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ADDRESS

OF THE

HON. JAMES W. WALL

OF NEW JERSEY,

BEFORE THE

MONTGOMERY COUNTY AGRICULTURAL SOCIETY,

OCTOBER 4, 1860.

PHILADELPHIA:

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ADDRESS.

Farmers of Montgomery—

Aristomenes after his unsuccessful defence of Eina against the Lacedemonians, carried with him some sacred pledges, said by the Delphic oracle to contain the fate of Messena. Beneath this oracular response of the god was concealed the great and useful truth that the safety and prosperity of this warlike people never could be secured until they had beaten their swords into plowshares and their spears into pruning hooks, for these sacred pledges were nothing more than leaden plates on which were engraved the labors and services of the goddesses Ceres and Proserpine; in a word, simple treatises upon the arts of Agriculture and Horticulture over which these deities were supposed to preside. The talismanic properties of these leaden sheets consisted not in any divine power they possessed, but in the benefits to be conferred upon this warlike people by the abandonment of their fierce struggles and the sedulous and diligent cultivation of those arts, the secret of whose power lay hid within the folds of these leaden sheets. Thus early did even the sacred oracles of Greece surround with an importance commensurate with their dignity and value these noble arts, whose cultivators are this day all around me, and whose triumphs in the

field, the garden and the homestead, have gladdened the eyes and made proud the hearts of the farmers of Montgomery; and upon whose judicious and wholesome patronage the present prosperity of the old Keystone State so much depends, and her continued greatness can alone be secured.

But while Greece spoke through her oracles, and gave the stamp, "the stamp and signet of the god," to the importance of the cultivation of these noble arts, Rome in the example of the noblest of her sons, gave high and practical exemplification of the importance she attached to the industrious pursuits of the tiller of the soil.

Nothing is so familiarized to the mind of the school boy, or lingers longer in his memory, than the fact of her generals, statesmen, dictators and emperors, tilling their own paternal acres, leaving them with reluctance for State service, and retiring to them with gladness. Visions come and go, of that prevailing plowman who, at the call of country, "left his plowshare in the furrow, hastened to the field, met and conquered the foe:" so that the slant rays of the very next sunset gilded his triumphal banners as he entered Rome; and then before the rays of the next morning had empurpled the earth, was driving his team afield "with such rapidity," says the Roman annalist, "by all the gods, that one might say he only hastened home to get his plowing done."

We have, too, Cicero as authority for the fact "that couriers were first introduced by the high officials," to run between the Capitol and their farms, that they might not leave them except on State occasions.

Virgil in his *Georgics* describes all the rural economy of the age with a relish that is felt in every line. I may safely say that with scarcely an exception, in all matters of rural management, in all kinds of farming stock, sheep, cattle and horses, he would be pronounced by every farmer present, a most competent judge: while his rules for the cultivation of fields and gardens would serve for studies here, notwithstanding the difference in American and Italian climate. But it is only in that celebrated passage commencing

"O fortunatos nimium sua si bona norint,
Agricolas,"

in his second Georgic, that he appears to be carried away with enthusiasm in depicting the serene pleasures of a farmer's life.

“O, happy if he knew his happy state,
 The swain who, free from business and debate,
 Receives his generous food from nature's hand,
 And just returns of cultivated land,
 While in his easy and secure retreat
 He leads a harmless life, and knows no cheat;
 With home-bred plenty he is always blest,
 While rural pleasures crown his happiness.
 Unvexed by quarrels, undisturbed by noise,
 The country king, his peaceful realm enjoys.”

The accomplished Cicero in his work upon the Delights of Old Age, seems as if he never could have done talking about the pleasures of farming, and closes a most glowing description of its enjoyments, with this vigorous passage: “And what do these noble husbandmen reply when asked for what purpose they dig and plant? Why, simply this—in obedience to the immortal gods, by whose bountiful providence we received these fields from our ancestors, and whose will it is that we should deliver them unimpaired and with improvement, to our posterity.”

Farmers of Montgomery—It is hardly necessary for me to incur the charge of pedantry, by alluding at greater length to the dignity and importance of the profession you pursue in the opinion of the ancients. I have but sketched for you in faint and meagre outline, the high vantage ground your profession obtained in ages long since sped, in order to make still more manifest to you that in this remarkable age of the world, surrounded by all the appliances that science has conferred upon labor, the farming profession lags behind, or follows with a limping foot, instead of being in the vanguard of them all. And the reason is that you, Virgil's “country kings,” the independent yeomanry of the State, who call no man master, who own and till its broad and fertile acres, have closed your eyes to the immense influence, your intelligence, your numbers, your social position, and your important interests would enable you to wield in the affairs of the State, if you would only resolve to exercise it in a proper manner.

When you consider the immense importance and value of your profession to the present and future prosperity of your State, one would expect to find upon your statute book more legislative enactments intended to encourage and advance so important a State interest.

This omission has mainly grown out of the indifference and neglect of the class most injured by it. The past you cannot redeem, but the future is with you, the men of the plow, the men of toil, the *landwehr* of the State.

You can, representing as you do, nearly eighty per cent. of the population, if you will only awake to your own interests, mould, shape and direct its future legislation as you please.

You should send hereafter to your legislative halls, men who affiliate with you, men who drive the plow, and wield the scythe and delve the earth. Men who have an interest in the soil they till, upon whose clear common sense you can confide, whose patriotism has been tested, and whose honesty you know.

United in action as in purpose throughout the State, with your numbers, your local influence, you have it in your power to send men to your legislative halls, who will build up permanently the agricultural interests of your State—open up the soil to more thorough geological research—establish agricultural schools in almost every congressional district, endowed with State patronage—and promote by all honorable and judicious means the cultivation of those sciences that have done so much for agriculture, by the continued expansion of its field of operation, and the wondrous increase of its means of usefulness.

As far as regards encouragement to our farming interests, we are far behind continental Europe. In this country every interest seeks protection, clamors for it, and our political hustings are made the theatres upon which cunning politicians play their parts as the paid and interested advocates of such interests, while the great agricultural interest is comparatively neglected.

In monarchical Prussia they boast of at least five Agricultural Colleges, whose object it is to instruct young farmers who have already a preparatory knowledge acquired at the primary agricultural schools, in the physical sciences as applied to agriculture, and

in agriculture itself with its associated branches of industry. These academies are each provided with a chemical laboratory, a library, collections of natural history, and philosophy. To these institutions are attached nearly nine thousand acres of land, all under scientific cultivation. There they have established eighteen preparatory schools, where the first rudiments of agricultural science are taught to those who desire to prepare themselves for entrance into the five Agricultural Colleges. In France, there are numerous schools assisted by the State, where young persons can obtain instruction in agriculture both practical and theoretical. The principal institution of this kind is at Grignon, where one of the old royal palaces, and the domain attached to it consisting of nearly two thousand acres of arable pasture, wood and marsh land, have been relinquished by the State.

Indeed, there is scarcely a country in Europe where the important art of agriculture is not sheltered and encouraged by State patronage. And while I do not deny that our national government has done something in the right direction, it is high time that our State governments had done more.

I know I may be met by that enemy of progress, the oft repeated objection, that encouragement of this nature is hostile to the spirit and genius of republican institutions, and should be left to the perseverance and energy of private enterprise. I have lived long enough to be entirely satisfied with the fallacy of this political postulate. I have lived long enough to feel grieved at the tendency of our State governments, to become mere political machines, devoted to the business of advancing the interests of this or that partisan, or for turning outlaws for the benefit of private, or what is worse, electioneering capital. Now the great object of a Republican Government I take to be: "The regulation of the public affairs in accordance with the wishes of the people, and in conformity with the real interests of the State." I believe that theoretically the aim of all governments should be, the conservation of human rights, and the continued preservation of, and protection to the interests of the commonweal. Government should be the conservator of every thing tending to advance and improve humanity. It is "the minister of God to thee for good," or should be. And this divinity

of government is nowhere made more manifest than in this principle, requiring it to stand up in advance of the people, directing them and legislating for them in whatever affects their real interests as a whole people. It is the *State's organic judgment and will, its eye and its hand* to secure for the State both by its wisdom and its power, the highest weal of man. Governments are but instruments in the hands of man for human good, and when they become subversive of this end, it is high time to alter or abolish them. Upon you the farmers of Pennsylvania depends the correction of the evils that have grown up in your State legislation. Crafty politicians call you the bone and sinew of the land, and you will remain that and nothing more, if you continue blind to your own power and influence in the State.

When I think of your numbers in the land, your power in every township and district, I honestly believe, that by a concentration of action, your strength would be greater than all the industrial pursuits combined. But now your power seems to be like the restrained and controlled influence of the elephant in the menagerie. The politicians use you and abuse you; they pierce you with sharp goads, and they ride upon your trunks with impunity. Whereas, if you were but fully alive to the fact of your real power, how soon would you crush them at a blow, and trample them under foot.

I have seen enough to enable me to make the observation, and had experience enough of their dishonest machinations to give it some weight, that the injury done to a State by plotting politicians, can only be compared, to use Swift's words, "to the ravages of swine in well cultivated fields." While an honest farmer, who by skilful draining, manuring and planting, has increased the intrinsic value of an acre of land, is worth all the politicians that ever were spawned from the brain of faction.

Why just look at it—pause for a moment and scan the nature of the political strife by which the country is convulsed with almost the throes of an earthquake, and is it not a most ludicrous re-enactment of those fierce struggles in Blefuscu, related in Gulliver's Travels, between the Big Endians and the Little Endians. Those who will break their eggs at the big end, and those who prefer and will go to the stake rather than break their eggs at the little end. For really

the questions at issue among the factions do not appear to me to be of much more graver moment. Which is the convenient end of this great slavery egg that has been laid in our day, seems difficult to determine, and hence the pother that is kept up on every side. The strife and struggle of Blefescu behold revived in our day.

Farmers of Montgomery—Once more have you gathered from every section of your county to keep your annual festival and jubilee.

Greece for a thousand years summoned to her Olympian festivals, beneath the graceful porticoes and shady groves of Elis, all who bore the Grecian name. They gathered there from every kingdom under heaven—from the islands of the sea—from the colonies that her hands had planted—from war-like Macedonia, and from sacred Delphos, from rocky Doria, and flower crowned Ionia—to greet once more their ancient mother, and meet like loving children round the family altar to enkindle afresh the noblest feelings of the soul. The Grecian Olympiad was a common bond of allegiance and re-union. While ostensibly it was but an exhibition for the display of physical vigor in the numerous games that pleased the public eye, and nerved and stimulated the youthful ambition to excel, it had really a much more elevated object and meaning. It was in fact the grand central point, where philosophers, sophists, statesmen, poets and husbandmen assembled, that they might compare observations, and devise the ways and means of facilitating intercourse, and diffusing useful knowledge, while one or more pronounced discourses upon the progress of civilization and humanity.

So here, and at your numerous Agricultural festivals throughout the State. Pennsylvania assembles all who wear the Pennsylvania name. They come up from every township and district, bearing proudly with them the rich products of their fields—the ingenious specimens of the skill and industry of the loved ones of their own homes and firesides—their choicest cattle, and the fairest of their flocks—together with those numerous agricultural implements that modern ingenuity has devised for easing the yoke of labor. They come from their rural homes to their delightful festivals to exchange greetings with their brethren—to talk over the results of the last year's farming—to compare notes about this or that mode of culture—

to examine critically this or that improved stock—and to admire on every side, the astonishing products, which a generous soil aided by experience and culture, has poured out in such rich abundance.

Let me to-day in what remains of this discourse, imitate the custom of the Grecian Olympiad, by speaking of the progress of humanity and civilization, and show in brief the contributions made by the stirring age in which we live to the improvement of the agricultural art.

The age in which we live has been pre-eminently marked by the wonders that have been wrought in the subjugation of the material world to the uses and purposes of humanity, and its most startling intellectual advancement.

And this great mind movement is characterized by its practical tendency. The age of the ancient school men is over, and the public of our day expect from its thinkers and experimentalists, not clever paradoxes or ingenious puzzles, but the best, the surest and the shortest method of grappling with obstinate realities. Philosophers have ceased to speculate in retirement upon unsubstantial air drawn theories. Science is no longer an abstraction floating above the heads of the multitude. It has descended to earth—it walks with men—it penetrates the bowels of the earth—it enters our workshops. It analyzes the soil upon our farms, and the chemical constituents of the atmosphere above them. It traces with faithful minuteness the organic elements that enter into the composition of our plants, and makes manifest how those elements are held together by a kind of balance of opposite attractions, and which remain united only so long as that balance is retained. It speeds the iron courser of the rail. It tramples upon the billows. It defies the tempest. It gives to man the sun-beam for a pencil, and the lightening for a messenger. It lends to man's feeble arm an irresistible might, before which mountains crumble into dust, the barriers of kingdoms are removed.

What is there in the recorded dreams of Arabian fancy, more wonderful than the force and enduring power of steam agency. How stupendous its power, and yet how manageable! A child may direct it. It would crush an army. A single touch puts in motion the gigantic ship that can bear upon its deck the population of the city, or stow within its hold the freightage of a nation's wealth. Un-

affected by time, place, circumstance or fatigue there stands this universal servant of man, ready to relieve him from all drudgery and to assist his limited ability in carrying out the intentions of his will. In Webster's glowing words: "It seems to say to men, at least to artizans, leave off your manual labor, bestow but your skill and reason to the direction of my power: and I will bear the toil, with no muscle to grow weary, no nerve to relax, no breast to feel faintness."

But even the subtle influences of caloric, which thus animate the inert waters with titanic might, fail to excite our astonishment to as great a degree as those marvels recently produced by electric agency.

Look at those wires as they stretch along by your great rail-lines. They appear perfectly quiescent. The weary bird rests upon them, and clasps them in its tiny claws. Yet along that motionless thread and through that feeble grasp, there may be passing tidings of life or death, ruin or prosperity, intelligence of the fall of kings and thrones, of battles lost and won, of events that change the destinies of the world, plunging whole nations into mourning, or intoxicating them with joy.

A thousand fathoms beneath the keel of the war ship, undisturbed by the tumult of the elements in which she reels and struggles, in the dark and silent abysses of ocean where uncouth monsters hide, where human vision has never penetrated, there shall lie the wondrous ligature connecting the minds of nations, conveying manifold contributions to the sum of human wisdom and experience: and from the humanizing operations of which man shall yet learn to still his mimic thunders, and aspire after higher and brighter glories than those won at Magenta and Solferino. The electric fire that glides along this ligature shall scorch away the differences of race and nation, when man shall cease to learn war any more. This globe of ours is yet to be transformed by this wondrous agency into one vast human head, these magic wires like interlacing nerves, universalizing and harmonizing every sensation and every thought.

It was out of the passing whirl-wind came the mysterious voice that asked of suffering Job: "Canst thou send lightnings, that they may go and say unto thee here we are?" The power denied to the

age in which the patriarch lived, has for some wise purpose of the Infinite been reserved for the men of this generation, who have not only found out the path of the lightning, and can send it on its human mission; but, Prospero like, have caught in passing, the northern Ariels, those merry dancers of the skies, who light their torches in our northern zones, and compelled even these "tricksy sprites" to do their bidding.

And in this great mind movement by which our age is peculiarly distinguished, evinced in the rapid development of the hitherto unknown laws of nature, and the successful application of those laws, so as to make them contribute to man's comfort and happiness, the Agriculturist has not been forgotten.

Agriculture now has become a pursuit which to prosecute to its full capacity, the arts and the sciences of modern times must be made to bear upon and co-operate with it, so as to add something to its progression, or to apply beneficially the knowledge of its already established principles and practices.

Science in descending from her high places in this age, has taken agricultural labor by the hand, that they may walk together over the earth's surface and through the fields, while they search out the causes of things.

Geology in this wondrous age reveals to the intelligent husbandman that the solid earth whose surface he tills, and that bears upon its stalwart breast the cyclopean masonry of the granite and limestone mountains, was once held in aqueous solution, and its substance as impressible as the sand from which the ocean wave has just retired. She points him to the delicate markings, the foot-prints and impressions of organic animal structures hardened in the solid rock, as proof of the once soluble condition of the earth. She builds up for him the great globe itself, by a regular succession and continuity of strata, each presenting its own particular organisms, establishing the important fact that there has been a systematic and progressive succession of life in the ancient world, and preserving as in some curious museum, the specimens of organic life that existed at each period of deposition, manifesting that God's power on the earth has not been limited to the two thousand years of man's existence. Geology counts the age of the earth not by celes-

tial cycles, but by an index found in the solid frame-work of the globe itself. It points to a long succession of monuments, each of which may have required myriads of years for its elaboration. It arranges them in chronological order, observes in them marks of skill and wisdom, finds within them the vast cemeteries of the successive inhabitants of the earth—tracing the changes backward through successive eras of development, until the time when the “earth was without form, and darkness rested upon the face of the deep.” This brilliant science attests that man was the last of created beings upon this planet. Through centuries and ages of creative activity, there is not the faintest trace of his presence, his footsteps, or his handiwork. In all the pages of this stony volume wherever it has hitherto been unfolded, there is no reliable record of man. And yet how sublime the thought that here suggests itself of man’s importance and of a Creator’s love, when the truth leaps forth from such scientific revelation that all this creative energy and intelligence were exerted only to prepare a fit habitation for the coming man. The flint of your mountains, the marl that fertilizes your fields and makes wave with golden harvests—the rich abounding treasures of your coal fields, are but evidences of that divine forecast which thus deposited the remains of animal and vegetable life, that by decomposition and transformation should be made to minister for all time, to the wants of the coming ruler who was “to have dominion over the fish of the sea, over the fowl of the air, over the cattle, over all the earth, and everything that creepeth upon the face of the earth.” This noble science which thus tells the interesting story of the earth’s past career, marking its epochs by revolutions which have repeatedly submerged, elevated and dislocated its frame work, has in a remarkable degree made itself subservient to the great art of Agriculture.

It shows this earth with its huge mass resting on its primary strata, where the granite and the gneiss, the limestone and the slate have their beds. It points to the transition period when tropical vegetation, under the influence of tropical heat, gave birth to the ancient Flora of the earth, rank and luxuriant, whose decay accumulated that vast amount of carbonaceous matter now ministering so much to the comfort and prosperity of man—those immense coal

deposits, out of whose subterranean treasure houses comes the substance that enlivens your hearth-stones, prepares your food, furnishes light to your dwelling, and is fast becoming the essential agent of that mighty power of steam, upon which modern locomotion, the increasing value of the products of your farms and manufactures so much depends.

And we may well pause here to admire that wise mercy which has thus provided so inexhaustible a field of fuel at the time it was most needed, and in the very localities it was most required. And yet it is no slight proof of the patience and majesty of the procession of the divine will, that it has only been within a comparatively short time that man has been enabled to understand the object of this great contrivance. Those huge cone-bearing trees, those rich and varied mosses, that flowerless and fruitless vegetation, so luxuriant and so immense, which, ages before the creation of man, covered so large a space of your own State. For what were they meant? And those layers of black stone cropping out from the hill side in more modern times, what object have they? But now the answer comes in the hum of thousands of steam engines, in the flash of thousands of forges, in the light round thousands of hearth-stones, and the whirr of myriads of spindles.

With unerring certainty geology points the Agriculturist to that tertiary formation where the marine strata are deposited, to which the rivers, lakes, floods and seas of the ancient world contributed. Here you find the grand depositories where are laid up the fat and unctuous marls and green sand which have proved such efficient fertilizers of the soil in our alluvial districts.

You come to the surface, to the soil you cultivate, and geological science shows you its derivation from the original primary rocks, which by convulsions, changes and repeated disintegrations, has been the better fitted for the purposes of tillage and cultivation. It teaches the Agriculturist how to divine the character of the upper soil from the rocks beneath it. In some places you meet with sand-stone, in other places lime-stone, in others slate or hardened clay and rock, hence your sandy soils, your clay and your calcareous soils. Thus the modern intelligent Agriculturist seeking a locality for settlement, by the aid of this useful science is now enabled to

say—by the geological structure of this section of country, here I shall have the more permanent productive soil, here I will be within the reach of more agricultural improvement. Here in addition to the riches of the surface, my descendants may hope to derive the means of wealth from the mineral riches beneath.

But geology is not the only science that comes to teach the agriculturist the nature of the various elementary constituents of bodies, and the laws regulating their combination in the inorganic and non-vital world; while animal and vegetable physiology instruct him in the constituents of organic or vital beings. Chemistry discloses to him the existence of deleterious gases in the atmosphere, while vegetable physiology most beautifully demonstrates how the leaves of the plants are the lungs by which they breathe, and appropriate these deleterious gases which are retained by them, while oxygen so necessary to man's vitality is thrown off by them to purify and exhilarate the atmosphere. So thus by an arrangement, whose wisdom is apparent, the vegetable and animal kingdom are made to contribute mutually to each other's support. Nay, they are essential to each other's existence. Destroy the animal reign, and the vegetable will speedily perish for the want of its proper nutriment. Eradicate the vegetable cover of the earth, and the very air we breathe will lose that element by which life alone exists.

Chemistry reveals to the intelligent agriculturist how certain elements of the inorganic world contain nitrogen, phosphorus, soda and lime; while vegetable physiology beautifully makes manifest how the living organism of the plant, when such substances in the shape of natural or artificial manures are brought to its roots, through these vegetable mouths imbibes the liquid nourishment that the rains wash down,—nature, by her secret process, so combining them as to form stem, leaves and flowers.

Vegetable physiology makes apparent to him that as the blood is to the life of man, so the sap in vegetables is the vital current, which circulating through their veins and arteries, is necessary for the maintenance and increase of their frames; and as this nourishing fluid is being constantly consumed, chemistry analyzes it, and shows him what elements enter into its formation. It makes manifest how this vital fluid contains all the elements out of which the structure

of the plant is composed, while carbon, hydrogen and oxygen enter materially into its formation. Then vegetable physiology shows to a demonstration how certain plants derive all these gases from the atmosphere—their carbon from its carbonic acid—their hydrogen from its moisture—and their nitrogen from the gleaming lightning, that shedding its lucid glare during the passing thunder shower gives down this important element, which coming in contact with earth's substances, produces that vigor in vegetation which is the certain accompaniment of the summer shower, so that in fact the electric magazines of the skies coming in contact with earth's substances are continually engaged in the manufacture of those nitrates of potash, of soda, or of lime, that form such important ingredients in your best manures.

In fact the science of vegetable physiology to one who studies it aright, may be said to reveal the sublime and exalted mission of humanity. For though of the earth, earthy, it symbolizes in the immutable laws of vegetable life, the spiritual ordinance of that which is yet to be for man in the great hereafter.

It in truth makes manifest

“How creation's soul is thrivance from decay,
And nature feeds on ruin; the big earth
Summers in rot, and harvests through the frost
To fructify the world; the mortal now
Is pregnant with the spring flowers of to come,
And death is seed time of eternity.”

It clearly reveals how the immutable laws of vegetable nature decrees that death shall proceed out of life, and life out of death; that the living animal shall draw its vitality from the dead plant, and the living plant from the dead animal; that decomposition must be but the commencement of recomposition, and putrification but the symbol of renewed production. The brave apostle to the Gentiles, preaches this beautiful truth. “But some will say, how are the dead raised up, and with what body do they come? Thou fool! That which thou sowest is not quickened except it die;” and how like a light from heaven it bursts upon the darkness of the tomb; and how often it has comforted the stricken mourners, as with wildly beating hearts

they heard that fearful misere of the last service of the church, "Earth to earth, ashes to ashes, dust to dust."

Man decays and ages move, and in the long course of centuries the very fibres and tissues of this mortal frame, the sinews that have toiled, and the brain that has thought, may reappear in the emerald leaf of the oak, or the painted wing of the insect. Decay is only apparent, no atom is lost, not a single molecule destroyed, and the very signs and tokens of dissolution are but parts of a gigantic system, wherein death is the very condition of life. It is therefore no paradox to say that life could not exist without death; vitality and decay, production and corruption, formation and destruction, are so intimately and mutually dependent, that their reciprocal and compensatory action alone maintains the equilibrium of our natural system and the essential conditions of our well being.

And is not this too the great truth that history teaches in the progress of the political world? Has not the dissolution of old forms of government been but a preparation for new phases of humanity. Dynasties may die out, and forms of government be changed, but the great law of reconstruction ~~from~~, is still apparent, and the ruins of States and Empires become like the falling of the leaves in autumn, manuring the soil, and preparing it for the growth of richer vegetation and more abundant harvests.

Nor is this wondrous truth of reconstruction from decay the only marvel that reveals itself to the earnest student of vegetable physiology. Amongst the wondrous analogies disclosed by it in the animal and vegetable kingdom, none are more astonishing than that curious discovery of sexes in the higher order of plants—making manifest how by the impregnation of the germ in one sex, that germ is converted into a seed, and how that seed if placed in the ground, in a condition where it can have health and support, becomes the perfect plant. So that calm race, the flowers, all loveliness and tranquility, whose life is beauty, and whose breath is perfume, play no idle part in nature's workshop—for to them is in reality committed the task of perpetuating not only vegetable, but animal life. Upon their active industry depends the life of every bird that soars in air, of the cattle on a thousand hills, of every insect crawling in

the dust—aye, of the very life of man himself. As England's laureate poet asks :

“Who is it that could live an hour
If nature put not forth her power,
About the opening of a flower.”

Look too at the beautiful revelation vegetable physiology gives us of the superintending love that watches over all things from the least to the greatest. See how kindly nature with a mother's instructive love and tenderness surrounds the germ before it is separated from the parent flower with nutritive matter, the starch, the gluten and albumen, which shall form its future food when the parent flower dies, the carpel splits, and the seed is free. And learn too nature's ingenuity, when you note the little wing-like expansions on the sides of the new born seed, that it may the more easily waft it to some distant place, where it is to lie feeding on its own stores, until exposed to warmth and moisture, and the oxygen of the air, it shall burst its seed coats, and commence its active existence.

But the science of vegetable physiology stands not alone in the valuable contributions it has made to the art of the husbandman. Chemistry, as every intelligent farmer knows, has in a most remarkable degree advanced the agricultural interests of the world.

As a science, it is of comparatively late origin ; and yet how difficult it is to fully realize the extent to which in that short period it has contributed to the comfort, prosperity and luxury of the world.

When in the latter part of the last century, the focus of Priestley's burning lens, evolved from the common red precipitate bubbles of gas, identical with that which supports life, who could have supposed, that by freeing one of the metals from its companion element, the composition of many of the most useful ores would have been detected, and a hint furnished, which was to bring the whole metallurgic art to a system of rigid and practical economy. Or who could have been presuming enough, when his nostrils first caught the suffocating odors produced by the German Chemist's operations on the acid of sea salt, to have then predicted that this discovery would introduce a total revolution in the manufacture of paper and

linen textures, and a vast variety of objects. Or when the chemists of the last century observed the discoloration and degradation which certain metallic salts underwent in the sunlight, who would have ventured the prediction, that the sun in our day should place a pencil in the hands of Daguerre and Talbot, that should make the highest efforts of the painter's skill, poor in the comparison? Or when the French philosopher, not half a century ago, perceived the disturbance of the magnetic needle produced by a neighboring galvanic current, who could have conceived that from this circumstance science would conjure up a spirit that would outstrip the fairy Oberon in "putting a girdle round the earth in forty minutes."

But great indeed as are these contributions to the sum total of human comfort and prosperity, we very much doubt whether in practical everyday usefulness they have not been equalled by those which chemistry has made to agriculture, and that, too, within a recent period.

It is within the memory of most of us, when the application of this science to Agriculture was first efficiently made. It was only the other day that Liebig made the first successful attempt to improve agricultural resources, when he suggested on theoretic grounds alone, the addition of sulphuric acid to bones, as a means of rendering them when used, more soluble, so that the spongioles of the thirsty plant might the more easily appropriate the liquid nourishment.

But the intelligent farmer of to-day who has learned through the development of this science great and useful truths, truths of which he never dreamed before, is ready to acknowledge his indebtedness. He knows that with a knowledge of geology, vegetable physiology and chemistry, he is much better enabled to realize upon his farm the full advantages of its culture, from his knowledge of the soil, the organism of plants, and the nature of the food that will best perfect such organism.

The farmer of one idea—the man who in this age despises book farming as he contemptuously styles it, is ever like the man with the muck rake in *Pilgrim's Progress*, looking downward, and never desiring to extend the range of his vision. He is as one who is content to stick to the old Troy coach in preference to the many more

certain and expeditious modes of locomotion. Experience has done much, and will do more for the farmer. But experience after all, is but the dim glimpse of truth, like the religious faith men had before a revelation. Experience did much for the age in which old Cato the censor lived, and in his Agricultural treatise he very properly enjoins the young Roman farmer: "Beware of rashly contemning the usages adopted by others." That was good advice in the days of the stern old Roman, and it is good advice now. But he who relies upon experience alone in this age when the laws of science are unfolding truths that experience never revealed, will find himself going behind, and that pretty rapidly, too. Oh! but methinks I hear one of these old fogies say—the world got along very well without farming many years ago; and so they did for a time without breeches or buttons, and much longer without the printing press or the steam engine.

As Henry Ward Beecher very pertinently says upon this subject: "a farmer never objects to receive political information from newspapers; he is quite willing to learn the state of the market from newspapers, and as willing to gain religious notions from reading, and historical knowledge, and all sorts of information except that relating to his business. He will go over and hear a reading neighbor tell how he prepares his wheat lands, how he selects and puts in his seed, how he deals with his grounds in spring, in harvest, and after harvest; but if a neighbor should write it down very carefully and print it, then its all poison—its book farming."

Farmers in this active age must use their heads as well as their hands, and must not content themselves with simply being as wise as their ancestors, trusting alone to experience, and despising all scientific information. If they do, the farming profession will find itself more and more in the back-ground every year, for every other pursuit is availing itself of all the aids that science, assisted by experience, can discover, and if Agriculture chooses to grope about in the dark with the farthing taper of experience, when she can avail herself of the Drummond lights of science, she is false to her own interests and to the age in which we live.

Let me enumerate in brief—for time warns me that I must not trespass much longer on your attention—the benefits that have

resulted to Agriculture by the developments of chemistry. Those developments have taught the Agricultural world the value of substances for manures which heretofore have been thrown aside as worthless. They have made manifest why plants grow upon a soil that is well manured, because such manure has added to the soil, with the aid of the atmosphere, the elements that enter into the structure of plants—nitrogen, phosphorus, soda, potash and magnesia. They have taught the Agriculturist that when the natural manures fail, artificial compounds may be resorted to, giving to the soil and the plant something in which the first was deficient and the latter was craving for its nourishment.

Chemical analysis may perhaps show you that your soil is deficient in sulphur or in soda, but contains all the other substances required by wheat. Guided by this, you apply a top-dressing of sulphate of soda to your wheat, and the full grain in the ear almost bends to the earth with its own weight. You find that the land you are about to lay down in grass is deficient in nitrogen—you top-dress it with a preparation of nitrate of soda, and a rich luxuriant crop greets the advent of your mowing machine.

The intelligent husbandman who spreads lime upon his land through the revelations of Agricultural chemistry, is made aware that by this means he goes through the very process a chemist resorts to in his laboratory to analyze the soil—that is, he liberates the silica, the potash and the phosphates, which enable these substances the better to mingle with the soil, and administer to the demands of vegetation. And he learns further, that by this liming process he has furnished no equivalent for that removed by the crops, and unless he restores to the soil what the lime has evolved, his pregnant liming will only serve to burn up and exhaust it. He learns perhaps what he never dreamed of before, that lime is not in the ordinary sense a manure, for manuring consists strictly in the restoration of that to the soil in which it is deficient. But lime is a robber, and the farmer who works slovenly, contenting himself with frequent liming, without compensation, will find that it is a spoliation system, leaving his soil ultimately poor indeed.

Agricultural chemistry has further revealed to the Agriculturist that the drought when the earth is parched, and vegetation dwarfed

and withered by the heat, is only an affliction for the present, a blessing in disguise for the future, that the early and the later rain may perhaps produce at once abundant crops; but still dry weather is needed to bring to the surface from the depths of the earth, food for the future harvest; that as the drought continues, the water from the sub-soil keeps constantly bringing to the surface the salts of lime, of magnesia, and of potash, that it holds in solution. Thus you are taught to see in the drought, one of nature's ordinances for keeping up the fertility of the soil.

The management and tilling of the soil has now become a branch of practical chemistry, which like the art of dyeing, or lead smelting may advance to a certain degree of perfection without the aid of pure science: but can only have its processes explained, and be led on to shorter, more simple, more economical and perfect processes by the aid of scientific principles.

Nearly a century ago, a Scotch mother according to Sir Walter Scott, objected to her sons using on the farm what she called a new-fangled machine for dighing the grain from the chaff—thus impiously raising wind by human art, instead of soliciting it by prayers. We wonder what that good old Scottish woman would have exclaimed could she have been spared to our times, to witness the increasing triumphs of mind over matter, and the almost complete subjugation of the physical elements to an intellectual sovereign. Surely, if in any department man hath sought out many inventions, it has been in the department of Agriculture with your patent horse hoes, and with your steam ploughs, your centre draft ploughs for sand and for clay soils, your side hill and subsoil ploughs, your reaping, mowing and threshing machines, your revolving wheel and hay rakes, your patent sowing and planting machines, you have a mass of labor-saving machinery, that must excite the wonder of the farmer who tilled the land a quarter of a century ago.

Such are the wonders of the remarkable age in which we live. Such the contributions made by science to Agriculture. Living then in this progressive age, it is hardly necessary for me to say, that it is the duty of all classes in such a noble State as Pennsylvania, to gain by every means in their power, all the benefits within their reach. We have been heaving to-day the log into the deep, and

measuring the rapidity of the current by which the world is borne along. You cannot stop it if you would, and you ought not if you could, nor can you stand idly by trusting to the strength of the ancient moorings by which your vessel is made fast; for against such a current the stoutest cables will give way, the strongest vessel drag her anchors. Your duty, and the duty of all of us, is to strive to turn in the best direction the current which is carrying us so rapidly forward.

Farmers of Pennsylvania—Your lines have fallen indeed upon pleasant places. Yours is truly a goodly heritage. Like the “Children of the Promise,” you have been brought into a good land, a land of brooks of water, of fountains and depths that spring out of valleys and hills, a land wherein thou canst eat bread without scarceness, thou canst not lack anything in it; a land whose stones are iron, and out of whose hills thou mayest dig *coal*.” And the same Almighty power which gave you this goodly land to possess it; has blest the fruit of your land, your corn, and your wine, and your oil, and your flocks of sheep.

It is a land with rich and verdant meadows smiling beneath its pleasant skies; with grain fields ripening for harvests that fill to the full its groaning wains and bursting granaries, with orchards bending to the earth with their russet, brown and golden fruitage. It is the Keystone that locks together and holds firm in their places the springing extremities of the glorious Arch of our Union; upon whose patriotic strength the confederacy has relied in times past, and which will not fail it in the future.

Such, Pennsylvania farmers is the lot of your inheritance. It is your heritage. See to it, that you continue to own the fullness of your debt of grateful love by the faithful discharge of your high duties, to God, your Country, and the generations yet to come, that it may be to you—a heritage forever.

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