NEW YORK UNIVERSITY—DEPARTMENT OF MEDICINE.

AN

# INTRODUCTORY LECTURE

ON THE

# HISTORY OF CHEMISTRY,

DELIVERED IN THE

UNIVERSITY OF NEW YORK,

SESSION, 1846-7.



BY

JOHN WILLIAM DRAPER, M. D.,

Professor of Chemistry.

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New York, Nov. 6, 1846.

Prof. Draper.

*Sir*—At a meeting of the Students of the University Medical College, held on Monday last, Robert M. O'Ferrall, of Ohio, being in the chair, and J. Sill, of Michigan, Acting Secretary, it was unanimously

*Resolved*, That a Committee be appointed to solicit, at the hand of the several Professors, a copy of their excellent Introductory Lectures for publication. We, who have the honor to constitute the above Committee, take great pleasure in expressing the warmest desires of the Class, to which we would add our humble request, that a gratification so great to us, and at the same time so honorable to the Institution, as the publication of *your* eloquent and able address, delivered on Friday last, be not withheld.

With great respect, we are yours, &c.

Robert M. O'Ferrall, *Ohio.*
James Farrington, *New York.*
M. C. Hoyt, *Vermont.*
John B. Sweat, *Maine.*
Wm. H. Wilber, *Massachusetts.*
Edwin Bentley, *Connecticut.*
George D. Wilcox, *Rhode Island.*
T. M. Franklin, *New York.*
Thos. E Hunt, *New Jersey.*
Robert Martin, *Pennsylvania.*
Chas. Galagher, *Delaware.*
Miles W. Palmer, *Maryland.*
Samuel Rixey, *Virginia.*
Albert Myers. *North Carolina.*
Edward Sill, Jun, *South Carolina*
W. N. King, *Georgia.*
J. D. Holly, *Alabama.*
J F Dismukes, *Mississippi.*
James F. Seguin, *Louisiana.*
J. P Garvin, *Tennessee.*
Robert J Bryan, *Kentucky.*
John F. Conlan, *Ohio.*
Ziba Foot, *Indiana.*
James Noble, *Illinois.*
Leon De Alvear, *S America.*
Alex. Harvey, *Canada*
Daniel F Vasbinder, *Canada.*
Mathew O'Callaghan, *Ireland.*
R. W. Fisher, *Florida.*
Geo. A. Smith, *Texas.*
Thomas Frye, *Arkansas.*

By J. SILL, Secretary of Committee.

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University, New York, Nov. 10th, 1846.

*Gentlemen*—I have to acknowledge the receipt of your letter, requesting, in behalf of the Class, my Introductory Lecture for publication.

I comply with your request with very great pleasure, and offer my best wishes that the session which we are now commencing may be pleasant and profitable to you all.

Yours truly,

John W. Draper.

Messrs. R. M. O'Ferrall, S. Sill, &c.,
Committee of the Medical Class.

# LECTURE.

I PROPOSE to commence the course of lectures which I shall have the honour to offer before you this winter, with some general observations on the History and Progress of the Experimental Sciences, among which, I need scarcely say, that chemistry holds a very exalted rank.

From all other animated beings man differs in the circumstance that he lives in two worlds at the same time. The material universe which surrounds him, gives him his present impressions, but all his recollections of the past and his hopes of the future are derived from a world that is within. In common with the rest of his species each one sees the same skies, the same stars, the same pleasant alternation of land and water, of day and night, but there is also given to us a separate internal world. It has its own peculiarities which for no two men are alike,—peculiarities arising in the diversified events of life or in mental constitution. The external world and the world of thought are equal in their relations to us—ever present, ever acting.

A conviction of the unity and symmetry of nature has led men, from the earliest times, to attempt to reconcile these two worlds to each other; to make the one the mere reflection, the counterpart of the other. It is possible so to mould the mind as to bring it in complete harmony with external nature, but, as we are soon to see, man with an innate perverseness has too often and too long attempted to make the external world conform to his internal views, forgetting, that if of the one he is the creator, of the other he is only the creature.

In the infancy of science there are many reasons which lead men to substitute opinion for absolute truth. They who have obtained a reputation for wisdom will always exert an influence on the uneducated. The oldest, and by far the most expeditious system of philosophy, is that which receives as its rule the dogmas of a master, and will recognize no phenomenon in the world, except what is confirmatory thereof. But this substitution of hasty opinion for patient investigation leads, as experience has fatally shown in almost every instance, into error. Omniscience was never given to the human mind. The acutest intellect can go but a little way in the interpretation of natural facts or natural events. We float on the ocean of infinity, and unless there be landmarks to guide us, we are soon enveloped and lost. He who is deprived of every sense—who can neither see, nor feel, nor taste, nor touch, is dead—for it is the impressions that are awakened within us by the exercise of the sensual organs which constitute the

foundation of all our intellectual processes, and all positive science arises in the comparison of fact with fact. You cannot insulate the mind from the external world. It is folly to talk of the internal genius of the great masters of philosophy. It is with the fire of genius as it is with the natural fire—there is a wandering flame that feeds upon nothing and deludes the beholder with its uncertain and baleful ray—there is also a steady heat which becomes the more intense as it is the more supplied with fuel on which to exert its operation; the one, an *ignis fatuus*, can only be discovered by the ignorant and benighted—the other we can see and feel, and know it to be strong to cheer and strong to destroy.

All ancient philosophy is full of errors and contradictions. They are the results of the system pursued,—a system which made fact depend upon faith, and inverted the eternal law of the human mind that faith shall depend upon fact. Look at what is left of the philosophical opinions of antiquity and contrast it with the science of our times. On one side you have countless contradictions, groundless assertions, and the most shallow speculations boldly put forth as truth. On the other, principles recognized by men of every country and degree of civilization.

The distinction between the science of the ancients and that of the moderns is in the system of investigation pursued. They looked to the world within, we look to the world without. Disregarding sensible phenomena they closed their eyes to material things, and their philosophy was in reality the dream of a summer's night. Ever active in its operations the human mind, if it cannot reason, will dream. It calls up the images of a thousand objects, arranges them in landscapes that simulate reality, peoples them with moving shadows, and then takes part itself in the passing events. In the absence of any control of external objects it indulges in imaginary scenes, and possesses no internal principle of check. The mute objects around us, the things that we see and feel, are the guides of our processes of thought; they control us into reason,—cut off from them we sink at once into an intellectual dissipation, and our fancy riots in a thousand scenes of folly. But nature has so ordered it that these mental abstractions are only transient events,—the opening morning and the rising sun break in at last upon the deepest sleep; external objects once more recover their sway, and we become reasoning beings once more. The history of an individual is the history of our species, an abstraction from external nature ushered in the dreamy philosophy of the middle ages,—a dream that only ended when men awoke to a perception of the facts and things around.

What then was the cause of this wonderful intellectual phenomenon this slumber of the mind for so many centuries. Was the political remodelling which Europe underwent at the breaking up of the Roman empire attended with a mental imbecility in the nations? It is true that there is a law to which we know no real exception, that the mental evolution of a race like that of an individual is an affair of time. The Goths and Gauls, the Vandals and Huns, even the legions which

profaned the name of Roman and swayed the destinies of the empire, recruited in Britain, in Germany, in Thrace, were savages benighted as the woods from which they issued. The flame of civilization which had been kindled in Italy they extinguished; but a thousand years rolled over them, and brought not a single discovery in science—not a solitary achievement in literature. Can you not see that there is a moral cause for this prodigious anomaly. For 900 years the policy of Rome had been aggression, bloodshed, and national robbery. The most awful commission a nation can receive is to conquer another. Conquest is only righteous when it is tempered with mercy. From Spain to Egypt, in Europe and in Africa, one nation after another had fallen before the republic. The Mediterranean sea was filled with the tears of her victims. In her relations with weaker people she set the fire to destroy what the sword could not reach;—in the language of her own immortal historian "she made a solitude and called it peace." We who have been taught to admire her poets, her philosophers, her soldiers,—who participate in all the weaknesses of human nature, grow warm over her glorious annals, and forget, in her achievements, her crimes. The fate of that doomed peninsula is a lesson to the world, and he who disbelieves a retributive justice may profitably enquire, who it was that brought the men of the north upon her; who in the utter extermination of her people, her language, her religion, became the executioner of his own law "that they who use the sword shall perish by the sword." Was there ever any thing like it in the world before or since,—the awful skeleton of the eternal city with all its blood-stained recollections still remains, but the people, their religion, and their language are absolutely put out! Whilst in other countries a genial climate gives rise to the intellectual development of man, who was it, that, as of old, cursed the ground for the sake of the crime, and made of no effect her cloudless skies, her lands beautiful beyond expression? Who stimulated an upstart soldier of the remote island of Britain to break the charm of a thousand years and remove her seats of government to the Bosphorus? Who still permits his vengeance to pursue her very name, and, at this day, suffers the infidel Turk to defile the palace of her Cæsars? Shall not the Judge of all the Earth do right?

From the midst of the political convulsions which arose in the thirteenth century, the great principle which rests as the foundation of modern science was gradually evolving itself. All revolutions in history are the expression of the prevalence of some new principle. Whoever contrasts the six centuries which preceded, with the six that have followed the period of which I speak, becomes convinced that some extraordinary change had then taken place. It is the contrast of shadow with sunshine, of death with life. I will not deny to those earlier ages the tribute which is theirs. An infinite darkness is sublime. I turn from the cheerless spectacle to seek for the cause of the change. On one side I see an age of faith, on the other an age of fact;—on one an age of commentators, on the other one of original discoverers;—on one a servile cringing to the old philosophers, on the other a bold

assumption of intellectual independence; and the grand principle which distinguishes the change is an assertion of the supremacy of personal observation.

We can scarcely put too great an estimate upon the difference between what a man has seen for himself and what has been related to to him by another. The mind is so constituted that it is almost impossible for it to deliver a fact and to communicate precisely the same effect that it has itself received. It is its quality to be unable to furnish its own impressions in all their original precision and sharpness. You cannot stamp upon wax with a waxen seal without the marks becoming effaced and the images distorted. There are multitudes of events and things which no powers of language can precisely tell. Were I, in the most elaborate way, to attempt to describe the countenance of an individnal, would that ever enable you to recognize him in the street? but a momentary glance is sufficient for yourselves. Nor is it alone this inability of one to transmit to another his own impressions,—there is a far more serious difficulty encountered, the indisposition of men to tell the strict truth. The fat knight of Shakspeare, himself no common adept in the art, exclaims "Lord, Lord! how this world is given to lying," and I dare say there are few persons here present who cannot recal to their minds numerous illustrative instances they have observed in the case of their neighbours, which substantiate the views of Sir John Falstaff. And beyond all these, which may be looked upon as mere constitutional or common place affairs, there are those more criminal deceptions, of which the pages of history and philosophy are full,—those scandalous impostures invented for the sake of gain.

It is interesting to trace, how from the midst of the old philosophy, the new maxim of the paramount nature of personal observation was gradually developed, and how it originated in one of the most sordid and yet powerful principles of the heart. As early as the fourth century a rumor was very extensively propagated that it was possible out of baser materials to form gold and silver. Like many of the rudiments of modern knowledge we owe the beginning of chemistry to Asia. Stories were related how artists had suddenly become possessed of immense wealth, and how princes in remote countries maintained their power and satisfied unheard of extravagance by the possession of the great secret. There can be no doubt that from early times alchemy had been practised as a sacred and secret art. The Egyptian priests, in their colleges and temples, carried forward all kinds of chemical pursuits, such as the manufactories of cotton and glass. In the collisions which arose at the establishment of Christianity in the Roman empire many of the secret pursuits of the pagan priesthood were divulged, and among the rest alchemy;—at first a nameless science, but soon known indifferently as the sacred art, the hermetic science; and, from a supposed connexion of its cultivators with evil spirits, the black art.

From this obscure and impure origin alchemy slowly made its way all over the civilized world. Wandering philosophers perambulated

Europe exhibiting experiments in natural magic. At first the church issued its anathemas against these practices, and successively in different countries sovereigns enacted laws against them. Charles V. of France, forbade his subjects to practice chemistry, or even to possess a furnace, for fear they should emit false coinage ; but the tell-tale money of those times, which has descended to us, bears an ominous evidence to the fact, that some of those princes themselves debased their own coins and falsified them with alloy.

It is to this condition of things that we trace the origin of the maxim of the supremacy of personal observation. The earlier natural philosophers were pursued by the state authorities, and classed with forgers, counterfeiters, poisoners, and magicians,—they were scourged, imprisoned, fined, hanged, and burnt. Impelled by the lust of wealth they still carried on their operations in caverns and lonely places. Of the thousand floating rumors of new experiments which reached them, many must have turned out on trial fictitious, but the habit was gained of directly testing their value, and experimental philosophy arose as an embodiment of the new principle.

All history bears witness to the fact that it is impossible to coerce the mind either in matters of religion or in matters of philosophy. In the midst of the opposition of church and state—in the face of severe punishments inflicted again and again by the magistrates, the art of making gold steadily found increasing votaries. By degrees all classes of men became infected, and the church itself has furnished us with some of our ablest experimenters and most eminent writers. In the quietness of their monastic retreats these men of leisure turned to the forbidden art. Albert, the bishop of Ratisbon, the first who introduced the word "affinity" into chemistry, was a great authority with the adepts towards the close of the middle ages; and Thomas Aquinas, a name well known to the religious, gives us his method of transmuting copper into silver,—it was done by the aid of arsenic. Nor was it alone the christian clergy who became infected with these delusions. Though expressly forbidden by the Koran, the Arabs were devoted chemists. To one of them we owe the discovery of nitric acid. In other departments of knowledge they also excelled,—to them we owe much of our astronomy, the fundamental branches of modern mathematics, and the very figures we use in arithmetic. In the five centuries that Spain was a Mahometan country, the crescent of Arabia shed many a ray on Europe. The Saracens in Spain, and the Byzantines were, at that time, the only scientific people, and among them both alchemy was actively carried on. With this spread of its votaries its aims had become correspondingly enlarged, and in the tenth century it comprehended three great divisions,—the art of making gold ; the discovery of the universal elixir which should remove all diseases ; and an inquiry into the nature of the soul of the world. Men were living in times when there was no legend too miraculous to be believed, no practice too monstrous to be followed.

In human affairs it often happens that, when disappointment has followed disappointment, and hope is at an end, prosperity suddenly

comes. "Man's extremity is God's opportunity." I know of no event in the history of our species more worthy to excite our attention than that of the sudden regeneration of the mind in the thirteenth century. And there are few events which are popularly more misunderstood. Whoever will contrast the deadness and blankness of the tenth, the eleventh, the twelfth, with the glories of the three centuries that followed them; glorious, I say, because in them those great discoveries occurred which have made modern society what it is,—the invention of fire-arms—the printing press—the discovery of the new world—the doubling of the Cape of Good Hope—the introduction of the magnetic needle into navigation—the invention of spectacles—whoever will contrast these together cannot fail to be astonished at the difference. It is not that a new spirit had been infused into man, for Providence allows human affairs to work out their own effects. How was it, that on a sudden, in Western Europe, universities were founded, philosophical societies arose, and the great discoveries to which I have referred succeeded one another with rapidity. An alchemist might trace this wonderful change to the fact, that on the 16th of September, 1186, all the planets arose in the East at the same time with the sun. It may be permitted to me, acknowledging this beautiful celestial phenomenon as a fitting harbinger of the change, to seek for another explanation in terrestrial affairs.

It is in the bloodshed and horrors of the sack of Constantinople by the French that I see the germs of better times. This people, at that period, but a step advanced beyond barbarism, possessed all those noble qualities which have made them a leading nation in Europe. Brave and chivalrous to admiration—possessed of a clear intellect and a versatile genius, how was it possible that, for sixty years, they should be masters of the city of the Cæsars, with all its untold treasures of literature, and matchless productions of art, and not grow warm with enthusiasm. The glorious recollections of nineteen hundred years were theirs. They seized the prize at the moment when all Europe and Asia were moving. Great political events were going on—the Crusades had brought the benighted inhabitants of Western Europe in contact with the civilization of Asia, and, at this very moment, Jenghis Khan possessed the mightiest empire that has ever existed—with one hand he grasped China, with the other Poland. Through his dominions, extending across Central Asia, an active correspondence was kept up. To me it is not at all astonishing that the magnetic needle, gunpowder, the manufacture of silk, the burning of pit-coal, were at this time so mysteriously made known in Europe. The route through which they came is obvious enough. The political commotions of these times precipitated the extreme east and west, France and China on each other, and made Constantinople the very focus of Asiatic and European knowledge. It is a fact of significant import, that, at this, time a professorship of the Tartar language was founded in the University of Paris.

From the crimes of ambition, and the miseries of war, how delightful it is to see the course of events ending in the advance of knowledge and the production of blessings. The learning of China exercised no

ordinary influence on the intellect of young Europe. Without her mariner's compass would there have been, at this day, any United States? The social habits of men have been changed and improved by her—the intoxicating beverages in which our ancestors delighted, have been replaced by the drinking of tea. And, again, in our times, the violence of war has opened to us the treasures of that hoary empire, and there is the surety, that we are to reap from her science, her literature, her arts, her histories of thousands of years, a rich harvest. This very year there have been published Chinese astronomical records of the successive apparitions of Halley's comet, as far back as the year 451, shewing that that wandering star has once had a period of 77 1-4 years. Time, which has carried in its flow the Egyptian, the Persian, the Roman, has spared to these days, in the remotest East, that primœval empire. More than one-third of the human family is shut out from us in the mysterious secrecy of that enchanted wall.

Again, I repeat, it is to the capture of Constantinople by the French, that the resurrection of learning is to be traced. The consequences of this event are plainly shewn in the immediate foundation of not less than thirteen universities in Western Europe. That of itself constitutes an imposing fact. Nor was this all, the older establishments of the kind underwent a sudden expansion. Among these I may distinguish, for it bore no common share in the events which soon came to pass, the University of Paris. And here for a moment I may pause, and before this audience and in this city, may offer a reflection not out of place. For we are living in times when war is declared against the higher institutions of learning, by men who have either forgotten, or never known, how intimately the greatness, prosperity, and reputation of nations, is connected with the well-being of their universities. There is a senseless outcry that these are the institutions of the rich, and should never be patronized by governments, whose only cares ought to be directed to schools of elementary education. The last six centuries have shewn that it is mainly through this channel, that persons born in an humble station of life have reached the direction of public affairs, or adorned their country by attainments in letters and science. Universities are founded not for the sake of the affluent, but through a state necessity, for nations must now have such men as they alone can produce.

The University of Paris became thus the centre of the grand movement which now commenced. The biographies of the most eminent men then flourishing, shew how extensively communications were kept up between it and similar institutions. Thus Arnold of Villa Nova fled to it from one of the Spanish colleges, and was excommunicated on an accusation of changing a plate of copper into gold. From it Raymond Lully went to England, and, it is said, was compelled in the Tower of London to make gold for King Edward II., from which a coinage was struck. Roger Bacon removed from the University of Oxford to that of Paris, and there, by him, some of the most brilliant discoveries were made. Communication among the colleges was then

carried forward to an extent which we can scarcely realize. It arose unquestionably from the religious organizations of those times.

The direct result of these events was the establishment of learned societies. These, in their origin, were small associations of philosophers who met, on stated days, to relate the various experiments they had made, and exhibit them to each other. The Italian Societies, and, at a later period, the Royal Society of London, originated in this manner. They exist now, as every one knows, in all parts of the civilized world.

The results which ensued were such, that the world was absolutely turned upside down. Not a calling in life, not a profession but what felt the effect. In the church there was the commotion of Wickliffe and Huss, and then came the burst of the Reformation. In science the discovery of the new world by Columbus, the doubling of the Cape of Good Hope by Vasco de Gama, the circumnavigation of the globe by Magellan, and the discovery of the mechanism of the universe by Newton. And where was medicine, where was our chosen science ?

It has been the experience of every age that all attempts at reformation, in pursuits from which extensive bodies of men draw their daily bread, are destined to meet with a furious resistance. Try a reformation in any of these and see what is the result. The living of the professional man is involved. You cannot expect that he will acknowledge he has been practising error all his days. These are no new principles—they were understood by one in old times as well as now. "Put forth now thy hand and touch him in his substance, and he will curse thee to thy face." To accomplish such changes it needs men of uncommon firmness and decision.

It was by the furious invectives of a malignant quack that the grand principle of philosophy was brought into medicine. This drunken vagabond rejoiced in the resounding name of Aurelius Phillipus, de Hohenheim, Theophrastus, Bombastus, Paracelsus. Like many of the wandering philosophers of those times, he travelled through central Asia, and was sent by the Tartar Emperor on an embassy to Constantinople, in which city, he tells us, he was taught the art of making gold by an Arab. In these peregrinations he learned the medicinal value of two of the leading articles of the materia medica, Opium and Mercury. It so happened that a curious disease at that time made its appearance in Europe, the origin of which, by all other nations, was imputed to the French, and called by their name, but by that gay and gallant people the insinuation was transferred to the natives of Hispaniola or other parts unknown. To this the mercurial preparations of Paracelsus seemed to be a sovereign and specific cure. What with his opium and what with his mercury he rose to an immense popular reputation. He delivered and published the most scandalous diatribes against the old physicians, publicly burnt the works of Galen, Avicenna, and those old authorities which the profession had been following for hundreds of years. The great principle which animated him was the preference of his own experience to the combined wisdom of antiquity. But, perhaps, I do an injustice to the memory of this immortal quack—

the reformation he was called to, demanded such a man—strip him of his alchemy, which never could prevent him being a deplorable pauper, and of his elixir of life, of which he carried a bottle always in his pocket, and which could not prolong his earthly thread beyond the forty-seventh year, and he did great things for our profession. He made the doctors in white gloves, for so he called those who were too vain to soil their fingers in a laboratory, a laughing stock from one end of Europe to the other; and the fury with which they retaliated and persecuted him, served only to give him a stronger hold on the people, and finally confirmed the principle for which he struggled.

The prevalence of that principle, that our own observation must take the precedence of every other species of testimony, was followed by its necessary consequence—the emancipation of the mind. With the single exception of chemical writers, the tone of every philosophical book had been a servile dependance on the ancients. So intimately connected are thought and action, that freedom of the one inevitably gives vigour to the other. He who surrenders his mind to the guidance of another may live without apprehension and at his ease, but he lives the life of a slave. He who assumes the position which a free man ought to assume in this world, that he is the creator and therefore the lawful master of his own thoughts, will never fail to make the acts of his life a representation of the liberty of his mind. What was it but this self reliance which gave birth to the great maritime enterprizes, which carried Columbus across the Atlantic Ocean, and De Gama round the Cape of Good Hope. The men of those days could scarcely realize the distance that already separated them from their immediate predecessors—a new geological epoch had transpired—a new man was made—gunpowder had given him an earthly omnipotence, the printing pres an earthly immortality.

I have not time, nor indeed am I able, to trace the action of the new system of things in the various departments of life. It is only to general effects that I look, and take the present condition of the world as the result. Here is all North and South America, once a wilderness, covered with rising nations. In Europe, the lower classes so greatly elevated, that public opinion has a tribunal from which there is no appeal. Upon those nations who have steadily pursued this system, prosperity and gory have so greatly descended, that peace has become their true inerest, and justice and mercy their best policy. Above all, the more noble qualities of the mind have been developed, for, unlike a mirror, which reflects all objects which are presented to it, but takes no permanent impression from any, the mind receives from external nature an indelible stamp, and that philosophy, whose grand object is to study the universe, has left its proper effect upon us. The seed that is put into the ground, under the influences of the air, the sun and rain, becomes at last a tree; the crawling worm of to-day expands its wings and is an inhabitant of the air to-morrow. If nature has thus interwoven a principle of evolvement in the vegetable and animal world, she has not denied it to the intellectual. No one can define our capabilities of thought and reason. Compared with the men of the eighth

century, we are as gods. We move over the land and sea with the swiftness of the wind, and speak to one another through hundreds of miles in a moment. Our forefathers knew only by chance what was passing beyond their native circle ; to us, each morning, the newspaper tells all that is doing in our own nation, or what was done but a few days before in Europe or in India. Our point of view is becoming so elevated that we begin to see the universe at a glance; and with this godlike quality of omniscience, we combine so great an individualizing power, that wherever affection guides or interests prompts, we single from a thousand millions of men a solitary one, and the post office carries our thoughts to him in whatever part of the civilized world he lives. We free ourselves from the casualties of nature, and by our policies of Insurance can even extract, from the perils of the sea and conflagrations, security and profit. Our literary system has reached such perfection that genius need not wait for the slow judgment of posterity, but in whatever country or language it is found it is hailed with a present and universal applause. Are not these glories of modern civilization—are not these some of the first fruits of independence of thought ? But such results have not been gained without a struggle, for science has had its martyrs. In the early assertion of these principles their defenders had to encounter the bitterest opposition of prejudice and ignorance. The patriarch of modern science, Roger Bacon, the first of English philosophers, to whom millions will forever be indebted for sight, by his invention of spectacles, in his old age, was accused of practising magical arts, andof a commerce with the devil. In vain this great man wrote a book on the non-existence of magic—his works were condemned as containing suspicious aud dangerous heresies, and he was sentenced to prison for life. After an incarceration of ten long years, a liberal and merciful Pope restored him to freedom—it was a freedom to go down to the grave. Nor is this a solitary event, the biographies of all the leading men of science of those times are full of persecutions. These were the men who, in the midst of an age of faith, asserted the predominance of fact—these were the men who first set the example of a practical interrogation of nature, and the answers that she gave are the foundations of modern science. They saw that it was better to study the works of God than be lost, as their cotemporaries were, in the confusion of wordy sophistries of men. To them no natural phenomenon was in vain—they diligently searched the earth, the sea, the air, and subjected objects, of every kingdom of nature to experiment. And may not we, as physicians, gather from their example an instructive lesson ? for in no science does the great principle of philosophy apply more pertinently than in ours—to weigh for ourselves every fact, to cultivate a mental independence, and, above all, to study nature. It was to break down the authority of prescriptive opinion that those men dedicated their lives ; and shall we, who have reaped the benefit of all their labours, and more than realized their hopes, go back to the system from which they revolted, and embrace the darkness of those dreaming centuries. We know how that ancient philosophy, which depends on the mind alone, brought the human

family almost into chaos,—we are ourselves monuments of what that other philosophy, which takes external nature as its guide, can do. And shall we exchange reality for a vision, and for the fanciful opinions of any philosophical system whatever, renounce the great book which God has opened before us—his universe, which neither, by the art or power of any man, can be falsified or interpolated, nor a solitary fact in it be perverted or expunged.