INTRODUCTORY ADDRESS

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GENTLEMEN,—I occupy this place to-day by the desire of the College Board, to bid you welcome to the London Hospital; to offer to you who are beginning, and to you who are resuming your studies, some words of counsel as to their management; and to express the hope that you will here worthily qualify yourselves for your future work in life, and that hereafter you will so do that work that you will maintain, as in times past your predecessors have maintained untarnished, the name and fame of this beneficent institution.

Twenty-two years ago, this College was opened by Dr. Little, then senior physician to the hospital, and now a member of its executive committee. That event was an important epoch in the educational history of the school. And now that we have touched another epoch, it will certainly be interesting, and it may not be unprofitable, to look back along the time which has passed; to note the more important changes which have marked its passage; and to observe whether they have tended to help or to hinder the work of healing the sick, of increasing our knowledge of disease, and of grounding our students in the principles and practice of our art.

Let us, in the first place, examine the hospital. Special departments have been instituted for the study and the treatment of diseases of the eye, the ear, the skin, the throat, the teeth, of venereal diseases, and of diseases of women and children. Modern instruments for the investigation as well as for the treatment of disease have been added without stint to the hospital armamentarium. A new *post mortem* theatre has been built and furnished with every appliance for study, for demonstration, and for research. Acknowledging the fact that hospitals exist not only for the reception of patients, but for the advancement of knowledge and the education of medical men, the governors have, from time to time, met with enlightened liberality the financial needs of the College. The addition of the Alexandra Wing in 1866, and of the Grocers' Wing in the present year, has made the hospital the largest in the metropolis. And now, with its eight hundred beds and its yearly tale of more than forty thousand out-patients, with its dense and busy population around, and the great port of London at hand, there can never be lack of abounding means for studying, in all their variations and degrees, the accidents, the disorders, and the diseases of mankind.

Turning now to the College, and the educational work which it regulates, we shall observe that, although the changes of the last twenty years are here less striking than those which have happened in the hospital during the same period, they are neither less numerous nor less important. For the most part, they consist in giving a more practical turn to the teaching of the students, and in making easier for them the difficulties of learning.

The College building has been enlarged. A reading room has been given to the students. The contents of the museum have been rearranged and catalogued. A gallery of models and drawings of skin-diseases has been added. The teaching of every chair has been supplemented by a class for demonstration and working. There have been originated courses of instruction for the application of chemistry, of the microscope, the laryngoscope, and of the ophthalmoscope, to the diagnosis of disease. Lectureships have been established on special classes of diseases. Particular wards with exclusive teaching have been set apart for clinical instruction. Examinations have been organised to test, and prizes have been created to reward, the progress of the students in their studies. Arrangements have been made by which every student attached to the hospital is expected, and will soon be required, to take a share in the work done within its walls. And, lastly, scholarships have been instituted in order to encourage a high preliminary training in general knowledge, and to foster diligence, thoroughness, and accuracy in clinical work.

Such are the chief changes which have been effected in the hospital and in the College during the last twenty years; and, reviewing them with as much critical impartiality as can be expected in one who has been concerned in them, and making allowance for the antagonistic

views with which some of them may be regarded, it must be admitted that, in the main, they tend to promote the attainment of the objects for which these institutions exist. But it is not pretended that those changes have yet enabled us to achieve an entire success. It has been felt and confessed that there is still room to make our education more efficient and complete, and to adjust our ample means with more exactitude to the varying wants and capabilities of individual students. We have, therefore, effected recently an important and crucial change in the constitution of the College. Upon conditions which need not now be specified, because they cannot now be here discussed, its management, hitherto conducted by the staff, has been transferred to a College Board, composed in greater part of representatives of the governors chosen from the House Committee, and, in lesser part, of representatives of the staff and of the teaching body elected by the Medical Council. In fact, for a definite time of trial, with power at the end thereof to ratify or to terminate the engagement, the College has been "taken over" by the hospital; and, in virtue of their subsidies to educational work, the governors will have a ruling majority at the new Board. To its deliberations the medical element will bring its technical knowledge, its educational experience, and its high responsibilities to the profession; the lay element, its larger leisure, its business habits, its freedom from the disturbing influences of professional jealousy, and its moral obligations to the interests of the hospital, and the well-being of society, which there it will virtually represent. From their united counsels we expect fresh accessions of administrative strength, unity of plan and of action, a closer supervision, and, therefore, a more efficient working of our educational machine; and, lastly, a higher kind and larger measure of educational success.

It is obvious that the working of this new constitution is necessarily beset by great perils; and, did we not believe, as we do, in the sincerity and in the zeal of those engaged, we should justly fear lest the partial counsels of merely personal interests or of party intrigue should prevail over broader and juster views. Happily, we are without grounds to justify indulgence in such fears. Happily also, if the scheme should fail—if, contrary to our expectations, loss, and not gain, should be the issue of the trial—we can still return to our former state, and resume our work upon the ancient lines.

But, whilst reckoning thus our gains, our losses must not be overlooked. They are neither few nor light; and it is only the strong vitality of the hospital organisation which has enabled us to refill the gaps which time has made and to show now so little of its scars. Of the staff of twenty years ago, only one remains to connect the active list of that day with the active list of this. Some, by length of service, have been promoted to the ease and dignity of the consultative office. Others have turned aside into different spheres of work. Death has had his share. And here gladly would I recall the names and services of those who helped to make, and in their time maintained, the reputation of the London Hospital, and whose names and services ought never to be forgotten in this place. But time will not permit me now to dwell upon this subject, and I must limit myself to a brief notice of one who, in the prime of life and at the height of his activity, has been taken recently and suddenly from amongst us.

For over thirty years, Dr. Letheby was lecturer on chemistry in this College. Full of his subject, lucid, and orderly in his thoughts, a fluent speaker, gifted with the power of popular exposition, an admirable experimenter, and abounding in illustrations of the applications of chemistry to medicine and to the domestic arts, he was, and he was justly, one of our most popular and successful teachers.

One of the first to bring to light the prevailing practice of systematic food-adulteration, to set forth the injurious influences exercised by certain modern manufactures upon health, and to point out the consequences and the remedies of our noxious gas-supplies—an accomplished chemist, an acute medical jurist, an admirable sanitarian, to whom we owe numberless improvements and contrivances in almost every department of public health—Dr. Letheby, although standing high in the estimation of the public, never received from the profession that full recognition of his merits which he had fully won. Dr. Letheby had made few original investigations; but certainly they are not the only measure of a man's usefulness to his College or to the community. If he was outspoken, we must not forget the respect which is due to a fearless independence. If he had enemies, is there not reason to suspect the sincerity of him who has none? If he erred in judgment, where is the man that is infallible? If he had weaknesses many and faults many, where is the human excellence which is greatly privileged from them? Making full allowance to his detractors, we can still say of Dr. Letheby that he was an able and an honest man, a loyal colleague, a true and genial friend, a benefactor to this College, a successful promoter of the applications of knowledge to the practical business of life, a valuable servant to the public—and

that his memory deserves, here at least, some more lasting expression of gratitude than this that I can offer it to-day.

The profession which you have chosen is one of the noblest, the most important, and the most interesting of all those occupations to which the highest human endeavours are turned. But it is also the most self-denying and the most arduous. Exacting the largest internal sacrifices, it returns the fewest external rewards. Neither wealth nor rank waits upon its longest or its best services; and he who is not prepared to find in its cultivation and in its exercise his chief and sufficient recompense has mistaken his calling and should retrace his steps. To prevent and to cure disease, to prolong life and to put back death—these are the broad objects of our art. Thus stated, how narrow they seem! and yet, when we penetrate their meaning, how vast are the interests which they are found to cover, into what conditions or relations of human life do they not enter! The well-being of the individual, as it is affected by development and education, by the regulation of labour and the formation of habit, by the discipline of the emotions and the control of the will; the continued existence of society, made increasingly difficult by growing complexity in the conditions of civilised life; and even the safety of the State, in so far as it may be imperilled by the ravages of epidemics, the evil effects of manufactures upon the health of crowded populations, and the improper hygiene of fleets and armies,—are all more or less dependent upon obedience to laws which it is the business of our art to discover and proclaim.

But medicine not only involves vast interests, it establishes, and for its existence it must maintain, and for its progress it must continue to multiply, the most intimate relations with every other form of knowledge. There is none into which it does not lead us; none with which it does not necessitate some degree of acquaintance; none which does not lend it aid. Nor is the entire domain of the physical sciences sufficient for its needs and purposes. With the facts of the mental and of the moral worlds it seeks as close and it holds as necessary a relation. And thus, throughout the whole realm of Nature to its utmost bounds, Medicine lays down its lines of inquiry and establishes its channels of communication. It is the metropolis of the kingdom of knowledge, and we are the privileged denizens thereof. Here we are brought face to face with the mysteries of nature, of life, of man, and of the Eternal which enfolds them. Here, in the light collected from every lamp of science and converged into a focus upon them, we may discuss the loftiest problems which can engage the human intellect. And here, in the seeking after truth, and in the doing of good, we may open for ourselves sources of interest and of happiness greater and more enduring than any other that the world can supply.

In feeble and broken outline, such is the art of Medicine, and such are the relations which it maintains; and, as year by year it grows in importance and increases in influence, our responsibilities become more numerous and solemn. Even in a moderate sense it is neither a short nor an easy duty to discharge the obligations herein imposed, and in the highest sense it is impossible—our knowledge and our power of using it being both, although unequally, inadequate. For Medicine, with all its teachings and appliances, is still an imperfect art, in which the known suffers restriction from the unknown; and, for all the light which has been cast upon it, it is still burdened with errors and superstitions, still blind to the modes and measures of its ignorance, distracted by false aims, and shackled by imperfect methods. But to these external difficulties, which time will take away, we must add others, which seem to be inherent and ineradicable. It is true that here, as elsewhere in Nature, there is in like conditions an unalterable uniformity of action; and that in proportion to our knowledge of exclusive successions of actions is our power of controlling their direction, when it is capable of control, and our freedom from error. But the conditions in which Nature acts under the phenomena of health and of disease admit of such infinite variations from such minute disturbances that, in the midst of a constantly moving equilibrium of multitudinous forces essential to the life of every organism, the causal relations of things or states are with the utmost difficulty caught and demonstrated. There is, too, in at least one region of Nature, a sense in which this absolute and eternal uniformity of action must be denied; for although, from the standpoint of logic, it may be held that the *causal nexus* exists unbroken throughout the universe, from the standpoint of medicine it may also be held that it is certainly interrupted in man. Logic is neither the exclusive test nor the final measure of truth; and there are conditions in which strictly reasoned conclusions must suffer refutation from empirical observation. In the mystery of the human will—in the play of thought which connects the visible with the unseen—in the emotions which agitate the human breast—there is an element of disturbance which, in the phenomena of

disease, is almost always in action, and which, in the calculations of causality, can never be precisely estimated.

Again, in studying the history of pathological actions, we can sometimes observe that a certain malady recurring from time to time in the same individual, in apparently the same conditions, assumes new characters and a different quality of action under the influence of differentia so subtle as to elude the narrowest scrutiny. Even our advancing civilisation creates its difficulties, as the human organism performs responds to its progressively changing environments. The nervous system, cultivated in every direction, strained, excited, hurried by the baleful exigencies of modern life, assumes an almost fresh relation to the other parts of the body, recasts its solidarity, and not only alters the complexion of accustomed diseases, but engenders new and puzzling disorders. Hence, it sometimes happens that the accumulations of experience become valuable only for their suggestive uses and their personal discipline. On fresh occasions, still far too frequent, our knowledge must be discovered and our practice framed anew; and our desire to help, fettered by the fear that we may harm, falls short both of its object and its end.

Nor should we here overlook those difficulties of medicine which lie in the personality of its cultivators. Inaccurate and insufficient observation, ignorance of the collateral knowledge necessary to a just interpretation of facts, narrowness of view, the substitution of names for ideas, lack of accuracy and method in setting down results, the confusion of things accidental or accessory with things essential, the disturbing influences of desire, the bias of preformed opinion, hasty and erroneous generalisations; these are all difficulties which seriously hinder or misdirect the progress of medicine; and they are difficulties from which no intellect, however trained and disciplined, is wholly free.

But this is not all. I cannot conceal from you that besides these and other difficulties to which I have not adverted, affecting the cultivation of medicine as a science, you will have to suffer many grievous drawbacks in the exercise of medicine as an art. If it is one of the noblest of professions, it is also one of the most difficult; if it is one of the most arduous, it is also one of the worst remunerated; if the sacrifices demanded of it are the greatest, the rewards returned to it are the fewest; if it is sometimes the most praised, it is often the most abused; the homage occasionally rendered to its aims is neutralised by the bitter sarcasms launched at its achievements; and its highest success can be secured only by the sacrifice of almost everything which lies beyond the pale of professional life. Too often you will find the public with which you have to deal selfish, exacting, impatient, fault-finding, credulous, and ungrateful. Expecting from you wonders which it is impossible to perform, it will deny you the merit due to skilful knowledge and conscientious care. Ignorant of the course of disease, it will credit some quack, seeing a case at its close, with the good which you yourselves have done. Too ready to depreciate services exacted at unreasonable times, it is prone to consider our success accident and our failure ignorance and mismanagement. It will be pleasant enough when recovery accompanies your work and sunshine fills the house; but when death comes, then, too often unable to recognise in it the will of Heaven, it sees in it, or chooses to see in it, only the fault of the physician.

Nor are the dealings of the State with the profession much more just or much more generous. We are not like publicans—those ardent promoters of health, morality, and happiness—a numerous and powerful body which can turn the tide of political battles or decide the fate of cabinets, and whose interests therefore at any cost must be conciliated. We are still political nobodies, to whom nothing is to be conceded which can possibly be denied. We are even without a social or civil status, except such as we may possess accidentally in virtue of our academic degrees. Thus we, who as a body give gratuitously to society the largest services, receive from the State in return the least consideration. Our formal remonstrances remain too often unheeded, and the recommendations of our official representative have been on several occasions either ignored or opposed. All its regulations for civil and military service are framed on the principle of securing the cheapest rather than the best material; and thus whilst the profession is straining every nerve to raise the educational and personal qualifications of its members, the State is practically, if not intentionally, undermining its efforts.

All these and many other drawbacks we must continue for the present to endure. Nor have I any hope of their removal until the profession becomes more loyal to itself and more active in the assertion of its just rights; until every member of it feels, and acts as if he felt, that upon his own efforts, as much as upon the efforts of any other person, the future position of medicine will depend. When we are sufficiently represented in Parliament, and upon the Privy Council, and when we have a Minister of Health, who shall be also a member of the Cabinet,

we shall probably take our just place beside the other professions in society and in the State.

But all such considerations, whilst they forbid us to expect perfection in our art, require us to aim at it, that we may reach the utmost limits of possible improvement. Happily they are yet beyond the range of human vision; and to bring them within it, the distance to be travelled over is practically unmeasurable. Here then is room for almost endless pursuit, and for almost endless progress; and surely on the earth there can be no higher satisfaction for man, than when, having undertaken a noble work, he finds himself day after day advancing therein.

As I have said a little while ago, medicine is advancing with rapid strides in every direction. The whole field of work has been enlarged; freer communications with bordering sciences have been established. New lines of inquiry have been opened; fresh interests have been created; unthought-of agencies have sprung into importance; unexpected problems are pressing for solution; and the hum of a busy and fruitful activity has been pervading all its ranks and filling the air around. The discoveries of the last twenty years surpass in number and importance those of the preceding century; and to-day we are so full of the promise of others that it would seem as if the immortal Descartes was not dreaming but prophesying when he said, that, if ever it became possible to perfect mankind, the means of doing so would be found in the medical sciences.

We need not go far a-field to find the causes of this great and happy change. In the readier diffusion of knowledge through more numerous bodies of investigators, in truer aims and correcter methods, in the disregard of scientific creeds, and in greater readiness to revise our opinions and recant our errors—in limiting the points and simplifying the conditions of particular inquiries, in more delicate instruments, in finer and exacter calculations, and, above all, in the greater number of more skilfully conceived and carefully executed experiments upon animals, we shall find the main secrets of the progress over which we now exult.

When we cast our eyes along the past to mark the manner in which medicine has advanced in the later periods of its history, we observe that the scientific army has never moved with more than one leader at the van. In the beginning of the century it was chemistry which led the way and carried on the work; and when chemistry was exhausted morbid anatomy took its place. To morbid anatomy succeeded histology; to histology, pathology; and now in the forefront we see experiment, young in command but skilful in strategy and successful in conquest.

It is to experiment, in some shape or other, that we owe the bulk of our recent gains: and for at least a generation to come it is to experiment, assisted by chemistry and physiology, that we shall have to look for the most substantial additions to our knowledge of the nature and treatment of disease. The importance of experiment, indeed, cannot be overrated; for through it we shall often have to look for the criteria of uncertain doctrines, the solution of unsettled problems, the organisation of fresh inquiries, the annexation of outlying truths, the discovery of unknown facts and laws.

But experiment has also its other side; and, disregarding its inherent difficulties, which are neither few nor slight, it is beset with dangers, which must be watched with a jealous eye and guarded against with a firm hand. By the prestige of precision, often unmerited, which they carry with them, experiments sometimes cover the most flagrant errors and give currency to false or inadequate generalisations. Even when every precaution has been taken to secure precision and accuracy in every particular, it cannot safely be inferred that the results of certain experiments upon animals will be identical with those which would happen in man submitted to like conditions; nor, without other authority, would it be justifiable to use those results in the explanation of physiological or therapeutical facts. Let me pause to give you a single illustration. The insertion of a thread-seton into the neck of a guinea-pig produces what is alleged to be, and what in some respects resembles, although I do not believe it to be, acute tuberculosis. Now, I shall not insinuate that this experiment is barren in its bearings upon human pathology, because the insinuation would be unjust; but I contend that it cannot in any special and important sense be applied to it. For either a seton in the neck of a man will not produce tuberculosis, in which case the point of the experiment is broken, or else if it does, then, from what must be the frequency of its occurrence, the absence of symptoms, and the certainty of recovery, acute tuberculosis in the human subject, thus induced, cannot be a disease of any moment. For what practical physician would accept this as a just account of the acute tuberculosis with which he is familiar? Surely there could be no greater abuse of experiment and of language than to identify the tuberculosis of the seton with this tuberculosis, which, sudden in its

origin, febrile in its character, profound in its constitutional effects, and rapid in its course, ends always, or almost always, in death.

It is in the facts of such an appeal as I have just made that we shall find the only sure means of protection from the dangers of experimental pathology. For, however numerous may be the results of experiment, however important may seem their bearings upon the progress of science, they will be of no avail to medicine, and it will not be safe to use them in its service until they have been filtered through the checks and counterchecks of clinical experience and have responded to the tests and counter-tests of clinical trial.

Connected with this subject, there is one other consideration which must for a few moments engage our serious attention. Experiments cannot be performed upon animals without the infliction of suffering; and we, whose lives are spent in its relief, ought not to be indifferent to this painful and inevitable fact, nor regardless of the solemn responsibility which its existence imposes upon us. I rejoice to believe that we are not; and that, as a body, we have never transgressed the limits set to our inquiries by the order of Nature, the exigencies of human suffering, and the sanctions of wise and good men. But of late a large part of the public has thought otherwise, and the right of experiment upon animals has been called in question and angrily denied. In consequence of the circulation of statements, either exaggerated or false, a tumult of emotion has swept over the public mind, its powers of reasoning and its sense of justice have been alike disturbed; and, on the plea of an outraged humanity, there has arisen an hysterical outcry for action which has precipitated the Government into a hasty and repressive legislation.

To me this seems one of the saddest things that has happened in this country for generations; and, as it is certain that inquiry cannot move with much useful freedom in fetters, I confess to the fear that the progress of medical knowledge will be seriously interrupted, that medical education, crippled at home, will seek refuge abroad, and that England, from lack of courage, disloyal to the rights of science, will lose her place in the intellectual hierarchy of the nations. But these fears may be ill-founded; and it may eventually happen that the legislation which now threatens to impede will only regulate and protect. In any case, laws having been framed and guarantees given to prevent the possible recurrence of "experimental atrocities", it might be justly expected that, whilst we were conforming in good faith to the conditions imposed upon us, our adversaries would leave us undisturbed. But rumours of a contrary character fill the air, and I am informed that means are being collected for a fresh crusade; that no quarter will be given; and that no peace will be concluded until the liberty of experimental inquiry is unconditionally extinguished.

It is hard to understand the reasons of such a passionate antagonism, and still harder to believe that it has no other foundation than the desire to protect inferior animals from unnecessary suffering. For, if this be so, why do our antagonists confine their warfare within such narrow limits? The infliction of suffering for ulterior ends, everywhere manifest in Nature, now adjusting the balance of nations or establishing the autonomies of peoples, pervades the whole structure and relations of civilised life. What is all the suffering inflicted by all the vivisectionists of all the world in comparison with those hecatombs of suffering which political experimenters have inflicted upon mankind in their attempts to settle the question of the balance of power in Europe. Are the sufferings of men of less account than the sufferings of brutes? Or is their blood less precious? Are the countless woes of countless human hearts to be reckoned but as dust in the balance against the wounds of guinea-pigs and frogs? Why is it, then, that the assault is not coextensive with its object? Or, if it is the plan of our assailants to defeat their enemies in detail, why have we been made the first and bitterest objects of attack? It is not from wantonness, nor is it for ease or pleasure or gain, that we make the subjects of our experiments to suffer. It is assuredly for the advancement of science, and it may be for the good of mankind. Surely, the love of knowledge is as true a human desire as the love of sport, and, whilst the fruits of *this* die with the individual and his interests, the fruits of *that* live for ever in growing uses to the race.

If this question is reopened, it must no longer be confined within the narrow limits which our adversaries desire. Discussed with judicial calmness and impartiality, in the full light of its relations to the facts of Nature, to the sentiment of benevolence, and to the rights of inferior animals as they are qualified and conditioned by the exigencies of human knowledge, and of human suffering, we shall neither gainsay the wisdom or justice of the discussion, nor shall we refuse to abide by its conclusions. But if it be otherwise; if hostilities are to be renewed on the old lines with the old tactics; if again the freedom of experiment upon animals is to be the sole object of attack, then I trust that every member of this great profession and every thoughtful man

beyond its pale will have the courage to make this cause his own, and will offer to threatenings of fresh legislation such an united, earnest, and implacable opposition, that the statute book of England shall never again be sullied by penal enactments against the just liberties of men. The highest heritage of humanity is in our keeping—all the past and all the future conspire to keep us loyal to the sacred charge; and at whatsoever cost of whatsoever kind, we must hand down the right and the freedom of inquiry unmortgaged to future generations.

But I have wandered so far from the highway of my subject as to forget that you are still learners; and that it is only by your continued patience in learning that you are yourselves to become the practitioners, the teachers, and the investigators of the coming generation.

Your curriculum is crowded with subjects; and when you turn from their number to your few short years of study, any efforts that you could make to master them seem hopeless. But the hopelessness is on the surface only. For, when you resolutely grapple with the subject, you begin, with the help of good counsel, to find that there is a certain attitude of mind and a certain method of work, which enable you to get over all the ground and to gather by the way enough for your present needs and something for your future uses.

There are three great divisions of your curriculum, to each of which you must carry in an especial manner untiring diligence and the exercise of your highest powers. They are physiology, including anatomy; pathology, including morbid anatomy; and clinical work, including therapeutics. I say nothing of physics, of chemistry, or of materia medica, or of botany, or of zoology. They have their use and place; but neither is sufficiently high to require notice here and now.

Physiology is the chief foundation of rational medicine. For disease, the penalty paid for conscious or unconscious violation of physiological laws, is neither an essence nor a thing. In the beginning, at least, it is but a series of alterations, mostly in mere degree of physiological states. In their evolution, no new laws are brought into operation, nor is the character of those already existing altered. It is only the conditions of action which are changed; and, however different from those of health these results may seem, physiological laws preside as truly over the growth of a tubercle, as over the development of a tongue. Hence it follows, that the true and complete understanding of disease is to be reached only through mastery of the statics and dynamics of health, and that there can never be a great physician who is not at the same time a good physiologist. Throughout the past, every forward movement of physiology has marked an epoch of improvement in the science and art of medicine. And, even to day, the seemingly barren question of germ-development has, in respect of wound dressing, revolutionised the practice of surgery throughout the world. Let me take for illustration a case of indigestion. The practical man, as he loves to be and with exquisite irony is sometimes called, considers whether the attack is asthenic or sthenic, congestive or irritable; and, calling to mind the remedies for these respective conditions, he attacks the one in fault with anti-phlogistics, or sedatives, or tonics; and, if eating or drinking be worthy of special notice, with full diet or with low. The mere anatomist, claiming to be, *par excellence*, the man of science, endeavours with great form of procedure to determine the particular gastric tissue which is structurally at fault; and, localising the malady with marvellous precision in epithelium or gland, in blood-vessel or nerve, in connective-tissue or muscle, he proceeds, with a different working hypothesis, to use somewhat the same means of cure. Last of all comes the physiological physician, who is as empirical and anatomical as either, and more physiological than both. Believing that the malady is due to some violation of the conditions of healthy digestion, he investigates the manner of their fulfilment. Is the dietary too liberal or too restricted? Is the food proper or improper? Does the patient drink too much or too little liquid, at too high or too low a temperature? Are the meals too far apart or too near? Does the patient waste his saliva, and yet indulge his taste for starchy messes? Is his urine loaded with gravel, and is he nevertheless clinging to beer? Is the stomach halting, because defrauded of its rightful share of nerve-force by undue work and worry? Does want of free elimination keep the blood impure with waste, and the secretions foul with decomposing stuff? Proceeding after this manner, the physiological physician discovers where the conditions of healthy digestion are incomplete or broken, and, then by some simple suggestion, he recalls the patient to physiological obedience, and often without help from drugs relieves him from his trouble.

Give the strength of your minds, then, to physiology: first, in the dissecting-room, that you may master completely the relations of parts and organs to each other; next, in some quiet corner, with your microscope and reagents, that you may learn the minute structure and chemical relations of tissues and organs; afterwards, in the laboratory

with your teacher, and in solitude with your book, that you may comprehend the whole functions of organism in life and health; and, lastly, in the wards, where you will exercise and strengthen your new-got knowledge in the physiological thinking-out of disease.

In studying histology, remember always to proceed from the more simple to the more complex tissues; and, in every tissue, to investigate the earlier before the later stages of growth. Development is the only complete solvent of the residual obscurities of physiological inquiry. In making yourselves acquainted with function, have a quick regard to your future work; and give especial thought to the circumstances which disturb, and when disturbed, to the circumstances which restore, the physiological equilibrium. It is by virtue of this knowledge that, as practitioners, you will be at once scientific among the empirical and empirical among the scientific.

Pathology will make you acquainted with diseased structures, and with the conditions under which they arise and live. It is the science of diseased actions; but it is still in a sense physiological and to be studied after the same manner. It conveys to the mind ideals of the states with which we have to deal, unfolds their relations to each other and to the organism, explains their course and tendencies, and, if it does not supply us with therapeutic power adequate to our knowledge, it preserves us from inflicting injury, and teaches us when we may confide in the healing power of nature, and when, and in what manner, we must have recourse to art.

To learn morbid anatomy you must often be in the *post mortem* room; to learn pathology you must often be in the wards; and to learn their mutual relations and uses, you must often pass between the two, and connect by thoughtful synthesis what you see and hear in life with what you see and handle after death.

Here let me remind you that the object of these studies is not to make you mere physiologists or pathologists: it is, with sufficient general knowledge and culture, to make you practitioners of medicine. Hence, your next and chief place is the wards; your next and highest work clinical. To it all other work and culture, of whatsoever kind, must be secondary; for medicine will neither share her supremacy, nor suffer a rival near her throne.

Be much in the wards. Confine your study to a few cases at a time, and work them out thoroughly to the end. Deal with each case as if it were the only one you had. Adopt an uniform plan in the examination of your cases and pursue it exhaustively throughout every part of the body. Neglect no means, chemical, mechanical, or instrumental, which may reveal otherwise unattainable knowledge of your patient's condition and help you to the discovery of his disease. Above all things, practise yourselves in the habit of minute, precise, discriminative, methodised observation: without it, nothing good can be done; with it, nothing ill. Make your notes, and write your descriptions at the time of observation. Record them in the fewest words and in the simplest terms. Avoid hypothetical phrases; and to severe precision of thought join literal fidelity of expression. In each case, endeavour to form, not a mere verbal diagnosis, but such a diagnosis as will cover and explain the facts of the patient's condition, and let your reasons for it be stated at length. Watch with a questioning mind the administration of drugs, and in the events which follow, take heed lest you set forth as their effects phenomena which belong only to the period or progression of the disease. That you may know hereafter in what conditions you are to act, and in what to refrain from acting, and that you may possess some just criterion for measuring the effects of drugs in the cases which you may employ them, seize every opportunity of becoming familiarly acquainted with the course pursued by acute and chronic affections uninfluenced by any but the simplest hygienic means. Observe the new associations and relations of diseased states in every case, and study with special care the procession of events which brings the endurance of the organism to an end. When death terminates your case, follow it to the deadhouse. Compare the results of the necropsy with the course of your clinical observations, and with the interpretations which you have put upon them. Consider wherein you have erred, and then with the courage which marks every lover of truth, set down your errors, naked as they are, for future warning and guidance.

As in this way you become familiar with the coarser, you will make acquaintance also with the finer manifestations and distinctions of disease. You will learn how often permanent pathological changes grow out of long-continued little disturbing things, and how greatly all of them are influenced by trivial changes in the conditions of the atmosphere and of the soil. You will discover how to distinguish structural from functional affections which so often assume their guise, and to discriminate between maladies arising accidentally in the healthy and apparently similar maladies which are the inevitable outcomes of long-continued textural decay in sickly people. You will note how different

often are successive examples of the same disease, and you will cultivate the faculty which in each case will enable you to decide how much belongs to the malady and how much to the man. You will pursue the personality which you have isolated, and ascertain how the course of its disorders is influenced by inheritance, by type of constitution, by mental and moral peculiarities, and by physical habits and occupation. At last, you will become personally interested in your patients, and then, out of the sympathy which you give to them, as well as out of the knowledge which you get from them, you will gather your first experiences of the precious gift of healing power.

But, however well it may be done, or however long-continued, this hospital clinical work will not only leave imperfections, but will even suggest faults in your knowledge which only the experience of private practice can make good.

In hospital you miss the wider information accessible in private practice—that knowledge of personal habits, surroundings, antecedents, and family tendencies which often make clear things otherwise hopelessly obscure in the nature and course of disease.

In the next place, your hospital experience will dispose you to make much more gloomy than is necessary the prognosis of organic disease. As you walk along the wards and note case after case, in which heart, or lung, or kidney is diseased, and learn that each will soon end in death, a habit of fatal prognosis attaches to the name instead of the stage of the malady, and hereafter you transfer to the private patient at the beginning of an illness the experience you have gained from the hospital patient at its close. There is, therefore, perhaps some ground for the opinion that the prognostics of hospital physicians are unreliable. Assuredly, the prognosis of disease, as it is commonly taught in the schools, is much too grave, and requires to be remodelled on a more favourable foundation. You will find it anything but a satisfactory proceeding to receive the apologies of patients for being alive years after you have, with unhesitating confidence, condemned them to die.

Thirdly, you will be here in peril of forming false judgments of the true position of drugs in the treatment of disease. Many of our patients, before admission, have been for years fighting with their maladies, until at last, unable to fight any longer with them, or with work, they take reluctant refuge in the hospital. And, as drug after drug is tried for their relief, seldom with good, and often with ill effect, and as day after day the disease, despite of all that is done, pursues its natural course unhindered to the end, you begin to believe in the fatality of disease, and, doubting all curative power in drugs, you commit yourself at last to the therapeutic nihilism of the day. But this is a false and paralysing conclusion, which, as it seems to me, has a closer alliance with indolence, imperfect observation, the habit of incredulity, and a certain defect of judgment, than with the vaunted enlightenment which is claimed to be its founder.

When I reflect upon the true nature of disease, when I am told that, in some of the acuter forms, its characteristic phenomena result from the action upon the organism of poisons for which antidotes are expected to be found; when I see that, in many of its chronic forms, it is but the result of a long-continued petty violation of some simple physiological condition; when I find that, by the action of certain agents, with sufficient time, similar states may be artificially induced and afterwards removed; when I observe that rational therapeutics as now cultivated upon a physiological basis, is not only overtaking and correcting the results of empirical observation, but also deductively discovering new remedies; and when I remember that, in order to influence the character of nutritive processes, drugs are still frequently administered in an unphysiological manner, and not, as mostly they ought to be administered, in small doses, at short intervals, over long periods, I cannot but believe that it is not an inexorable necessity, but an ever-yielding ignorance which hinders the increase of our therapeutical powers.

These, then, are the three divisions of your curriculum which are chiefly to occupy your attention; and the best means of making the results of it fruitful and permanent are *reading*, *discussing*, and *doing*. Let me say a word or two concerning each.

Read the best books, and only one, or at most two, on each subject. Read slowly, thoughtfully, and critically; and be sure that you have mastered one sentence before you begin another. Never skim the surface, nor skip from place to place. More than half the difficulties of students, and indeed more than half the battles of *savants*, spring from superficial and disconnected reading. Commit to writing in a notebook the pith of every important paragraph. Test your reading by observation, and occasionally your author's conclusions by placing yourselves in an attitude of literary antagonism to them. Do not read too long at a time; and when your brain rebels, submit and stop. Take in no more material than you can easily digest: it is worse than useless to put upon the fire more coals than can be burned.

Discuss with and frequently examine each other upon the subjects of your studies. Rightly conducted, this habit will rouse you from indifference, sustain your interest, and excite your emulation. If it will reveal your weakness, it will also increase your strength. It will teach you how to give ready expression to your ideas; what to keep and what to cast away. And whilst it will cherish in you the ingenuousness which acknowledges defeat, it will inspire you with the courage which makes its renewal improbable. But it must be rightly conducted with singleness and sincerity of purpose for mutual help. If other and lower motives enter into your discussions, there will come forth only wasted time, contentions, and bitterness.

But before reading or discussing comes *doing*. You may read and discuss hereafter; but, if ever you are to learn the manipulations necessary to the exercise of your art, you must learn them now. Few things can be done by the help of mere descriptions, and fewer still can be done well. You must see to do, and you must do often to become skilful in doing. One of the great advantages of this hospital is, that here everyone has unfailing opportunities for practical work and counsel at hand to guide him in its performance. Leave nothing undone, then, that you have the chance to do. Never be ashamed of doing badly what you are determined to do better. And, whether it is dressing a sore or setting a fracture, analysing urine or examining the chest, looking into the larynx or tapping a pleurisy, do it as often as you can and always with all your might.

And now for the gaining of the knowledge necessary to the earliest exercise of your art, and for the training of the hand and the judgment to use that knowledge aright, you will have here, as I have said, abundant opportunities and skilful guidance. But neither these nor any conceivable external aid will suffice without your own co-operation in the work; and just in proportion to the share which you take in it will be the worth and the endurance of your future success. And this necessity for self-education need cause you no discouragement; for, although in carrying it on you must meet with many difficulties, you will find none which may not be overcome without greater effort than is just necessary to increase your strength for fresh encounters. Your hindrances will become thus your helpers. Special gifts are not essential to your progress. Nor will the issues of your endeavours turn upon robust health, or superior abilities, or exceptional opportunities, or powerful interest, or a favouring fortune. Doubtless, these are precious advantages. But, without them—nay, in despite of the reverse of them—there is in every one of you a somewhat which, if you choose to cultivate it, will more than compensate for almost every disadvantage, and will bend the most adverse circumstances to your uses. But it is now that this somewhat is to be cultivated; it is now only in the pliability, the plasticity, and the passion of youth that you can practise the discipline and form the habits essential to its development and preservation. This is the discipline of self-denial, the sacrifice of the lower to the higher nature. Every idle moment which you redeem, every weak indulgence which you refuse, every evil habit which you conquer, every disturbing temptation which you resist, will form a step in that sacred stair which alone conducts you to the highest life. And as you mount thereon over your slain desires, a nobler prospect will meet your view, a higher enjoyment will fill your hearts, larger ends will come within your reach, a greater power will nerve your arm. And thus it comes to be that, by loving interest in your work and by patient diligence in following it; by observing, handling, asking, contending; by taking at second-hand no knowledge which you can get at the fountain-head; by the thinking out of things for yourselves; by submitting to no ignorance which books or teachers can remove; by knowing no shame in asking or being informed; by recourse to physical amusement as a necessary relaxation, and not as an engrossing occupation; by making the best rather than the worst of the circumstances in which you are placed; by a just deference to authority in matters which must be accepted on the testimony of experience; by independence tempered with humility, and by resolution tempered with caution—there is no knowledge which you may not acquire, there are no methods which you may not master, there is no professional position which you may not achieve.

Yet one thing more. I am now old enough to claim the privilege of reminding you, before we separate, that professional knowledge and practical dexterity, the habit of observation and the faculty of judgment are not the sole objects of the highest education. Unquestionably they are indispensable. But more than half their value will be lost if you miss the influences which your studies ought to exercise in developing that spirit of sacrifice, sincerity and faith, which should rule your ways and works in life, and be the lustre of all your days; that spirit which will keep you at all times loyal to your work even at the cost of recompense, of comfort, or of health; which will prevent you from covering with the cloak of professional sanction the weak in-

dulences or the vicious habits of your patients; which will enable you to resist the sacrifice of your convictions to the tyranny of dominant opinion, or the seductions of popularity; which, keeping you conscious of your own infirmities and errors, will make you candid and generous to the infirmities and errors of your professional brethren; which will teach you "to admire without envy", and to suffer without bitterness; and which, lifting you above the highest region of human interests and passions, and showing you how human freedom, like a "swimmer shaping his course in the stream which carries him along", is but a limited activity in the hands of overruling power, will place you in filial relations to the Eternal Mind.

This is the spirit which you should strive to cultivate in yourselves, as one of the most precious results of the knowledge which you will acquire, and of the discipline which you will practise within these walls. This is the spirit which will redeem you from failure and be your sure support in every time of trouble. Wealth may fail, friends may fail, you yourselves may fail, but this spirit, living and fructifying in you, will never fail. In the hurry, the turmoil, and the conflicts of life; in fears that might dismay, and amid calamities that might overwhelm, it will abide with you and it will fill your hearts with the peace which passeth understanding—the peace which the world cannot give.

MEDICINE IN 1876:

BEING

AN INQUIRY INTO THE EFFECTS OF EXPERIMENTAL RESEARCHES ON THE PRINCIPLES AND PRACTICE OF MEDICINE.*

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GENTLEMEN,—We are to-day commencing another session. Many whom I see before me are now entering upon the battle of life. Each one of you has chosen for himself his future career. Commercial pursuits and a business life have no attraction for you. You have resolved to devote your lives to one of the learned professions. But, though your choice has been made, I feel persuaded that, to many of you, the selection of a calling has been no easy matter. It is difficult, at the age of eighteen or nineteen, to decide on that sphere of usefulness which will prove most congenial in after life. In choosing a calling we are beset by difficulties. In selecting such a profession as that of medicine, each one has doubtless asked himself this important question: "Is the step I am taking a wise one? Is the profession with which I am associating myself a mere empirical art, founded on no generally accepted or trustworthy principles, or is its teaching based on a vast collection of well-established truths, the outgrowth of many independent but collateral sciences?" I will endeavour to solve the doubts that have arisen in your minds. The question you have asked yourselves I will strive to answer for you. Does, then, medicine rest on such sure foundations that both we, who have long been engaged in its practice, and you, who are to-day commencing its study, can feel satisfied that the ground under our feet is really secure?

In considering this subject, I do not propose, even in a cursory manner, to follow the progress of medicine through successive ages. Such knowledge you may acquire in the pages of an encyclopædia. If you study the history of the healing art, as taught by the Chaldeans, the Greeks, the Egyptians, the Romans, or by the priests of the middle ages (the great expositors of the laws of health and of disease in those days), you will find that, for upwards of three thousand years, everything connected with the principles and practice of medicine was dark and uncertain. Theories were propounded, and for a time accepted; but as they rested on no sound scientific basis they were soon forgotten, to be replaced by other theories equally erroneous, and, as guides to practice, equally misleading. Particular methods of treatment were pursued for a season, then fell into disuse, frequently to be again revived at a later period. Nor could it be otherwise. So long as everything bearing on the structure and functions of the different organs and tissues of which

our frames are composed was either veiled in obscurity, or very imperfectly understood, no sure progress could be made.

Among the ancient physicians the symptoms of disease were noted with extraordinary care. No more careful observer of clinical phenomena ever lived than Hippocrates. But, in the days of Hippocrates, the significance of the nerves and arteries was altogether falsely interpreted. No practical advance could be made in the science of medicine while the arteries were looked upon as air-containing tubes. Yet these views were held by many, even in the most enlightened days of ancient Greece. Such ignorance, however, was not destined to last. Slowly, it is true, but still surely, the mechanism and relations of the component parts of the body were severally mastered. The anatomist commenced the work. By his labours the ground was cleared for other investigators. His task has been a long and tedious one; but he has nobly accomplished what he set himself to perform. Indeed, so thoroughly has it been carried out, that I believe we may with truth assert that, in the domain of human anatomy, we appear now to have reached a vantage ground. During the last fifteen or twenty years, comparatively little has been added to our store of knowledge in this direction. Indeed, the coarser structures which enter into the composition of our frames seem almost thoroughly worked out. Hand and eye have apparently gone as far as it is possible for them to go. Every muscle, every nerve which the eye can discover, the dissecting blade has followed out until it becomes lost in the surrounding tissues. In the thorough knowledge of anatomy, which has been bequeathed to us by many devoted and trustworthy observers, we possess immense advantages over those who have preceded us. Indeed it is to this knowledge that we are indebted for the important advances effected in surgery, no less than in other departments of practical medicine.

Nor is it alone in human anatomy that we seem at the present day to have reached a secure resting place. In morbid anatomy, likewise, our progress has been no less sure. Here also the unaided eye has pushed its researches as far almost as is permitted by the nature of the inquiry. We are thoroughly familiar with diseased structures, with the granular kidney, the cirrhotic liver, the fatty heart, and the degenerative changes observed in the blood-vessels. Each and all are readily recognised, and, were we dependent on our unassisted senses, it is questionable whether in this direction our knowledge could be much more extended. But no such limitation is possible. Though science for a time baffles her votaries, she still loves to reward them. When the eye failed to see, and seemed to exclaim "thus far can I go, but no further", other sciences came to the rescue. Histology took up the search. When objects no longer produce sufficiently large images on the retina, the microscope is required for their examination. When nerves and arteries grow so small that they are altogether lost in the surrounding tissues, the microscope opens out to our bewildered vision boundless fields of research. Of all optical instruments, this is the most perfect and complete. Of late years, its application to medicine has been immensely extended. In the present day every student has his microscope, and is instructed in its use. Through the labours of histologists, many questions, till lately clouded in obscurity, have been satisfactorily worked out. Twenty-five years ago, little was known regarding the relation of the ultimate nerve-fibres to muscle; little also concerning the mode of origin of nerve-fibres in nerve-centres; little of the structure of the capillary vessels; little about the minute anatomy of the lymphatic system; little regarding the minute structure of the muscle tubes. These questions have now all been investigated. Though the information acquired be not in all respects so definite and exact as it doubtless will become, yet much has been garnered in the storehouse of knowledge.

In other directions, also, medicine has been aided by the allied sciences. Chemistry has shed a vast flood of light on subjects which, until comparatively lately, were but little understood. The coagulation of fibrin, the forces which regulate the filtration and diffusion of fluids through membranes, the specific constituents of the various secretions, the chemical processes which occur in muscle, the processes also which regulate the digestion of our food, have all been worked out with the most elaborate care, and have all more or less directly contributed to the advancement of medicine. But though in these, and in many other ways, our stock of knowledge has been increased, there is one science to which we, as practitioners of the healing art, are more especially indebted. I need scarcely tell you that I refer to physiology.

Two hundred and fifty years ago, Harvey, in discovering the circulation of the blood—in demonstrating that the liquid flesh in our bodies passes from the heart by the arteries, and returns again to the heart by the veins—unveiled to our forefathers the most momentous discovery (in its bearing on medicine) that the world has yet seen. This discovery, so convincing when explained, so shrouded in obscurity before it was brought to light by the great magician, has proved the very

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