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Fisher (Wm R.)

# INTRODUCTORY LECTURE

DELIVERED IN

THE CHEMICAL HALL

OF THE

## UNIVERSITY OF MARYLAND,

OCTOBER 31, 1837.


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# INTRODUCTORY LECTURE.

GENTLEMEN:—

CALLED, unexpectedly, by the appointing power to which the interests of this institution are confided, to discharge the duties of the chair of Chemistry and Pharmacy; and introduced suddenly from the walks of private life to a station in which the incumbent is required to announce phenomena and facts which have engaged the attention and occupied the labors, of a THENARD, a BERZELIUS, and a DAVY; and to expound the principles, which the sagacious minds of these distinguished masters of the science have drawn from the classification and arrangement of these facts, it may be naturally imagined that I approach this chair with mingled feelings of awe and diffidence—of awe inspired by the sublimity and perfection of nature's works, as exhibited by their demonstrations; and of diffidence of my own ability to follow where they have led. The path which they have pointed out for their successors, though defined and regular its course, and ornamented with the beauties of order, simplicity, and harmony, is yet steep in its ascent; and the traveller who fain would pursue it, is limited in his rambles and restricted in his journey by the exact and unerring rules of demonstration.—No brilliant hypotheses may captivate his fancy; no creatures of imagination are allowed to people his domain; he is bound, with the exactness of mathematical science, to the observance of facts, and is compelled at every footstep to regard with undeviating precision the landmarks which bound his track. His pilgrimage is soothed, however, by the knowledge, that every fact he acquires is one that may be subsequently available in explanation of some apparent novelty; and that this fund of information when once obtained, will be of essential

advantage to him, through whatever walk of life his course may be subsequently directed: for the science which this Chair is especially called upon to teach, mingles its observations and researches with the most humble as well as the most exalted conditions and operations of either human or natural creation. It regards with interest the domestic operations of the matron, in the preparations for her daily food; as well as penetrates with a piercing inquiry into the crater of the volcano, the vast crucible of nature herself; and it finds upon reducing the contents of this great laboratory to their simplest elements, that they compare in identity with the elements which constitute the insignificant material upon which that matron exercises her culinary skill.

Great, however, as may be the diffidence which attends my introduction to this hall, and humble as may be my efforts to give interest to the themes which have occupied the illustrious names already mentioned, so inspiring is the subject itself, that, divested of all artificial aid, its principles and phenomena conveyed to the hearer in the most plain and unpretending style, must win his regard, captivate his feelings, and secure his affections.

Satisfied, then, that the merits of the subject must command attention, I enter on the discharge of the duties of the Chair with the less reluctance, and pledge myself to bring to its support an industrious, enthusiastic attachment for the science.

The sciences of Chemistry and Pharmacy, have universally been held of primary importance in the education of an accomplished physician, but they have unfortunately been regarded by society at large as limited in their operation, to the wants of that profession. Ignorant of the benefits which have daily accrued to their comfort and health, from the skilful administration and exercise of these sciences, mankind have suffered their knowledge of them to sleep in obscurity, in a period of unusual thirst after knowledge, and been satisfied to learn that these subjects received a degree of attention from those who cultivated the healing art. We think, however, it may be shown that every member of the community has

more or less interest in these too commonly estimated abstruse studies; and, remote as they seem to be from domestic happiness, that they are nearly allied to it.

The material which gives its hue to the fabric that decorates the fairest of creation's works; the application of fuel, and the mode of applying it for household purposes; the investigation and improvement of the manufacture of bread and soap, all owe their existence to the display of affinities ascertained by chemical philosophers, and must derive their improvement and consequent perfection from a regard to the principles ascertained and promulgated by them. When Sir Humphrey Davy found thousands of his fellow creatures perishing from the explosion of fire-damp, in the deep, dark recesses of the mine, and contrived the ingenious apparatus which would, for ever after, shield them from its pernicious and devastating effects, no chance came to his aid to direct him in its construction. Certain well established and demonstrable principles were endowed by him with a local habitation in the safety-lamp, and his name became identified with the instrument destined to prove a powerful philanthropic agent in arresting misery and averting death, from the head of many a helpless fellow creature. No less distinguished for the adaptation of chemical principles to the wants and comforts of mankind, was the invention of the electric conductors, by our own Franklin, by which the destroying bolt was arrested in its course, and diverted through a channel in which its energies became confined, and were rendered powerless.

These facts, when dwelt upon, are calculated to arrest the mind of the observer, and to induce him to regard with interest, subjects which he may have previously considered as entirely abstract and unconnected with himself; but let him proceed from these, and follow in his mind the various tradesmen and artificers, in the pursuit of their daily toil, and he will scarce fail to discover in each some application of chemical science, by which their labours are accomplished, or the product of their hands improved.

In extracting and reducing the metals from their natural

combinations, or ores, so that they may resume their individual properties of malleability, ductility, and tenacity, chemistry has rendered an aid to mechanical science, without which it could scarcely have had an existence. The agriculturist who improves his lands, and is enabled to renew their vigor when exhausted by repeated cultivation, is equally indebted to chemistry, for a knowledge of the materials of which his soil is composed,—in what it is deficient, and how that deficiency may be supplied. The navigator has been taught, by the inductions of chemical philosophy, how the copper sheathing with which his vessel is protected may be rendered and preserved bright; and a powerful mechanical agency has recently been put in motion, which, from the representation of those who have witnessed its operations, bids fair to rival the expansive force of steam itself,—owing its development and even existence to the investigations and experiments of chemists. Chemistry has shown that the simple immersion of two metallic surfaces in a weak acid solution, generates a heat that has been found capable of fusing the hardest substances, and of causing the combustion of platina itself, one of the most fixed of all the metals; that the same simple combination, reduced in size, and immersed in a weaker solution, gives out an energy, that when properly applied, creates a magnetic force requiring a powerful exertion to overcome it, capable of sustaining tons in weight; and the steam engine itself, that mighty agent, giving to man the power of a giant, was incomplete, and would probably have been abandoned, had not the genius of WATT applied the means of suddenly depriving the steam of all its expansive power, by the adoption of a simple contrivance, to which he was directed by a knowledge of the fact, that this expansive power was due to the latent heat within it, as likewise discovered and taught by the celebrated BLACK, Professor of Chemistry at Edinburg.

Who that has enjoyed the security and comfort derived from the brilliantly illuminated streets of a city, when he is told that the production of the elastic fluid, which is consumed to afford the lamp that lights his path, could never have been

accomplished without the aid of chemistry, can withhold from that science the character which I claim for her, of being intimately connected with domestic comfort and happiness?

The consideration and examination of all these facts, is calculated to show the importance of a knowledge of chemistry in promoting, and creating a thousand conveniences, which characterize civilized society, and of winning for her devotees the respect and veneration of all who are made acquainted with her advantages and allurements. But when applied to the relief of suffering humanity, exhausted on the bed of sickness, or prostrate from the maddening influence of pain, bereft of reason, through disease, or burning with the heats of fever, then, indeed, is chemistry a ministering angel.

Who that has enjoyed the delights of calm repose, obtained through the aid of anodynes, after days and nights of sleepless wretchedness; who that has allayed the parching thirst of fever, and experienced the relief afforded by the effervescing draught, has ever dreamed of awarding to chemistry her full share of credit for the relief thus opportunely obtained?

It is by recounting some of these facts, and apprising you of their existence, that I trust to be enabled to show you how great have been the contributions of chemical science to the supply of your different wants, and the alleviation of your sufferings, and to convince you how essential is a knowledge of its principles to every member of society, more especially to those who have the preservation or restoration of the health of that society in their charge.

From every source capable of furnishing information or yielding products available to the use of man, chemistry has drawn her resources; and, in her estimation, the most apparently worthless substance is held with a regard equal to that with which she appreciates the diamond. In her eyes they are both regarded as elements employed in the formation of the material world, whose characters and properties it is her province to investigate; whose affinities she is called upon to discover and record, and whose combinations possess an in-

terest in proportion as they manifest more or less intricacy and harmony. To her view,

> "All are but parts of one superior whole,
> Whose body nature is—and God the soul."

Strange as it may appear, and unexpected as may be the enunciation, the fact is nevertheless true which chemistry has ascertained, that in the fabrication of the vast universe by which we are surrounded, and of which we form so insignificant a portion, nature has employed but fifty-one or fifty-two elementary substances; and that all the various forms under which matter presents itself to us, owe their existence to the infinite variety of combinations of these elements among each other. The material composition of the body of man, the lord of the creation, is precisely identical with that of the flowers of the field and the stones of the quarry; each containing in its due proportion the elementary bodies known as oxygen, hydrogen, nitrogen and carbon, united with other substances necessary to produce and sustain its structure, or in other words, to endow it with its appropriate form.

The beautiful system of laws regulating and controlling all the combinations, developed by the chemical philosophers of the present century, exhibit the prevalence of the most perfect order and symmetry in the formation of all the compounds of which the universe is composed. Rough and misshapen as the form may be, in which many an aggregate presents itself to us, yet in its interior arrangement, in the manner and proportion in which its integrant particles are united, there is as much symmetry, harmony, and regularity of proportion, as in the most finished architectural structure that art can design or erect.

How great, then, must be the interest inspired by the study of a science, which is capable of unfolding the beauty and regularity concealed in the rugged mass of granite lying in the quarry; and with what intense anxiety must the experimenter watch a process that is about to develope some new revelation of an unknown reality, crowning, perhaps, the pyramid which he has erected upon the basis of observations

acquired during years of previous toil! Numerous are the instances in which a general principle has required a century for its development. Facts have accumulated upon facts, and been regarded as mere isolated entities, until a master spirit has arisen, at whose command they have all arranged themselves in order; apparent incongruities reconciled themselves, and a law whose existence has been coeval with the creation of the world, been adduced, to the astonishment of those who had never conceived the possibility of its existence.

The discovery of the laws regulating the formation of compounds from their simple elements, was of this character. Various facts respecting compound substances had been observed and recorded; speculations had been entered into respecting the causes of the phenomena observed; additional facts were accumulated, when soon after the commencement of the present century, the genius of DALTON conceived the idea of arranging all these phenomena, and deducing from them the circumstances under which they were exhibited; happily for the science, his effort was successful. He succeeded in demonstrating, that these combinations were perfect harmony and order themselves; that the measure of their proportions could easily be ascertained, and that when ascertained, could be applied as the measure of all future combinations of the same elements.

A Saxon chemist had previously shown the positive identity of every compound in which the same elements were united in the same proportions, and this fact formed the basis of DALTON'S theory, not to say the basis of the science itself. The discovery of this law puts the whole material world within the grasp of the chemist, and enables him to describe the structure and composition of a whole aggregate, forming, perhaps, a mountain chain, from the bare examination of minute and inconsiderable fragments. Aided by a knowledge of the affinities which one element has for all others, no composition is so complex as to bid defiance to his powers to separate and discover its integral components; and when his task is completed, he is satisfied that he possesses a

knowledge of the composition of that body, wherever existing, in whatever form, or under whatever latitude it may be found; whether beneath the frozen skies of the artic circle, or fanned by the orange-groves of tropical climes.

These facts are referred to, to show, that in the investigation and discovery of the materials of which the surface of the earth is composed, no ordinary degree of intellect is required deliberately to weigh, and compare, causes and effects, phenomena and their attendant circumstances; and that no mind, however superior in its endowments, can conceive its powers misused or misapplied, when devoted to such a cause as the pursuits of chemistry are thus shown to be.

It is my purpose now to recal your attention from this stupendous fabric, an appellation to which I consider the science honestly entitled; and from the regard of its application to the development of the structure of immense masses, to direct you to some of its humbler duties, wherein its utility is no less apparent, nor less conducive to the happiness and health of mankind. The science of PHARMACY, which may be considered as embraced in this sphere of its operations, is one to which too little attention has hitherto been paid. Exceedingly humble and unpretending in its details, its operations are as closely identified with the well being of society, as those of any other profession; but the few splendors attendant on its successful cultivation, have as yet proved not sufficiently alluring to induce the entrance into its ranks of many competitors for the simple rewards which it has to offer; consequently, public attention has, in this country, not been sufficiently awakened to an idea of its importance, and influence on the comforts of society.

It is the offspring of civilization, and can only exist in highly civilized communities: like the great science of medicine itself, of which it constitutes a no unimportant branch, the application of fixed principles for its practice, was, during the early ages of barbarism, entirely neglected and unnoticed. The savage in his native wilds, was satisfied with the application of a few bruised simples to a

wound produced in the conflict or the chase, or in the administration of some simple infusion or tea, to assuage the paroxysm of fever. Beyond this culling of simples, he neither knew, nor cared, nor indeed was there probably occasion, for all the remedies which have since been introduced to our notice. In that primitive condition of existence, disease much less frequently manifested her powers; and the few ills which did afflict humanity, were perhaps capable of being relieved by these simple agents. But, as population increased, and civilization advanced, remedies were required which exceeded in complexity the bruised herbs and infusions of the early ages; and from the employment of vegetables alone as remedial agents, recourse was had to the mineral substances also provided by nature for our use. In the application of these to the wants of society, chemistry was called in to bestow her aid, and many of the preparations at present of established reputation in medicine, were the results of processes invented and pursued hundreds of years ago. At that period chemistry itself was but little better than empiricism; and adventitious circumstances attending the production of some compounds, were supposed seriously to influence their effect; while from a want of the knowledge of principles which have since been discovered, many important requisitions for their production and efficacy were entirely neglected and disregarded. Chemistry, however, was making rapid advances to the character of a systematic science, and along with her improvement was a corresponding amendment in the remedial agencies put at the disposal of the physician; and with the perfection which chemistry has now attained, perhaps, all the advantages to be derived from this application of her principles and precepts, are realized. But the extension of these has now become so general, and the importance of a thorough knowledge of their application become so great, that the cultivation of these laws, and their use in the preparation of medicines, has, in the division of labor which characterizes civilization, been erected into a separate science, and this is entitled PHARMACY. Its name is taken from the Greek word Φαρμηκον, signify-

ing a medicine, and its operations consist in investigating the physical and chemical properties of substances used in medicine; in selecting those parts of vegetables, and preparing those compounds of minerals, which are best endowed with remedial powers; in so modifying their natural form, as shall render their powers most available when required for use; and finally, in discovering all those circumstances by which their powers may be impaired or improved. To undertake a conscientious discharge of duties so important requires an education far above the common standard; a thorough knowledge of chemistry; an acquaintance with botany, and an inflexible honesty of purpose, which will suffer no prospect of pecuniary advantage to arrest for a moment a strict discharge of all these duties with fidelity.

Great as is the dependence of the invalid on the skill and judgment of his medical attendant, for a correct diagnosis of his complaint and subsequent advice, as to the remedial agents necessary for him to have recourse to, equally great is his dependence on the honesty, skill and abilities of the pharmaceutist, to whom is intrusted the preparation and dispensation of those means which have been indicated by the physician, as essential to his relief and recovery. Should the remedies which are furnished on the physician's requisition, have become inert through age, or been impaired by a want of proper skill in their preparation; should, as has unfortunately too frequently occurred, one substance be furnished for another; should a greedy desire for gain, induce the supply of a medicine inferior from any cause, the health of the patient may receive a shock, from the effects of which the skill of the ablest physician may be unable to save him.

The importance which is attached to a proper exercise of this profession, and the high degree of responsibility involved in its functions, have induced all the governments of Europe to prevent, by the enactment of strict penal laws, any of these abuses which might otherwise have crept into it. The education of their pharmaceutists, is required to be carried to a high degree of attainment; boards of examination are established to

prevent incompetent persons from intruding their services on the community, and censors are appointed whose duty it is to make a thorough examination and inspection of all the medicines submitted for sale or dispensation. Such as are found impure, deteriorated, or improperly prepared, are immediately confiscated, and a penalty is inflicted on the delinquent, besides the ignominy which attaches to a public exposure of his disgrace.

In some of the German cities, but a limited number of pharmaceutists are allowed to dispense medicines, and the inducement to enter into a competition, which may deteriorate their materials for the sake of enhancing their profits being thus removed, the only incentive remaining is, to attract employment by the offer to furnish the best supplies. In France, the same scrupulous regard is paid to the cultivation of a proper knowledge of pharmacy; and although the number of those who may practise this art is not limited by law, as is the case in Germany; yet numerous regulations exist designed to promote the interests of the profession, secure the rights and health of society, and to elevate the character of the profession by requiring from its members a thorough education in every department of science, allied in the least degree with pharmacy.

Unfortunately for the profession in this country, the law takes no cognizance of its character or duties. The spirit of our institutions is averse to the establishment of privileged orders, and although the advantages would be decidedly in favor of that community, which was protected by the enactment of wholesome laws, prescribing the regulations under which this science should be practised, yet the conferring of an exclusive right to prepare and dispense medicines on those who alone are qualified for it, would be regarded as creating a monopoly for the benefit of a favored few. The spirit of open competition is allowed to run riot through the land, even in the exercise of a profession requiring equal skill, and a knowledge almost co-extensive with that expected in the education of a physician, and the health

and lives of the community are exposed to the chances of frequent detriment, from the consequences which may result from an incompetent or ignorant discharge of the duties of a pharmaceutist. Poisons are openly and undisguisedly furnished to children and servants without fear or restraint, and no kind of inspection is practiced to determine officially that the medicines administered on the requisition of a physician, are either perfect of their kind, or prepared according to acknowledged authority. Is it not a strange, not to say a negligent oversight, that legislators should direct a careful investigation into the quality of the most common articles of merchandize, and yet suffer agents employed in the refined and delicate operations of medical practice, to pass without notice? And that the means of procuring the lasting illness or painful death of a valued member of a family, should be suffered to be dealt out without restraint, while the public press resounds with indignation at the practice of wearing weapons about the person? An open evident means of destroying life, against which the assaulted person may raise an arm in self-defence, arouses the clamors, and excites the interests of the whole community, while the silent, stealthy, insidious venom, against the operation of which no care can guard, no caution escape, no skill avert, may be instilled into the cup of festivity, or mingled with the food which hospitality provides, without any legal enactment to put it beyond the reach of the demoniacal spirit disposed to avail itself of its powers.

The importance of a regard to the prevention of this abuse to which society is constantly exposed, has been forcibly and fatally illustrated by a case which has occurred within the observation of several of my auditors, since the preceding reflections were written. A member of a family has been laid a victim, to the habit of employing arsenic for the purpose of killing rats. Had the proper police regulations existed on this subject, which obtain in all other countries, the helpless sufferer might have been still in existence, about commencing a life of usefulness; and the unfortunate cause of the accident have been spared the remorse which must attend

the consciousness of having unintentionally caused the death of a fellow creature.

Society has no idea of the many risks encountered, nor of the many evils to which it is exposed, from the want of a proper regard to legislative restrictions on the practice of this profession. Nor has it a competent idea of the importance of encouraging a class of well educated, skilful manipulators in this department of the social economy.

To illustrate the character which this science has acquired abroad, and the high standing which its adepts occupy, I desire to call your attention to the annexed extract, which is taken from a remonstrance by the Pharmaceutists of Paris, addressed to the Chamber of Deputies, on the occasion of some abuses having crept into the profession. "The knowledge," say they, "which pharmacy requires, without being as extensive, is in part the same as that which is necessary to the physician. It is as various, and is sufficiently useful to entitle him who possesses it to the particular protection of government, and to general respect. The pharmaceutists enrol in their number men of distinguished learning, who belong to the most celebrated academies, skilful professors who fill the chairs of chemistry and natural history, writers whose works are sought for in France and abroad, respectable citizens whose public services have been rewarded by honours, titles and decorations." To enumerate the names of VAUQUELIN, PELLETIER, ROBIQUET, HENRI, PLANCHE, and VIREY, is to justify, to its fullest extent, this warm eulogium on the characters of those who have cultivated pharmacy in France.

Alas for our native land, she has no list of worthies to compare with those enumerated; nor, indeed, with hundreds of others less distinguished in the annals of fame. "The particular protection of government and general respect," have, on her soil, offered no incentives to men of genius and education to engage their services in the profession, which abroad has won "titles, honours and decorations," and provided chairs of distinction for its disciples.

The only improvements which have arisen in this coun-

try, have been the result of voluntary, spontaneous efforts on the part of the pharmaceutists themselves. Ashamed of the condition in which their profession existed, and stimulated to the exertion of rendering themselves and pupils better qualified to minister to the wants of society, means have been adopted which, though slow and gradual in their inception, have taken deep root in the soil, and must, at no very remote period, yield a harvest that will amaze by its productiveness, and will nourish by its excellence, those districts in which its growth and maturity have been attained unnoticed. A sentiment of honest pride arouses itself within me, while thus acknowledging the warmth of my attachment for the science of pharmacy; and I reflect with lively satisfaction upon the honors now, for the first time, bestowed on a graduate of an American College of Pharmacy, in the person of the present incumbent of this Chair. It bespeaks an era about to commence, in which pharmacy will receive her due share of protection, and the general respect of the community; when her votaries will no longer be regarded as mere venders of medicines, and when she will receive her proper location among the liberal professions.

Having indulged in these encomiums on pharmacy, and introduced the evidence of the French Society to assert the claim of that science to notice and cultivation, I feel bound to show that my encomiums have not been misplaced, nor that the respectable representatives of the Paris Society have over estimated their own importance or utility. To prepare and dispense with propriety and ability, the medicines required for the renovation of health; to study their chemical and physical properties, so that the good may be distinguished from the bad, and the perfect from the imperfect; to devote a life to the study which is requisite to keep pace with the rapid advance of knowledge of this age; and to discharge, honestly and faithfully, their duties to their compeers and the medical profession, should, in my opinion, qualify those who do discharge these several duties, and do possess these requirements, to as high a regard in the estimation of the public, as any other class of

society is entitled to. And here I might rest their claims; but I found their demands to respect and protection on specific benefits which have been conferred by the science, which, when enumerated, will, I think, justify what has been said.

The advantages to be derived by society from the uniform and defined preparation of medicines, furnished to the sick in precisely such form and activity as is prescribed by the physician, (not the least conspicuous among the benefits derived from pharmacy,) are sufficiently obvious to impress upon the mind some share of her claims. But independent of that, which is doing no more than pharmacy acknowledges as a duty, for the discharge of which she asks no favours, I will point with satisfaction to the discovery and application of the chlorides of lime and soda as disinfecting agents, which constant domestic use has now familarized to every household; and which have become as necessary aids in promoting cleanliness and comfort, as the use of any of the agents habitually applied to that purpose. In their uses as medicines, the practitioner of medicine will admit the many important benefits derived from them; and the helpless sufferers who have been relieved from the pains and disgusting attendants upon a class of diseases by no means unfrequent, or uncommon—a class for whose relief, these remedies appear to have been almost especially provided—bear me witness to their efficacy and utility.

These chlorides have procured health and comfort for the inmates of crowded ships, and dispelled the apprehension of a disease among them in tropical climates, at whose approach the stoutest stood aghast, and reflecting on the prospect of death, may be imagined to have uttered,

> "Take any shape but *that*, and my firm nerves
> Shall never tremble."

The discovery and perfection of the process employed for producing these compounds, was the result of the skill and intelligence of a pharmaceutist of France, LABARRAQUE, whose name has become celebrated from having been identified with these substances which his science and industry intro-

duced to the notice of the medical profession, and to the domestic use of society at large.

The discovery, by analysis, of the composition of vegetable substances, and the determining of the fact that their remedial powers resided in an active principle, capable of separation from the great bulk of woody fibre in which it was enveloped, was the result of pharmaceutic enterprise and talent.

This discovery has opened a new branch of science for the labours of the present generation, and has materially changed the therapeutic system as formerly established and taught. The system of the patient is no longer overloaded with an immense amount of inert matter, in order that he may receive the benefit to be derived from an infinitely small proportion of active matter associated with it. Who that has his recollections awakened of spoonfuls of nauseous dry powder, at which the stomach revolted, forced upon him in the shape of bark, can withhold from pharmacy the merit she claims of having separated from that same bark the beautifully crystallized element which gave it all its powers, and which was capable of producing in a dose "in shape no bigger than an agate stone," all the beneficial effects for which the bark had long been celebrated. In many cases it so happened that a vegetable provided by nature with a principle which gave it an ability to do good, was, at the same time, invested with a principle to do harm, and hence its use became either altogether prohibited, or at least it was a matter of accident, whether, in particular cases, the good or bad principle might prevail in its influence on the system; of such a character is opium, so constantly and extensively employed in the practice of medicine. It is a matter of general notoriety, that the use of opium, in many cases, is utterly precluded, from the occurrence in it of two principles, as above described. The soothing, calming influence, which it is capable of exercising, being, in some constitutions, entirely overruled, and its effects counteracted by the stimulating, exciting power, with which it is also provided by nature. Pharmacy, by discovering the existence of these two principles, and designating the process

by which they may be separated, has conferred an invaluable boon upon the comforts of the sick, and has provided, through the skill of the medical practitioner, the means of procuring the calm of "nature's sweet restorer," without arousing the debilitated nerves of the sufferer into a state of anxious and thrilling excitement. There is, perhaps, no more beautiful example of the operations of pharmacy, than the process of separating morphia from opium. This process it will be hereafter my duty to describe and explain; at present, a bare allusion to it is all that is in my power.

The separation of quinia from bark, morphia from opium, strychnia from nux vomica, and, indeed, of numerous other active principles, has led to the introduction of a new mode of administering medicines, in which the patient is spared the fatigue and nausea attending the ordinary practice of swallowing his dose. By a process termed the *endermic* mode, these active principles are introduced into the system, and their effects are manifested just as when taken into the stomach; according to this mode they are applied either in the form of an ointment, or dry powder sprinkled over a small spot from which the skin has been removed by the action of a blister; and, in some diseases, more success has attended the endermic method of treatment than that formerly pursued. It enables the action of the medicine to manifest itself directly upon the diseased part, and of course is more rapid in its effects than when compelled to travel the whole circuit of the circulation before reaching that part which requires its aid.

One of the chief advantages which attends our knowledge of the presence of these active principles in vegetable remedies, and of the means by which they may be separated, is, that we are at once furnished with a prompt and certain mode of ascertaining the qualities of vegetable medicines. For since it has been proved that all owe their efficacy to the presence of some one of these, it is evident that their powers are in direct proportion to the amount of the active principle which they are found capable of furnishing. Hence, in making choice from different portions of opium, in order to select

that which is best, we naturally prefer that which produces the largest amount of morphia; the same reasoning will apply to bark from which the separation of quinia forms the criterion by which the judgment is formed; and the quantity of atropine, or hyoscyamine, obtained from the plants in which these principles exist, enables us to decide whether the leaves which furnish them, are entitled or not to our confidence.

In a word, Pharmacy has applied to vegetable substances the same unerring test for estimating their value to which general chemistry had already subjected mineral bodies. The amount per cent. which may be yielded, in both cases, being the direct measure of their value. This object is, alone, one of primary importance, and cannot too often be made available in the successful prosecution of the duties of a pharmaceutist and physician.

But Pharmacy has by no means limited her investigations to those which have been announced; she has directed her attention to the improvement of the processes by which the extractive matter of plants is removed from them and converted into a form, by which its efficacy is preserved unimpaired, and may be employed long after the plant which furnished it has mingled with the dust. She has discovered and invented hundreds of modes by which the form of medicines has been improved, and has simplified formulæ, applying to their construction the beautiful and systematic proportions developed by the laws of combination.

I have now, I trust, made out a case proving to your satisfaction, that Pharmacy is equally worthy the cultivation of enlightened minds, with her parent Chemistry; and, I trust, that with the medical class certainly, if with no other portion of my auditors, no further comment will be required to invite an enthusiastic devotion to the course of study, required to embue their minds with her principles, and familiarize their hands with her practice.

Situated as the large body of the practitioners of medicine are in this country, in remote situations, beyond the reach of

those who make pharmacy a distinct object of study, it is incumbent on them to possess such a knowledge of that science as will qualify them to judge of the quality of their raw materials, and enable them to prepare the officinal and magisterial formulæ, required for the relief of their patients. They cannot place too high a value on this department of their education; for no one can realize the importance which may attach to the purity of a vegetable powder, or the unimpaired strength of a blister. Employed at a moment when the contest between disease and vitality has brought the fluttering soul almost to the period of dissolution from her material abode; when anxious friends and distressed relatives look with intense anxiety to the effect of every remedial means employed, the impurity of a medicine administered in a minute dose, or the failure of a blister carelessly or inefficiently prepared, may decide the contest between life and death; and, with the liberated soul of the departed friend, may vanish all confidence in the skill of the physician. How awful, then, the consequences which attend the preparation and administration of medicines to the sick, and how high are the responsibilities assumed by those who undertake their preparation and direct their use;—a career of distinguished reputation just dawning on the young aspirant for medical honour, may be suddenly arrested, and all his prospects destroyed, by the failure of any of his remedial means through inefficiency or impurity.

The consideration of these responsibilities, and of the means by which the risk of their being brought home upon you for redemption may be avoided, is an important subject for reflection; and I think I do not magnify the importance of it, when I address these appeals to your understandings and feelings. It shall be a constant object of solicitude with me, while I have the honour to hold this Chair, to maintain, with what ability I possess, the importance of a thorough knowledge of Pharmacy, as a branch of medical science, and a requisite in medical education; and I shall endeavour to present its details in such an aspect, during the course which is to

follow, as will, at least, enable you to appreciate their value and qualify you for their practice.

To obtain a thorough knowledge of Pharmacy, requires a knowledge of Chemistry, which is required in the formation of a medical education by various other considerations; one of the principal of which may be said to be the selection and preparation of proper antidotes to the various poisons, which may be introduced into the system, and threaten life with destruction. All proper antidotes depend upon their chemical properties for their efficacy.

Called suddenly to the bedside of the sufferer, who may be the victim of accident or design, the medical practitioner, who is perfectly familiar with laws of affinity and combination, is never at loss for an agent which will neutralize or destroy the potent energies of the substance which "pours its leprous distilment" into the system of his patient. No loss of time in the application of his remedies is to be apprehended; a cause which not unfrequently tends to the accomplishment of the effects of the poison. Calmly and philosophically he learns the name, or judges by the symptoms, of the enemy which is in deadly conflict with vitality, and possessed of a thorough knowledge of chemistry, he is at once enabled to counteract its effects by decomposing its structure, or by reducing it to such a condition as will entirely change its character. On the other hand, he who is ignorant of the means by which these changes in its character may be effected, employs his antidotes at random, or suffers the early moments to be wasted, while he is acquiring the necessary information, during which period the agonized sufferer is gradually perishing from the power of the venom, "which shuts up sense, and o'er his inmost vitals creeping," finally overcomes by its prowess, and secures a victim, if not to ignorance and poison, at least to poison which ignorance was incapable of counteracting.

The prevention of disease is equally an important object with the physician, as its removal when formed, and a knowledge of chemistry is indispensable to the full understanding

of public hygyene. The diagnosis of disease is frequently aided by chemical agencies, and there is a class of diseases in which it is almost impossible to form a correct diagnosis, without an aptitude at chemical manipulation, as well as knowledge of chemical principles and affinities. Situated remotely from the residence of practical chemists, the practitioner of medicine is frequently called upon, in courts of justice, to furnish testimony in cases involving the greatest responsibility and intricacy. The life and death of the prisoner, his acquittal or conviction, rest upon the fiat of the medical witness. How exceedingly important, then, that that witness should possess, in a thorough knowledge of chemistry, the means by which he may be enabled to pronounce his opinion with certainty, his mind unembarrassed with the reflection that he may, through ignorance, have the responsibility of an unjust verdict laid to his charge. The recent application of the galvanic fluid to the cure of disease, renders a knowedge of that subject important to a physician; and, finally, it may be said, that a complete medical education cannot be attained without extensive acquirements in the science of Chemistry.

It is deemed unnecessary to delay you longer with an enforcement of the claims which the chemical and pharmaceutical sciences have on your attention, and even on that of society at large. Enough has been said, it is believed, to show that their operations are directly and indirectly involved in the interests and comforts of every class of the community. Their connexion, in many instances, has been pointed out, and some important results have been shown to depend upon their exercise and cultivation.

It remains, therefore, only to acknowledge the important responsibilities, which are assumed by the occupant of this Chair who has undertaken the duty of inculcating subjects fraught with so much interest and importance. The responsibilities of a public teacher, at all times deep and momentous, are in this case particularly imposing. Flattered, however, by the choice of the trustees, and encouraged by the opinions

expressed by many friends who are deemed capable of advising, the present incumbent undertakes the duty with a full sense of the difficulties he is about to encounter; but trusting to your clemency as critics, and relying upon the partiality which has called him to the Chair for an indulgent regard to his fallibility, he embarks upon the extended sea, before him.—Demonstration his sheet anchor—the experience of his predecessors his pilot—your ultimate success in the attainment of Chemistry and Pharmacy, the haven to which his course is directed—and the polar star toward which all the results of his industry and solicitude centre, *the professional reputation of the* UNIVERSITY OF MARYLAND.