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Address Delivered before the Queens County Agricultural Society, at Its Third Anniversary, at Jamaica, Thursday, October 10th, 1844

Gabriel Furman

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A D D R E S S

DELIVERED BEFORE

THE QUEENS COUNTY

AGRICULTURAL SOCIETY,

AT ITS

THIRD ANNIVERSARY,

AT

J A M A I C A ,

Thursday, October 10th, 1844.

BY GABRIEL FURMAN.

JAMAICA:

PRINTED AT THE OFFICE OF "THE LONG ISLAND FARMER,"

BY C. S. WATROUS.

1845

JERICHO, OCTOBER 29th, 1844.

HON G. FURMAN:

MY DEAR SIR: At a meeting of the Managers of the QUEENS COUNTY AGRICULTURAL SOCIETY, held on the 10th inst., the following resolution was adopted:

“Resolved unanimously: That we tender to the Hon. G. FURMAN our most sincere thanks for the able and interesting Address, so rich in historical, scientific, and agricultural facts — which he has this day delivered before our Society; and that we most respectfully request he will furnish a copy for publication.”

In discharging the very agreeable duty of transmitting to you a copy of this resolution, I can but express the hope entertained, not only by the officers of the Society, but by all who heard the Address, that you will comply with this request.

I am, dear sir, very respectfully,

Your obedient servant,

ALBERT G. CARLL, *Corresponding Secretary.*

BROOKLYN, MARCH 24th, 1845.

ALBERT G. CARLL, Esq., *Corresponding Secretary, etc.*

DEAR SIR: In accordance with the request of the QUEENS COUNTY AGRICULTURAL SOCIETY, I transmit to you a copy of the Address delivered before them at their last Anniversary, for publication.

You will please accept my thanks for the kind manner in which you signified to me the wish of the Society in that respect.

I am, dear sir, yours, very respectfully,

G. FURMAN.

ADDRESS.

THE formation of this Society to improve the Agriculture of our Island, manifests in itself the opinion you entertain of its importance, and renders it almost, if not quite, unnecessary to call your attention to the usefulness and high value of advanced knowledge in this main pursuit of life.

It can only be requisite to remind you that the cultivation of the earth is that means of employment, above all others, of which the Deity, in his wisdom, has expressed a decided approbation—in showing us that the cultivation of a garden, with the enjoyment of its fruits and flowers, were the occupation and reward of man, when most perfect and in a state of primitive innocence; and it is not a little remarkable, and may, indeed, be regarded as a strong internal evidence of the truth of that narrative of the primeval condition of the human race, that a cultivated mind and innocent heart still receive high pleasure from the same pursuit.

Agriculture is truly the parent of all science, uniting men by the bonds of civil society, who, without its aid, would continue to be wandering savages, as we may witness, duly substantiated, upon the frontiers of our country, in the various stages of human life, from the roving Indian, who subsists by the chase, through the first organization of communities, where they throw off the habits of the hunter state, with its precarious means of living, for the certain recompense arising from the culture of the soil, up to the regular farmer, who tills hundreds of acres for the production of grain. This cause, the great and paramount importance of agriculture, its effects in humanizing the world, induced the ancients to worship it under the semblance of Ceres, Pomona, etc., to deify the inventors of the plough, and other means of culture, and to represent the enjoyment of rural happiness and pursuits as the perfection of their golden age. This honour and reverence for the parent science have not been confined to particular nations, but has extended over the whole world, wherever the soil has been turned up and prepared for the receipt of the seed, and its attendant blessings have ever been experienced.

It is not necessary for us to look beyond our own hemisphere for striking evidences of high ancient cultivation, and the advantages which resulted to the community from

its practice long anterior to the discovery of America by the Spaniards; Peru, Central America, and Mexico up to the Southern boundary of the United States were under a state of cultivation, far, very far, superior to any thing which either of those countries have witnessed since their European occupation.

Numerous wild and arid plains, which have not now for ages produced a head of grain, and some of them scarcely a blade of grass, were then tilled like gardens: the numerous terraced hills, and even mountains, the frequent remains of canals and aqueducts for the purposes of irrigation, all show the high advance which that ancient people had made in the art of cultivating the earth. The result of all this was an immense population, living in ease and comfort, of which the earliest Spanish accounts, compared with what they are now, or have been at any time during the last two centuries, almost appear like fables, and would truly be considered as such, but for the corroboration which they receive from the numerous architectural and other remains scattered over the whole country, to an extent which is truly surprising.

So, also, when the Northmen visited this Island and the adjacent Continent, between the years 986 and 1100, they found the Indian corn growing, and the grape in abundance,—evidences showing a previous cultivation of the soil,—it will be observed, that I speak of the visit of the Northmen to this part of our country as a question positively settled. I, in truth, regard it in that light. A careful examination of the subject will show that their description of the productions of the country, the length of the day, and the appearance of the coast coincide in a remarkable manner with the United States, and with no other country in the known world. Thus their *Helluland* is Newfoundland, even yet remarkable for its naked, rocky barrens, where not a tree or a shrub can grow; their *Markland*, with its forests and white sandy cliffs, is Nova Scotia; and their *Vinland*, so called from its grapes and fruits, is the country from Massachusetts to the Chesapeake Bay. Their voyages in the year 1000, (four hundred years before the first voyage of Columbus) describe an Island, on which they landed, which is evidently our Long Island; the soil fertile, the air mild, and numerous shrubs bearing sweet berries: after passing this Island, they entered a river stored with salmon and other fish, (which is also Hudson's description of the North River,) where they wintered. Another and almost conclusive fact is, that they state, that during the shortest day the sun was above the horizon from *dagmal* to *eikt*, that is from $7\frac{1}{2}$ A. M. to $4\frac{1}{2}$ P. M.; which makes the day equal to nine

hours, and consequently the latitude of the place as near that of the city of New-York, as well as could be ascertained at that time. Verazzano, who visited this region in 1524, almost 200 years before Hendrick Hudson's first voyage on the North River, and whose description, Dr. Samuel Miller, a most able authority on such matters, regarded as applicable to the Bay and Harbour of New-York, states that he found many grapes growing with the vines entwined around the trees, and running up on them, as in the plains of Lombardy.

He also states that they must have been held in estimation, as the people carefully removed the shrubbery from around them, to allow the fruit to ripen better, indicating the relics of ancient cultivation. He also found "wild roses, violets, lilies, and many kinds of plants and fragrant flowers," different from those of Europe. You will not fail to recognize the similarity between the description of the country and that of the Northmen between 4 and 500 years earlier. That this is the region indicated in those very early voyages, and the *Vinland* of the Northmen is rendered the more certain from the first history of New Amsterdam, now New-York, by Vanderdonck, printed at Antwerp, in 1650, which describes the whole country on this Island, and about New-York, as being, when settled by the Dutch, "full of many kinds of grapes." Speaking of these grapes, the author also observes: "It is gratifying and wonderful to see these natural productions, and to observe such excellent and lovely fruit growing wild:" and he further remarks, that "the country, when the vines, are in bloom is perfumed with the lovely fragrance of the blossoms, and it is delightful to travel at this season of the year." What a beautiful description is this of our own land, when in its forest state! We could almost wish to have lived in that early age, if it was only to stroll along the bridle roads and the Indian paths to inhale the lovely fragrance of the grape blossoms in the Spring. This portion of our country, and especially Long Island, is celebrated in all the ancient historical works treating of New-York or the Middle Colonies, for its rich, natural covering of flowers, and its exuberance of fruits. In Denton's account, printed at London, in 1670, the first work describing the Colonies of New-York and New Jersey in the English language, a considerable portion is occupied with a beautiful picture of this Island, which he styles a natural garden; and of the parties, which we now call *Pic Nics*, which at that early period made frequent excursions through its verdant fields to gather and eat the wild strawberries and other fruits, then existing in profuse abundance. No one could

be more competent to a faithful description of Long Island than this author, for he was many years an inhabitant of this Island, and from 1656 to about 1669 resided in the town of Jamaica, where we are now assembled, which town he represented in the first Legislative Assembly of the Colony of New-York, held under the English Government, in the year 1665; which Assembly met at Hempstead, in this county.

I have thought the preceding facts, exhibiting a condensed view of the early condition of our own land, might not be uninteresting. But whatever may be said of the high advance in agriculture and many of the arts, made by the ancient inhabitants of Mexico, Central America and Peru, yet it must be admitted, that our Colonial condition was not propitious to the cultivation of science: our forefathers had great and peculiar difficulties to surmount, a wilderness to subdue, their physical wants to provide for, their personal and public rights to secure, and the foundations of government to settle:—and we are now realizing the benefits resulting from their most arduous labours, from their immense sacrifices of personal comfort, of domestic endearments, of wealth and even of life itself—sacrifices which should endear their memories to us, and teach us to truly estimate the privileges which they purchased for their descendants at such a cost—learn us never to trifle with the true interests of our country, nor to permit others to do so. After their exertions nothing seems to be wanting among us to promote the progress of science, but the aid and sympathy of the public; this encouragement is especially due to every attempt similar to the objects designed by this Association—to draw down science from lofty abstraction to practical use, and bring it home to men's business and firesides.

The diffusion of knowledge is closely connected with the happiness of society, and with the permanent prosperity and true glory of our common country. It appeals powerfully to the wise and the good, to those noble minds who labour not only for themselves, but also for posterity. In no land under the face of the sun can such exertions be attended with more immediate benefits, more enlarged and valuable results, than that in which it is our happy lot to dwell.

The land we inhabit is of vast extent, possessing every variety of soil and climate, and abounding with all the natural advantages for a free, prosperous, and happy people. The increase of our population has as yet found no resistance in the want of the means of subsistence; its tide is now swelling and overflowing in every direction, with a rapidity which has no equal in the kingdoms or

nations of the old world. But this rapid increase of numbers will not be attended with a correspondent increase of public tranquillity and happiness unless the region of the intellect is cultivated, as well as that which yields a supply to our physical wants: the wants of man are not restricted to his body; his soul is filled with aspirations after knowledge and fame, with an insatiable thirst for happiness, which seeks for its gratification, not in the enjoyments of sense, but in the cultivation of the powers of his intellectual and moral nature. The sentiments of patriotism are not merely associated with the soil on which we drew our first breath of life, but are made up of the recollections of the great men our country has produced, of their heroic and beneficent actions, of affection for its institutions and its fame. This sentiment should be cherished and invigorated by associating with it an enlightened love of freedom, a taste for knowledge, and an ardent enthusiasm for those arts which lend to human existence its enjoyments.

Could the future glories of our country be spread before our astonished vision, could we but for a moment lift the dark veil, and look in upon the mighty nation, the thousands, and tens, and hundreds of thousands, who will swarm in the wide spreading, fruitful valleys of the West, could we view the great nation which will, at some future time, extend its borders from the Atlantic to the Pacific Ocean, and witness the immense trade of a world coming into this land, both from the East and the West, could we now read the future history of our country, of the fierce struggles of contending partizans, of the contests for different principles of governmental action, of the threatened dangers to our institutions, could we have futurity opened to us, but for a moment, and in the vision see all this, or a part of it—we should then know the great truth, that all the happiness and prosperity which awaits our country, depends upon the supremacy of the mind, on the cultivation of the intellect, on the diffusion of knowledge, not merely to a chosen few, but to that immense multitude, who are at once invested with the privileges of freemen, and the prerogatives of power, and we would feel it a religious duty to exert ourselves to the uttermost in carrying out that great and noble object—the education of a whole people. No one branch of human industry owes more to science than does agriculture in our day; and, permit me, my fellow-citizens, to congratulate you on the advance of science in this respect in our land. It was but a few short years since, that it was esteemed no slight reproach to style a man, “*a book-read farmer!*” but who is there now among you, let me ask, who does not, in the in-

creased amount of his crops, in their advanced value, in their comparative ease of culture, in the facilities of a market, and in numerous other results, see the benefits, the open palpable advantages of book learning applied to agriculture, and yet, with all these advantages, we have only taken the first step in the grand march of agricultural improvement. The prospective benefits to result from the application of science to agriculture is not, however, a new idea or of modern invention. Many of our ancestors were fully impressed with the belief of its truth, and adopted a plan, somewhat analagous to your own, for its development; they, also, formed associations, having for their object the improvement of this most valuable pursuit. A society, for that purpose, was organized in New-York, in 1763, combining among its members, the most talented and distinguished men in the Colony; among whom were Charles W. Apthorp, a member of the Council, and for a long time a distinguished man in America; William Smith, the historian of New-York; Walter Rutherford; John Morin Scott, afterwards one of the first Major-Generals in the American Revolution; and James Duane, the celebrated banker of New-York. In their circular, which they issued under the date of December 10, 1764, they commence by stating: "A very laudable spirit for promoting the welfare of this Colony begins to prevail here, —[New-York City]—a society is already formed, consisting of persons of all ranks, who propose to advance husbandry, promote manufactures, and suppress luxury. Several hundred pounds are already subscribed, and paid into the hands of Mr. John Vanderspiegel, the treasurer; the society have thought fit to name us to be a committee of correspondence with all those gentlemen at a distance, who may be willing to lend their aid for the general weal of the Colony." After stating the manner of subscription, and, "that no subscription under twenty shillings will be received," and, "that a subscription of five pounds entitles the subscriber to vote in the disposal of the funds," they proceed to urge the formation of a society in the neighbourhood of the persons addressed, in order to correspond with the parent association in the city of New York, and to furnish useful hints in relation to what branches of husbandry ought to be encouraged, and for what manufactures premiums ought to be given; and, in general, to suggest all manner of proposals that may be for the public benefit, in arts, manufactures, agriculture, and economy." And they conclude, by observing, "you may be assured that a proper respect will be paid to your schemes, hints, and proposals, and that they will be regularly communicated to the society at their monthly conventions."

This circular was printed, and each of them subscribed by the different members of the committee, in their own proper hand-writing. I have one of them of the date before mentioned, thus subscribed, from which the foregoing extracts are made.

This association was very useful in its day, and from its history, is intimately connected with our Island; it therefore requires no excuse for adverting to it on this occasion. I find, from an inspection of its proceedings, that at a meeting, held at the city of New-York, December 21st, 1767, that Society awarded to Thomas Young, of Oyster Bay, in this county, a premium of £10, for a nursery of 27,123 apple trees, and, at the same meeting, certificates were received and read from Joshua Clark and Francis Furnier, both of Suffolk county, stating that from the year 1762 to April 1st, 1767, Clark had set out 3200 grape vines, and that Furnier had in the same time set out 1551 grape vines; the description of grape is not specified, but the matter was deemed of sufficient importance to be certified by this Society to a similar association in London, in order that those gentlemen might there obtain a premium. The New-York Society also speak of the business of raising silk worms, and of silk throwing, as about being then established in the Colony.

This was the only association of the kind in this State, previous to the close of the revolutionary contest. After the termination of that eventful contest, an association was incorporated in this State, under the style of the "Society for the Promotion of Agriculture, Arts, and Manufactures," which continued in operation until May 4, 1804, when it expired by the limitation in its charter, and the books, papers, moneys, and effects passed over by Legislative authority to the "Society for the Promotion of Useful Arts," incorporated April 2, 1804, and of which Chancellor Livingston was the first President; and Ezra L'Hommedieu, of Suffolk county, the first Vice President. This last association, together with the Albany Lyceum of Natural History, which was established, "for the purpose of encouraging the study and disseminating a knowledge of Natural History, and other useful sciences," became merged, in 1829, in the Albany Institute, which still exists. There were at various periods, previous to the commencement of the present century, many enlightened individuals, who exerted all their influence, both personally and in association with others, to advance the cause of agriculture, yet science made but small advances to its aid; there were popular prejudices to be overcome, which required ages of patient toil in those worthy souls, who live for the general good. Hartliff, who was the friend of Milton, and who

was pensioned by Cromwell for his agricultural writings, states that old men, in his day, remembered the first gardeners, who came over to Surrey, in England, and sold turnips, carrots, parsnips, early peas, and rape seed, which were then great rarities, being imported from Holland. Potatoes were first carried from America to England about the year 1563, but they were not much known there until about forty years after, and they continued for nearly a century to be cultivated in gardens as a curious exotic, and furnished a luxury only for the tables of the richest persons in the kingdom. It appears in a MS. account of the household expenses of Queen Anne, the wife of King James I, of England, that the price of potatoes was then one shilling sterling a pound, about 22 cents of our currency.

The potatoe was long used in other portions of Europe, before it was generally adopted in France; so strong are the prejudices of mankind, even in matters of the greatest moment. The French proscribed it because they imagined that various disorders were occasioned by its use, and it was more than two hundred years before the popular prejudices in that country were entirely overcome, and then only through the instrumentality of that celebrated and distinguished chemist, Parmentier. During the war of 1756, he was surgeon in the army of Hanover, and was taken prisoner; whilst in prison he frequently had no other food than the potatoe; he analyzed the qualities of the root, and on his return to Paris, after the Peace of 1763, he pursued his investigations with increased zeal. The dearth of the year 1769, called the attention of the French minister to the vegetables, which were calculated to supply the place of bread and corn,—and the Potatoe was attempted to be introduced: the old clamor revived, and it was again proscribed, and would have been rejected as poisonous, if Parmentier had not vindicated its character and usefulness in a prizé essay, submitted to the Academy of Bésancon; his exertions did not stop here; he cultivated it himself, and persuaded the nobility to put it on their tables, and induced the king to wear a boquet of potatoe blossoms at a Levee, or on a solemn Fast Day. He also studied the most palatable mode for its culinary preparation, and, on one occasion, gave a dinner consisting of potatoes only, served up in twenty different forms. The opposition he met with may be estimated from the fact, that when, during the French Revolution, it was proposed to elect him to a municipal office, he was opposed on the ground, that “*he would make the common people eat nothing but potatoes:*” “for,” said one of the voters, “*it is he who invented them.*” But his favourite vegetable came into general use, and with complete success, and he

had the gratification, in his old age, of seeing whole districts formerly barren, fertilized and rendered habitable, and great numbers of people, through his instrumentality, saved from the horrors of famine.*

I have introduced this short history of the potatoe to exhibit to your view, the astonishing force of popular prejudice, and how necessary it is for us to guard against it, and not prejudice any thing of moment, or form an opinion upon any matter of importance, without a fair and candid examination. Here was the potatoe, a most important article of food, and now forming a most valuable addition to the means of subsistence for the world, totally excluded from France, and proscribed as poisonous for a period extending from 1563 down to within the last sixty years.

All that had been done for the cause of science, during the past three centuries, will, however, scarcely bear a comparison with what has been effected within the last half century; indeed, the discoveries and improvements made in the mechanical arts since the year 1814, have been really astonishing, and they are now working a mighty revolution in the affairs of this world, most certainly and surely; they may be estimated as follows:

In 1816, printing by steam power; stereotype plates; the circular saw; sugar from beet roots; anthracite coal; lithographic impressions.

In 1817, musical boxes.

In 1820, safety lamps; chain cables of iron.

In 1832, the chronometer perfected; power looms for cloths, stockings, etc.; the stomach-pump, (an invention which has saved the lives of thousands, and therefore, worthy of special notice); railways; locomotive steam-engines; general working of lead and coal mines in the United States.

1833, gum elastic boots, shoes, and cloths. The amount of money saved in the use of these articles is great—probably far beyond the estimate of any one who has not made a careful examination of the subject.

* His reward for his unwearied exertions, and his self-sacrifices for the public benefit, it is true, came late; but now, it seems, as if the French people could not do too much to immortalize his name. The town of Mouridier, in the department of Somme, in France, a little over a year ago, were erecting a bronze statue to the memory of this illustrious philosopher, who introduced the culture and use of the potatoe into France; thus verifying the prediction of the unfortunate Louis XVI, who observed to Parmentier, during the height of his struggles in the labour of love: "France will thank you one day for having found bread for the poor."

The name of the Citizen King, Louis Philippe, heads the subscription for the erection of this memorial of public gratitude; and it is followed by the principal scientific and agricultural societies in that kingdom, and also by the most distinguished friends of science and humanity. Subscriptions were likewise opened in every district in France, so that all might join in testifying their respect for the memory of Parmentier.

But what truly astonishing results have the last fifty years produced in our country! A half century since and cities, now full of thousands of souls, were the hunting grounds of the Indians, and covered only with the forest or swamp. Fifty years ago and the city of New-York had but about 33,000 inhabitants, and has now near 350,000. Brooklyn, her adjunct then had but a population of 250 souls, and now numbers about 50,000. Boston, then 18,000 inhabitants, has now near 100,000. Baltimore, which then possessed but 13,000 people, now has 100,000; and Philadelphia, with a population then numbering 40,000, has now about 280,000. What an increase in population, wealth, and power has been added to our country in one short half century! The world has no parallel to it in its history.

Fifty years ago and we had nothing of the gigantic powers of steam; no steamboats stemming the currents of our rivers, at the rate of fifteen or twenty miles an hour; and no rail roads traversing our land in every direction at a speed of from 12 to 30 miles an hour: formerly, before the use of steam upon our waters, it sometimes occupied a week and even a longer time, in passing from New-York to Albany, a distance of one hundred and sixty miles; but now in the great revolution produced by the march of science, the steam-packet-ship, *Britannia*, which arrived in Boston from the port of Liverpool a few days since, in that passage lost sight of the British coast, and made the coast of Newfoundland, in just *seven* days; one week in crossing the Atlantic. Fifty years ago the worthy fathers and mothers of the present generation were willing to dress in their own homespun fabrics; the busy wheel was whirring by their firesides, the knitting needles were plied, and wool woven in the house, and the finer cloths dressed at the fulling mill of the neighborhood,—all which has given way to the spacious and magnificent factories of the present day. Time is now too valuable, with the majority of the people, to be occupied as then, in work which can be better and cheaper done by machinery.

And the waterfall and the steam engine, with the improved spindles and other machines now supply the labour of thousands, and manufacture millions of yards of cloths, cotton goods, etc., where half a century since only a few hundreds were made.

In all this advance of science, agriculture and its implements have been concerned and have participated; from 1793 to 1830, the plough has been made to undergo one hundred and twenty-four improvements, and one hundred and nineteen thrashing machines were invented during the same period.

Thus have we progressed, not only in the arts but also in the luxuries of life. A little more than two hundred years ago sugar was kept for sale only in the shop of the apothecary; now, the annual consumption in the United States alone is eighty millions of pounds! It is almost startling to look forward to the coming half century, and to estimate our progress for the future at any thing like that of the past. Where it may terminate human judgment cannot foresee; but we have the assurance of Almighty wisdom for the belief, that mankind are now progressing to a state of perfection which the world has never as yet known; how long it may be before we arrive at that state—what trials and conflicts we may nationally and individually be called upon to pass through before we attain it,—we must and should leave to his Omniscience.

The improvement of agriculture in this great march of knowledge has been in a high degree owing to the increased amount of geological information abroad in the world, which science, together with astronomy, as they now present themselves to an inquiring mind, possesses a more overpowering immensity than all the other branches of human knowledge. The first informs us that the earth produced plants and animals at one time, when the very stones of the oldest ruins which now exist were only mud or sand, and of a gigantic form and order almost incomprehensible. Astronomy also teaches us that the sun of our system with the orbs that ceaselessly wheel around it, form but a very small and almost insignificant portion of the great and immense system of creation, with which they are connected, and that our whole solar system is itself revolving around some unknown centre, and that with a rapidity almost unappreciable. It has been ascertained within the last quarter of a century, that our whole solar system, as one body is passing with almost inconceivable velocity, in the direction of the constellation Hercules, which passage, it is evident, cannot take place at hap-hazard and by chance, through the spheres of the various other luminaries of the heavens, but must be made upon some orbit regularly settled and defined, although our knowledge is not now sufficient to ascertain the extent and shape of that orbit, and the history of man's observation is spread over too brief a space of time to enable us to ascertain its progress in this vast revolution. The preceding may be regarded as one of the wonders of astronomy; its sister science, geology, exhibits numerous facts, equally calculated to excite our astonishment.

In that formation in geology, known as the *lias*, being the first richly fossil formation overlaying the more ancient

one of the old red sand stone, we discover, for the first time in the geological system, indications of a change of seasons; the frosts of winter had not as yet made their appearance in the world, all seems to have been Spring and Summer before throughout the whole globe, and that for ages: and now many ages after, we find in this lias formation, the footsteps of Winter, impressed amid the lignites of cromarty; and there you may see the alternations of Summer-heats and Winter-cold as distinctly marked, for the *first time*, in the age of the world, as in the trees of our forests. Before Winter began to take its place among the seasons, the fish, fitted for living in a highly heated medium, disappeared; they were created, as is agreed by all distinguished geologists of the present day, to inhabit a thermal ocean, and died away as it cooled down; and so in the same manner disappeared gradually our gigantic palms and vegetables, and our immense animals, for this change was a work of time; they had performed the part allotted by the Creator, and having finished their task, they rested from their labors.*

These changes have not been confined to the ocean, but have progressed throughout the whole extent of creation; entire races of animals and plants have disappeared, as the form of the earth's surface and the degree of heat upon it, became ill adapted to their wants; and others of a different class came in and supplied their places, as is manifest, in many striking instances.

Our own country exhibits some curious examples of this great change. In excavating the canal at Zanesville, in Ohio, numerous impressions of tropical and other plants were found. Among them were the leaves of the cocoa nut tree, the bearing palm leaf twenty inches in length, the roots, trunks, limbs, and leaves, of the bamboo; the trunks, limbs, leaves, and even the blossoms of the cassia; the cinnamon tree; the petals even of these blossoms were entire, and uninjured, showing conclusively that they grew near the spot where they were found. But what immense changes must have taken place in our climate since the cocoa nut and the cinnamon tree flourished in the Valley of the Ohio!

Still greater and more astonishing changes must have happened since the animals of the fervid zone lived and flourished within what is now the Arctic Circle: that they did so at some former age is evident from the numerous discoveries made there within the last century. The whole soil of the first of the Lachone Islands appears to consist of the

*See Hugh Miller's "Old Red Sand Stone of Scotland; or, New Walks in an Old Field."

remains of the elephant, mastadon, and the mammoth. For about eighty years the fur hunters have yearly brought cargoes from this island, and as yet there is no sensible diminution of the stock; they maintain that when the sea recedes, after a long continuance of easterly winds, a fresh supply of these bones is always found to have been washed upon the shore, proceeding, apparently, from some vast store at the bottom of the sea; as if some large tract of land, enjoying the advantages of a warm climate, and inhabited by an immense number of animals, by some mighty convulsion, had been instantly submerged by the ocean.

The Faroe Islands, lying between the Orkney Islands and the Arctic Circle, afford another singular instance of this change. On these islands there is now no wood growing, and has not been any for a very long period of time, which is attributed to the cold high winds, and the salt fogs from the sea; and yet the great number of large birch trees found in the mosses on those islands, prove that they formerly grew and thrived there. And so also, we learn from Dr. Aikin, that although the Fens of Ely, in England, now produce nothing but osiers and willows, yet the bodies of oaks of large dimensions, and other trees are frequently dug up in the lowest and wettest tracts, which proves that this extensive section of country which now requires a continued and active drainage to make it habitable, at some remote period was well wooded, and was, probably, in great part a forest.

Does not all this prove that the earth, at some former period, enjoyed a higher degree of temperature than at present, and presented a very different aspect than that of its present appearance?

But for one further proof, let me refer to Iceland, a country certainly cold and bleak enough at present. On both the eastern and western coasts of this island, are found beds of bituminous wood, which the natives call *surtur-brand*, burnt wood. They also find there a grey colored slate containing very many impressions of leaves, exhibiting in a most beautiful manner, all their veins, ribs, and fibres. Among these are the leaves of the willow, birch and oak, some of the latter as large as a man's hand, and also the leaves of the common poplar, a native of the warm plains of Lombardy. Most of the wood appears like large trunks of trees, on which the marks of branches, five or six inches in diameter, are found. These remains are found in clay, interposed between them and the trap rocks, formed by the tremendous volcanic eruptions, to which that island has been subject to from the most distant ages, and the force of the compressions has been so

immense as to compress trees a foot in diameter into their plates.

What a change in the earth must have taken place since the period when those trees grew in Iceland, where now nothing thrives but a stunted willow, two or three feet high!

Some who have not paid much attention to the great changes which have taken place in our earth, suppose these trees to have been drift wood, which is not, in my judgment, a very reasonable supposition, as they are found, in many instances, far from the shore and elevated hundreds of feet above it; and they find no drift wood of the species of trees existing in the present day, with their leaves and branches so fresh and perfect, cast upon their shores. And what more extraordinary is it, let me ask, that those trees should have grown in Iceland, than it is, that the forests of birch trees should have grown upon the now barren Faroe Isles: or the oaks in the watery Fens of Ely; or the cinnamon tree, the bamboo, the palm, and the cocoa nut should have grown in the Valley of the Ohio? How these changes were produced, is an interesting inquiry. These facts separately, but not in a connected view, have long excited the attention of the curious, and theory, contradicting theory, has been formed and again abandoned in the endeavour to point out some adequate cause for these great results, until at last many have abandoned the task as hopeless, and have contented themselves to regard these matters as being inexplicable.

The error with most of us has been, that we have looked upon this little spot of earth, on this mere speck in the Almighty's great creation, for the cause of all these revolutions; and we have had our bold theories, as they were sometimes termed, of the action of fire and water as contained in the globe itself, when in truth they were but the agents acted upon by some great cause without; or, at the best and the farthest, we have extended our vision to the sun as the centre of our system, and as being the only body acting upon us; and then talked about its attraction, and descanted wisely and learnedly, as we supposed, of the changing of the poles of the earth, and by this means placing part of our temperate regions with the frozen seas under the fervid rays of an equatorial sun; but the advocates for that system seem not to have adverted to the fact, and a most important one it is, that while we find the remains of the elephant in Siberia, and even almost under the North Pole, and forests of the palm tree in France and Germany, the cinnamon tree in the Valley of the Ohio, and tropical plants with the crocodile in England: none of the remains of either animal or vegeta-

ble life peculiar to the Arctic Regions, have ever been found in the tropics or any where else, except as modern deposits in the icy regions, above the more ancient relics of a warmer climate; and, also, that the first appearance of Winter in the earth's history is registered by the hand of the Almighty in his eternal record, which cannot be falsified.

In my judgment, the explanation of the cause of these great changes and convulsions which have taken place in our world, is to be found in the revolution of the whole solar system, as one mass, to which I adverted when speaking of astronomy. We have only to suppose, as almost every thing about us would seem to indicate, for all the orbits of the planets are elliptical, that this immense revolution is also performed upon an elliptical orbit, and it must be evident, that at some very distant period of time, the earth, with the rest of the solar system, must have been at a point of that great orbit, which placed it comparatively near, and under the active influence of some immense central body, of the size and influence of which, our sun will scarcely afford the slightest conception, (for such a revolution of the whole solar system, as is admitted to be now making, a moment's consideration will show, cannot be made unless it be around some central body proportioned to the size of the bodies revolving,) the heat and vivifying properties of which would induce a monstrous growth of animals and vegetables, the remains of which we now discover, which increase of size was gradual, as the orbit was travelled over until it arrived at its maximum, when an universal equatorial heat pervaded the whole world, as is proved by the fossil remains found on and in every part of it, and that as the whole system receded on the opposite side of the orbit from this great centre, the heat would gradually decrease, and with it the size of animals and vegetables; but the utmost limit of that orbit is probably not so far distant from its centre, as to cause a total destruction of animal and vegetable life, or to deprive the earth of its torrid zone near its centre, and this passage from the centre would also serve to recruit the earth, and to enable it, when it again reaches a certain point of that great orbit, to sustain animal and vegetable life throughout its whole extent, as it appears to have done at some former period; and also the approach to and the departure from this centre must inevitably cause great natural convulsions, by the earth being greatly heated in approaching towards it, and cooling down when it recedes from it.

This, in my opinion, explains the finding of tropical fruits and animals all over the globe. This is *my theory* :

one on which I have thought much and patiently, and it is the only one which is at all reconciliable with the numerous facts which modern geology has brought to light; and this is perfectly consistent with all of them. On no other system than this of an elliptical revolution, around some immensely greater centre than our sun, can be explained, those curious facts which have been recently brought to light by the investigations of M. Agassiz among the glaciers of Switzerland. That such an immense centre as I have spoken of may, and probably does, exist, we will the more readily believe when we recollect, that as large as our sun is, as immense in size as it is, compared with our earth and the other planets of our particular system, yet it bears no proportion to some others of the fixed stars, the suns of other systems; as, for instance, the star, Alpha, in the constellation, Lyra. That one star is well ascertained by the geometrical problem of the parallex, to be nearly as large as the whole of the known solar system, if this system was formed into a solid sphere! Here we have alone, a sun sufficiently large to produce all the effects which I have ascribed to the great centre operating upon our system. What an immense body must that star, Alpha, be! The conceiving of the idea alone is almost overwhelming. What pigmies!—mere nothings!—we are when we regard the immensity of creation!*

Thus I have exhibited to your view some of the astonishing discoveries of modern geology, a science intimately connected with agriculture, and which is destined to pour untold wealth into the hands of the farmers, if they will only attend to its instructions. In it, however, I have given you a very concise statement of the facts, for this is not the place, and neither would time permit, to enter upon this noble and interesting theme at large. We must still,

*This view of the changes produced in our earth, and the cause operating to produce those changes, I first gave to the public five or six years ago, in some lectures which I delivered at the request of literary associations in different places; but it was long before I met with anything like support in the principle I had thus adopted. It is, therefore, with no slight gratification that I now see some celebrated men of Europe turning their eyes in the same direction; they sought for, and examined the causes operating in the earth itself, until they became satisfied that they were inadequate to the results produced, and have been obliged to look for those causes beyond the boundaries of our globe. Thus, Professor Nichols, of Glasgow, the celebrated author of "The Architecture of the Heavens," in his last work, entitled "Contemplations on the Solar System," second edition, Edinburgh, 1844, page 151, after remarking upon the usual method of explaining the mighty convulsions and changes which our earth has experienced, exclaimed: "How utterly the whole fair speculation vanishes before one glance into the universe farther than our own door steps!" and he concludes with the wise recommendation: "Ply thy hammer, geologist! continue to ply it well; but sometimes, also, look through the telescope." This is, indeed, a wise recommendation, and if followed up by a connection of astronomy with geology, it will cause most of the difficulties which at present attend the explanation of geological discoveries, to vanish like mist before the rising sun.

however, bear in mind, that notwithstanding all the advance made in geology, all the wonders exhibited to our sight and our imagination, we are as yet upon the threshold of the great temple of creation, and can only hope to realize its benefits by a continued and active prosecution of its study.

Agriculture also exhibits its curious and surprising phenomena, independent of geology, and some of which are as worthy of attention and curious research.

Among the phenomena is the interesting fact, that seeds will retain their germinating principle, if covered from the action of the atmosphere, for an indefinite length of time ; as is evident from facts of frequent occurrence.

Let any one dig down into a bed of mere gravel or sand forty feet or more, in the month of November or December, and throw up the gravel or sand from the lowest depth, and spread it out to the action of the atmosphere, the next Spring it will be covered by a thin coating of grass, which could only be caused by the seed which had remained in the ground at that great depth, germinating upon being brought to the surface, so as to enable the degree of heat necessary for that process. People frequently labor under a great mistake as to what is soil ; they generally suppose it to be confined to within a foot or 18 inches of the surface, whereas the truth is, if they turn up the poorest sand, gravel or clay, from any depth, however great, and expose it to the chemical action of the atmosphere for a single winter, it becomes soil ; of course the longer it remains so exposed, the better it becomes. The fault is in not ploughing or digging deep enough ; for by ploughing deep, they may make any depth of soil they please, when, by their ordinary shallow ploughing, they confine their soil to within 18 inches of the surface.

A most striking instance of the vitality of ancient seed, was manifested in France, in 1832, where a gentleman planted a quantity of seed wheat from an Egyptian mummy. It sprouted, and was growing with vigor, although it was ascertained to be two thousand two hundred and fifty years old. It was precisely like our ordinary wheat, and served to show the identity of the corn of the ancients with our grain, and it also upset the notion that wheat was once nothing but cheat, and owes its present difference from it to cultivation.

Another and even an older instance of this Egyptian wheat occurred in England, where, at a meeting of the East Suffolk Agricultural Association, in 1838, a sample of wheat was presented, grown from seeds taken from an Egyptian mummy, which was said to have been encased three thousand five hundred years !

It was exhibited by Wm. Long, Esq., of Hart Hall, and was white wheat, the ears of which were considerably larger and broader than the ears of English wheat, appearing to grow double on one stem, and the straw was long and stout. The practice of the ancient Egyptians was to enclose grains of wheat in the mummy cases before depositing them in their resting places; but that the wheat should retain its vital principle through so many ages, is to be regarded as one of those great wonders in the economy of nature, which baffles the skill of man to solve. Much indeed has been done for the advancement of science, for the promotion of agriculture, and for the cause of natural history generally, during the present century, and the exertions which have been thus made will confer honor and distinction upon their promoters for ages to come. To no one individual do we owe more for his labours and exertions in this noble field, than to a native of our own Island, the late Dr. Samuel L. Mitchell; a name which will live and be honoured by posterity; indeed every succeeding age will add to the appreciation of his unwearied life in the prosecution of science. For a long period he was almost alone in the pursuit of his favorite studies, having but few who felt a real and active sympathy with him.

It was indeed difficult to convince the people generally that inquiries of natural history were of any advantage in their business pursuits; they thought it might do well enough for a man who was independent in his circumstances and had no particular business occupation to devote his time to such pursuits, but otherwise they esteemed it both a waste of time and money. He had, however, the gratification to see first one and then another association rising up into existence, for the furtherance of those particular objects which he had so much at heart, and now, if as some wise and holy men have believed, the happy spirits in another state of existence experience high pleasure in observing the good actions of mankind, with what delight must he witness those pursuits in which he took so great an interest when living, now prosecuting not only by individual enterprise, but also fostered and encouraged by the Government itself, in the several geological surveys which have been made of different States, and in the aid which has been given towards the establishment of agricultural associations.

The memory of Dr. Mitchell should be cherished by us especially; his name is identified with researches of which we are now reaping the advantages, and his life was spent in advancing the interests of his fellow-men; such

a man is worthy of all commendation, and for example's sake should not be forgotten.

The farmer is truly the lord of the soil, and his position in society the most independent of all its members. The leisure which Winter affords from the labours of agriculture gives him an opportunity for storing his mind with useful knowledge, which few, very few, in the active pursuits of life can ever hope to gain. There is every opportunity for him in this country to take the lead in all the affairs of the nation if he chooses so to do.

But to occupy such a position with honor to himself and advantage to those interests which he dearly cherishes, he must cultivate his intellect, and in no way can he do this more effectually, than following up the study of natural history, so intimately connected with his agricultural pursuits. Every step taken in such a course of study will open new beauties until the mind becomes perfectly fascinated with that, which at first might have been regarded as a task. The whole man becomes changed; his nobler faculties and pleasing traits of character become more and more predominant over the others, until at last the latter are entirely hidden from his view.

It has been said that angels can read songs and anthems, glorious themes of praise to the Most High in the arrangement of the flowers upon the surface of our earth. The delighted student of natural science will find this practically true; the small flower of the meadow, which he had before probably passed hundreds of times, without notice, will now afford him more ennobling conceptions of the Deity, more heartfelt gratitude for the bounties and beauties so profusely spread before him, than he had ever before attained from any source.

I am willing to be thought enthusiastic on such a subject, but let me commend it to the practical use of each of you who now hear me; try it for yourselves, and I will then venture to assert that you will, when fairly initiated, rather think that I have been tame instead of glowing in my description of the advantages resulting from such a course of study.

The value of a continued and active exercise of the mental faculties will be properly appreciated, when we consider that this ennobling principle was given us for the purpose of directing and controlling our powers and animal propensities, and for bringing them into that subjection whereby they become beneficial to the individual and to the world at large; enabling him to exchange with others those results which the power of his own, and the gigantic efforts of other minds, have developed and bringing into action those characteristics of social life, and those af-

fections which alone are calculated to make our present state of being happy.

Independently of the utility of study, what a world of delight, hidden from the view of the mass of mankind, is opened to the mental vision of him, who has devoted a portion of his time to the investigation of the truths of science. The prosecution of such studies, however laborious in the outset, soon become their own reward, in the overflowing pleasures they create.

One great advantage of associations, like the present, is that a desire for the acquisition of knowledge is kindly fostered and brought to a maturity which develops itself for the benefit of mankind. They also create and encourage a spirit of inquiry, which is of the highest moment. For without a desire of knowing the designs and processes of things, no investigation will be bestowed, and we will remain in ignorance of all, but the bare facts and gross perceptions of creation; nor can it be questioned but that the more extensive our acquaintance is with the objects of Providence, in the same proportion must be our convictions of the justice, wisdom, and power of the Almighty Creator.

It is an old proverb, that he who aims at the sun to be sure will not reach it, but his arrow will fly higher than if he had aimed at an object on a level with himself; just so should it be in the establishment of all associations of this character, set your standard high, and though you may not reach it at first, you will not fail to raise higher than if you had aimed at some inferior grade of usefulness. Who can say what may be the result, when each individual of this and similar associations, shall go forth in their strength imbued with a high moral principle, to the great work of enlightening the public mind; when they view their societies as the means of blessing the community, as well as of benefitting themselves, and when they exert their abilities in scattering around them that taste for knowledge which they have learned to appreciate. If each one will bear this in mind, and also that he owes, as a duty to his country, his aid in this matter, the consequence will be triumphant for the cause of science.