow of an almost unlimited run for catttle in the summer time In the spring the cattle go to the high land around the rocks, where there is a very quick growth of young herbs and grasses. Persons going into the feeding of cattle on field pasture would have to keep the pasture closed until about the beginning of June. They could not pasture very close after hay if they wished to raise a crop of hay the next year. My idea would be to throw open the pasture field so that the cattle could have the run of them and the woods too. I mean by throwing open the pasture fields, not to make a common of it, but rather to fence in say 50 or 100 acres of bush land with 20 or 30 acres of pasture; by so doing double the number of cattle could be kept. My brother has sold, to a cattle feeder near Barrie, four steers three years old, they were estimated to average twelve hundred pounds each; these same cattle have had nothing since they were calves but straw and beaver hay in winter and bush feed in summer; these cattle were greatly admired by parties on their way out; this is the first shipment from this neighbourhood, but hundreds of the same class might be shipped every year from this country. Steers and other young stock can get their living in woods as soon as the snow is off the ground and will feed well until the snow falls again; our woods are generally clear of snow by the 20th of April; cattle can live in the bush about seven months. Spring wheat can be profitably grown for home use if carefully cultivated and sown early; twenty bushels to the acre is about the average. Barley and peas are generally a good crop, yielding 35 and 25 bushels to the acre, respectively; oats, potatoes and turnips are generally a heavy and a sure crop. Grasshoppers only injured us one year in fifteen in this neighbourhood; they have at other times injured young grass seeds and late oats; the hopper cannot be considered a drawback to the country. Around the shores

[*Mr. W. F. Sivett.*]

of our numerous lakes tomatoes can be successfully grown. If a stranger were to come into the settlement and turn, say, 200 head of cattle into the woods to feed, I do not know that the settlers would like it, although they regard the bush as common property among themselves.

W. F. SIRETT.

MR. EBENEZER SIRETT'S EVIDENCE.

Ebenezer Sirett, of the Township of Humphrey, was called and examined.

To Mr. Dymond.—I was engaged in farming in England from 1843 to 1858, and in 1859 I emigrated to Canada. I left England because I was not allowed to exercise my political rights as freely as I desired. In 1859 I took up a farm in the Township of Etobicoke, in the County of York. I left York in 1864 and took up land in Humphrey; the land was not surveyed at that time, and there were no roads. I got a grant of 500 acres from the Government of Old Canada, which grant was subsequently confirmed upon the payment of a nominal sum of money. My land is a mile and a half inland from Lake Rosseau, with plenty of drainage, and is of a rolling character; there is a beaver meadow on my land of about 40 acres, which is flooded in the spring. About 120 acres are cleared and under cultivation, and it is all tillable excepting three acres of rocky land, which I keep for pasture; of the 547 acres which I now own 400 acres are fit for cultivation. The soil is a strong rich clay loam with very little sand. I have grown fall wheat, but though the straw is very heavy it is liable to mildew. I attribute this to the want of drainage as well as of proper openings in the woods to let in the air and sunshine; under other circumstances I believe fall wheat would be a profitable crop in most seasons. Spring wheat has been very successful with me, the average yield being from 20 to 30 bushels to the acre. Barley is a good crop if sown upon suitable land, though it occasionally grows somewhat irregularly; oats and peas are our chief crops. I have grown from 40 to 60 bushels of oats per acre. I do not require pasture, and prefer cutting the hay when the bush pasture is so plentiful. I have a piece of timothy which has been cut regularly for eight years, and this year it yielded fully one and a half tons to the acre. I have tried orchard grass, but it does not seem to do well; it runs out very quickly, and I am of the opinion that we will have to introduce some grasses which we have not got yet in order to make permanent pasture. I am very favourable to bush feeding, and do not think there is any pasture in the front from which they can turn out stock so early as from the woods here. As to sheep raising, I would recommend those who have sheep at the present time to breed to good Cotswold stock until they get a thoroughly good class of ewes, and they can then, if they desire, cross with more fancy breeds. The first improvement we have had in the bulls in this neighbourhood has been by means of a Shorthorn pedigree bull introduced by Mr. Robinson. The steers which I exhibited to the Commissioners to-day are out of common Canadian cows by a bull which was a second cross by a thoroughbred Shorthorn on a common cow. The calves are fed new milk for about a month, then skimmed milk from about June to August, after which they are allowed to run in the bush and the pasture fields—having the choice of both—until the winter sets in. In November they are taken in and fed on beaver hay, timothy alsike, and a few turnips and potatoes; the next spring they are turned out and are allowed to run in the woods if they wish. At first they come home at nights, but when the bush feed becomes more abundant they stay away for weeks at a time; they make flesh fast while in the woods, especially from July to the latter end of September. The steers referred to have no grain or turnips the second winter; of course they do not go out in the spring so poor as the majority of cattle do, which are fed on nothing but straw.

To Mr. Dymond.—If it is desired to reach the English market the common sheep should be crossed with the Hampshire Downs. I prefer them to the Southdowns, because they have larger frames, but I would prefer the Shropshire Downs to either. Sheep do

very well in Muskoka as they are not liable to disease, and thrive well. The scarcity of money in the country is an obstacle in the way of purchasing thoroughbreds for the improvement of stock. I keep 25 head of cattle and upwards of 50 sheep. I have been trying to breed from thoroughbreds, but have not got so far in that direction as I would like. In point of quality my land is far superior to that in Etobicoke, and as regards its capabilities, it will compare favourably under the same cultivation with the best land in England. To the west and north-west of this neighbourhood there is an abundance of land as good as mine is, and capable of growing profitably almost any kind of crop under proper cultivation. This is the country to which I would recommend English tenant farmers to come, or at least such of them as are thoroughly practical men, but they must throw away their old English ideas, when they come here first. After they get their land into a good state of cultivation they can follow almost the same system as in England; the climate and soil of Muskoka approximate more closely to those of England, than the climate and soil of the older parts of Canada. If a man takes up 200 acres he can get 100 cleared for $1,600, and can build a very respectable house for $700, and a barn for about $400; implements, stock, etc., would not cost very much at first, as a person would get them by degrees. I would not advise a man to go into clearing up, etc., upon a large scale at first, but rather to go on by degrees. A man with a family and having $2,000 or $3,000, could do well in Muskoka, whereas a man with £500 in England could do nothing as a farmer; £10 an acre used to be regarded as the regular capital required there. A farm of 200 acres, with 40 or 50 acres cleared and a barn and outbuildings, but without a house, would cost about $600. I know of a good farm of 200 acres, with 30 acres cleared and well fenced, a good house and barn, which can be bought for $800. About three-fourths of this farm is cultivable.

To the Chairman.—Q. What would shearling wethers kept partly in the bush and partly in pasture weigh in the fall, supposing they weighed 100 pounds apiece when put in about the first of May? A. I can't answer this question as a matter of fact, not having weighed any at any time live weight, but have had yearlings that I suppose would average from 90 to 100 pounds live weight in May, and at the fall when killed weighed from 9 stone 4 pounds, to 10 stone 6 pounds (8 pounds to the stone) of mutton.

EBENEZER SIRETT.

MR. JAMES ASHDOWN'S EVIDENCE.

James Ashdown, Reeve of Humphrey, was called and examined.

To Mr. Dymond.—I farm two lots of 100 acres each, and have about 35 acres under cultivation; my land is about 1½ miles from the lake. My experience is that there is no trouble in raising wheat upon old land if it is properly cultivated. The trouble is that so many persons find their way into new settlements who are the very worst kind of farmers; they will not draw out manure nor work their land properly. I consider that the alleged difficulties in the way of wheat growing in Muskoka is largely owing to the fact that the land is not skilfully cultivated. I am doing some ditching but no under-draining; I grow about 25 bushels of wheat to the acre in stumpy land, which would be equal to 30 bushels on old land. Fall wheat does very well on new land, and when I sow it I seed down and keep in meadow for five or six years so that the roots may decay. Hay sells at an average at $10 per ton; we have a pretty good market for it with lumbermen. I keep 14 head of cattle and 10 sheep; the greatest trouble I have with my sheep is to keep them poor enough to breed. I generally keep them on rocky land seeded down for pasture; this pasture I believe to be permanent, and sheep do well upon it. I am about to procure some Southdowns, as I think that breed will do well crossed with Leicester or Cotswold. In my opinion sheep will pay if a little capital is invested in underbrushing and seeding down with red and white clover, the high lands and rocky portions of the farm, the same to be well fenced, and several of the sheep provided with

bells, as a protection, or herded. I think the Hereford cattle would succeed well here as they could stand the climate better than the Shorthorns, and are better adapted for the use of the early settlers. I would recommend the growing of more clover, it being superior to timothy for fattening cattle and sheep; can have two crops in one season; does not require as deep a soil; does not impoverish the land as much as timothy; and, ploughed under, is a good manure. I prefer the Norway oats as the most productive in this latitude; I imported them in 1871. Two good farmers have raised to my knowledge over 1,000 bushels each for the past four years, and have not any desire to alter the variety. I have been experimenting with several kinds of wheat (new varieties), and expect to be able to recommend and offer seed, suitable to the climate, much superior to the varieties now in use, which for spring are Fyfe and Red Chaff; for fall, the Senecca or Clawson succeeds admirably. Apples may succeed if sheltered from the north winds.

JAMES ASHDOWN.

MAGANETAWAN, *August 31st, 1860.*

The Commission met at 9 a.m. *Present*—Messrs. BROWN (Chairman), and DYMOND.

MR. WM. HOLDITCH'S EVIDENCE.

WM. HOLDITCH, of the Township of Croft, was called and examined.

To the Chairman.—I have 400 acres of land in my possession lying between Ah-mic Lake and the Maganetawan River, and 80 acres cleared. The general character of the soil in my neighborhood is a clay loam, but there is also some light sandy loam on my farm, and a ridge is inclined to be gravelly. The soil in Croft and Chapman is rather heavier than in the townships to the north—Lount, Ryerson, and Strong, for instance. These latter townships are mostly in the water shed of the Ah-mic Lake and the Maganetawan River. The country is considerably broken by rock, though not so much so as the townships of Monk, Wood, and Macaulay. I came into this part of the country three years ago, after living in Bracebridge for some nine years. There has been great progress in this part of the district since I came in—the amount of clearing and the number of settlers having about doubled. I had very good fall wheat last year, the yield being about twenty bushels to the acre, and the sample good. We are liable to frost here to a certain extent, but not so much as those who live back from the lake. For the last two years we have had frost about the 15th of August, but we had no June frost to hurt the wheat, and there is generally sufficient snow to protect it during the winter. There is not much danger of the frost doing harm if the crops are put in early, but when people have to clear up their land in spring, they cannot always get in their crops early enough to escape the frost. I succeed very well in growing spring wheat: I had twenty bushels to the acre last season, and this year I will have rather more. I formerly farmed in the township of Markham, and find that oats do better here than there. I grow a few peas and they turn out very well, and are not troubled by the insect. I make it a rule to seed down my new land with grain the first year I sow grain, as thereby I keep the ground clean, and the grass holds good much longer. My average yield of hay is one ton per acre on land with stumps. I have grown only a small quantity of barley, but it did well, the sample being plump and bright, and the head well filled. I have 14 head of cattle, including some thoroughbreds. I have a pure Durham bull, with a pedigree, which I brought in two years ago. The encouragement I received from my neighbours in the way of improving their stock was not so much the first year as I had expected, but on the whole I have done very well by the investment. I believe that stock raising will pay well in the district, and that if people would turn their attention more to stock they would be more successful. A great many people seem to think that thoroughbred cattle will not do as well as others, but I have had thoroughbred heifers which I turned into the

bush with the other cattle, and though I at first gave them extra food, in a short time they preferred the bush pasture and did well upon it. I have twelve head of cattle and nine sheep, and I only keep three acres of pasture for them to which they have access; the flies trouble the cattle a good deal, and it is well to have a small pasture field to which they may resort when the flies bother them. I am convinced that the Shorthorns would do well if brought in young or bred in this country. I find that sheep of the Southdown cross do best with me. I am under the impression that Cotswold sheep are liable to catch cold and take inflammation. I have a thoroughbred Southdown ram four years, and the wool from the Southdown brings five cents per pound more at Bracebridge than the long wool, though the clip is rather lighter. I intend to cross my Leicesters and Cotswolds with a pure Southdown, as I find in that way I can have mutton and wool both. The Southdown I will keep pure for males.

To Mr. Dymond.—I think for all the purposes of cultivation the land is as favourable here as in Markham. We are sometimes slightly troubled with rust on the wet land, but I believe it will disappear when the land is drained properly, and the clearings are larger so that the air will have freer circulation. I do not think we have any disadvantage as agriculturists here that they do not have in Markham, excepting the land being more broken, and it is as easy to raise crops here as there. Upon the light soil timbered with hemlock we need not expect to grow wheat with success, but we have soil here upon which we can raise wheat as well as in Markham; we can grow as good crops of oats, peas, and barley. This country is superior to the front townsbips for pasturage, and the yield of hay will compare favourably with that in the older sections of Canada. I do not consider Beaver hay of any importance in connection with permanent settlement, but is, and also the bush, certainly an advantage while the land is being cleared. Even if a man had plenty of pasture, it is an advantage to let the cattle run in the woods, as it makes them hardier. At present the most convenient way of reaching market is to drive the cattle to Rosseau, and put them on the boat there. Up to the present time, however, the local consumption has been sufficient, as the lumbering interests absorb a great deal. Last year hay was cheap, but generally speaking we get about $10 per ton from the lumbermen. Oats average 50 cents a bushel at the barn.

WM. HOLDITCH.

MR. JOS. E. HUNTER'S EVIDENCE.

Joseph E. Hunter, of the Township of Croft, was called and examined.

To Mr. Dymond.—I have been farming in the township for three years, and have about 30 acres cleared out of the 300 acres which I hold. I grow successfully all the crops described by the last witness, except that I only grow peas in the garden. I raise about 200 bushels of potatoes to the acre. I think the only difficulty in the way of wheat growing is the lack of proper cultivation. It is my intention to go into stock raising—principally horses—as I fancy them most and was engaged in raising them in Markham. The first two years I was in the district I paid $20 an acre for clearing and fencing land; but now I can get it done for $15, because flour and other provisions are cheaper, and labour more plentiful. The labour to which I refer is that of labourers living near me—men who come here without means and have to work out. I think cattle raising could be carried on here on a very large scale; but I do not regard the country as specially marked out for wheat growing. There is crystallized limestone in the Township of Croft near my farm. Lime is also found in Chapman and at the foot of Ah-mic Lake.

To the Chairman.—I came here first because I was suffering from dyspepsia, of which I am now entirely free, and when I saw the country I thought I could do well. My intention is to graze horses on the pasture. Horses do not seem to care for the wild pasturage on the low land; but they are fond of the blue joint grass.

JOSEPH E. HUNTER.

MR. HUGH IRWIN'S EVIDENCE.

HUGH IRWIN, of the Township of Chapman, was called and examined.

To the Chairman.—I have been in the district nearly eleven years, I came here from the County of Huron, as a squatter before the survey. There were only two or three settlers here before myself. When I saw the soil I was pleased with it, and, having no family, my brother and I concluded to try the country. I have 315 acres of land, of which 115 acres are cleared. I had only $250 when I came here, and I have followed farming exclusively, clearing some of the land myself and paying for the clearing of the rest. I have 100 acres in the village of Maganetawan, which is good land, and 200 acres out of the village, which is considerably broken, though the soil is good. I know the general character of the country between Bracebridge and Rosseau, part of that country is good land, but on the whole I think this neighbourhood to be about the best portion of Muskoka for farming. Generally speaking the land along the Maganetawan River is the best we have in the country, it is a better soil, and the land is not so much broken. The same thing is true of some of the land near some of the lakes. The best crops of oats I have are raised on ploughed land which had been cropped for five years. I am satisfied that when the land is cultivated and properly drained it will yield far better crops than it now does. The average yield of oats at present is from 35 to 40 bushels to the acre, and I believe that the quantity could be increased 10 or 15 bushels by cultivation. I have grown peas and barley successfully, and they yield well. I do not grow any fall wheat. I have an idea that it will not succeed well here, though I have seen good samples. I think the country is not open enough for it—that it would be apt to rust. I have grown spring wheat for the last three years, the return being about 20 bushels to the acre. I have always had good average crops of potatoes—about 200 bushels to the acre. I have 22 head of horned cattle and 16 sheep. My cattle are common Canadian cattle, but for the last three years I have availed myself of the services of Mr. Holditch's bul., and it is improving the stock. I turn my cattle into the woods in summer, but keep the cows in the pasture. In the winter I feed them with hay and straw, and they do well on this treatment. Some of my cattle are stabled in the winter, and others have the run of the sheds; occasionally they get a little thin towards spring, but they soon recruit. I have some timothy mixed with red and alsike clover five years old. The white clover seems to come up naturally in the timothy and fill it up, and it makes splendid sheep grazing. I do not think that clover will stand more than two seasons on ploughed land; that is my experience. The frost does not seem to have the same effect in heaving it out on new land as as it does on the ploughed land. My sheep are a mixed breed. I do not think there is a thoroughbred ram in the district, though there are some pretty good ones. I believe this will be a great sheep-raising country as we can combine the use of the cultivated grasses with those kinds which grow on the wild land. I feed some grain to the milch cows in the winter. I never sold beef outside of the local market, and I get 5, 6, and 7 cents per pound for it, dressed weight. If a man had $1,000 it will pay him better to come here than to buy land in Huron County, where he will have to mortgage his farm for $3,000 or $4,000. On the whole my experience in Muskoka has been very successful, as I can now live comfortably. East of this there is a good tract of country, but on the whole the land between here and Rosseau is practically worthless for cultivation. North-east of here, in Armour, Strong, and Machar, there is good land for farming and stock raising purposes. There is a large tract of land in Muskoka, not yet taken up, well adapted for that purpose.

HUGH IRWIN.

MR. THOMAS G. PEARCE'S EVIDENCE.

THOMAS GEORGE PEARCE, of the Township of Chapman, was called and examined.

To Mr. Dymond.—I have been farming here for four years, and have about 35 acres cleared out of a 200 acre grant. I grow crops pretty nearly identical with those mentioned by Mr. Irwin. I grow wheat, and it succeeds well, when it is sown early enough to escape the frosts. I find that the tendency to frost diminishes as the clearings become larger. I have a large beaver meadow in the rear of my farm, and I think it has a great deal to do with the effect of frost in the surrounding land. I would not feed beaver hay to horses, I would rather give them straw. I was at one time a druggist in London, England, and when I was twenty-one years of age, after reading a number of pamphlets about Canada, I resolved to come here. I spent considerable time in working with farmers in Canada, and then took up my present farm. I have been in Canada ten years, and from my observation, should consider this district adapted to breeding and grazing. As a chemist, I have looked to some extent into the quality of the soil here, and I consider it would raise all the usual crops excepting wheat; wheat will not do without carbonate of lime, and the soil here has only a trace of lime. The chrystallized limestone found in this neigbourhood has, I think, a great deal of silica in it. It requires a greater quantity of stone to produce a given quantity of lime than ordinary limestone. It is my intention to go into stock-raising. I brought a small amount of capital into the country—$600 or $700—and I have found the investment a good one. I can raise more than enough to support myself and family, if we had cash markets and received current prices for produce. There is a fine section of country in the Townships of Joly, Strong, and Armour—not much broken by rock. I have 100 acres of land, every foot of which I can plough, with the exception of two acres. On the other 100 acres I have, perhaps, 20 acres of flat rock. I think that 70 per cent. of the land in the township is tillable. There is a great deal of good land in the district; more than is generally known, and the consequence is that new settlers are apt to stop short of the best land. There is some excellent land in the vicinity of Stony Lake. I have ridden four miles there without seeing a stone, but the roads were bad. If $1,000 were expended on the road between here and Stony Lake, it would have a great effect in opening up a settlement there.

T. G. PEARCE.

MR. DAVID NELSON'S EVIDENCE.

DAVID NELSON, of the Township of Spence, was called and examined.

To the Chairman.—I have been in this country twelve years; I came in poor, and was obliged to work out part of the time; I and my son together have about 100 acres cleared; I came here with thirty dollars and nine of a family; I have done well and have been able to retire. I farmed in Owen Sound before coming here. I would not rely upon fall wheat as a regular crop until after we can cultivate the land properly. We have been troubled with the blight for some years, but if we were able to sow early and cultivate the land well, I believe it could be avoided. Had I continued farming I would have looked forward to stock-raising as my main industry. I have some meadow eight years old, and this year I took 1½ tons off one acre of it. There was no clover in it. I agree generally with the statements of previous witnesses. I consider that a man with limited means can do better in this country than renting farms in the old settlements, and also that persons with capital can invest it profitably in clearing and improving lands.

DAVID NELSON, SR.

[*Mr. Pearce and Mr. Nelson.*]

MR. THOS. FOWKE'S EVIDENCE.

Thos. Fowke, of the Township of Lount, was called and examined.

To Mr. Dymond.—I have been settled here four years, having come from the Township of Darlington, County of Durham, where I have farmed a little. I now own 200 acres, of which about thirty are cleared. I have some sons, and they have been able to do their clearing and other work themselves. I came in as a squatter, but my right to my land has since been confirmed, and I do not think I will have any difficulty in obtaining my patent. The Township of Lount is similar to Chapman; some parts of it are sandy; but where I am it is a clay loam on top; the soil is splendid, but we have a good deal of rock; I have tried both fall and spring wheat, and they did very well. Turnips are a good crop when they do not suffer from the fly, and I do not know that the fly is more troublesome here than in Durham. The frost has been destructive for the last two years in the month of August; potatoes and corn suffer most, in fact, though corn sometimes does well, it can not be considered a successful crop so long as these frosts prevail. The effects of the frost are localized, to a certain extent, and are less injurious on high than on low lands. I have tried lime-burning, but it has not been quite successful. I have abundance of crystallized limestone on my farm, both white and coloured. I am a tanner by trade, and I find it to be the best lime for tanning I have ever used, and it is also first class for building purposes; I sell the lime at twenty-five cents a bushel at the kiln; I cannot afford to sell it for less unless in much larger quantities; it is very hard to quarry and very hard to burn. I do not think I would have been able to get along on the farm alone without the assistance I have got from the lime-kiln; as it is, I make a very comfortable living, and have never been sorry for coming to the country. A good many settlers have come into Lount since I came in, and most of them are doing well; they are English, Scotch, Irish, Swiss, Germans, etc.; a good many of them have been mechanics before coming here; they get along well, as they are able to work part of the time at their trade. As soon as I found out the nature of the country, I made up my mind to go into stock raising as soon as possible. Cattle would do better here in the woods than in the pastures in Durham county.

THOMAS FOWKE.

P S.—The greatest complaints I hear is about the way the road appropriations is given out to parties who expect to pocket the half of it, and live in the front, when there are men that live in here that could do the work as well, and for about half the price that is paid. If the work was let in shorter sections it would help the settlers that come in here to make homes; they should have all the encouragement the Government can give them.

T. F.

REV. H. DIERMANN'S EVIDENCE.

Rev. H. Diermann was called and examined.

To Mr. Dymond.—I am a missionary among the German and Swiss settlers, who are scattered over the Townships of Chapman, Ryerson, Lount, and so on, up to Nipissing; some of them are energetic and thriving, but others do not do so well, especially the mechanics, who do not know how to clear land. There are some splendid tracts of land northwards to Lake Nipissing, and some very rough land. My idea is, that if a man has a little means, and has a mind to work, and extend his clearing, he could make a good farm. People generally do not go at the work of clearing in the right way, and it is their own fault that they do not succeed; they are too late in getting in their crops and do not work the land properly.

[*Mr. Fowke and Rev. H. Diermann.*]

To the Chairman.—I am strongly convinced, too, that people should sow fall rye instead of wheat, as it is a sure and productive crop, and bread made of rye and wheat flour is acceptable to most people; rye can also be used with great advantage in feeding stock; I believe, however, that as soon as they get into cultivating the land properly, wheat and all other grains will do well; the rough broken land in Muskoka could be largely used as pasture; I think the Nipissing district is as favourable for cultivation as those of Muskoka and Parry Sound; but the great want of the country is roads, some of the people have no roads at all; some of the Swiss and Germans, instead of pushing back to the good land—as they would if the roads were better—settle down on the first land they come to, and usually it is about the worst they can get; some of these people have to go to New York and Michigan to work in order to get their seed grain, and I believe it would be wise to help along some of those who are here rather than to spend so much upon immigration agencies.

H. DIERMANN.

The Commission then adjourned.

McKellar, *September 1st, 1880.*

The Commission met at 9 a.m. *Present*—Messrs. Brown (Chairman), and Dymond.

MR GEORGE KELCEY'S EVIDENCE.

George Kelcey, of the Township of Hagerman, was called and examined.

To Mr. Dymond.—I have been farming in Hagerman for ten years, and came here from Rugby, Warwickshire, England, where I followed the business of a plumber and painter. I have between 500 and 600 acres of land, of which a little over 100 acres are cleared. One-third of the soil is light and two-thirds clay; about 25 per cent. of the land is rough and rocky, but fully one-half of this would be suitable for pasture, and part of it could be ploughed. The best crops I have grown have been upon the roughest land. I sometimes manage to raise good crops of fall wheat on new land, but it does not pay to raise it on old land, as there seems to be something lacking in the soil. If this ingredient were supplied, and the land properly cultivated, I believe we could raise good crops of wheat. I think lime is the element which the soil requires; the wheat comes up well, but just when it is coming out in head it begins to fail, and in many of the ears a few of the lower grains are large and plump, while there are scarcely any in the top at all. Several good crops of wheat have been raised this year on old land, from 25 to 30 bushels to the acre, and of good quality. Crystallized lime is common in the neighbourhood, and though I have not used it on the soil I noticed that a few heads which grew near the kiln were excellent; we would use the lime if we could get it burnt, but people do not seem to understand the burning of it. Oats are always a good crop in our settlement; I had 60 bushels to the acre last year, on land where there were a good many stumps. Barley is also a good crop, and I think rye would do well, though I have never sown any of it; good crops of rye have been raised this year. Peas are grown successfully, though of late there have been some signs of the bug. I always seed down my land with the first crop, and plough it up after it has been in grass about five years. I have some land which was seeded nine years ago and the grass is good yet. My yield of hay averages 1¼ tons to the acre. New land can be cleared and fenced with rails and logs for $13 an acre. I have been very successful in growing turnips, though they have been attacked by the fly several years. I had four splendid crops out of seven, and the other three, though materially injured, were not complete failures. I keep a number of sheep and cattle, including a bull, which is about half bred; it is the best bull we have, but I would like to have a thoroughbred. There has not been much stock raising in my neighbourhood, and nobody has come in with a view of sending cattle to the outside, as the local

market is better. The lumbermen take nearly everything we raise. I brought some capital into the country with me, and find that farming pays me now, though it did not at first. I think stock raising should be carried on to a considerable extent, as the bush pasture is a great advantage in the summer. In the winter I feed my stock upon hay and straw, giving some turnips to my milch cows, and they do well on this food if kept in comfortable buildings.

To the Chairman.—The rocks are mostly in bluffs, the soil being good and deep right to the edge of the rock; there is very little flat rock. Twenty to thirty miles from where my farm is, in the Townships of Mills and McConkey, there is plenty of good land lately come into market for settlement; that is to the west of the Commanda Road, between it and Georgian Bay. The whole neighbourhood round here is fit for settlement. Potatoes do well with me; two years ago this fall I took 53 potatoes to Parry Sound weighing 63 pounds, and they were picked off one load, they were of the Early Rose variety. Last year I planted 24 bushels, from which I got 450 bushels. The people do not encourage the introduction of thoroughbred bulls; they would sooner put their cows to some common little bull running the road than pay $1 for the services of a thoroughbred. There are no pure-bred male animals of any kind in the district except Berkshire hogs. The reason we have not gone into stock raising is because there is a good demand for the crops we raise. The demand by the lumbermen has been increasing, and the settlers have never been able to supply the market, so that the lumbermen have to send outside for some of their supplies. I have a half-bred Shorthorn cow which has been living in the bush since the snow disappeared, and now she is the fattest animal in the neighbourhood; she is now good beef. She does better in the bush than any of the common cows, and I can winter her better than a common animal on the same food.

[Witness adds, before signing the transcript of his evidence, as follows:—]

"I saw the reports of your meetings in the papers, which read as though we were in Muskoka. It mentioned Mr. John Armstrong, of Muskoka, which is not correct; should have been Parry Sound District. In not mentioning it as Parry Sound our district sustains a certain amount of injury; everyone who reads the reports and thinks of moving to the free grants, will go to Muskoka. Half of our farmers travelled over Muskoka first and would not settle in it, and are now successful farmers in Parry Sound."

GEORGE KELCEY.

MR. WM. HURD'S EVIDENCE.

Wm. Hurd, of the Township of McKellar, was called and examined.

To the Chairman.—I have been here ten years, and have been farming all the time, and never farmed before coming here from Meaford, where I was a storekeeper. I have 165 acres, of which 25 are under cultivation. My soil is a clay loam. The land throughout the township is of that character. Oats yield me from 40 to 50 bushels to the acre. I generally seed down with the first crop. Owing to the difficulty of cultivating among the roots, I keep it in grass for five or six years. Spring wheat does very well with me, and there is a good deal grown throughout the township. I expect to have over twenty bushels to the acre this year. I think, however, that oats, barley, and other coarse grains pay better than spring wheat, as we have a better market for them. I am of the opinion that the soil requires more lime than it has to make it permanently suitable for wheat cultivation. A great deal of the straw breaks off at the second joint from the ground, owing, I believe, to the weakness of the stalk. I have twelve head of horned cattle—scrub stock—and I let them run in the woods in the summer, they come out in good condition in the fall, and the cows give a large quantity of good milk, which yields as good butter as we can get in the outside townships. I have had timothy growing for seven or

eight years. I never top dress it or pasture it except for the after-grass. When I break up meadow I generally put in peas and sometimes wheat. Peas yield ten or twelve bushels to one of sowing.

To Mr. Dymond.—To team gypsum from Parry Sound to McKellar would cost about twenty cents per hundredweight. I have not tried anything in the way of improved farming owing to the necessity of clearing the land. We do not suffer much from frost close to the water, but in other situations we do to some extent; we have suffered considerably the last two seasons from frost; the crops chiefly affected are potatoes, corn, buckwheat, etc. The usual price for oats in the fall is 35 cents, but during the winter and spring they go up to 50 or 60 cents; hay averages from $8 to $10 per ton. The reason I came to Muskoka was because an in-door life did not agree with me, and I was desirous of getting some land. I consider that I have been pretty successful. Land can be cleared for $16 an acre, which sometimes includes the fencing and sometimes does not.

W. A. HURD.

MR. WM. SHAW'S EVIDENCE.

William Shaw, of the Township of Ferguson, was called and examined.

To the Chairman.—I have been in Parry Sound district upwards of ten years, and came from Owen Sound as a practical farmer. I farmed in Grey county for fourteen years. My land is a heavy clay, though the greater part of the township of Ferguson is a light sandy soil; the timber being a mixture of pine, birch, hemlock, basswood, balsam, etc. I have 195 acres of land, of which 70 are cleared. My system of farming is pretty much the same as that described by the previous witness, only that I began summer fallowing last year. I have one field which was seeded down nine years ago, and it is splendid pasture yet—the clover lasted seven years. I grow all the coarser grains successfully, but I do not think wheat is a safe crop here, owing to the want of a sufficient quantity of lime. My land is rather heavy for potatoes, though they do well in the township. I have not grown corn, but it does well with my neighbours, who raise two or three acres every year. I am close to a lake, and am not subject to frost, but the farmers farther back are, slightly. The first sheep I had were good Leicester grades, but I have been trying to improve them with Cotswolds. I have a ram which is represented to be a pure Cotswold, but I do not think it is. I find that the cross improves the quality and the quantity of wool, and makes a larger sheep. If I were in a position to do so I would get some improved Ayrshire stock from outside to cross on the common cattle, as I think the Ayrshires are hardier than the Durhams, and can stand the severe winters better, besides being good milk producing animals. My idea would be to combine beef making and dairying. I would keep the cattle in the woods until about this season of the year, and then turn them upon the hay pasture. To keep up my grass I would use land plaster—I would have used it already had I been able to procure it—it is not kept at Parry Sound. I would not get Ayrshire stock if I were raising beef to export to England. In sheep raising I would stick to the Cotswolds and Leicesters. My wool is of an excellent quality; I send it to Wyebridge to be manufactured; it sells there at 30 cents per pound. I came from Chinguacousy, in Peel. The soil of my present farm is a good deal the same as the soil of Chinguacousy, but the township of Ferguson is very much lighter. Having regard to its agricultural capacities, I prefer the soil of Chinguacousy to both my present farm, and the soil in the county of Grey. Land now costs, in Chinguacousy, about $50 or $60 an acre. I am satisfied that the better cultivation of the land would make a great improvement in the way of immunity from frost. My view in coming here was to get property for my family, as I was not able to do it in Grey, and I think farmers situated as I was would do well to follow my example, especially as it is now much easier to select a location than when I came into the country. There are no land jobbers or speculators here to my knowledge, and there are no deserted locations in

my neighbourhood. The opportunities for going in and out where I am are good, and the settlers are, on the whole, a contented and progressive class of people. I have been running a threshing machine through this part of the country for the last few years, and I know that the settlers are making progress, as the men who two years ago could only give me half a day's threshing, now give me a whole day or more. A great many of the farmers are beginning to adopt what may be called a systematic mode of agriculture. I have tried fruits of nearly every kind, and they have proved an utter failure, but many of the farmers have already successfully grown crab apples, grapes, and other small fruits.

WILLIAM SHAW.

MR. JOHN FISHER'S EVIDENCE.

JOHN FISHER, of the Township of McKellar, was called and examined.

To the Chairman.—I came from Niagara district, where I was a boatman, and I have been farming here ten or twelve years. I have 195 acres with 35 acres cleared. Of the 195 acres I think 180 are tillable. The soil is a clay loam. Only about 15 acres of my land is broken by rock, but 4 or 5 acres are cut off by the East River. My most reliable crops are oats and peas. Oats yield from 40 to 60 bushels per acre, and the yield of other crops is pretty much the same as mentioned by the previous witnesses. I came in without means, and did all my clearing with my own hands, as my family were young. I am now able to support myself and my family by the produce of my farm, though I have not been doing so, having to purchase implements, etc. I have no cause to regret having come to Muskoka. A farm such as mine should be worth $2,000 including the buildings, though perhaps I could not get that much for it. I have seven or eight head of common cattle. I do not think there are any improved bulls in the neighbourhood. My intention is to devote myself to grain raising, as I think my soil is adapted for that purpose. It is not easy turning beef into money here, as I am fifteen or sixteen miles from Parry Sound.

JOHN FISHER.

MR. JOHN ARMSTRONG'S EVIDENCE.

JOHN ARMSTRONG, of the Township of McKellar, was called and examined.

To the Chairman.—It is eleven years since I came to Muskoka and Parry Sound from Davenport, in the Township of York, where I followed farming from my youth. When I first came here I was engaged in building Government roads, lumbering, milling, and store-keeping, but I have been farming all along and have taken particular interest in it. I think the reason that the crops are not doing so well here as they might is because the farmers are sowing only such crops as are best adapted for the lumbering business, which gives them their best market for the present. Most of those who settled here were poor, and had to work out at lumbering, etc., but most of them have made their way, and a good many of them are now worth from $1,000 to $2,000. All the grains grow better here and with less labour than in the Township of York, with the exception of wheat. Fall rye has done remarkably well, and ought, in my opinion, to take the place of fall wheat to a great extent for the bread of the people. Turnips and carrots are very successful—more so than in York where they summer-fallow and sow plaster and use the drill. All kinds of oats yield well. We have been troubled a little with frost the last two years, but chiefly in the newer settlements, where it is most likely to do injury. I think that for stock raising the Parry Sound district will yet prove to be one of the best parts of Ontario, though little or nothing has yet been done in that direction. I am sure that any kind of stock that does well in the front would thrive here, as the pasture is excellent

[*Mr. Shaw, Mr. Fisher and Mr. Armstrong.*]

and the water pure and abundant. I believe that if men of capital would get hold of large tracts of land, partially cleared, and go into stock raising, it would not only be a good thing for the country, but a paying business. So long as people have a good market for their coarser produce they do not care to go into experiments such as stock raising, but in time, as the lumbering operations decrease, they will have to turn their attention to that branch of industry, as well as wheat growing, which I believe will be successful when the land is properly cultivated. I have grown wheat successfully for two years, but other crops requiring less labour pay better at present. All sorts of vegetables do well and come to perfection. I have not given many fruits a fair trial, but crab apples succeed splendidly.

To Mr. Dymond.—I am familiar with the townships to the north of this, and know that many of them contain large tracts of good land fit for settlement. Beginning at Parry Sound, for ten miles around 50 per cent. of the land is fit for cultivation, the soil being a light loam, in some places rather inclined to be sandy, that is in the Township of McDougall and part of the Township of Ferguson. In McKellar the soil is very varied, parts of it being as fine a clay loam with heavy clay bottom as can be found, about 60 to 75 per cent. of it being fit for agricultural purposes. Hagerman and Croft are about the same. Mills and McConkey, two new townships, are reputed to be better than McKellar, having less broken land and more good soil; very little of it has been located or settled yet. The line of good land is to the north-east from Parry Sound and then a little to the north-west again. My farm is in the village of McKellar, and I have about 175 acres cleared and under cultivation. I keep from 15 to 20 head of cattle, and the same number of horses. I have thought some of getting a thoroughbred bull, but I have a great deal to attend to, and there is considerable trouble in keeping such an animal. I think plaster could be used to great advantage on the soil, and might profitably be made a merchantable commodity: there is every facility for bringing it to Parry Sound cheaply; it could be brought in here from 15 to 20 cents per 100 pounds. There is a comparatively inexhaustible supply of crystallized lime not far from here, but no one has had sufficient encouragement to go into the burning of it on a large scale. The progress of this part of the district, during the last eleven years has been something wonderful.

To the Chairman.—Some of the settlers make good use of their barn-yard manure, and some do not. There is an Agricultural Society here, of which I am President, with a membership of 60. We received $64 from the Government this year. We give prominence to premiums for improved stock; but we have no special prize for a thoroughbred pedigree bull, because there are no such bulls in this neighbourhood. The usual quantity of flour to a bushel of wheat is 40 pounds and tolling. As a general thing the wheat does not get the care it should, but is mixed with cockle weeds, etc. The Government ought, in my opinion, to encourage immigration to this district by way of Parry Sound. Those new townships to the north, which have lately been placed in the market, afford the best opportunity for securing good land—Free Grant—that has been afforded in this Province for many years. These townships are within forty miles of navigation at Parry Sound. The Government ought to continue their liberal appropriations for Colonization Roads, from year to year, until this District, which is the best Free Grant District now in Ontario, is thoroughly settled. I would also recommend the Government to encourage the immediate construction of a railroad through this District, as it would be the means of thoroughly settling and developing the whole District in a comparatively short space of time. This Parry Sound District, alone, has, in my opinion, resources enough in agricultural lands, pasture lands, timber, and minerals to make a populous and thriving county, and that it will experience such progress in the not far distant future is my firm belief.

JOHN ARMSTRONG.

The Commission then adjourned.

PARRY SOUND, *September 2nd.*

The Commission met at 9 a.m. *Present*—Messrs. BROWN (Chairman), and DYMOND.

MR. DAVID McFARLAND'S EVIDENCE.

DAVID McFARLAND, of the Township of Carling, was called and examined.

To the Chairman.—I have been in the district twelve years, having come from the County of Lanark, Ontario, where I had been farming for fourteen years. I came here as a squatter long before the township was surveyed. I hold 200 acres of land, of which 40 are under cultivation, and 150 cultivable; the soil is mostly a heavy clay, though I have some which is lighter. I have grown almost all the crops to which I was accustomed outside, but though I still cultivate wheat, I have almost gone out of it. I have grown two pretty good crops of fall wheat, but the last two years it has been so winter-killed that I have been obliged to plough it up; it is also liable to rust and mildew unless it is sown early, and it suffers from the lack of lime. It would be a great advantage to us if we were able to obtain salt and lime at reasonable prices. My land is near Lake Sims, and I am liable to frost to some extent, though not seriously. I have about 20 bushels to the acre of fall wheat. My soil is naturally pretty dry, and has no sponginess below when properly cultivated. We have no drains but those we style top drains, but if I am able I will do some under-draining. I have tried salt on a small scale as an experiment, and can recommend it very highly; from two to five bushels of it to the acre will act as a preventive of rust, and it also strengthens the straw. I have raised some very good crops of spring wheat; the largest yield I have ever obtained was 23½ bushels to the acre; its liability to rust is the only difficulty in the way of cultivating spring wheat. Practically there is no difficulty in growing oats. Last year I had 75 bushels to the acre, and the average will be about 40. I do not raise much barley, but it does well, yielding about 30 bushels to the acre, and the sample being of good quality. Peas do well on my clay soil, but my neighbours who have lighter soils do not succeed so well, as the vines are liable to mildew. I have been growing peas for the last eleven or twelve years from seed which has not been changed for twenty-six years, and they are fully better this year than ever. The worm has been getting into the peas the last two or three years, but not to any serious extent; the wheat weevil is decreasing. I have grown rye very successfully for the purpose of feeding to stock. I have not yet got into any rotation of crops. Upon new land I sometimes put potatoes and turnips, sometimes oats, and occasionally wheat, but I do not approve of wheat. I seeded down the first grain crop with timothy, but I did not use any clover, I prefer timothy alone. Potatoes yield splendid crops, over 200 bushels an acre; turnips do well, except that they are occasionally troubled by the fly. I have got 800 bushels off three-quarters of an acre of new land. I have twelve head of horned cattle, of which five are milch cows; six sheep, and two teams of horses. I allow my cattle to run in the woods in summer, keeping a small piece of pasture, which is accessible to the milch cows. A good deal of the land in the Township of Carling is rough and broken, most of the soil being rather light. The cattle are pretty thin in the spring, as we do not feed grain except very occasionally. I am not paying particular attention to sheep raising, but I know they do well. I once brought into the district what was called a thoroughbred Shorthorn bull, and kept him for three years until I got tired of him; I have one at present which is three-quarters thoroughbred. I had plenty of encouragement to keep my thoroughbred bull, but little pay; the stock I got was very much improved, and did better in the woods than the common cattle.

To Mr. Dymond.—I would rather have one acre of land here than five in Lanark, only the proportion of good land is not so great. The soil in Lanark is very shallow, but wherever we have soil in Muskoka it is deep, the rock only cropping up in places. I would not take less than $4,000 for my farm, it is worth that much to me; probably I could not get that figure if I had to sell, as people prefer getting free grants to buying improved

land. As a practical farmer of large experience I consider that the change from Lanark to Muskoka has been a favourable one. I had only 50 cents when I came in and a small quantity of supplies for immediate use. I have no mortgage or other incumbrances upon my farm. We sell most of our produce to the lumber merchants, but we can get no cash in return, nothing but goods from the stores. I think it would be a profitable thing to feed stock if we only could get buyers of cattle to come into the country; there is a great deal of stock for sale in the country at present. Butter generally sells pretty high—20 to 25 cents—though it is sometimes as low as 12½ cents. I get cash for my butter, as I make it as good an article as possible, and do not sell it at the stores. We have no outlet except by Parry Sound, and there is no railway in contemplation in the shape of an extension of existing lines; I would not mind driving my cattle twenty miles. I bought about $50 worth of young fruit trees, but they have been a failure except crab apples and plums. Salt costs us $1.25 and upwards, though we have easy communication with Goderich by water. Collingwood is the outlet for our produce, but it would not be convenient for us to bring in small shipments ourselves, and there is no one here who undertakes to get in the salt as a matter of business. Most of our produce is sold on the principle of barter; there are only three stores in Parry Sound, those of Mr. Beaty, the Parry Sound Lumber Company, and the Guelph Lumber Company. There is no better market for stock than for produce, though I suppose we could drive cattle to Rosseau and get the boats there. I highly recommend the country as being very healthy, and also those coming here to have capital enough to support them for at least one year, particularly immigrants, who are not acquainted with clearing of land. It would be better for immigrants to get acquainted with the work with farmers in the older settlements in Canada before coming here. But I think Canadians who are either paying rent or interest would do better by selecting a good farm in this country.

DAVID McFARLAND.

MR. THOS. PEAKE'S EVIDENCE.

THOS. PEAKE, of Foley Township, was called and examined, in the unavoidable absence of his father.

To Mr. Dymond.—I am the son of S. J. Peake, a farmer, who has 150 acres of land, of which twenty are under cultivation. He has been farming here eleven years. He has more land cleared, but it is not cleaned up for cultivation. His oats will yield 60 bushels to the acre this year. (Witness produced samples of oats in sheaf, of the Black Tartarian variety, the straw, which was fully five feet in height, being bright, strong and clean.) The oats were grown on a light, sandy loam, upon which turnips and potatoes had grown last year. We generally plant potatoes upon the new land, and then seed down with oats. (The witness produced specimens of wheat on straw, of which the heads were fairly large and well grown, and the sample good, but the straw was rather weak. He also showed the Commissioners some potatoes, turnips, and tomatoes, all of them unusually large.) Spring wheat does not succeed very well, as it is liable to rust. The turnips produced were grown on a light loam, new land, and the potatoes on clay. We sometimes grow 300 bushels of potatoes to the acre on clay soil. Tomatoes always grow freely, yield well, and come to perfection. In former years the leaves might be cut off by the frost, but the fruit ripened. My father came here directly from Ireland. He was in the army, but had been raised on a farm until he was ninteen years of age. He came originally from Barnstable, in England. He manages to get a living off the farm, and is quite satisfied with the experiment he has made.

THOMAS PEAKE.

MR. WILLIAM WILCOX'S EVIDENCE.

WILLIAM WILCOX, of the Township of Foley, was called and examined.

To the Chairman.—I have been here thirteen years, and have been farming most of my life. I was five years on a rented farm in Toronto Township, County of Peel, and two years in Osprey, Grey County. I was a farm labourer in the Old Country. I have 285 acres of land, of which 60 or 70 are cleared. My farm is on the Horseshoe Lake, inland ten miles from Parry Sound. The land in the township is broken, but there are some very good farms. All kinds of soil can be found on the same farm and almost in the same field. Crops of all kinds do well except wheat, and the land is becoming better adapted for wheat all the time. I have used salt upon the soil and find it of very great benefit. A person can stand forty rods away and tell exactly where the salt has been thrown; the grain comes a week earlier than the rest, and the rust never touches it. Salt is so dear, however, that we cannot afford to buy it in any great quantity. It would be a great advantage if some one in Parry Sound would get in a quantity of it. Fall wheat does not succeed well, owing to its liability to rust, caused, I believe, by the fogs and damp weather. I think, on the whole, that I can raise crops much better than in Toronto Township, especially hay, roots, and oats. Clover and timothy last eight or ten years in hay or pasture, and I think that is because there is so little frost before the snow comes on. I think clover does better on new than cultivated land, as it is more apt to heave out on the latter. Potatoes yield good crops, and though we are troubled by the beetles, they are getting less numerous every year.

To Mr. Dymond.—I have tried land plaster as a fertilizer, and wish I had got it in larger quantities. It comes from Toronto, Ont., but I could not say whether it was Canadian or American. It is gray in colour and costs $2 per barrel. It has a splendid effect on the growing crops, and, if good plaster could be got at reasonable rates, it would be an immense advantage to the country. There ought to be no difficulty in getting salt from Goderich at a cheap rate, as vessels go away from here with lumber for all parts of the coast of Lake Huron, and come back empty. I have 18 head of cattle and 28 sheep —all of them thoroughbred Leicesters. There is a thoroughbred Shorthorn bull in the township, owned by Mr. Haines, but it is not generally known that there is such an animal. Up to the present time there has been no improvement of the stock in the township. Cattle are pastured in the woods, the cows being kept in at night, but the bush pasture is beginning to fail. Rocky land produces the best bush pasture. I bought my Leicesters from Mr. Smith, of Acton, and from Mr. Waldie. The market for our surplus is Parry Sound, and we generally sell to the hotel-keepers, storekeepers, etc. It is not very easy to get money, if farmers are forced to sell early, but if they keep their produce to the proper season, they can get cash and higher prices. I had some old hay this season which I sold to the lumbermen, just before the hay season, for $12 cash. If corn is planted early it matures well, and is generally a good crop. People who come directly to Muskoka from the Old Country are generally failures—they should get some experience in older parts of Canada. I had a fair stock of implements when I came here, but no capital. My farm now affords me a good comfortable maintenance. I have a family of ten children.

To the Chairman.—I have thoroughbred Leicester ewes, as well as rams, but I could not say very much as to how they are going to do.

W. WILCOX.

MR. JAMES BADGER'S EVIDENCE.

JAMES BADGER, of the Township of McDougall, was called and examined.

To the Chairman.—I have been in Parry Sound eleven years. I am a native of England, and farmed there as well as in the vicinity of Niagara Falls. I spent four years in the milk business in London, England. I had a rented farm of 300 acres in the Niagara District. My present farm was put in the market before the Free Grant Act was passed, and I had to buy the land from the Government—469 acres in one block—for which I paid 70 cents an acre; this was in October, and the Act was passed in March; by the liberality of the present Government in Ontario I was allowed for my having had to pay for my land, by being permitted to take 200 acres of free grant. I had some means when I came into the country. I have now about 70 acres cleared. Besides the land I have mentioned, my sons have taken up free grants. I have 200 acres of really good land—200 acres of which is somewhat broken, while 70 acres of my best land has been flooded by the Parry Sound Lumber Company. Some of my soil is a sandy loam, some is rather light, and some is clay; that is about the description of all the land in the township. Neither fall nor spring wheat can be grown with any satisfaction, though it may do after we are able to cultivate the land well. I keep the most of my land in meadow and pasture. I corroborate generally what previous witnesses have stated about their crops. (Witness produced specimens of oats in straw, grown upon his farm. They are of the Black Tartarian variety, more than six feet high, the straw somewhat rusted, but bearing a full head of grain not yet ripe. He also produced some millet not yet ripe, the straw being four feet high, with a strong head of grain.) I grow millet to feed my cows in the winter, and in the fall if the pasture fails. Rye does remarkably well with me, and it makes very good bread. I have grown corn, but I could not recommend it as a safe crop. I have grown hay largely and feed most of it to my stock. I always sow red and alsike clover with my timothy; sometimes it does not seed well the first year, but it comes out strong afterwards. I have clover and timothy which have kept up for eight years. I have about eighteen head of cattle and only two sheep, though I used to have more. I allow my cattle to go either in the pasture field or the bush, and they generally prefer the latter.

To Mr. Dymond.—Our market for beef is generally in the village of Parry Sound, but sometimes we sell to the settlers; we get six cents per pound from the butchers for dressed meat. I have a bull which is as nearly thoroughbred as possible, but it has no pedigree. I have improved my own and my neighbour's stock, and I find that it pays me to keep the bull. I intend to go in for raising sheep as soon as I have my farm cleared. In the Niagara District I paid a rental of $250 for 330 acres, of which 130 acres were cleared; the farm was badly run down, and I improved it while I had it. I think it a wise thing for a farmer, circumstanced as I was, to come to Parry Sound District.

JAMES BADGER.

MR. MATTHEW HAILSTONE'S EVIDENCE.

MATTHEW HAILSTONE, of the Township of Ferguson, was called and examined.

To Mr. Dymond.—I have been a settler here for seven years. I am a miller by trade, but I have followed sawing a large share of my time in the old country as well as here. I have taken up a free grant of 200 acres. One of my sons has 200, and the other 100 acres. I have cleared 25 acres, and my sons 17. My sons generally work out, and I work the land. I had no capital to start with. I grow a good deal of hay and feed it to my stock. Fall wheat does not do well, but I have fair crops of spring wheat, though the coarse grains pay best. Turnips and mangolds are very productive, the latter especially so, as they

are not attacked by the fly. I keep a good deal of stock, as it pays to manure the land. I am pretty well satisfied with my experience in Parry Sound, and I find if the settlers do not get on well it is generally their own faults. I have seventeen head of horned cattle and seven sheep. I allow the cattle to pasture in the woods; none of them are improved. I have had good crops nearly every year, though occasionally the frost does a little damage. We have plenty of pork to kill this fall. We have bought a span of horses since you were here, and are going into the lumbering, as we generally do in the winter. I have seven in family—five boys and two girls—the youngest boy is fifteen. I consider this a very healthy place, as none of us has ever been laid up with sickness since we came to Canada. I came from Swindon, in the County of Wilts, England, in 1873, with my second boy, and the rest of the family came out the spring following. When we first came here the roads were in a very bad state, but have been greatly improved. I think anyone can do a great deal better here without capital than he could on the prairies (for there is always work to be got here at fair wages), but of course would be better with a little capital, as he could purchase an improved farm. It appears the people from the old countries do better here than Canadians. The Parry Sound Agricultural Show on the 6th of October was very fair; some fine samples of grain were shown, and vegetables were very good, as also the root crops. I think a railroad is very necessary for the advancement of the country, as the circulation of money would then be greater, for the truck system is too much in vogue here. I will give all the information in my power to inquirers.

MATTHEW HAILSTONE.

MR. FRANCIS STRAIN'S EVIDENCE.

Francis Strain, of Parry Sound, and Reeve of the Township of Foley, was called and examined.

To Mr. Dymond.—If farmers have to pay $1.25 for salt per barrel, it is their own fault, as I am certain that arrangements can be made to bring it in for 80 cents per barrel.

F. STRAIN.

During the sittings of the Commissioners at Parry Sound, the following letter was put in and admitted as evidence.

Ilfracombe, Muskoka.

Dear Sir,—I have been reading the reports of Tenant Farmers' Delegates on the Dominion of Canada as a field for settlement, and notice that this district is entirely ignored. Now, I came out to Canada in the winter of 1875-6, and know Ontario pretty well, and have farmed in East York, but in the winter of 1877-8 I moved in here, and have now nearly 75 acres cleared, and I am so satisfied that for stock raising this district is far ahead of any other part of the Dominion that, besides Mr. Æmilius Baldwin, of Masquoteh, who came in with me, I have induced a number of gentlemen with some capital to come from England and elsewhere to settle here, and they have all large clearings, notably H. H. Stotesbury, E. N. Stotesbury, W. A. Vernon-Garratt, R. H. Tothill, F. M. De la Fosse, P. F. G. Belle, A. J. O. Sweet, and F. G. Fauquier, and there are others still coming. I have a thoroughbred Durham pedigree bull and about twenty head of cattle and 20 head of sheep, and our greatest drawback is that the settlers in here are so poor that they cannot even afford to pay for the services of a good bull. If all the settlers had some means, like my friends, the country would soon become a very important part of Ontario. We have built a church and parsonage and raised $950 per annum for our clergyman, and cleared him five acres of land. I have had my house full

[*Mr. Hailstone, Mr. Strain and Mr. Harstone.*]

of Toronto visitors, etc., who are astonished at what they see and could not believe the country was anything like it until they came here. If the Government would only induce men of some means to come and settle here the whole Province would be largely benefited by the stock that would be raised. Surely this could be done by the Government by some push or exertion, if I alone have been the means of forming such a settlement here. As you may guess from my being able to form this settlement, I am pretty well known in England and my opinion is of some weight, so that if the Government will take some steps to make a push for the right class of settlers, instead of letting the district be so entirely ignored as it is in the report of the delegates, I shall be happy to give them all the assistance in my power. I trust, therefore, that you will take some action to induce the Hon. Commissioner of Crown Lands and the Minister of Agriculture to take some steps in the matter.

I am, dear sir, yours truly,

C. GREVILLE HARSTONE.

J. C. MILLER, ESQ., M.P.P.

This terminated the sittings of the Commission in the Electoral District of Muskoka and Parry Sound.

ONTARIO AGRICULTURAL COMMISSION.

APPENDIX S 1.

REPORT

ON

MANITOULIN ISLAND,

AND THE

SAULT STE. MARIE DISTRICT,

By WILLIAM SAUNDERS, LONDON, ONTARIO,

A Member of the Ontario Agricultural Commission.

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A Member of the Ontario Agricultural Commission.

To the Honourable Samuel Casey Wood, *Chairman of the Commission.*

Sir:—I have the honour to submit a brief report on the agricultural and other resources of the Manitoulin Island and the district around the Sault Ste. Marie, which has been prepared by request of the Ontario Agricultural Commission, during a recent visit to these localities.

Killarney.

Leaving Owen Sound a little before midnight on one of the steamers of the Georgian Bay Transportation Company, a journey of ten hours directly up the Georgian Bay brings one to the romantic little settlement of Killarney, a rocky, barren looking spot, but the seat of a Hudson's Bay trading post, and an important fishing station, from which, during the summer months, is obtained a large proportion of the salmon trout and white fish to be found in our markets. During this warmer portion of the year, a large number of fish leave the heated waters of the eastern portion of the Georgian Bay, and luxuriate in the cooler waters of the upper western part, adjacent to the settlement referred to, returning again in the autumn. On an evening visit to Killarney, on my return from Manitoulin, while our steamer was taking in wood etc., I embraced the opportunity of inspecting the busy scene which here presents itself, in connection with the catching and shipping of large quantities of fish daily.

The Fisheries.

A small steam tug owned by the Fishing Company had recently come in with the results of the day's work, having from 500 to 600 white fish and salmon trout, many of them of a large size. I learned that this branch of industry gave employment there, during the summer months to more than 100 hands, most of whom are engaged in fishing, others in cleaning and packing for market. At the time of my visit, the 2nd of September, most of the fishing was done about 18 or 20 miles from Killarney, among some islands in the Georgian Bay. The fish are caught in gill nets, the meshes of which are large enough to

admit the head of a large fish, but not to allow its body to pass through. Swimming against this net the head passes through the mesh, and in the effort to withdraw it the fish is caught behind the gills and seldom escapes. The nets are from four to five feet wide and many yards in length, are spread in the most promising locations, buoyed by means of small sticks, and weighted here and there with stones, and thus kept upright and near the surface of the water. They are visited, weather permitting, the following day, drawn up, and any fish caught in the meshes taken. Many miles of such nets are used, and the catch each day will run from four or five hundred to a thousand fish. At Killarney they are cleaned and packed in ice in small fish cars, holding five or six hundred pounds of fish each, and shipped to various ports in Ontario and the United States.

Manitowaning.

Leaving Killarney our course lay among a multitude of islands of every size and form, many of them very beautiful. Soon after midday we neared the Manitoulin Island, and entering Manitowaning Bay, which is about twenty miles deep, reached the Village of Manitowaning about 3 p.m. From thence we went to Little Current, then across to the north shore to the Hudson's Bay post at La Cloche, then to Mudge Bay on Manitoulin Island, and from thence to Gore Bay, which is situated in about the centre of the Island where we arrived about midnight, and here remained nearly a fortnight.

The Grand Manitoulin.

The Grand Manitoulin Island, which is included in the District of Algoma, separates the waters of the north channel west of the Georgian Bay from Lake Huron. It is nearly one hundred miles in length, and varies in width from about forty miles in the widest part to about two and a half miles at its narrowest portion at the base of Elizabeth Bay. It contains about a million acres, fully one-third of which is suitable for general agricultural purposes, about another third adapted for stock-raising, or dairy or sheep farming, while the remaining portion consists either of bare rock, or of rock covered with a soil so shallow as to prevent its being of any practical value. Occasionally a long stretch of this barren, rocky land is met with, but more frequently the rocks run along in ridges often near the shores of the island, giving it, in some places, a sterile and uninviting aspect. Frequently it will be found that a farm of 100 acres in such a situation, with a broken rocky front, will contain from 50 to 75 acres of good land. The island is entirely a limestone formation, and a striking feature in its geography is the numerous deep bays indenting its outline chiefly along the northern side, and the numerous lakes, large and small, scattered through the interior. The largest of these lakes is Lake Manitou, which is eleven miles in length and seven miles in width at the widest part. From the larger lakes flow rivers of sufficient volume and power to supply a number of mills. No mountains occur on the Manitoulin Island, but the surface presents a series of elevated plateaux, with their abrupt edges facing northward. The Niagara, Hudson River, Trenton, and Guelph formations are all found here, and many of the interesting fossils peculiar to these groups are met with in some localities in great abundance. On the northern side vast numbers of granite boulders have been transported from the north shore and deposited, frequently forming a serious obstacle to agriculture.

The Indian Reserves.

The east end of the island is its widest portion, and here, east of the two deep indentations which at this point nearly meet, known on one side as Manitowaning Bay, and on the other as South Bay, is a large Indian reserve, comprising about 170,000 acres, a large proportion of which is very good land. On this tract there are about 1,200 Indians, about two-thirds of whom reside in the village of We-quim-a-kong. There is also a reserve at Sheguiandah, and another of 5,000 acres adjoining the village of Shishiawaning, which is situated on a very pretty slope facing the westerly shore of Barrie Island. This latter village has a population of about 200. All the remaining portions of the island are open for settlement.

The Soil.

The soil varies much in character from a rather stiff clay loam to a light sandy loam, very fertile, producing in favourable seasons good crops of wheat, oats, peas, barley, corn, and excellent root crops. Although I travelled the entire length of the northern side of the island, and entered nearly all its principal bays, most of my time was spent at Gore Bay, a village containing two or three hundred inhabitants, about the middle of the Island, and at Manitowaning, with a population of six or seven hundred, towards the eastern end.

Island Farmers.

In the neighbourhood of Gore Bay I visited several farms, and obtained much information regarding the condition of agriculture in the island; and while careful to learn all I could by personal inspection, there were many things I could only ascertain by inquiry. For many items of information I am indebted to Mr. Andrew Willet, who resides on lots 4 and 5, west range, Government road, two and a half miles from Gore Bay, and from Mr. James M. Fraser, Reeve of the municipality of Gordon, whose farm is adjoining Gore Bay. These are both practical men who were among the first settlers, and in the correctness of whose statements I have every confidence.

A Settler's Experience.

Andrew Willet settled here eight years ago, on a wild lot of 200 acres; he was the second settler in the district. Beginning with very small means he has now 65 acres cleared, a comfortable dwelling, and very fine barns (one of them 65x36) and outhouses. The soil on this farm is lighter than the average, being chiefly a good sandy loam.

Wheat Growing.

Spring wheat is usually the first crop planted after clearing, and the average yield, taking one season with another, is from 20 to 25 bushels to the acre. In all the estimates given of the yield of crops, it must be borne in mind that the land is still very full of stumps, and that these, with their roots, occupy a considerable area in every field. Red Chaff and Glasgow are the varieties of spring wheat chiefly grown, red chaff being generally preferred. Mr. Willet has never had or known of any trouble to the wheat from insect pests, except in 1876, when a field of his, of ten acres, was entirely destroyed by the army worm, when the grain was four or five inches high. This field was at once ploughed up, and eight acres of spring wheat again sown on the 4th of June, which, notwithstanding the lateness of the sowing, produced 100 bushels of very good wheat. The average price paid for spring wheat in the island of late years has been from 90 cents to $1 per bushel. Fall wheat has not been much tried here until last season, when the winter being of a most unusual character, with very little snow, the wheat was winter-killed, a disaster which is likely to discourage further experiment in this direction.

Barley.

Barley has been grown in this section for the past two or three years, with an average yield of from 25 to 30 bushels to the acre. There is a sufficient home demand for all the barley yet grown; it is required for seed and as food for stock.

Oats.

Oats grow very well here. Mr. Willet has raised as much as 80 bushels to the acre, but the average yield is about 40 bushels; the varieties chiefly cultivated are Black Norway, Black Maine, and Black Diamond. The crop is not yet in excess of the wants of the the district, and 50 cents per bushel is about the average price.

[*Mr. Saunders.*]

Peas—No Bug yet.

Peas are grown very successfully and appear to be entirely free from the bug or weevil. I examined carefully peas in different stages of growth in several fields, but could find no evidence whatever of the presence of this insect, which is so destructive in many parts of Ontario. There are several varieties grown, but the large Marrowfat pea seems to be most in favour, and grows very luxuriantly. The crop is usually about 30 bushels to the acre, and being free from bug the peas are much in demand for seed.

Indian Corn.

Corn is of finer growth on Mr. Willet's farm than any I have yet seen elsewhere on the island. It is usually sown from the 15th to the 20th of May, and sometimes as late as the 1st of June. Spring frosts are very seldom experienced here; there was a light frost this season on the 8th of June, but not sufficient to injure corn or beans. At the date of my visit, August 14th, the ears of corn were plump, and most of them well filled. As much as 45 bushels of shelled corn to the acre has been grown here, the varieties usually cultivated are the Common Yellow and White Flint.

Hay Crops.

Hay, Mr. Willet finds to be a better paying crop than wheat, the price usally ranging from $12 to $16 per ton; average about $14. At present there is a demand at home for all that is produced, but if it were produced in excess, a ready market with remunerative prices would probably be found for it farther north, since large quantities are yearly sent from Owen Sound to Bruce Mines, Prince Arthur's Landing, and other points.

Root Crops—Potatoes.

Root crops do remarkably well. On one occasion, Mr. Willet dug 380 bushels of potatoes from seven bushels of seed. Early Rose is the most popular variety, but several others are also grown; the average crop is about 150 bushels to the acre. A long black beetle, a species of blistering beetle, which devours the leaves, is usually common, and sometimes abundant; occasionally they eat the stalks almost bare, yet no serious injury to the crop, from this cause, has been observed. The Colorado potato beetle has appeared, but has not yet increased to a sufficient extent to excite alarm.

Turnips.

Turnips are grown to a considerable extent, chiefly Swedes. They are sown broadcast, often in very stumpy land, yet as many as 1,500 bushels have been gathered from two acres sown in this way on the first of July. The cabbage butterfly has been here about three years, and now injures the crop to a considerable extent.

Apple Culture.

Apple trees do fairly well. Mr. Willet has an orchard of 2½ acres with about 150 trees in all, chiefly apple, with a few plum and cherry. The varieties of apple growing are Northern Spy, American Golden Russet, Wagener, Rhode Island Greening, Fameuse, Twenty-Ounce, St. Lawrence and Red Astrachan; all seem to be hardy. There are many young orchards in this neighbourhood, but none of them are more than three or four years planted, and most of them only one or two years. The only tree bearing in Mr. Willet's orchard was a Transcendant crab, which fruited also last year.

[*Mr. Saunders.*]

Pears—Plums

A few pear trees have been planted here and there, but I could not learn that any of them had yet fruited. Of Mr. Willet's plums none were fruiting, excepting a wild plum, and on this most of the fruit had been injured by the plum curculio, the larva of which I found in some of the specimens examined. The few cherry trees he had were all planted during the spring of this year.

Currants.

Red, White and Black currant bushes succeed well here and produce good crops of fruit. The currant worm has not yet appeared in this neighbourhood.

Bee-keeping.

Bees have been introduced into the island by several parties and are doing well, but the quantity of honey produced is small.

Stock—Horses—Cattle—Sheep.

Not much effort has yet been made to introduce improved stock into this part of the island, and there are no pure-bred male animals available. The horses in use have been brought here and are of common stock. Something has been done in sheep. South Downs, Cheviot and Cotswold sheep all succeed well, but the Cheviots are the hardiest. Sheep raising might be very remunerative; one drawback to this is, that as yet there are no buyers of wool here. The mutton is all consumed at home and commands about the same price as in Toronto.

Dairying.

Butter in this part of the island is not yet produced in sufficient quantities to supply the home demand, and a considerable quantity is brought up by the steamboats from Collingwood. In summer the price ranges from 15 to 20 cents; during the autumn and winter 25 cents can usually be got for a good article. At Manitowaning, which is a much older settlement, the production of butter is in excess of the wants of the settlers, and is sold at from 10 to 15 cents per pound. In one locality the price at which butter can be imported regulates the market, while in the other it is the price at which it can be profitably bought for export to other points.

Agricultural Land—Sheep Farming—Dairying.

Mr. Willet has travelled over a large portion of the island, from Manitowaning west, through the interior, and also along the southern and northern shores as far as Elizabeth Bay, and, apart from the Indian Reserves, which include some of the best of the land, he is of opinion that not more than one-third of the whole area could be used for general agricultural purposes. Another portion would be suitable for sheep farming or dairy farms, while the remainder would be too rocky to be of any value. As a rule the island is well watered with springs and small lakes, which makes it very suitable for cattle raising. Good water can also be got by sinking wells from about 25 to 30 feet in depth. The past season has been a very wet one, and in consequence all the crops were late planted. Wheat sowing was not finished until the last day of May. Oats were sown as late as the 7th of June.

Another Settler's Narrative.

James M. Fraser, Reeve of the Municipality of Gordon, settled at Gore Bay in 1871. The soil in this municipality is chiefly clay loam, about one-fourth of the whole being too stony to admit of cultivation. This district is very free from hills, and there are no swampy lands but such as will be suitable for agricultural purposes, when drained.

[*Mr. Saunders.*]

Land—Price of Farms.

The Government price of the land in most parts of the island, to actual settlers, is 50 cents per acre, but all the good land about Gore Bay is taken up. Here 100 acre farms with 10 or 15 acres of clearing will sell at from $8 to $10 per acre. The first settler came into this municipality in 1870, now fully half of the farms are settled on. At present the land is too stumpy to admit of the use of mowers and reapers. Threshing machines worked by horse power are brought here.

Fences and Buildings.

The fences are nearly all snake, made of cedar rails. Material for fencing is abundant and cheap. Fully one-half of the buildings in this district are frame, the remainder log. Lumber is worth from $6 to $10 per thousand, according to quality. No fertilizers used excepting barn-yard manure.

Spring Wheat.

Spring wheat is the most important crop; Red Chaff is chiefly grown; have tried Club and Glasgow, but Red Chaff does the best; about half the cleared land is occupied by wheat. The crop this year is unusually poor in consequence of the very wet weather in spring, the wheat will not probably average more than from 10 to 20 bushels per acre, while the usual average crop would be from 20 to 30 bushels.

Barley.

Barley ranks next in importance; four and six rowed are both grown, but chiefly six rowed. The crop this year will average from 30 to 35 bushels.

Peas.

The varieties of peas usually cultivated are Golden Vine, Marrowfat and Crown. They are entirely free from bug, and the average yield on Mr. Fraser's land, which is a heavier and richer soil than Mr. Willet's, would be from 40 to 50 bushels per acre. The crop is nearly all consumed at home. The average price varying fron 60 cents to $1 per bushel.

Oats.

The oats grown are chiefly Black Maine and Norway, and the average crop would be from 40 to 50 bushels to the acre. No rye is grown in this section now, it has been grown formerly and has done well. Buckwheat is grown to a limited extent and with much success. Corn ripens well but does not succeed as well, as in some other sections; in many instances it seems to be stunted, which often occurs from its being planted too late, other farm work being allowed to take precedence of this.

Potatoes.

Potatoes are grown to a great extent and very successfully, so also are turnips, chiefly Swedes, Aberdeens and White Globe. Turnips are often sown as late as the 15th or 20th of July and mature well.

Cattle—Hogs.

No attention has been paid to cattle raising. The male animals in use are very inferior. The same remark may be made in reference to horses; there is a large and promising field open here for enterprise in these departments. Pigs are raised in considerable numbers, but not much attention is paid to purity of stock, they are chiefly Berk-

shires. Sheep are met with of nearly all classes and they all do well, but South Downs and Leicesters are most esteemed. No animals are yet raised in excess of the requirements of the district for home consumption, in fact many are brought in every year.

Butter.

Butter, home-made, finds a ready sale at from 15 to 25 cents per pound, a large quantity is imported. Fowls are kept to a considerable extent, but the breeds are very much mixed, no marked preference seems to be given to any particular variety.

Fruit-growing.

Fruit growing is in its infancy, there are no bearing orchards yet, but there are young orchards all over the municipality. Have grown strawberries with success—varieties, Wilson's Albany and Jucunda.

Climate.

The climate here is about the same as that of the district around Toronto, but there is usually more snow on the Island and more steady cold weather; doubtless the climate is modified and tempered by the influence of water which surrounds it in such abundance.

Communications.

The island is advantageously situated for the shipment of grain, etc.; although the roads in most places are bad, in winter the ice can always be used, and in summer water communication is readily obtainable, as there is scarcely a farm in this municipality more than twelve miles from a steamboat landing. The boats run as late as from the 20th to the 25th of November, hence most of the crops are marketed and shipped before the close of navigation. Boats frequently arrive in spring as early as the first of May and are seldom delayed later than the 8th.

FORESTRY.

Forest Wealth of the Island.

A very large quantity of cedar is growing on the island, chiefly on the south shore. The bulk of the trees are large, but many of them are dead in consequence of the fires which have prevailed in some seasons, yet the timber, in most instances, is sound and in good condition. A large number of railroad ties and considerable quantities of telegraph poles and material for cedar block pavement is annually got out here; one firm in Gore Bay has received orders for 60,000 railroad ties this season. Cedar wood is also much used for boat-building and fencing.

Destruction of Timber.

There have been extensive pine forests, but a large portion of the land has been burnt over, and the scorched and dead pine timber has been rendered unmerchantable and almost worthless by insect borers, hence good pine is much less abundant than formerly.

Lumbering.

On the south shore there are two or three mills doing a large business in lumber, particularly those at St. Michael's Bay and Providence Bay. There are smaller establishments on the north shore at Mudge Bay and Gore Bay, and another in process of construction at Meldrum Bay. These produce annually considerable quantities of lumber, a

portion of which is used for local purposes, and the remainder exported. On the main land opposite, some twenty miles or more distant, the lumbering establishments are larger, those of Spanish River, Thessalon River and Blind River being most important.

Economic Wood.

Besides cedar and pine, there is on the island an abundance of maple, beech, basswood, several varieties of birch, tamarack, hemlock, spruce and balsam, a quantity of red oak and a smaller proportion of white oak, American elm, poplar and some red pine.

Lands for Settlement.

Although all the good land is taken up in the municipality of Gordon, there is plenty of it awaiting settlement in the adjoining townships. From Mr. Savage, Government agent at Gore Bay, I ascertained that in the township of Mills, which is adjoining that of Gordon, out of 23,130 acres only 8,800 are taken up, and in Burpee out of 27,400 only 10,000. In Barrie Island, which is connected with Manitoulin by a shoal ten chains across, where the water varies, in different seasons and at different periods in the year, from one to four feet in depth, and which may be considered as part of Manitoulin, there are 20,000 acres, only 8,500 of which are taken, and further west on the Manitoulin Island, there are other townships opened and opening, where but very few of the lots have been sold.

Fruit at Manitowaning.

At Manitowaning, which is an older and more thickly settled district, I made a shorter stay. The village is prettily situated on a hill overlooking the bay. In the garden of Mr. J. C. Phipps, Indian agent of the Government, I saw several varieties of apples fruiting freely—Duchess of Oldenburg, Tetofsky and Red Astrachan, and younger trees of Grimes' Golden. The Clinton grape was also fruiting well. Mr. Phipps grows successfully black and red currants, Belle de Fontenay raspberries, water melons and nutmeg melons. Tomatoes ripen here from the middle to the end of August.

Varieties of Fruit Cultivated.

In the garden of Mr. John Reynolds, an enthusiastic lover of fruit, at the upper end of the village, I found a great variety of fruit trees and grape vines. The trees were chiefly apple and plum with a few pears. The only trees bearing at the time of my visit were two young Lombard plum trees, which had nice crops of fine fruit. I examined them carefully for evidences of curculio, but could find none. Among the grapes, there were Clinton, Concord, Delaware and some of Rogers' hybrids, all doing well, and some of them with small quantities of fruit.

Stock Raising.

I visited the farm of Mr. John Ingram, about four or five miles from the village. He has 440 acres, a portion of which he devotes to stock raising. He has one Shorthorn bull which he purchased young for $200 ; it is now a fine animal three years old, the only pure-bred Shorthorn bull in the district. Mr. Ingram finds that the farmers generally in his vicinity begin to appreciate the advantages of pure blood in their stock and gladly avail themselves of the services of his animal. Mr. Ingram has fifteen head of cattle, also a Clydesdale stallion, several horses and four fine young colts. In sheep he prefers the Cotswolds, thinks they are better than Leicesters. He finds he can cut from 15 to 20 pounds of wool each from his sheep of this breed ; from one of his sheep he cut this season 21 pounds. The crops on his farm looked well, all bearing evidence of the industry and enterprise of the owner.

[*Mr. Saunders.*]

Crops in the Manitowaning District.

Mr. S. R. McKerven resides a few miles distant in another direction, he settled here seven years ago, has 400 acres, 55 of which are under cultivation. The soil on his farm is clay loam, with more or less of muck on the top of it. He grows chiefly wheat, oats and peas; in 1877 his wheat averaged from 35 to 40 bushels to the acre, this year it will not exceed from 15 to 20 bushels.

Mr. W. R. Smith, President of the Assiginac Agricultural Society, lives also within a few miles of Manitowaning. Six years ago he settled on his farm of 213 acres. He has now 40 acres cleared; his principal crops are spring wheat, barley, oats, and peas. Usually the crops are good, but this season his wheat will not average more than 15 bushels, whereas in former years 20 to 25 bushels has been with him the usual average. Peas will average about 30 bushels; has no barley this year, but in former years has grown as much as from 40 to 50 bushels to the acre. The Colorado potato beetle has been seen here for several years past, but they have not yet increased to any extent. Mr. Smith keeps sheep, has a pure-bred Leceister ram and grade ewes; also has Berkshire pigs.

Timber in the Assiginac District.

The timber in this district consists chiefly of red and white oak, basswood, black birch, hard maple, which is very abundant, swamp elm—no rock elm—and whitewood, a species of poplar resembling the balm of Gilead, cedar is abundant everywhere, and pine chiefly along the south shore, balsam and spruce are plentiful, but there is not much hemlock. A part of Bidwell, a part of Sheguiandah, and the whole of Assiginac are included in this municipality. Mr. Smith has been assessor for the past three years.

Character of the Land.

He is of the opinion that in these townships about one fourth of the land is rocky and of no value, another fourth stony land which would make good pasture, but to fit it for general agriculture the stone must be picked; the remainder is good land, suitable for any farm purposes. The land is assessed in this district at from $1 to $3 per acre. Unimproved farms, a considerable distance back, will sell readily at from $200 to $300 per 100 acres.

Maple Sugar.

Maple sugar is extensively made here by the Indians. Some of the store-keepers in Manitowaning will buy in a single season as much as from eight to ten tons each. Most of this product is exported to other parts of the Province.

Young Orchards.

There are a number of thriving young orchards on the farms about here, one of the best is on the farm of Moses Burnett, of Sheguiandah, those of Messrs. Rutledge and Sproat are also worthy of mention in this connection. In a year or two more, many of these young orchards will begin to fruit freely.

An Indian Village—A Jesuit Mission.

While in this district, I spent a day in the Indian Village of Wequimakong, situated on the large Indian reserve, and about seven miles west of Manitowaning. In this village, which is beautifully situated on Wequimakong Bay, besides its Indian population of about 800, there is a large Jesuit establishment, under the charge of three Fathers and seven Brothers. The venerable Father, who is at the head of this institution, has resided in these northern portions of the Province, labouring among the Indians for forty years,

and one of the Brothers has lived thirty years in this village, and during that long period has never been absent from it. They have a large church, which was built entirely by the Indians, also a school for girls and a large one for boys now building. The aged Father did everything in his power to make my visit a pleasant one. Besides being shown through the buildings, I was permitted to visit the garden, where I saw a number of young apple trees, one of which, a Duchess of Oldenburg, was fruiting, also a blue plum tree well laden with fruit which was just ripening; and a Clinton grape in fruit. A very small proportion of the land in this reserve is under cultivation. Fish are plentiful in the surrounding waters, and from this source the Indians derive a large portion of their sustenance, selling their surplus fish to the settlers in the districts adjoining, at from five to ten cents each. During the blueberry season a large proportion of the Indian population are engaged in picking this fruit, which grows in the greatest abundance on the north shore of the mainland opposite the Island. Thousands of bushels are brought to the steamboat landings, where they are shipped to the various towns and cities in the Province.

THE SAULT STE. MARIE DISTRICT.

From Manitoulin Island I proceeded to the Sault Ste. Marie, touching at Cockburn Island and St. Joseph's Island on the way; also at several points on the north shore, including Spanish River, Bruce Mines, Thessalon River, and Blind River. On arrival at the Sault, I called on Mr. John Dawson, one of the most active members of the Agricultural Society there, with whom I waited on the president, Mr. W. S. Simpson, and the secretary, Mr. Brampton. These gentlemen were exceedingly kind, and supplied me with all the information in their power.

Inspection of Farms.

To Mr. Dawson I am particularly indebted, since he placed both his vehicle and himself at my disposal during the greater part of my stay, and through his kindness I was enabled to see the larger portion of the townships of Tarantorus, Korah and Ste. Marie, and inspect the farms and crops of the following gentlemen.—*In Korah:*—Richard Chapman, John Harris, John Kemp, Henry Penns, John Lanning, Thos. McCulloch. *Tarantorus:*—William Morland, John Penman, John Taggart, Henry Lamon, Morris Christner, Mr. Edwards. *Ste. Marie:*—W. S. Simpson, Isaac Scott, George Alderson, and Mr. Bennett.

Settlements Proceeding.

I found that great progress had been made in this section of country during the past few years, and that the land was being rapidly settled on. Although comparatively an old settlement, it is only within the last few years that anything worth speaking of has been done in the way of thorough cultivation of the land. The earlier settlers, largely French and half-breeds, devoted their time mainly to fishing, hunting, etc., and it is only since a more enterprising and thrifty class of settlers began to move in, that the agricultural capabilities of the district are beginning to be developed.

The Seasons—Frosts.

The season is shorter than with us, yet crops appear to mature well; seeding begins about the 10th of May, and fine weather prevails until about the 15th or 20th of September, when the fall rains come on, and there is not much growth after that. Frost seldom cuts tomatoes and beans until the middle of October, and winter sets in in earnest from the 15th to the 20th of November.

The Settlers.

Richard Chapman, section 13, township of Korah, settled here nine years ago. He

came from Muskoka, where he resided for some time in Muskoka township, two and a half miles from South Falls. He considers this district very much ahead of Muskoka, as there is a much larger proportion of the land free from rock and stone. The soil here is equally fertile, the climate much the same. His spring wheat is below the average this season, and will not yield more than from 12 to 15 bushels to the acre. Oats will run from 50 to 60 bushels, barley from 25 to 30. Potatoes and turnips are finer crops here than he has ever seen anywhere else. Fall wheat and corn are both risky crops, but buckwheat does well. Peas also are grown very successfully, and are quite free from bugs, but are sometimes subject to mildew.

The Live Stock.

The stock in this district consists of common cattle; he thinks it would be a good country for stock and sheep raising. Animals could be wintered here as easily as in any part of Ontario, but the winters are nearly a month longer. Cold weather sets in during the latter part of November, and cattle cannot find food outside until about the 10th of May. The sheep bred here now are chiefly Leicesters.

The Crops—Harvesting.

The crops are cut mainly with scythes, but some farmers are adopting the plan of clearing their land entirely as they proceed, and in such cases improved implements are being used to great advantage.

Cost of Clearing.

Some ten or twelve years ago a large portion of the land was burnt over, and the young growth which consists chiefly of white birch, poplar, spruce, and balsam is cleared with comparative ease, root and branches. About twenty dollars per acre is the cost of thoroughly cleaning the land in this manner. When the trees are merely chopped, and the stumps not taken out, they will rot in from six to eight years, so that they can be ploughed out. Several of the farmers I have visited have adopted the more thorough system of clearing the land, and the large fields of grain without a stump or stone in them presented a picture worth looking at. This was particularly the case at Mr. Penn's, whose clearing is large and whose fields also are large.

Heavy Crops of Oats, Barley, and Wheat.

I saw some heavy crops of oats which I believe would average over 50 bushels to the acre. At Mr. Scott's I saw barley which had yielded over 50 bushels to the acre, which was sown on the 22nd of May, and cut on the 9th of August. His spring wheat looked well, and it was estimated that it would yield 30 bushels to the acre. On many of the farms I saw young orchards, most of them newly planted, some doing poorly, others fairly well.

Orchards—Fruit Culture.

At Mr. Bennet's there was a young orchard, one year planted, which had made fair growth. In his garden I saw three crab trees fruiting, two of which appeared to be Montreal Beauty. I saw also here a good field of spring wheat (Russian White wheat) which would average from 20 to 25 bushels to the acre. In the garden there were Brinckle's Orange Raspberries, black, red and white currants and strawberries. The white currants had been eaten bare of foliage by the grasshoppers, while the red were scarcely injured at all. Mr. Edwards had White Mann oats, which were expected to yield fully 50 bushels to the acre. Last year from 4½ bushels of Early Rose potatoes he raised 130 bushels.

Hay Crops.

The hay crop throughout this district has been good, and is said to have averaged two tons to the acre. Both soil and climate seem particularly adaped to the growth of clover and timothy. On the 26th of August I saw a field which had been cleared of bush early in the spring and seeded down with oats, in which the young clover and timothy were both in flower, and flowering freely, as far as I had an opportunity of inspecting it.

The Pea Crop.

The pea crop will average about 30 bushels to the acre. A variety known as the Grey Mildew-proof seems to be the most popular. On one farm visited, two rowed barley had produced 60 bushels to the acre last year, and 50 bushels during the present season. Butter sells at from 12 to 16 cents per pound. There is no cheese made in this district.

Seedling Apples.

Mr. Thos. McCulloch settled here about twenty years ago on 200 acres of land, four miles from the Sault. Three years afterwards (that is seventeen years since) he sowed some seed of the snow apple (Fameuse), and now has about 70 trees of this parentage. I visited this interesting seedling orchard, and found some twenty varieties fruiting. Two of them bore small fruit resembling crab apples, and were late in ripening. Seven or eight resembled the Fameuse in size and general appearance, with a similar white flesh. The others varied considerably in character and flavour, also in time of ripening, some of them being earlier, none of them however were winter fruits. These trees have thus far proved very hardy, and a number of them have borne crops of fruit for some years past. Several of the better varieties are very promising and worthy of propagation, since it is probable that they would prove to be hardy and productive in many of our more northern districts, where the well known standard varieties are too tender to succeed.

Method of Tree-Growing.

Mr. McCulloch has adopted the plan of growing all his trees with low heads, a method which has many advantages; the trunk being short and well shaded by the overhanging branches is preserved from sun scald, and the tree itself being nearer the ground is more sheltered and the fruit is easier gathered. He has also a young orchard which he has planted with trees one year old, so as to admit of their being grown with branches near the ground. Among them he has Pomme Grise, Northern Spy, Fameuse, and several other varieties, all of which had made fair growth. He had planted two pear trees, Flemish Beauty, but they were both killed last winter below the graft; has had no experience yet with grapes, as his vines were only planted this year; his gooseberries and currants do well. The spring wheat on his farm will not average more than from 15 to 17 bushels to the acre; his land is better adapted to the growth of hay, oats, peas, and root crops.

Timber—Stock.

The timber in this neighbourhood consists chiefly of hard maple, yellow, black, and white birch, black spruce, balsam, some cedar, but of rather a stunted character, and some ironwood and whitewood. There is no beech, and very little oak. But very little has been done to improve stock, and Mr. McCulloch is of opinion that the native stock is desirable, because it is hardier than any that is pure bred; he thinks the Percheron horses best suited to this district.

Grape Culture.

In the garden of the Roman Catholic priest, Father Laurens, at the Sault Ste. Marie,

[*Mr. Saunders.*]

I saw a number of grape vines, comprising several varieties, all growing very thriftily, and some of them fruiting. Also a few pear trees which had been planted two years, growing well, and two of them bearing fruit.

Land near Sault Ste. Marie.

From Mr. Chas. Brown, Government Land Agent at the Sault, I learned that there is a vast quantity of good land here awaiting settlement. He has charge of ten townships in which there are very many thousands of acres still available, the price of which varies from twenty cents to one dollar per acre. He thinks that in the townships under his charge fully four-fifths of the land will be found suitable for agricultural purposes.

The Laurentians.

All along the north shore the formation is of granite and the water front in most places, is bold, rugged, and rocky, while at a little distance back the chain of Laurentian hills, a continuation of what is known as the "backbone of Canada," stands out very prominently. I am informed that in many places behind this rugged front there exist large tracts of good land. With the opening up of the country by the proposed railway through this district, a great impetus will doubtless be given to its settlement, and when we take into account the vast amount of mineral wealth still undeveloped there, and add to this its immense agricultural resources, it is not too much to expect that, with ready means of communication, new homes for hundreds of thousands of settlers will be found, homes, where the industrious and frugal will soon be enabled to obtain all that is essential to comfort and happiness.

Telegraphs Wanted.

One great need much felt, both here and at the Manitoulin Island, is telegraphic communication, which would do much to relieve the present isolation of these settlements, a boon, which I trust, will, before long, in some way be supplied to both.

SUGGESTIONS.

Before closing my report I propose to make a few suggestions mainly in reference to fruit culture, with which I am more especially familiar, for the benefit of the residents in the districts over which I travelled.

Fraudulent Tree Peddlers.

I learned that the indomitable tree peddler had found his way years ago into these comparatively remote sections, and with the aid of a smooth tongue and highly coloured pictures, had succeeded in selling, at very high prices, some very suitable varieties of fruit, and some very unsuitable, generally, such as could be purchased by him cheapest. Dishonest tricks, as usual, had also been practised on the unwary. On more than one occasion I saw young Clinton grape vines growing, to which were attached labels with high sounding names not to be found in any fruit catalogue; pure inventions of these ingenious men. I found that the Northern Spy had been much recommended, and largely planted—an apple which requires the full length of the season, in our more favoured fruit sections, to mature, and which, it is very probable, will be a failure in these settlements. Others, such as the Baldwin and Rhode Island Greening, which could scarcely be expected to be entirely hardy so far north, have also been much planted.

[*Mr. Saunders.*]

A Caution to Fruit Buyers.

I would strongly advise those intending to plant fruit trees to have their dealings directly with responsible nurserymen, and Canadian nurserymen, too, of whom now there are many good reliable firms, to whose interest it would be to recommend, and send out only such varieties of fruit as would be likely to succeed. Trees grown in Toronto, Hamilton, St Catharines, Fonthill, London, Paris, or Windsor, are much more likely to succeed and prove hardy than those grown in the United States, further south. In many instances about the Sault Ste. Marie I saw abundant evidences of the partial winter-killing of the wood of fruit trees, and sometimes of the death of the entire tree from this cause, while in other cases, in the same neighbourhood, the growth was thrifty and very fair. The failures had probably resulted from one of several causes or a combination of them, the selection of unsuitable varieties, improper treatment, and from the fact in many instances of the trees not being properly hardened to our climate.

Suitable Varieties of Fruit.

I submit a list of some varieties of fruit which, being very hardy, would be among those most likely to succeed in these districts.

Apples.—Early varieties—Tetofsky, Red Astrachan, Duchess of Oldenburg. Later sorts—Fameuse or Snow apple, Wealthy, Ben Davis, Grimes' Golden, Pomme Grise, and Golden Russet.

Crab Apples.—Transcendant and Hyslop.

Pears.—Clapp's Favourite, Tyson, Flemish Beauty, Seckel and Lawrence.

Plums.—Lombard, Imperial Gage, Yellow Egg, Pond's Seedling and Yellow Gage.

Grapes.—Champion, Moore's Early, Concord, Clinton, Delaware, and probably Rogers' No. 4 (Wilder) and No. 15 (Agawam).

The small fruits are usually so well protected by snow during the winter that almost every variety, would be likely to succeed.

Peas for Seed.

Should the fortunate exemption from pea bug, which has hitherto prevailed, continue, which I think is probable, it will be found a profitable undertaking to grow peas for seed for the purpose of supplying the less favoured portions of Ontario and the Western States.

All which is respectfully submitted.

WILLIAM SAUNDERS.

ONTARIO AGRICULTURAL COMMISSION.

APPENDIX S 2.

REPORT

UPON OBSERVATIONS MADE DURING

A VISIT TO GREAT BRITAIN,

IN THE SUMMER OF 1880,

ON THE

British Market for Canadian Agricultural Products,

By MR. RICHARD GIBSON,

A Member of the Commission.

ONTARIO AGRICULTURAL COMMISSION.

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British Market for Canadian Agricultural Products,

By MR. RICHARD GIBSON,

A Member of the Commission.

To the Ontario Agricultural Commissioners.

Gentlemen,—In presenting this report I must apologize for its meagreness, not only of material but of interesting and useful matter—but when I inform you that I was barely a month in England, and that my business was such, that it left me but little time to devote to the interests of the Commission, I feel satisfied that you will grant me your indulgence and not expect an elaborate report.

OUTLOOK FOR THE YEAR.

As regards the English outlook for the coming year, the wheat plant is generally promising, but very backward. During the four weeks that I spent in England we had but one showery day, cold easterly winds prevailing, consequently all plant life was backward, more especially pastures and meadows. Of course the crops were not sufficiently developed to hazard an opinion as to the result of the harvest,—that depends so much upon the weather,—for as most of you are aware there is seldom any difficulty on well farmed lands there of growing a sufficient quantity per acre, the greatest trouble being in getting it thoroughly ripened and properly harvested.

THE ROOT CROP PROSPECT.

The weather was very propitious for cleaning the root ground, (which, owing to the late wet season, was very foul in the fall, much of it being laid by for the winter without the customary autumnal cultivation.) This spring, every advantage was taken of the dry time, and the preparation of the soil for the reception of the seed was more thorough than

usual, consequently we may anticipate a full crop of roots, which in Britain means an extra quantity of butchers' meat disposable off each farm.

THE PASTURES.

Referring to the pastures they are more backward than usual, and the store stock, owing to the bad quality of hay and straw of last winter, conjoined to the scarcity of roots, are, this spring, much lighter than usual, consequently we may expect the grass-fed beef to be fully a month later in reaching market in the same ripe condition as usual, though many of the largest graziers, knowing the value of early grass beef, are supplementing the pastures with artificial food, such as cotton cake, etc.

ENGLISH VIEW OF THE CANADIAN CATTLE TRADE.

In conversation with several butchers and dealers, they all took the same view of the Canadian cattle trade, viz. : That the best time to ship is from February to August; that the grass fed stock should, for a few weeks previous to shipping, be fed some grain, and so gradually prepared for the change to the dry food used on the voyage; that the stall fed cattle arrive in good condition without loss of flesh, but that the grass fed lose considerably.

NECESSITY FOR IMPROVING THE STOCK.

Unanimously they all speak out loud "Why don't your people use better bulls? We know that you can grow as good cattle as can be found anywhere, for we have seen some sell in public this spring for £45 each, but not one in ten of the ordinary stock you send has paid for his keep. Send them of good quality and breeding, and then, if any accident happens so that they are bruised too bad to slaughter for market, they will sell for all that they are worth to be grazed for a few weeks, but no English grazier would ever think of buying such rough, coarse, specimens, as most that you send, and if your farmers had to pay rent for, instead of owning their farms, they would soon be compelled to breed better stock."

STORE CATTLE.

"Again, a good trade could be done in stores, if we could get them of right quality. Two year old steers such as we describe, would be worth more in public market than the rough old cows and steers you have sent."

THE CANADIAN TRADE—LIMITED SHIPPING ACCOMODATION.

I made some enquiries as to the benefit Canada derives from the live stock trade. The general opinion was that it was worth fully one cent per lb over the American cattle, but that owing to the large competition for space and the limited shipping accomodation from Montreal, or rather, the monopoly of the carrying trade by one or two wealthy companies, our farmers lose that benefit, as the shipper has to pay about that amount extra per head over what the American shippers were paying from New York.

THE TRADE IN SHEEP.

"Sheep"—same complaint as to quality. "Why do your farmers send us nothing but rams and old ewes? Wethers are worth from five to eight cents more per lb." "Why?" "Because they contain so much more flesh that is lean meat of a much superior quality. To obtain the highest market price your sheep breeders should use a Down cross on your common stock and save your ram lambs for wethers."

[*Mr. Gibson.*]

SOUTHDOWN OR HAMPSHIRE DOWN WANTED.

"Which variety of the Down would you recommend?" "Southdown or Hampshire, because they contain the most flesh. Your sheep have large enough frames, but carry too much useless fat or tallow. The larger Downs such as Oxfords or Shropshires would not give you the lean meat as readily or satisfactorily as the smaller and purer varieties of Downs."

THE CANADIAN BUTTER TRADE.

Along with Mr. Dyke, Dominion Agent, Liverpool, I called upon some of the largest American produce importers. We were kindly received, and every opportunity was afforded us of examining and testing the different brands of cheese and butter.

ILLINOIS BUTTER—UNIFORM QUALITY.

The best makes of butter are from the Western States; a splendid consignment had just arrived from Illinois; we examined several kegs and found them uniform in quality, taste and colour, in fact; as the merchant observed: "One is a sample of the lot—I can send the whole of that consignment out to my customers with perfect confidence without opening a keg, thay are always alike."

CANADIAN NOT UNIFORM IN QUALITY.

Upon asking to see some Canadian—several kegs were opened, but not one was uniform, except, I am sorry to say it, uniformly bad—soft, bad flavoured, and of different colours.

CREAMERIES.

Upon asking the question—"What is our remedy?" "Your only remedy is to establish creameries; formerly butter from this very district," pointing to the lot from Illinois, "was no better than yours—now it is the finest brand imported into Liverpool—better than any we get from Ireland."

FINE ENGLISH SALT.

"Again you must use fine English salt—your American and Canadian will not do if you wish a slice of this trade—and there is another thing I want to call your attention to, and that is the kegs."

NICE SMOOTH KEGS.

"Look at those all nicely planed *inside* as well as out, so that when a keg is inverted on the marble slab generally used here, the butter comes out nice and in one piece. Yours are rough inside and the butter is broken; all these little things add to the market value; you must please the eye."

WANT OF CARE IN SHIPPING.

"Now look at that consignment forwarded by one of your Montreal steamers, and this one by a New York line. That looks as if it had been stored in the ship's coal bunkers; this, as if the S. S. Co. were alive to their interests. We scarcely ever get a dirty keg by the one line, and as seldom a clean one by the other. Now the difference of appearance even in the kegs makes a difference of cents a pound."

[*Mr. Gibson.*]

A CONSPICUOUS MARK NECESSARY.

"Again when your people have a really good article, whether of cheese, butter, apples, etc., tell them to get a nice attractive stencil plate and don't be afraid to let the world know where such an article was produced. Little mean plates with 'Ont.' in one corner—do you think people over here know what that means! Now if you would put "Canada" on in large letters, they would understand something about where it was produced."

OLEOMARGARINE.

"But I have something here I want to show you. Do you know what brand that is? It is the second best sample in the warehouse, and that is the article that will either drive Canadian butter out of the market or force them to manufacture a better article. That is Oleomargarine—nothing but the finest creamery brands can compete with it. It has a butter smell, taste and appearance, none but experts can distinguish between it and the best brands of butter."

TOO LONG IN MARKETING.

"Another thing that deteriorates your butter is, that it is too long after being made before put on the market."

CHEESE AS GOOD AS CAN BE GOT.

"Now as to cheese, you are sending as good as we get. I have no suggestions to make as to the manufacture or putting on the market."

THE COMMISSIONER'S CONCLUSIONS.

After seeing another commission merchant, at Manchester, who entirely agreed with the foregoing, I was forced to the following conclusions: That, to open a butter trade, we must establish creameries, take more pains in the manufacture of our tubs, market the article as soon as made, use fine salt, and effect improvements in transit both by steamer and rail. I had intended making enquiries as to the pork and bacon trade, but had not the time at my disposal. I cannot conclude without testifying to the courtesy and attention that I received from Mr. John Dyke, the Dominion Agent, at Liverpool, and the great assistance he rendered me in gathering the facts relative to our trade with England.

All of which is respectfully submitted,

RICHARD GIBSON.

ONTARIO AGRICULTURAL COMMISSION.

APPENDIX S 3.

REPORT

OF INFORMATION OBTAINED DURING A RECENT VISIT TO WASHINGTON

ON

AGRICULTURAL EDUCATION IN TENNESSEE,

AND THE

UNITED STATES BUREAU OF AGRICULTURE.

By Mr. E. H. HILBORN,

A Member of the Commission.

ONTARIO AGRICULTURAL COMMISSION.

APPENDIX S

REPORT

OF INFORMATION OBTAINED DURING A RECENT VISIT TO WASHINGTON

ON

AGRICULTURAL EDUCATION IN TENNESSEE,

AND THE

UNITED STATES BUREAU OF AGRICULTURE.

BY MR. E. H. HILBORN

A Member of the Commission.

To Hon. S. C. WOOD,
Chairman Ontario Agricultural Commission.

SIR,—Having had occasion recently to visit the city of Washington, where I met the Hon. T. B. Harwell, of Tennessee, the gentleman who introduced, and successfully carried through the Legislature of that State, the Bill making the study of the elementary principles of scientific agriculture compulsory in the public schools; and inasmuch as that subject had occupied the attention of the Commission to some considerable extent, I embraced the opportunity of interviewing the hon. gentleman upon it, and beg to transmit to you the substance of that interview, along with some other matters which arrested my attention while there, and which I conceived to be directly connected with our inquiry.

The Bill simply amends the section of the Public School Act, which prescribes the studies to be pursued, by adding the Elements of Agricultural Science to the list, with an additional section providing for a Commission to secure the compilation of suitable text books, the Commission to consist of the Superintendent of Public Instruction, and the Commissioner of Agriculture. The Commissioners have secured the compilation of and recommended a work entitled "Lupton's Elements of Agricultural Science," which has been adopted, and published by D. Appleton & Co., of New York, at 27 cents per copy. I have secured and forwarded to you two copies for examination. Mr. Harwell has promised me copies of the Bill, together with other documents relative to its working, which will be promptly laid before you on their arrival. Mr. H. assures me that the measure, though it encountered strong opposition, and its passage was the work of several sessions of the Legislature, is constantly gaining favour in public sentiment, and becoming very popular, and has given a strong impetus to the demand for industrial education for the

masses, which he predicts will somewhat change the system of early education by connecting with it an industrial training that must better qualify for the practical duties of life.

I also embraced the opportunity of visiting the several Government Departments. Through the extreme kindness of Commissioner Le Duc, by whom I was accompanied through the Agricultural Department, I was enabled in the brief space of time at my disposal to learn something of the functions, management and connection of the Bureau of Agriculture with the several State Bureaux, and the facilities provided for collecting from every part of the Union statistical and other information relative to the agricultural condition of the country, and diffusing it in such a manner as to enable the great mass of agriculturalists to benefit by it; anything like a description of which would require more space than could be devoted to it in this brief report. A very complete set of machinery has been devised by which the votaries of Agriculture are enabled to move as a unit in taking advantage of any advancement by way of discovery or otherwise in the science; the conducting of a system of experiments in every part of the Union, upon every known product, foreign as well as native, and securing the seed of such as are successful and dispensing it in the successful districts, forms a very important feature in the management of the Bureau. A number of these I have no doubt would be valuable to our Canadian farmers. Noticeably among them is the cultivation of sorghum in high latitudes. Mr. Le Duc finds that it can be successfully and profitably grown in the northern part of Minnesota, which is a higher latitude than Ontario; his experiments also show that sugar can be successfully made from it.

He also exhibited to me a record of experiments in the manufacture of sugar from corn stalks, which he has carried to a sufficient length to render its success no longer a question of doubt, the record showing a yield of from 900 to 1,000 pounds of sugar from the stalks of an average acre of corn, gathered when the corn was ripe, so that no loss of corn was sustained, and the cost of manufacture being but three cents per pound. The sugar produced is fine in flavour and capable of producing the highest grades by being refined. Mr. Le Duc computes that the stalks from the corn grown in the state of Illinois would supply all the sugar used in the United States at a cost of three cents per pound for manufacturing. That being so, is there any good reason why the corn fields of south-western Ontario should not be made to sweeten the tea and coffee of the Canadian people?

I have the honour to be, Sir,

Your obedient servant,

E. H. HILBORN.

Uxbridge, Dec. 18th, 1880.

ONTARIO AGRICULTURAL COMMISSION.

APPENDIX S 4.

REPORT

ON THE

PRODUCTIONS OF THE COUNTY OF ESSEX,

COMPILED BY

WILLIAM McGREGOR, Esq., OF WINDSOR, EX-M.P.,

AT THE REQUEST OF THE COMMISSIONERS.

ONTARIO AGRICULTURAL COMMISSION.

APPENDIX S 4.

REPORT

ON THE

PRODUCTIONS OF THE COUNTY OF ESSEX

COMPILED BY

WILLIAM McGREGOR, Esq., OF WINDSOR, EX-M.P.,

AT THE REQUEST OF THE COMMISSIONERS.

Mr. McGregor, having been invited to give evidence on the productions of the County of Essex, attended at Chatham for that purpose, and made a statement which he has since amplified, the whole of the information given by him being embodied in the following report:

I have been settled in the County of Essex for a number of years.

Surplus Wheat Products.

We have a large surplus product in this county, principally of wheat, the surplus of that grain, for the last three years, amounting to about 500,000 bushels annually.

Indian Corn.

We do not export largely of corn, but we sell about 100,000 bushels a year to the distillers in the county. The remainder is used in feeding pork, which brings us in, annually, about $400,000. Corn is about the most certain crop we have.

Pork—Salt.

Our production of pork is almost as certain as the season itself. Our pork is the same as the American pork, because it is fed in the same way—that is chiefly upon corn. It brings as much as any pork in the market. Goderich salt and Liverpool rock salt are mostly used in the curing. I don't think any objection is made by packers to the Huron salt.

Economic Wood.

We have another great industry in our county, that is wood. We have about twenty-five mills which cut hardwood, and this wood is exported to various parts of the

United States. The wood used is all raised within the limits of the county. The varieties of wood chiefly used are whitewood, oak, ash, elm, hickory, basswood, sycamore and other woods. The tulip tree, or whitewood, grows in spots in our district, and is found in large quantities throughout Essex and Kent.

Sawn Lumber—Manufactured Wood.

The amount which the sawn lumber, ties, square oak, bolts, spokes and cord-wood bring into the County of Essex every year is over $500,000. The mills give employment to large numbers of the labouring population in the winter time, and we have very little unemployed labour in that season.

Charcoal Burning.

We have another industry that came among us lately; that is the burning of charcoal for smelting furnaces in the United States. We are now consuming about 600 cords of wood a week for that purpose, and we have about thirty kilns in the county. Our market for this charcoal is in Wyandotte, Detroit, and other places where iron smelting is carried on.

Dairying Facilities

We have not developed the dairy industry to any extent, though dairying would seem to be the natural occupation of our farmers, as they have a splendid grazing country.

Straw Braid and Straw Hat Manufacture.

The trade in straw hats and straw braid, made by the French-Canadians, our early settlers, women and girls employing themselves at their homes in this work, is on inquiry found to be of much larger interest than would be supposed. The hats and braids are largely sold in Detroit and shipped to the east, the braid being made up into fashionable shapes and exported, part finding its way back, and part being exported to Mexico, South America, etc. One agent for the purchase of these straw goods, paid to the makers of the goods at Detroit last year, the aggregate sum of $80,000. It is estimated that Detroit pays to our French-Canadians, mainly of this county, $90,000 for these goods annually. It is a growing trade—growing from small beginnings, and seemingly confined to this point. The prices are governed according to grade. The instruction obtainable is only that imparted by one to another; the expert and painstaking ones getting the best prices for their work. Three dollars is readily obtained for a well-made fine straw hat for men.

Woollen Socks.—Vegetables.

They also manufacture woollen socks to the value of about $5,000 per year; and they export annually of vegetables grown along the river, about $4,000. We ship radishes and other small vegetables to New York, Chicago, and other places.

Sorghum Molasses.

We also manufacture a large quantity of sorghum into molasses. The plant grows very successfully with us, and the product is used by farmers' families. Large quantities of it are used in manufacturing apple sauce, or apple butter, as they call it. There is not much sold by wholesale, but I believe it would be profitable if it were manufactured on a large scale. One man has five or six acres, and he gets about six barrels of molasses to the acre, or about 300 gallons. It sells at about 50 cents a gallon.

[*Mr. McGregor.*]

Amber Sugar Cane.

The early amber sugar cane is being introduced now, and I think this industry will develop into something important, especially in one portion of the County. We have not made any sugar yet, as it costs a good deal to manufacture, but the syrup it produces is as good as the general run of the syrup purchased at the stores. The charge per gallon for making it is about 12½ cents, leaving the producer about 40 cents clear. The cane is not any more troublesome to cultivate than corn, and it is cultivated in pretty much the same way. We also grow considerable broom corn and tobacco.

Broom Corn.

The broom corn is not exported but is made into brooms for home use.

Horse Breeding and Shipping.

I have been largely interested in horses from my boyhood up. I have not been breeding them very much, but I have been buying them and dealing in them. I find that the general purpose horse is the best for my trade, and we have a good many of such horses in Essex. The old settlers used small, inferior horses, but the old country farmers who have been settling here lately have much larger and better horses. They are keeping up the quality and improving it rapidly.

Percherons and Clydesdales.

We have lately had a large number of fine stallions and mares imported into the county—some Percherons and some Clydesdales. The Clydes have been imported from different parts of Canada. They are not pure Clydesdales but are well bred. The finest colts I ever saw were some I saw lately from the imported Percherons. It is intended to cross the Percherons with the best families of our common mares, as farmers cannot afford to pay a high price for the thoroughbreds.

General Purpose Horses.

I have shipped between 300 and 400 general purpose horses to Manitoba, since January. I also sell a large number in the United States. The demand there is for general purpose horses, and we do not cultivate the roadster, as we do not find it profitable. The horse we want is one fit for any description of farm work, or for heavy draught purposes in cities. For the latter we get about $130 or $140, and for heavy horses weighing 1200 or 1300 lb. for farm work, we get from $90 to $120. We buy these horses all over Canada and sell them directly. Generally speaking we find that the farm horses throughout the country are in good condition and well kept. Out of 200 or 300 we can pick perhaps about twenty that suit us. In producing heavy horses I think we can compete with the world, for the reason that our farmers commence feeding their horses while they are young on oats, making them firmer, more enduring, and better muscled than those that are fed on corn.

American Demand for Horses.

In New York, and other American cities, Canadian teams are always in demand. There are hundreds of American buyers purchasing horses in Canada just now, and I believe that the reason our horses are preferred is, as I have stated, the different feeding they get while young, as well as that our farmers pay some attention to their breeding. There is a fair supply of these horses to be had just now. Canada is producing a great many horses, and there is a good demand for them, more this year than last. I don't think that our farmers have been tempted to sell their brood mares, and I believe they

[*Mr. McGregor.*]

are doing more now to improve their stock, than at any previous time in the history of the country.

Demand From Manitoba.

I don't think the English market, or the Manitoba market, opens such a prospect as we have in the United States market. Manitoba will take 600 horses from Canada this year, or take in the whole year round, perhaps 1,000. The age of these horses is from four to ten years.

The Percherons.

The Percherons seem to be much livelier horses than the Clyde, and more closely built, and they have also better carriage. They are smaller horses than the Suffolk Punch, and their colour is mostly a dappled gray. I think they would be very valuable horses to cross with our common stock so as to produce a distinct type. I am not prepared to say, of course, that they will prove a better horse than the Clydesdale, because they have not been tried so well.

Tobacco Culture.

I don't think tobacco culture is profitable in Essex, at the present time, or likely to become so. I don't think that there would be any advantage in growing it. It costs a large amount to cultivate it. It requires the richest soil, and it is susceptible to the frost. The market is also very fluctuating. The fancy for tobacco made from the plant grown in Canada has passed away in favour of tobacco made in the South.

Cattle Feeding and Fattening.

About 2,200 head of cattle are fed in Walker's distillery. They are put up in October or November, taken out in May or June, and sent to England. None are purchased over three years old. Most of them are from two to three years of age, weighing from 900 to 1,200 lbs. When they come out they will average from 1,500 to 1,600 lbs. Their cost when purchased from the farmer would be about $28 apiece. I could not say what they realize in England, but they bring about five cents per lb. here. They will compete with any cattle that are fed, and are as popular in England as any. They are not pas tured at all, but are fed eight or ten pounds of hay per day, and are shipped from Montreal to England in May or June.

Shipping Facilities.

I think Mr. Walker made his shipping arrangements early, but sometimes there is a great rush for ship-room. We have no reason to complain of the shipping arrangements which we are able to obtain, though of course, when the old country market is good, everybody is anxious to ship at the same time. I think our Canadian shipping line has given general satisfaction, and we have no difficulty with the railways. We ship by the Great Western to Toronto and thence by the Grand Trunk, and both lines afford us reasonable facilities.

Cattle Buying.

The cattle I refer to are all Canadian cattle bought in three or four countiesaround us, and none are purchased that are less than half bred. We give about 3 cents to 3½ cents per lb. for them, live weight. We could not make any profit upon them if they were not grades, and my experience is that inferior stock will not pay to feed. Durhams are the best, but we do not object to large bony cattle bred from Herefords or Galloways. The Durham, however, is the popular breed.

[*Mr. McGregor.*]

Fruit Growing.

This county is a great fruit growing section. The Ca awba grape matures perfectly in the southern townships, along Lake Erie.

Pears are a certain and great crop here. There are some remarkably large pear trees—over forty feet in height and of great girth—planted in the French settlements, by the early missionaries. These trees are known to be over 100 years old, and yet bear abundantly—10 to 15 bushels being often taken from a single tree. The trees are too large to gather the fruit from properly, but their size and luxuriance show this county to be a favourable one for the growth of this fruit tree. Apples are a certain and great crop —especially the hardy kinds. Peaches, plums and small fruits grow well without culture, and pay well when attended to.

Honey.

Honey bee culture is beginning to attract attention. Two or three persons have commenced the culture of bees on the latest approved scientific modes, with great success, though as yet on a comparatively small scale. These are the leaders of those who will probably make this a great business. The bees can be wintered without any very great precautions—many mild days in winter allowing them to come out without harm.

Glucose.

In addition to the disposals of surplus Indian corn mentioned, the manufacture of glucose (grape sugar) has been commenced in our midst. A factory, of fair and sufficient capacity for supplying the present demand of the article in this country, has been in operation at Walkerville some two years. In this connection, and to show the large use of this sugar in the United States, it may be mentioned that an establishment is now being completed at Detroit for its manufacture of a capacity sufficient to consume 3,000 bushels of corn per day. This is one of several already in operation at such favourable points as Buffalo, St. Louis, etc. The sugar is used in the manufacture of lager beer, and in making a common grade of molasses, and by confectioners. Doubtless an extended use will be made of the article in this country, especially when mixed with the syrup of sorghum or China sugar cane.

Charcoal Kilns.

The charcoal kilns are permanent kilns, built of brick, and iron-fastened, situated in the forests convenient to the railways connected through to the States, and by sidings at kilns and furnaces. The cars used for the transport of charcoal are unusually large, being made and kept for the purpose, and the charcoal iron smelters can, by these arrangements, command the requisite number of bushels of charcoal per day, at all seasons, saving large storage space and interest on storage supply. Much of the wood made into charcoal is unfit for anything else but fuel, and too far away to bear transport to market in the crude form.

Fisheries.

The whitefish, herring, and other fishing along the river and lakes bordering this county on three sides, is of great importance, worth say $60,000. The fish hatching establishment at Sandwich, put into operation some two years ago, will be the means of maintaining the stock of fish in these rivers, turning in annually about twenty millions of young fish.

WM. McGREGOR.

[*Mr. McGregor.*]

ONTARIO AGRICULTURAL COMMISSION.

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