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HUNTERIAN ORATION,

DELIVERED BEFORE

THE HUNTERIAN SOCIETY.

BY

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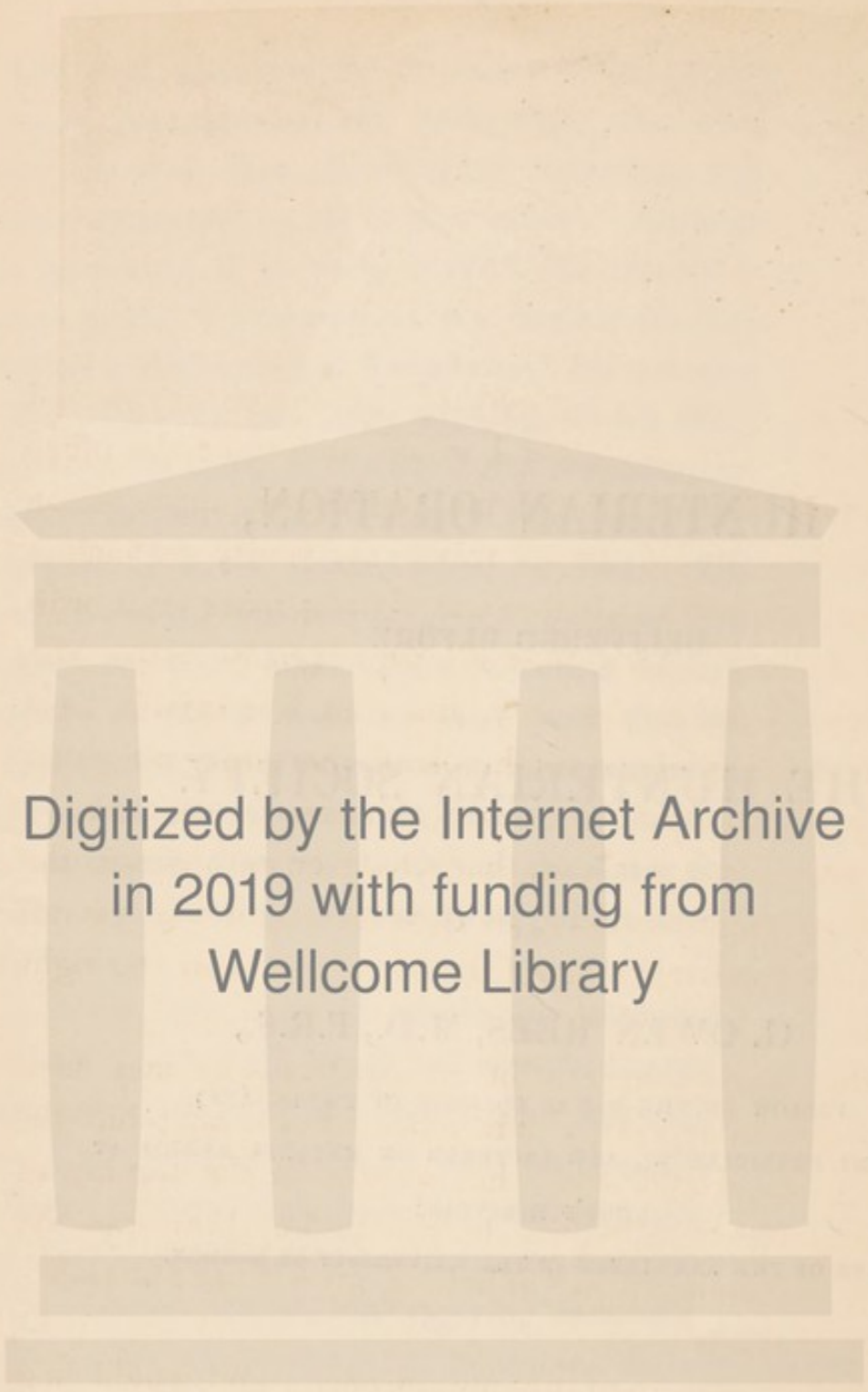
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Wm Ferguson Esq
from the author



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MR. PRESIDENT—

THOUGH I may feel proud of the honour conferred upon me in the request that I would undertake the office of Hunterian Orator, believe me the fullest appreciation of that honour by no means raises my vanity to such a point that I can appear before you without more than ordinary trepidation. This need not be urged on those who have preceded me in the duty, and who, like myself, have felt, as chroniclers of the mighty dead, that every reflection was but a memento of their own feebleness for the task.

They must have felt, too, that whatever enthusiasm the great theme might awaken in their hearts, it was yet all too weak to inspire the belief that they had even the right to praise.

On what the resolutions of my predecessors may have been founded in accepting this office I know not; but for my own part I would state, that respect for the opinion of the Society which called me to the undertaking was the reflection that induced me to believe myself not altogether unworthy of the trust.

I am before you, then, for my purpose; and would beg your indulgence while I first direct your attention to a consideration of that class of mind of which the illustrious Hunter may be regarded as a type. I do not here allude to the especial nature of his studies, to the manner in which he approached that never-failing source of gratification, the investigation of natural phenomena; but refer rather to

is true that many callings afford opportunity for the study of natural science, but there is scarcely one so especially demanding its culture as the medical profession. With us it is the most legitimate means of extrication from the position of the mere professional drudge, inasmuch as it is the best means of improving our social standing.

It may possibly occur to some of my hearers that the laborious duties of general practice are quite incompatible with the pursuit of science; that when the labours of the day are ended, it is but wise to shun the Helicon which inspired a Hunter and a Harvey; and that they would better prepare themselves for the duties of the next day by a less ennobling but more immediately inspiring draught, and by allowing the overtaxed brain to rest. Overtaxed brain! "Non meus hic sermo." How often do we hear the words! How often have we to regret men living in foolish dread of doing injury to their faculties by over exertion, when the truth is but too apparent that the brain merely needs exercise to perform with facility many times the duty imposed upon it by its unhappy possessor. But, after all, this involves a question of taste. The lamenter with the over-taxed brain will exercise, after his labours of the day, many faculties which might be put to other, and to great good use, in playing some game skilfully, or perhaps in acquiring proficiency on a musical instrument. Had his taste so ruled it, the same exercise of brain might have enabled him to comprehend the language of greater men than he can now associate with, and in whose society he will find himself under restraint. But how is this taste to be developed? How are we to raise the man by making him love science, not only as a stepping-stone to an improved social condition, but for itself also.

This brings us to the subject of early association. Taste is developed in many and in various ways : it may delight on the one hand in the acquirement of brute force, or, on the other, seek satisfaction in attaining the highest intellectual power. How, then, can we hope to direct the ambition of a crowded profession to the pursuit of science? This is best attempted by inculcating, at an early period of study, that scientific attainment is the more legitimate opening afforded to us ; and that, though polite learning and general literary accomplishment may effect much, and gain for us a high social standing, still these means of advancement have the great disadvantage of being separated from our professional work ; while natural science, on the contrary, approach it as we may, in any of its various forms, will be found extending a helping hand to assist us in our daily avocation, the practice of medicine.

There is a fear often alluded to, though in the present day with some reserve, that a scientific reputation will greatly injure the possessor in practice; nor is this fear entirely without foundation: it may, and often does, interfere with early success; but then, on the other hand, we have ample evidence to shew that, even at a time when this cry was most rife, it was from among the men who shone in science that the most successful and fashionable practitioners eventually arose.

The truth would seem to be, that the study of the accessory sciences will never for a moment distract a man of common sense from the pursuit of practical medicine. Those who desert our ranks we shall find have done so either from early disgust or from observing that by following some one of the sciences they see a clear road to fortune, owing to the peculiar circumstances of their case.

The study of science increases the interest of the prac-

itioner of medicine in every way. It assists him to analyse symptoms, to arrange and to eliminate them, and gives him a steadiness of purpose, and a facility in arranging his ideas, which will be of vast service to him on many trying occasions.

In order to shew how closely this assertion accords with the fact, let me now, as an instance, direct your attention to the manner in which one who has followed chemistry as a favourite science, and has had his mind strongly imbued with the principles of chemical analysis, might be supposed to search for the cause producing hæmaturia in some case under his care, and thus exemplify how his process of thought would accord with that which he would use in the chemical analysis of a specimen of inorganic matter of simple constitution. The discharge of blood may be accounted for in many ways ; it may come from any part of the urinary apparatus, and he looks to other symptoms in order to test the correctness of each of the possible causes as they severally present themselves to his mind. The chemist, having a mass of inorganic matter placed before him, goes through the same reasoning. It may consist of any one of a very great many substances, but then these do not shew the same reactions when tested by reagents, or, in other words, do not shew the same symptoms. We will suppose that he first applies heat to the mass : it remains unaltered. This fact at once excludes from his consideration every product of the animal and of the vegetable kingdom, all of which would have become either volatilised or charred, and thus his task is greatly simplified. In the same way, in analysing his case of hæmaturia he would test by questions referring to calculus in the bladder as the cause ; and on hearing of the absence of all such symptoms, he would at once sim-

plify matters by dismissing from his mind the consideration of malignant disease and of calculus in the viscus, both of which would produce some of the symptoms of calculus. His questions have acted as his tests did on the inorganic matter. To return to the latter.—The chemist next boils the substance in water; it dissolves: here again, having separated the organic kingdoms, he further separates from his consideration all matters of the inorganic kingdom which are insoluble in water, for the substance was soluble; so that the elimination of its real nature is going on apace. To turn again to our patient.—What must be our second test? We ask questions (our tests) referring to the prostate. The examination per rectum shews it of natural size, and the age of the patient is under forty, so that we may fairly exclude the gland as the source of the hæmorrhage. The chemist having the soluble substance in solution, now applies the carbonate of potassa to a portion of it, and finds the substance is not precipitable, by which he is enabled to exclude all substances precipitable by the carbonate. This shews him that he is not dealing with a metal nor an earth, both of which would have been thrown down; and as heat shewed the substance was neither volatile nor destructible, it can now be nothing but an alkali or an alkaline salt. Side by side proceeds the medical reasoning. We have excluded the bladder and the prostate as causes, and we now direct our test questions to the state of the kidney. On doing so, we find there is pain in the loins increased by exertion, that the hæmorrhage then tinges the whole urine, and that the patient has occasional attacks of vomiting. The previous symptoms or tests have now excluded the rest of the urinary apparatus, and we declare calculus of some kind in the kidney.

Now for the chemist again. He has ascertained that his solution contains an alkali. He adds tartaric acid to a portion of it; there is immediate effervescence; and on adding the same test in excess, he observes after a while a crystalline deposit of the bitartrate of potassa. He now knows he has been operating on a mass of carbonate of potassa, and his labour is ended.

To return again to the patient.—We have determined that he has calculus in the kidney, and we now look for symptoms to shew its nature.

Our questions acting still as tests, we ascertain that he is of gouty family, and that he often passes red sand in his urine. We conclude, therefore, our case is one of uric acid calculus in the kidney.

What I have here occupied your time in relating will be at once recognised by the logician and disciple of Bacon as referring to a simple process of analysis which would suggest itself to every student of mental philosophy. I would, however, draw a distinction, in the objection, that the assistance we obtain by the prosecution of chemical analysis is, as regards mental culture, rather like that which the study of geometry affords to the mind. We are dealing with things obvious to the senses: the idea is then more clearly appreciated, and is better dealt with in its application to other subjects. And were it held that the study of pure logic would do all that chemistry could so effect, we might afford, for argument's sake, to concede the point in returning to our original position; for even allowing the subjects equal value in mental discipline, still, natural science is in itself far more valuable to the practitioner than logic. That which I have just attempted to illustrate by chemistry, might as easily be demonstrated by others

of the physical sciences; and I cannot refrain here from especially noticing the science of geology, the study of which, did my time allow, I might easily shew to be an excellent means of mental training. A certain amount of acquaintance with this fascinating pursuit is daily becoming more necessary for medical practitioners; and I may add, more especially for those resident in country districts. In connection with the subject of public health, cases may present themselves, in which one perfectly ignorant of geology must fail to have before him all the data necessary to form a correct opinion on the possible causes of endemic disease. The physical geography of a country can be but very imperfectly studied independently of its geology; and the questions of drainage and water supply are in great measure dependent on these two sciences for their elucidation.

I feel I have done but poor justice to science, in recommending her to you so particularly for utilitarian purposes, regarding her so much in her less elegant attributes, rather than by bringing her before you as a refiner of the taste, a solace in the darker hours of life, and as developing in her pursuit the highest powers of the intellect, and the noblest and purest aspirations of man. I doubt that any triumph attainable by those engaged in temporal duties can afford the satisfaction and solace which science yields to its ardent votary. There are great moments, doubtless, for those who, in the giant struggles of intellect witnessed in forensic practice, adroitly seize the victory: a great thing this, and a proud reflection, should misfortune perchance number the man among her victims, that he holds the respect of his compeers with the firm grasp of intellect, and not by the chances of birth, the depth of a purse, nor

the active spirit of chicanery which stamps what the world calls "a sharp man of business." Yet, what are these reflections, flattering and soothing though they be, compared with those of the man who loves science for herself? They are indeed narrow, weak, limited, and must ever fail to develop those higher trains of thought which cause the man of science well nigh to forget the material world around him in contemplating the wondrous phenomena presented by its masses and molecules.

Science will rarely fail to imbue even the most careless, for a time at least, with the impressions I have above described. It has often happened to me to witness this after such characters have been listening to a popular lecture on a scientific subject, or when some of the more startling facts in science have been brought suddenly before them. They become more silent, while we may detect a seriousness of tone when they allude to the subject of their thoughts, rarely observed but as the result of the higher emotions. They are struck by the apparent impossibility of that which is declared an ascertained truth: they may, for instance, have heard for the first time, that in acquiring the sensation of a violet colour the eye is affected by a series of impulses 707 millions of millions of times per second; or that a ray of light would perform the tour of the world in less time than a swift runner occupies in taking a single stride; instances alluded to by Sir John Herschell, with the remark that "such things sound more like the ravings of madmen than the sober conclusions of people in their waking senses." They may hear such things for the first time, and for the first time, also, may discover that they live in a little world of wonders, and can only escape from the utter insignificance so conferred upon them in the reflection

that they possess faculties which, under cultivation, will enable them to understand some few of the mysteries by which they are surrounded. Unfortunately, this state of mind is mostly transient—the impression is as evanescent as it might have been valuable had the seed but fallen on good soil. And here we are led to reflect on the effect which would be produced on such a mind as Hunter's, could it be made cognizant of the present state of science.

How novel the views, how striking the analogies which we might expect would suggest themselves. Ideas, but half developed, which had floated through his brain, he would now know in their full expression; and in the newly awakened train of thought the master-spirit must help us now, even as it did of old. Never was science more in want of men of original mind than in the present day—of men who will think for themselves. We appear to be on the brink of great discovery in more than one branch of inquiry; and the time can scarcely be far distant when some favoured hand will open entirely new paths for investigation. I cannot refrain from quoting in this place a sentence taken from a lately-published lecture of Professor Faraday, who, in speaking of the discoveries of Professor Schönbein in connection with the allotropic or ozonised state of oxygen, remarks, “The philosopher, once led into this train of speculation, ends involuntarily by asking himself the questions, In what does chemical identity consist? In what will these wonderful developments of allotropism end? Whether the so-called chemical elements may not be, after all, mere allotropic conditions of fewer universal essences? Whether, to renew the speculations of the alchemists, the metals may be only so many mutations of each other, by the power of science mutually

convertible? There was a time when this fundamental doctrine of the alchemists was opposed to known analogies : it is now no longer opposed to them, but only some stages beyond their present development."

As the phenomena of allotropism to which I have just alluded have not yet been brought prominently before a medical audience, I shall venture to make a few remarks on the subject, for the reason that the condition of atmospheric oxygen, as to its being in the allotropic state or not, promises to become as essential an element of inquiry on the part of the medical profession, as the determination of the average temperature and moisture of any given climate. My time will not allow me to enter at length on the subject; and I shall therefore merely premise that others of our present chemical elements assume, like oxygen, the allotropic or masked form; or, in other words, exhibit greatly modified chemical reactions when subjected to treatment which can in no way be supposed to modify their constitution, or unite them to other bodies for the formation of compounds. Sulphur, carbon, and phosphorus are instances. To return to oxygen:—this gas, as it exists in the neighbourhood of the galvanic trough or the electrical machine, and as we find it in nature in regions uncontaminated by animal life and effluvia, is endowed with a quality by which it unites with substances with greatly increased energy. It possesses bleaching powers, and destroys effluvia, and loses these qualities as it exerts them during its passage over crowded districts. It was long supposed that these disinfecting and other properties depended on the presence of a new principle or element, to which the name of ozone was given, (from the Greek *ὄζων*, "I emit odour," in reference to the

odour of oxygen in this state, with which most of you are familiar, and have recognised when standing near an electrical machine in action). Further observations have proved that nothing but oxygen is present on these occasions, and that the phenomena are entirely due to the powers possessed by that gas in the allotropic condition.

Oxygen, either pure or as it exists in atmospheric air, may be easily rendered allotropic artificially. If the vapour of phosphorus be allowed to mix with air, and is then carefully washed away by water, the change is effected, and we find the residual oxygen re-acts accordingly. The same effect results if the vapour of ether be diffused in a glass jar, and a heated glass rod be held in it for a few seconds. The principal facts, however, which it is well to remember in connection with this subject, are, 1st. That oxygen in the allotropic state unites to substances with increased facility; 2dly, Oxygen in the allotropic condition—inasmuch as it is then an active deodoriser and disinfectant—is necessary for the maintenance of animal life in perfection; 3dly, The allotropic condition of oxygen is lost in an atmosphere which has passed over a crowded district.

Nothing can be more striking than to test such air before it approaches a city or town, and then again to examine it after it has passed over the masses of animal life in its onward progress. This examination is easily made, for we possess now test paper for the purpose. This is made by maceration in a solution containing starch and iodide of potassium. The paper so prepared is turned of a blue colour by exposure to air containing allotropic or ozonized oxygen, but remains unchanged in the atmospheres of

towns and crowded places.* The oxygen of air blowing from over the sea is in the allotropic state, as is also that coming from any considerable distance over open country.

I had an opportunity not many weeks ago of testing the air in the neighbourhood of Brighton, as to its allotropic condition. The wind was blowing from the north, or, more correctly, about N.W.N.; and on walking to the end of the chain pier, so as to catch the breeze after it had passed over the town, the oxygen contained in it failed to react on the papers I exposed as a test. On proceeding, however, to the downs at the back of the town, where the breeze had passed over a great extent of open country, the test papers began to change colour after a very short exposure. How many interesting reflections suggest themselves in connection with this simple experiment! It is clear that on the day I was at Brighton the inhabitants residing at the back of the town were breathing an air possessing very different chemical qualities to that respired by the inhabitants of the cliffs and esplanades, the oxygen in the first case being surpassingly active. Now, according as the southerly or northerly winds prevail, so will the sea front or the back of the town of Brighton enjoy the presence of ozonised oxygen in a greater degree; and another element for consideration is afforded the profession in investigating the history of epidemic and endemic disease. How promising, how encouraging all this! New fields for investigation—new trains of thought; and what are these but new means of enjoyment?

I was led to the foregoing reflections by considering how a knowledge of the present state of science might be ex-

* The effect is generally increased by moistening the paper after exposure.

pected to influence the mind of Hunter; how we might derive benefit from his perceptions; and of the necessity we have in the present day for men of original thought. The presence of such men amongst us not only assists the progress of our art, but it does more, it enhances our dignity. Greatness achieved by ability and industry is ever most honourable; but when a man's career has been such as to cast reflected glory on a whole profession by commanding the attention of the scientific world in his philosophical character, we feel the immortality he has gained is indeed well deserved. So it was with Hunter. He gained his bread by the practice of surgery, but posterity esteems him rather as a philosopher and discoverer; even as Solon laboured as a merchant, but posterity has forgotten the fact in recognising the lawgiver. It is well, then, for us that we have to boast such men as Hunter among our fellow-labourers, not only because their discoveries have led us to a better knowledge of our profession, but because the position we hold in the estimation of the public is thus greatly improved, and that the ambition of those who possess ability and energy receives impress from the noble example before them. I need not dwell on the advantage of making our profession honoured by the public. Much of the esteem we command I believe we owe to Hunter; but in the present day, when scientific attainment is more generally appreciated, and so much better understood, characters like his would indeed do much for us.

I would detain you, however, to consider the influence produced on the rising man of genius, reflecting, as he must, on those whose bright career stimulates his ambition. That influence must differ greatly in effect according as

it may be exerted on the well-disposed and honourable, or on the selfish and deceitful mind. To both characters the ultimate object may perhaps be the same—a high position and a lucrative practice. The remembrance of the honours accorded during the lives of the now departed great will stimulate both alike to exertion; but here the analogy ceases. Of the one we may say, “What thou would’st highly, that would’st thou holily;” and doubly difficult, as doubly honourable, becomes his struggle then. He spurns the assistance, apparently so valuable at the moment, which he might obtain by swerving from the straight road before him: many a bye path, which would lead him more easily to his object, must be shunned in disdain; and at risk of failing for ever he must face fence and thicket with the pertinacity which will not know defeat. How greatly does the progress of the pretender differ from this! With him the object before him is to be gained by any means. If a difficulty occur, there is some bye way or crooked turning by which it may be avoided, and he approaches the goal by the legitimate or illegitimate path, as may best suit his convenience. He can thus advance more rapidly, can make sport at the honest man struggling in the brake, while he may feel secure of passing his latter days in opulence. Nay, more than this: he may even have secured the respect of some few who may not be aware of the means by which he has gained his end; but his heart is smitten, and he is not a man.

Let it be remembered that there is much to tempt men into following this path. It affords many outlets, and if one road fail, another is ever open. The man of expedient, who has gained a certain amount of advantage, begins, perchance, to find it well to guard himself from

some growing suspicion, and the difficulty which has arisen from his desertion of the straight path he hopes may be removed by entering upon a new line of conduct. He may perhaps find great temporary help by committing the worst offence against society of which a man can well be guilty, and one which, of all others, is most contemptible in those whose study is among the works, and of the laws, of the Almighty hand, and from whom, therefore, the blasphemy of a pretence and parade of religion comes upon the heart with sickening disgust. Be it remembered, however, that these persons often labour well, and apply their abilities to good purpose in science; so that their history may be closed with the reflection, that, like even the meanest among created things, they have not been without their uses.

In considering the causes which have conduced to the success of men of talent, and more especially in the delighted wonder experienced in reflecting on the successes of genius, we are too apt to forget how necessary are some of the less noble but no less indispensable elements for success for which we are in great measure indebted to our animal nature.

The finest intellect may find its efforts interfered with, or even paralysed, if unsupported by strong will; and there are few among those who have mixed in the literary and scientific circles of society who have not had occasion to observe the evils resulting from this deficiency.

The man who discovers, and who is guilty of seeing further than his neighbours, is a delinquent whom human nature in its frailty too often feels bound to punish; and he who cannot meet suspicion, and even contempt, with philosophical disregard, and who does not feel that in the

enunciation of a truth he is speaking in suggestive language to generations unborn, must fail to maintain that spirit within him necessary to the full development of the faculties bestowed upon him by nature.

That Hunter possessed animal qualities conducing to success is not only obvious from the general history of his life, but also from a peculiarity in his writings, which betray in their style a certain determination of purpose, and a disinclination to pin faith on authority. These are but indications of a combative nature expending its force in preserving the mind from subserviency, and, what is more valuable still, from the fear of that incredulity which all have to encounter who venture on proposing novel views, or on destroying the value of some long-cherished error. The history of Hunter's period affords us, in Hewson, an instance of the less resolute class of mind to which I have alluded. This great physiologist never had justice done him in his own day, and it was left for us of the present generation to appreciate the great value of his discoveries. It might be said of him with great truth that he wrote for posterity; and no one who has bestowed the least attention on the physiology of the blood can fail to be struck with the perspicacity which so early pointed out the road for future investigators, and which, favoured, as it were, by some strange refractive power, could see truth far below the horizon that limited the views of other observers.

The importance of the labours of such men as Hunter and Hewson can scarcely be sufficiently appreciated, unless we remember not only the state of science in their day but the state of the medical profession. It is true, they escaped the period when the mystic belt of the alchemist was required to ensure the respect of the vulgar; but the

scarcely less potent influence of the wig and gold-headed cane was felt high and low in their day, and to an extent difficult to believe now, when Minerva is recognised in less mountebank costume. The difficulty encountered in combating error must have been greatly increased at a time when our profession felt so strongly the necessity of trusting to external appearance in order to secure public confidence; and all honour be to those who advanced science at such a period.

It is indeed painful to look back into the history of medicine. Historians and political economists have speculated that the study of the past may assist us in furthering the progress of the sciences immediately connected with the morals and wealth of nations. However true this may be of such subjects, we certainly cannot apply the rule to assist in the progress of medicine. The utter futility of such an attempt will be at once obvious, if we remember that at dates when governments were conducted on fixed principles, and political economy was ripening into a science, medicine was not only without a single true principle, but disgraced by such a mountain load of hypotheses as to set defiance to the advance of truth, and to terrify the boldest from the attempt to penetrate the mass.

The application of the natural sciences, to the study of medicine was unknown. Fame, and the highest places, were bestowed on an anatomist, a chemist, an alchemist, or a pretender to universal knowledge, just as accident might determine. One system succeeded another, not that it was the more correct, but because it was the invention of some imposing man with more shrewdness and assurance than his fellows. Matters do not stand thus in the present day. The time has passed when dogmatism and hypothesis

could run riot. With us, facts are assuming their true value; and while every narrative is carefully listened to, every attempt to generalise or establish a theory is jealously met by the less credulous, and perhaps seriously embarrassed by the results of some tiresome man, whose conversations with nature have impressed him with the propriety of thinking for himself. We have arrived at a period in medical history, when, old theories having been exploded, every new one is subjected to the severest scrutiny; and, as a consequence of such conditions, we have now a number of men in the profession who are in the habit of using the expression, "I do not know"—an acknowledgment so seldom heard upon the lips of folly, that its utterance would almost seem to indicate the wisdom of the speaker.

He who in our profession is ever ready with his explanations is either deficient in culture, or is a dishonest man, who would avail himself of the vulgarity of his hearers.

The medical profession, left amid the ruins of old systems to meditate on the follies, and benefit by the errors, of preceding generations, and free to choose any new line of inquiry that might appear most likely to lead to a rational system of medicine, has turned its attention to this difficult subject in its most intricate bearings; and it is curious to observe the rapid strides made by the theorists of the present time, with the assistance of humoral pathology. The absurdities of the earlier adherents of this doctrine in attempting to explain the phenomena of disease while unacquainted with the mechanical and chemical constitution of those very fluids which they held to be the active causes of disturbance, were early observed by those ready opponents, whom all systems, whether good or bad, must expect

to encounter. Humoralism was by degrees condemned: the fluids were considered to have had a fair trial, and were forthwith consigned to contempt. Advancing science has shewn us that humoralism was unsuccessful only because the subject was in its infancy; for until within the last few years, we possessed no means of ascertaining correctly how great a part either the solids or fluids might be expected to take in the production of disease. Our knowledge of animal structure was confined by a coarse anatomy and a still ruder chemistry; the microscope was not enlisted in the service of medicine; while animal analysis was absolutely smothered by the rough appliances of the laboratory. How changed is all this! Microscopes are becoming as common as stethoscopes; and the science of animal chemistry may be pursued in chambers so unlike those formerly required for its study, that the chemist is scarcely able to command the respect he deserves, owing to the simplicity of his apparatus, and the facility with which his processes are performed. The time has arrived when the sciences are producing that beneficial effect on our art that has been hoped for through centuries of darkness and confusion. We are applying chemistry and physics to the elucidation of natural phenomena with flattering success. Not only can we form many of the organic substances, whose production out of the organism was considered impossible, but we can trace that the same processes are used and the same re-agents had recourse to in the living laboratory that we ourselves apply for the fulfilment of a like end.

It is in the remembrance of such things as these, in contemplating which a feeling of awe is scarcely separable from delight, that we should feel ourselves invited to the study of medicine, and to the eager pursuit of those sciences

which can throw light on our path—a path to be followed with the humility of the child, the resolution of the man, and the calm dignity of the philosopher, whose tutored mind, while it admits that every thing is possible, still requires satisfactory evidence in order to believe in any thing.