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PROF. ST. JOHN'S LECTURE
TO THE
MEDICAL DEPARTMENT,
OF THE
WESTERN RESERVE COLLEGE.
SESSION---1845--'46.

AN
INTRODUCTORY LECTURE,
DELIVERED BEFORE THE
MEDICAL DEPARTMENT
OF THE
WESTERN RESERVE COLLEGE,

BY


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ADDRESS OF PROF. ST. JOHN.

IT is impossible to contemplate the progress of Society without perceiving, in some degree, how much the human race is indebted, for its advancement, to the cultivation of Natural Science. If we compare Man's first rude and puny essays, with the elaborate and almost incredible energies which he now wields; if we contrast the helplessness and degradation of the savage with the comfort, security and refinement of civilized life, we perceive what Science has done for man, and can form some conjecture of what it may yet be destined to accomplish. The difference between men in an uncultivated state, and in a state of advanced science, is so great, that we hardly recognise in both the characteristics of the same order of beings. In the one case the visible world is full of prodigies, and the invisible is peopled with imaginary beings of capricious will and vengeful power. Objects and events which a child in civilized society views with complacency, fill the mind of the savage with amazement and dread; he stands amidst daily recurring mysterious events alarmed and confounded; the lightning rives the sturdy oak, or strikes his companions dead by a power which he dares not investigate; the blazing volcano and the rumbling earthquake are objects of superstitious terror; the sun and moon rise and set to him, by capricious appointment; an eclipse comes to him unexpected, and while it sheds

"Disastrous twilight
O'er half the nations, and with fear of change
Perplexes monarchs,"

the laboring sun or moon betides impending evil. Disease invades his frame and prostrates his energies, by an inscrutable influence, to be removed by a power equally inscrutable. His processes and devices for supplying his daily wants are clumsy and puerile; no mechanical powers, or transformations of chemistry relieve his toils; and if in his timid voyages he is driven from sight of land, his wished-for port lies in a direction which he cannot determine. His religion, how senseless and degrading! The loathsome reptile, the deadly Upas, or hideous images, are his Gods.

But when science has illumined the mind of man, the material world

in which he lives is full of meaning. It is written all over within and without with characters of benevolence, wisdom and beauty. In the former objects of his dread he discerns adaptation to promote his welfare and secure his happiness. He boldly scrutinizes the causes of the changes which transpire about him. The scathing lightning he tames with a point, and regulating its energies, tasks its chemical powers, or sends it, with telegraphic speed, the messenger of his will. The raging volcano brings to him rare products which he makes subservient to his physical wants, while he views its stupendous phenomena, as manifestations of those laws of *instability* by which the *stability* of the universe is secured. The sun, moon and planets have for him their appointed times. The once so much dreaded eclipse he now views with intense interest, predicts its recurrence, and by his observations determines the grand truths of astronomy, or calculates tables for the navigator. No longer confining his timid voyages to friendly bays, he pushes boldly out upon the broad ocean, and with his eye fixed upon a little piece of steel which points unerringly to the pole, through thickest darkness he holds his steadfast course; penetrating unknown seas, braving the tempest, he directs his way with confident precision, and with chart in hand, tho' leagues remote, descries his home-port. He searches through all nature, scanning the heavens and earth, investigating animal, vegetable, and mineral bodies, to satisfy his physical wants or adorn his mind. The elements he presses into his service, plying their untiring energies in the accomplishment of his designs. If disease attack his frame, by the aid of science he follows into its lurking places, dislodges it, and fortifies his system against subsequent invasion.

No longer bowing in senseless reverence before loathsome objects, or with forbidden and untold rites worshipping the creatures of his own imagination, in that elder Scripture writ by God's own hand, as well as in the Book of Grace, he discerns the only object of true spiritual worship.

In order to a just appreciation of the superior comfort and power with which science invests man, we should compare the civilized and savage states, under the same circumstances of time and place. For this purpose we will not select the case of the Hottentot so brutalized as scarcely to exhibit a trace of humanity, to contrast with his neighbor colonist of Cape Town; nor that of the enervated, sensual Asiatic, with his European invader; but that of the imbecile though mag-

nanimous and sagacious North American Indian, with the Anglo-Saxon who came to the shores of the new world, possessed of all the resources which science had bestowed. Two hundred years ago the first European settlers found this vast territory in the undisputed possession of powerful tribes of Indians. The smoke of their wigwams and council-fires rose from every valley between the Ocean and the Rocky Mountains from Hudson's Bay to Florida. They kindled their watch-fires, where now our proudest cities rise. They then owned the majestic rivers, far-stretching lakes and fertile valleys, and unchecked, roamed the forests in quest of game. But where are they now? Whole tribes have perished, and the arrow head and tomahawk with the bones of sachems and warriors turned up by the plow of their successful invaders, are the only mementos of their existence. Neither the wasting pestilence, nor famine, nor war alone has effected their destruction. A more subtle power has been at work. Every where at the approach of the foot of the white man, they fade away. The Atlantic breezes fan not now a single region which they may call their own. A nobler race of wild men never existed in any age or country: but they were uncivilized. They possessed not the simplest elements of science. A wilderness was essential to their habits and pursuits. They subsisted by war or hunting. They applied no scientific principles to the culture of the soil, the pursuits of commerce, or manufactures, or the cure of diseases. They had no mariner's compass, water-wheel, or steam engine. Chemistry shed no light upon the mysterious processes of their "medicine man." Their melancholy fate awakens our sympathy: and Charity suggests, the powerful race should have adopted the waning into its bosom, and freely imparted the stores of knowledge, the source of its power. But how few were the sympathies between the white race and the red: the latter by their very nature seem almost incapable of such an assimilation. Their ferocious passions, their wandering life, disdain the restraints of society, and while they tremble at the power of their invader, they affect not his science or art. A few feeble remnants of the race still linger on the borders of civilization, illustrations of that hard necessity which seems slowly but surely accomplishing their extinction. Religion mourning over a destiny almost without hope, sends her ministers of mercy, not only to impart her peculiar consolations, but also to win to the reviving and invigorating arts of civilized life. But how sorely are their faith and

patience tasked. For ages science was accumulating and imparting its power to the Saxon race ; and enlightened christian faith even will not expect a single age will suffice to invest the Indian with the same. No—though within reach of the hum of the spinning jenny and power loom, with full knowledge of the benefits of the steam engine, the printing press, and the improved implements of husbandry, rarely does one aspiring thought swell their torpid spirits—they build no steamboat, lay no railway, urge no iron horse. Their curiosity never rises to the contemplation of those sublime laws which combine a universe, and spell it to harmony. Despising the arts and science of civilized life, they recede before the swelling tide of enlightened enterprise towards the setting sun, till the echo of their last feeble footsteps dies amid the murmurs of the Pacific.

The history of science has never yet been fully written out. The recorded history of our race is but the development of angry, proud, and lustful passions—a long tortuous line drawn with blood. The clangor of martial prowess and the glitter of military renown have withdrawn the attention of historians from the progress of those pure and elevating tendencies, which have advanced man from a state of savage barbarity to civilization and refinement; and which, though of gentle and unobtrusive mien, have a permanent and controlling influence in his destiny. It would be pleasant and instructive to survey the progress of science from its feeble dawns to its present splendor—rehearse its achievements and from the vantage ground thus gained, form some conjecture of its future triumphs. But such a survey of even one branch of science would far transcend the limits of the present occasion. The history of some branches may hereafter be attempted, as opportunity may permit. It shall be my object at this time, to adduce some conclusions and inferences respecting the advancement of the great interests of mankind by science, which may serve to impress upon the mind of the student a proper sense of his privileges and responsibilities. The growth of science has been gradual—sometimes slow ; its principles, discoveries and inventions have oftentimes been obliged to engage in sharp conflicts, and struggle hard before they acquired the ascendancy, and exerted their appropriate influence upon the welfare and destiny of mankind. We fail to realize this, because at our birth we are introduced to all the beneficial results of the successful establishment of those principles. In order duly

to appreciate the changes which science induces upon the face of society, we should place ourselves in the condition of Rip Van Winkle, or of the fabled "Seven Sleepers" of whom Gibbon speaks in his *Decline and Fall of the Roman Empire*, who slept while ages rolled on, and then awoke to find the use of their limbs and senses, an enigma amid the strange circumstances in which nature and art stood ready to minister to their wants. "When the Emperor Decius persecuted the Christians, seven noble youths of Ephesus concealed themselves in a spacious cavern in the side of an adjacent mountain; where they were doomed to perish by the tyrant, who gave orders that the entrance should be firmly secured with a pile of huge stones. They immediately fell into a deep slumber, which was miraculously prolonged, without injuring the powers of life, during a period of one hundred and eighty-seven years. At the end of that time, the slaves of Adolius, to whom the inheritance of the mountain had descended, removed the stones, to supply materials for some rustic edifice; the light of the sun darted into the cavern, and the seven sleepers were permitted to awake. After a slumber, as they thought, of a few hours, they were pressed by the calls of hunger; and resolved that Jamblichus, one of their number, should secretly return to the city, to purchase bread for the use of his companions. The youth (if we may still employ that appellation) could no longer recognise the once familiar aspect of his native country; and his surprise was increased by the appearance of a large cross, triumphantly erected over the principal gate of Ephesus. His singular dress, and obsolete language, confounded the baker to whom he offered an ancient medal of Decius as the current coin of the Empire; and Jamblichus, on the suspicion of a secret treasure, was dragged before the judge. Their mutual enquiries produced the amazing discovery, that two centuries were almost elapsed since Jamblichus and his friends had escaped from the rage of a Pagan tyrant. The bishop of Ephesus, the clergy, the magistrates, the people, and as it is said, the Emperor Theodosius himself, hastened to visit the cavern of the "Seven Sleepers;" who bestowed their benediction, related their story, and at the same instant peaceably expired. The easy and universal belief in this marvellous fable, so expressive of the sense of mankind," says Gibbon, "may be ascribed to the genuine merit of the fable itself. We imperceptibly advance from youth to age, without observing the gradual but incessant

changes in human affairs, and even in our larger experience of history, the imagination is accustomed, by a perpetual series of causes and effects, to unite the most distant revolutions. But if the interval between the two memorable periods could be instantly annihilated; if it were possible after a momentary slumber of two hundred years, to display the new world to the eyes of a spectator who retained a lively and recent impression of the old, his surprise and his reflections would furnish the pleasing subject of a philosophical romance." *

A survey of the progress of science presents a pleasing view of the successful labors of the human mind. It brings us into direct and active sympathy with men of genius of every age. We behold the toil and disappointment of one—the slow and tedious steps by which another has reached eminence. We witness the result of patient investigation and cautious induction. We trace the progress of discovery and invention, from the first rude experiment or accidental conjecture to the final glorious result. We perceive the intelligent observation of the slightest incident leading to the establishment of the most sublime truth. We see human ingenuity overcoming apparently insurmountable obstacles, and enterprise gathering courage from its very defeats. The establishment of almost every great truth has been secured by the enthusiasm of some gifted man upon whom its discovery has conferred immortality. For the highest success in the pursuit of any object there must be a *love* of the object itself. The philosopher, the student who is true to his vocation, loves the truth which he would develope and embody. The astronomer from his lonely turret on the plains of Chaldea watching the silent revolution of the heavenly bodies; Plato musing in the groves of the Academy; Pliny dying amidst the terrific splendors of Vesuvius; Linnæus penetrating the Arctic Circle, that he might study its Flora, *in situ*; Cuvier, a "lordlier Adam than he of Eden," restoring form and giving names to races of animals extinct ages before he lived—and from these scanty relics deducing the world's history at that remote epoch; Galileo in the dungeon and on the rack in vindication of his astronomical views; Newton, Franklin, and Liebig, demonstrating nature's sublimest laws, and revealing the secrets of her most subtle transformations; and Audubon, that hale old man, who even-paced with our boldest hunters, startles the clefts of the Rocky Mountains with his rifle, that he may catch

*Gibbon's Decline and Fall of the Roman Empire, Chapter XXXIII.

and transfer to canvas, the lustrous tints of beauty in each rare bird, ere they fade in death ; — all, all bespeak enthusiasm, a burning love of truth for the truth's own sake. It is in the contemplation of such minds, and their products, that abandoning all grovelling thoughts and vulgar desires, we feel a new sense of the dignity of intellectual pursuits, and of the power of human genius.

In the history of science we sometimes discern a single truth discovered and developed by some powerful mind, which long stands isolated — like a lone star in the overcast heavens. After the lapse of years, sometimes of centuries, other kindred truths appear, or some splendid genius, with magic wand scatters the clouds and reveals the former lone star a member of a brilliant constellation. The expansive power of steam was announced to the world by the Marquis of Worcester, in 1655 ; and a mode of propelling vessels by steam was patented in London in 1737 ; but three quarters of a century elapsed before our own Fulton presented to the world the “steamboat,” which, regarding its effects upon commerce and navigation, the increased facilities of travelling and trade, the rapid circulation of products and intelligence, is justly ranked among the noblest benefactions to the human race. The Alchemists too, though absurd in their pretensions, and base in their deceptions, elicited many valuable truths, which were obscured in the long night of subsequent ages, to be again revived by Priestley and Davy, and associated with other truths, pour their mingled light on the pathway of man.

It is one of the most interesting facts in the progress of science, that whether the advance of any particular discovery to a general reception be prompt or tardy — or even if its march be arrested, it is never ultimately lost. It is one of the laws of intellectual influence, that whatsoever be the fortune of inventors and discoverers, the invention and discovery are immortal. Persecution may consume their frames, but the truths they taught are immortal. Partial and erroneous views may even retard their own minds in the pursuit of truth ; but the errors of one age are the beacons of the next, and the failure of one great mind but serves to put his successor on the right track. When a great truth, of value to mankind, is once discovered, it incorporates itself with the very elements of society. When first struck out by some distinguished and fortunate genius, it may address itself only to a few minds of kindred taste or power. It exists then in the abstract

forms of science, and serves perhaps only as a test of the validity of theories. But it is one of the happiest laws of intellectual progress, that the profound reasonings, sublime discoveries, and generous sentiments of great intellects, rapidly work their way into the common channel of public opinion, visit the bedside of the sick and dying, encircle the altar and fireside, ascend the bench and tread the halls of legislation, raising the universal standard of attainment, correcting popular errors, and promoting the general welfare by an increase of intelligence, skill, comfort, and virtue. Historians affirm that the celebrated Grecian sculptor Phidias, in executing the statue of Minerva at Athens, so wrought his own image upon her shield, that it could never be effaced without destroying the statue. Thus the great truths of science are so completely woven into the texture of society, that their destruction would involve its disorganization. How entire is the revolution in political and social affairs, which has resulted from the use of the magnetic needle, the telescope, moveable metallic types, and the safety lamp! When will the effects of the invention of gunpowder; or the consequences that have resulted from the application of the vapor of water to the manufacturing arts, navigation, and transportation by land; or the results which have flowed from the adoption of that great master-principle of the philosophy of Bacon — the induction of Truth from the observation of Fact, — when will these, or any of them cease to be discernible, in the very intimate structure of society?

It has been said with great classical beauty and truth, that “every vista in the ample domain of science should lead to a temple dedicated to the benefit of man.” The slightest glance at the history of science reveals its tendency to apply all its principles to some direct practical purpose. There was a period when speculation constituted the principal delight of scholars and philosophers; and endless were the controversies and subtleties about which they distracted themselves. Through all the ages of philosophy to the time of Bacon, the true object of science was unknown: and the profound sentiment with which he commences his *Novum Organum*, was as new as it was beautiful to the philosophic world. *Man, the minister and interpreter of Nature, can do and understand only so much about the order of nature as he has observed; neither does he know more, nor can he.* “The ultimate object of the sciences,” says Bacon, “has by no one heretofore

been well defined : It is to labor for the comfort of mankind ; to work effectively for the purpose of lightening the annoyances of life ; to enrich the human race with new discoveries and possessions." Since the adoption of this maxim, the dreaming and speculative have passed away. On the discovery of a new principle now, the question at once arises, in what way can it be made serviceable to the happiness of man ? Society is now full of the applications of scientific principles, from the mighty steam ship that buffets the ocean tempests, to the humblest piece of mechanism. Our ears are filled perhaps to satiety, with the triumphs of steam, electricity, chemistry, and mechanics. Nor has medicine been overlooked in this beneficial change. In this branch of science, inductive philosophy has won some of her fairest trophies. In anatomy, physiology, pharmacy, therapeutics, instructed skill, patient observation, and accurate deduction, have been substituted for vague conjecture and bold pretension. Instead of mystical compounds, nostrums, and panaceas, science has introduced its powerful elements, and given energy and certainty to practice. Physicians no longer dream over the favorite theories of the art, succeeding each other in endless progression. They strive to adopt a truer course ; to read nature in her operations, and minister to clearly discerned symptoms. Chemistry, formerly an occult science full of mysteries, and unmeaning processes, abounding in theories scarcely furnishing a single rational principle, has become, in the highest sense a science. The laws of chemical action have been examined and ascertained with great accuracy, and can now be demonstrated with as much clearness and facility as any of the laws of mechanical philosophy. It has become eminently a practical science, and its beneficial effects are felt in every department of life. The apothecary's shop no longer abounds with nauseous compounds, the disgrace of the art. Chemistry has largely administered to the convenience, as well as the efficacy of medicines, by ascertaining their qualities, and component parts, by removing hurtful substances, simplifying processes, and purifying the crude material. It has saved the lives of thousands by its safety lamps, preventing explosions from the invisible, mephitic fire-damps of the mines. It is a spirit of all work, lighting our streets, fixing and discharging colors, disclosing the nature and properties of light and heat, of air and water, of the products of the vegetable and animal kingdoms, of earths and alkalis, acids, salts, and metals.

There is a large and comprehensive sense in which utility is inscribed on every swelling dome of science. The improvement effected in the condition of mankind by the advancement of science as applied to the useful purposes of life, is far from being limited to their direct consequences in the more abundant supply of our physical wants and the increase of our comforts. The successful results of experiments and reasonings tend necessarily to impress something of the progressive character of science on the more complicated conduct of our social and moral relations. To the study of nature we owe many of the triumphs of Reason. It is the power of science, in awakening the dormant energy of genius; in pointing out to it the true means of arriving at great ends; in preventing its waste in visionary schemes; in suggesting the first hint, directing the aim, and removing obstacles to the successful working of mind that constitute a portion of its true value, perhaps its noblest excellence.

Unless as students you have been singularly ill-taught, or worse misled by your own vanity, you know and feel that the learning you have thus far acquired is but an imperfect fragment of the science already attained by man, and still more imperfect when compared with the knowledge which lies within the grasp of the human intellect. How varied and magnificent does the wealth of the intellectual treasury here opened to you appear. But how does that magnificence grow before you when you reflect that the science of the present generation is the accumulated fruit of the patience, observations, and experiments of thousands of minds, all guided to one end—the improvement of the human race. From the period when the Chaldean shepherd solaced the long hours of his nightly watch by noting the silent and grand regularity of the heavenly bodies in their real or apparent motions, to that when La Grange could ascertain mathematically the law of the inequalities of the planetary motions, and show that these apparent irregularities are, in fact, regular and periodical; from that period when the Alchemist brooded over his mystic rites, in indefatigable but vain search after the brilliant phantoms of his dreams, to that in which Davy and Dalton have demonstrated not merely the quality but the definite proportions of the elements of the most complex substance—the long interval has been filled up, and the wonderful conclusions of science attained by the incessant mental toil of numerous, acute, patient, and daring intellects, through days of thought and nights of

watching. I have adduced this fact that great men during a long train of ages have accumulated and transmitted to you this princely inheritance, through a line far more illustrious than any ancestry ever blazoned by heraldry, not to inflate your vanity with pompous and empty words, but to incite you to noble deeds, to the labors of benevolence, the bloodless victories of reason and virtue. If you feel yourselves to be debtors to the past in an incalculable amount, shall not that reflection stimulate you to the desire of paying some part of that debt, by service to the present and future? Others have lived and toiled for us; it is for us to live and labor for others. You start on your way with all the benefits of the labors, travels, and profound study of all past times. Every happy discovery and useful invention have contributed to the refinement and intelligence of the age in which you live; you find the implements of science, experimental and demonstrative, ready fitted to your hands. For you, Hunter and Bell have scrutinized the human frame, in its minutest construction; Priestley, Davy, and Berzelius, have interrogated nature in the laboratory to learn her laws of aggregation; for you Harvey has demonstrated the circulation of the blood; for you Jenner has vindicated the validity of vaccination; for you, in short, if you will but have it so, all men of science have lived and labored. Be not disheartened as if nothing remained to be done. In every field of scientific research, there remains enough to fill the highest measure of ambition, or gratify the most ardent love of investigation. Say not, you lack genius for such exploits. These achievements have been wrought by minds like your own. In those periods in which science has advanced with the greatest rapidity, the same discovery has frequently been made by several individuals at the same time. This teaches us that the laws then discovered pointed out the next step in discovery, and thus talent common to many was able to accomplish what the highest endowments in intellect had previously found to be impossible. Listen to the declaration — made with characteristic modesty — of one of the most gifted minds. Sir Isaac Newton, at the close of a long life, spent in most successful study, says — “I do not know what I may appear to the world; but to myself I seem to have been only like a boy playing on the seashore, and diverting myself in now and then finding a smoother pebble or prettier shell than ordinary, while the great ocean of Truth lay all undiscovered before me.” What an animating prospect does this view afford,

what noble ends does it propose ! If every new acquisition operates as a moving spirit upon the still depths of our minds, to awaken new enterprise and activity, to warm our hearts to new affection and kindness to our race, and to enable us to add something to the capital stock of human enjoyment, we shall not have lived in vain. Much less of success in life is in reality dependent on accident, or what is called luck than is commonly supposed. Far more depends upon the objects which a man proposes to himself ; what attainments he aspires to ; what he chooses to educate himself for ; whether he looks to the end and aim of the whole of life, or only to the present hour ; whether he listens to the voice of indolence or ignoble pleasure, or to the stirring voice within him, urging his ambition on to the highest objects. The truths which you are here invited to contemplate have not only adaptation to prepare you to exercise the duties of a responsible profession, but have also the power to lift the soul above base desires, and a sordid ambition.

The laws that govern the material world are fixed and inviolable. When they have once been ascertained they may be safely taken as premises in all your processes of reasoning. Your calculations will possess a kind of mathematical certainty. These laws constitute the various branches of science. I hope to have the pleasure in our future meetings of enunciating, enforcing, and illustrating some of these laws.

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