Medical and middle-class education : an address delivered at the Chatham-Street School of Medicine, Manchester, on Monday, January 21st, 1856 / by Sir James Kay-Shuttleworth.

MEDICAL AND MIDDLE-CLASS EDUCATION.

AN ADDRESS

DELIVERED AT THE

CHATHAM-STREET SCHOOL OF MEDICINE,

MANCHESTER,

ON MONDAY, JANUARY 21ST, 1856,

BY

SIR JAMES KAY-SHUTTLEWORTH, BART.

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ADDRESS.

GENTLEMEN,

In accepting your invitation to distribute the Annual Prizes at this School of Medicine, I do not feel myself entitled to address you at length on the more recent events in Medical Science. You are familiar with the progress in its several departments. It is more congenial to my own sense of propriety to approach this School of a Special Art, rather as a spectator, who may bring reflected lights from other regions of thought.

In so far, therefore, as I may think it expedient to refer to recent discoveries, my object will be, to analyse the modes of investigation by which this progress has been made, and to define the paths of inquiry in which further progress may be possible.

On the policy of Medical Education it would be presumptuous for me to treat in detail, but I may be permitted to contemplate the external interests, rather than the internal economy, of such institutions as this Medical School.

Such a view of the external relations of the Art and the School, may be justified on many grounds, and among them on the following. On the one hand, the art of Medicine is affected by every thing which promotes the growth of the sciences, and also by our whole intellectual history. On the other hand, it is not merely an art which explores the physical constitution of man, and the subtle laws of mind, but the condition of that art is a sign of the state to which civilization has advanced. The interval between the mystery man and Hippocrates, or Sydenham, or Harvey, marks the distance between savage and civilized life. The art has a social relation which every thing now tends to develope. The Schools of Medicine are an important part of the means of progress possessed in any country. The Physician may so represent the relations of science to the well-being of man, as to become one of the most influential ministers of the commonwealth.

First, let us very briefly glance at the influence which prevalent philosophy and mental habits have at all times had on the modes of investigation pursued in Medical science, and on the forms of its development.

From the most distant period, the dependence of the art of Medicine on the prevalent philosophy is evident. The period preceding Hippocrates was formed of ages of empirical observation. He was the great historian of the results of that prolonged experience, and this was the foundation of his admirable system of dietetics. Aristotle's doctrine of the four elements was transported by Galen into the medical theories, and round them he grouped the facts which Hippocrates had recorded. In the doctrines of Galen lay hidden the germs of a chemical pathology, and when the Alchemists arose (who are truly described by Liebig[1] as the first philosophical chemists), the elements of Aristotle were extended to other matter. Thus a form of chemical pathology insensibly grew.

[2]"In the time of Geber the chemical process was considered analogous to the organic process: in the 13th century the idea arose that the vital processes might be analogous to the chemical." The researches of the Alchemists for the *magisterium*, or philosopher's stone, were attended by a corresponding movement in the art of medicine, in search of an universal remedy. [3]"In the 13th century arose, for the first time, the idea that the philosopher's stone possessed the powers of healing disease and of restoring youth. This idea was developed from the opinion that the vital process was nothing else than a chemical process. With the philosopher's stone it was possible to heal *metals* of their maladies, to render them healthy, to convert them to gold, and the idea that it must have a like effect on the human body naturally suggested itself." [4]"When the idea that the philosopher's stone was a universal medicine had been once developed, men resorted, in the most natural way, to the use of chemical preparations in medicine; and with this began a new era in that science." [5]"If the normal chemical character of the juices was the condition which determined the healthy state, the abnormal character of those juices was of course the proximate cause of disease; and disease could be removed by the predominating chemical quality of remedies, and health thus restored." [6]"In selecting remedies, then, especial attention must be paid to the chemical constitution and character of the bile, of the saliva, of the *sweat*, of the urine, &c. This was a step forward of incalculable importance." [7]"In the spirit and mind of Paracelsus

[1] Letters on Chemistry, pp. 43—45. [2] Ibid, p. 69. [3] p. 70. [4] p. 71. [5] p. 73. [6] p. 74. [7] p. 74.

the new ideas of the times were concentrated, and assumed a definite shape." Before these doctrines, the Galenic theories, which had held an almost undisputed empire of thirteen centuries, disappeared, and the practice of the art assumed a form which has chiefly been modified by the application of the inductive philosophy to the study of the exact sciences, and especially to the discoveries in botany, chemistry, structural pathology, comparative anatomy, physiology, and general physics.

The illustration of this species of external influence, which in modern times affords the most striking contrast, is that presented by the state and progress of medicine in the preceding century on the Schools of *Northern and Central Europe*, when compared with those of *the West*. With the revival of experimental philosophy, which distinguished the close of the last and the beginning of the present century, the art of medicine was affected, not less by the progress of the exact sciences, than by the form which metaphysical philosophy assumed in the north and south of Europe. In the middle ages the so-called scholastic philosophy (by diverting the attention of the learned from the observation of nature and a system of induction, and expending the thought of Europe in barren speculations on subjects beyond the limits of human research, and on disputes of words), substituted a school of sophistry for one of philosophy, and prevented the growth of every form of science. In modern times metaphysics have exerted an equal, though happily a more useful influence on the progress of truth. The philosophy of France led it away from idealism, even to scepticism. In its dialectics the language itself favoured habits of the most severe analysis, a delicate precision in definition, and the most algebraic form of reasoning. The French Naturalists were distinguished by their skilful observation, and by their powers of classification; the French Mathematicians by the subtlety and boldness of their calculus; the French Chemists by the ingenuity, dexterity, and penetration of their analysis; the French Physicians by their researches in structural pathology, and by their remarkable improvements in physical diagnosis. You will observe, that in all this they pursued rigidly the path of an inductive observation, on which they threw all the lights of science. As sensationalists, they reserved all attempts at generalisation until the facts of scientific inquiry could be grouped under general laws.

You are aware that these methods of investigation produced a great improvement in almost every department of structural pathology. Before this period diseases of the heart had not been distinguished. Many diseases of the heart and lungs were unknown: dropsies of the

chest were attributed to general weakness, and not to the obstruction of the circulation in the heart or great vessels. Many other grievous errors had been committed, which it is not my province to point out. Now, not only are the diseases of the heart and great arteries, the lungs and the pleura, scientifically classified according to the accurate results of those discoveries in structural pathology, but, by means of a much more refined and searching form of physical diagnosis than had before been conceived, these changes of structure can generally be detected with unerring certainty. In these discoveries the names of Laennec, Louis, and Andral, deserve to be held in the greatest veneration.

A similar advance was made in the pathology of the brain and nervous system, which, when combined with the great discoveries of Bell, Majendie, and Fleurens, as to the functions of its different parts, has thrown a flood of light on this class of diseases.

The progress of structural pathology in the classification and diagnosis of diseases of the abdomen has also been great. But, in the great assimilating system, it is obvious that a chemical pathology must come to its aid. This has been illustrated by the labours of Prout, by the discovery and description of albumenuria by Dr. Bright, by the researches into oxaluria, and especially by the recent remarkable inquiries of Bernard into one of the functions of the liver in the supply of sugar to the blood, and those respecting the power of the pancreatic fluid to reduce fatty matters.

I will not trouble you with further illustrations, especially as your own reading must make you aware, that the progress of medical science in France has been mainly owing to the methods of exact observation which I have described, and which have not only led to a new classification and diagnosis of disease, based on structural pathology, but have been applied with equal success in comparative anatomy and palæontology.

One of the consequences of these modes of investigation and their results has been the prevalence, until a very recent period, of *Solidism* in the Schools of the *West*. Morbid states are accounted for by the *diseased action of capillary vessels and solid parts;* and the traces of disease are sought in *alterations of structure*. Investigations of a like scientific accuracy in the region of a chemical or humoral pathology have only recently been made, and they have not yet turned the general current of scientific inquiry, in the West, to the *morbid states of the fluids*.

The mental activity of Germany took another direction. While, in France, the tendencies of its philosophy were opposed to idealism,

Germany accepted the spiritualism of Kant, and built up a system of metaphysics, some of whose chief doctrines had been rejected by the sensationalists of the West. Among its religious sects, this philosophy was often projected into mysticism.

On the other hand, a daring spirit of philosophical inquiry pervaded its historical researches, which was however *rather critical than sceptical.* But even the critical labours of the Germans partake of their tendency to hypothesis. They reject facts and theories with a hardihood as great as that of the encyclopædists; but the rejection of the literal interpretation of a myth, is with them only the first step to the adoption of some bold generalization, by which they fill the void they have created. In the exact sciences, they have, in like manner, until a recent period, been distinguished, not so much by the laborious collection of facts, as by the boldest exercise of the imaginative and reasoning faculty in anticipating the results of observation, or in supplying hypotheses, to group together phenomena in the midst of investigation and analysis.

Among the most striking examples of the success of this method of hypothesis, are Goethe's theories of the types on which the vegetable world is formed; and his anticipation that the skull would be proved by comparative anatomy to be a development of the vertebral structure. In like manner, the influence of these modes of thought and investigation may be traced in the German faculty of Medicine. The early periods of the cultivation of the art are marked, there as elsewhere, by empirical observation, but they are distinguished by a constant tendency to hypothesis. At every step of progress, there are the outbreaks of a bold idealism, down even to the latest period, when the severe inquiries of analytic chemists and of structural pathologists have been unable to restrain this erratic tendency. The operation of these modes of thought may be traced in various directions, but all more or less enter into a current which flows towards a *humoral pathology.*

You are aware how great a part the use of the mineral waters of the German Spas (found along the great spine of rocks which crosses Central Europe), plays in the remedial agencies of the German art. The resort to these Spas commenced in the period of empirical observation, a century and a half or two centuries ago; and it has continued through every stage of the advance of medical science, until the waters have been accurately analysed,—disease has been classified by the structural pathology, and detected by the physical diagnosis of the West; and the whole series of empirical observations have, in some degree, been arranged under these lights of modern science.

During the whole of this period, however, the phenomena presented by the use of these waters have been hypothetically explained, by reference to a humoral pathology. I need not remind you on how slender a strictly scientific basis such theories have hitherto rested. Nevertheless, it cannot be denied, that the idealism which has attempted to explain the effects of the Spas by humoral theories, has simply anticipated the path into which chemical pathology has recently entered with marked success, and that the application of a strictly inductive analysis to the mineral waters, to the ordinary and diseased states of the fluids, and to the effects produced on the excretions and *humours* by the Spas, will probably be one of the directions in which both the art and the science of Medicine will advance.

Idealism in Medicine is only another form of empiricism, but it ought never to be forgotten that the practice of physic is still, and is perhaps always destined to be, more an art than a science. It appears to me, therefore, unphilosophical to reject the results either of empirical observation or of empirical hypothesis, without some attempt to penetrate to the principle round which the facts may be grouped. Moreover, it is not wise, as is too common with physicians, to dismiss to the *limbo* of charlatanism, those *eccentric* hypothetical or empirical innovations in the art which have the equivocal sanction of a wide prevalence, though they are not the results of an inductive system of observation, such as has founded modern structural pathology and physical diagnosis. From even the history of alchemy, astrology, and sorcery, it would not be difficult to shew, that however extravagant be the error into which a *pseudo* science leads its votaries, by its fitful and false light, such errors never obtain an extensive and prolonged influence, unless they hide some great truth. Alchemy was the doctrine of the empirical period of observation, and was founded on the truth of the comparative paucity of the elementary substances. Astrology was the germ of astronomy; and sorcery was founded on some singular phenomena of the nervous system, which have yet received no sufficient scientific solution. Germany has been the great laboratory of eccentric innovations in medicine, which have sprung from her *idealistic* habits of thought. Witness the unexampled rapidity with which the theories and practice of Hahnemann and Priessnitz have spread over Europe. Where they have not commanded conviction, they have modified the state of the art. Not only have the doctrines of the homœopathists appeared to me not to be derived from any philosophical method of induction, but to be irreconcileable with principles which have been thus proved and have

obtained universal assent. If, therefore, we are not to be compelled, also, to reject the *facts* of the homœopathists as equally unsound with their *theories*, we must resort to some method of reconciling them to the established truths of science. Here we may remark that the *vis medicatrix naturæ* is often masked by remedies—its operations thus uncomplicated are seldom watched: and *have never been* defined. The recent observations of Dietl (tested as they have been by American physicians) on the treatment of pneumonia by blood-letting—as compared with that by antimony—and the absence of all treatment, deserve your most thoughtful attention. If we are to suppose the homœopathic remedies to have any efficiency, we must look to analogy for the explanation. The best analogy of the homœopathic therapeutics is the action of the contagious and infectious poisons and malaria, which probably enter the blood through the lungs or the skin, and like a leaven spread their influence through the whole vital current. The hydropathic treatment reveals the vast powers of that great transpiratory organ, *the skin*, not only on the bulk, but on the chemical constitution of the fluids. These two are the most recent and remarkable eccentric agencies of German medicine. Others of a more ordinary kind, which are still used empirically, but which may hereafter find an important place in the remedies of a humoral pathology, are the *grape cure*, the *whey cure*, the use of various baths, and a multitude of subordinate means unknown to the art of the West.

We have, however, now entered on a period of severe critical analysis and observation, which will subject all these hypotheses to the most microscopic scrutiny. Let us not forget that our own treatment of scurvy by a vegetable diet and citric acid,—the more recent application of lemon juice to the cure of rheumatism,—the use of iodine in cretinism, *goître*, and strumous disease,—and the treatment of a large class of maladies by the use of fatty matters, such as cod-liver oil, are rather facts evolved by empirical observation, than logical deductions from scientific research. Though our own habits of thought restrain us to the bare record of the fact, we are conscious that the secret of the *modus operandi*, probably soon to be revealed, lies hidden among the mysteries of a humoral pathology.

The researches of Liebig and his School into the chemical constitution of organic fluids and structures, and on the nourishment, growth, and decay of living bodies; and those of Dumas and Boussingault on the balance of organic life, concur in laying the only true scientific basis of a chemical pathology. To these have succeeded, as I have before said, the researches of Bernard into one of the functions of the liver in supplying the blood with sugar, which probably plays the

same part in the animal economy in the production of heat, as sugar and starch do in a like process during the germination and budding of plants. The observations on the power of the pancreatic fluid in reducing fatty matters, are in the same line of investigation; and some of the more recent discoveries in the etiology of disease, especially the modes of the propagation of puerperal fever and of cholera, both define modes of scientific inquiry, and point to the direction in which it may be pursued with success.

The French and German Chemists have, of late years, entered on a common path of analysis and inquiry, which tends towards the gradual revelation of the secrets of a chemical pathology; while in Germany, Köllicker, in histological, and Rokitansky, in pathological anatomy, have more than rivalled the structural researches of the West, Müller and Lehman are fellow-labourers with Prout, Prevost, Dumas, Brongniart, and Boussingault, in their researches into organic, physiological, and pathological chemistry. National distinctions in modes of thought and investigation are disappearing as rapidly as national costume; and the science of Europe now appears to obey the laws of induction expounded by our own Bacon. The intercourse of the forty years of peace has brought about this great result. Prior to that era, I have drawn your attention to the fact, that the art and theory of Medicine had been so influenced by the different modes of thought, that a vague hypothetical *humoral pathology* had already been created in Northern and Central Europe, in anticipation of the results of scientific research; while in the West, *solidism*, based on structural pathology and physical diagnosis, formed the staple of the theories of disease.

These facts, while they exhibit the influence of external philosophy on the modes and direction of inquiry, and the theories of disease, are not without instruction as to the course to be pursued in future investigations.

The recent progress of organic chemistry, combined with the discoveries in histological anatomy, point to two of the regions of research in which we know the least, and in which successful inquiry would now probably raise Medicine from the region of the arts to that of the sciences. The whole of the great phenomena of the animal and vegetable world result from the operations of living organisms, chiefly on the atmosphere and on water. The forests, the verdure, the harvests, the vast herds of cattle, the fierce and wild creatures of the desert, and even every variety of the human species, are but so much condensed air, combined in specific forms by the vital forces. Even the vast store of fossil vegetable matter, which constitutes our coal-

fields, is chiefly a reservoir of carbon formerly abstracted by living organisms from water, vapour, carbonic acid gas, nitric acid, and ammonia, which formerly occupied the lower strata of the air in a much greater proportion than at present; and from which reservoir the stores of the atmosphore will be replenished, with the chief food of vegetable life, and the fuel of animal existence, for a great development of both.

Chemists have recently revealed to us the chain of mutual dependence which connects animal and vegetable life. They show us that the vegetable world is a laboratory, in which the organic principles necessary to animal existence are combined, in the forms in which they can be assimilated by the digestive and nutritive apparatus, and used up, to support, in the muscles, the vital power of contractility; in the nervous fibre, to obey the volition and to convey sensation; and to enable every tissue to fulfil its appropriate function.

Vegetable life is a *reducing* apparatus, which, under the influence of light and a proper degree of heat, absorbs from the atmosphere (either directly or through the medium of the humus and water in the soil) some of the elements already enumerated. These elements are so combined in vegetables, that while a part of the oxygen is liberated, the rest are united into the organic principles on which animal life is supported.

On the other hand, animal life is an apparatus of *combustion*. The organic principles found in vegetables, having ministered to all the functions of animal life, are consumed and set free by the oxygen, and return with it into the atmosphere from which they were withdrawn.

All the forces of the several structures of the body are dependent on their chemical constitution, and on that of the fluids, by which their health and power are sustained. Each vital organism is an apparatus, in which the chemical laws and atomic constitution of its parts are instruments, operating, under the new conditions of life, for objects which each distinct animal or vegetable is intended to accomplish. If any tissue, or any fluid feeding a tissue, degenerate, the phenomena of life are disturbed. If we had the analytic power needed for the definition, we should find that chemical changes occur in every disease, both in the solid structures and humours of the body. The experience of ages has been required, first, to classify diseases according to their *external phenomena;* then, to correct this classification according to the *changes of structure* which attend them; then, to add to the distinctions of symptomatology the stricter analysis of *physical diagnosis;* and, lastly, in the labours of Prout, of Bright, and Bernard, to define diseases by changes to be detected only by *chemical*

investigation, and thus to lay the only true scientific basis of a *chemical pathology*.

The labours of Prout, Liebig, Brongniart, Prevost, Dumas, and Boussingault, have, by the analysis of organic structure and fluids in animals and vegetables, laid the scientific basis of further discovery. Their researches have already shown the nature of the mutual dependence of animal and vegetable life, and their relation to the air and light. Animal and vegetable *physiology*, therefore, already *rests* upon results of chemical inquiry, and will yield further secrets to the microscope, to analysis, and experiment. In like manner the phenomena of disease must be investigated. The circulating fluids, those humours lubricating tissues, the structures themselves, products stored in sacs and cells, the several excretions, and all the phenomena of disease, will be gradually subjected to a constantly more delicate chemical scrutiny. Such inquiries have already altogether changed the theories of inflammation and fever, and modified those of congestion and other conditions of structure. We may hope soon to be able more accurately to distinguish various diatheses, already known to depend to a great degree on the chemical constitution of the fluids, such as those of gout, rheumatism, the phosphatic diathesis, that of albumenuria and oxaluria. In such investigations lies the path to discover whether physicians are right in their suspicions as to the common origin of various tubercular and strumous diseases; as to the nature of various malignant or encysted tumours; melanotic deposits, and those rare but strange secretions which are sometimes poured from the mucous surfaces, or the ducts of the abdominal viscera.

Then, in the almost unexplored region of etiology, such modes of inquiry are indispensable. The fluids are known to have ten times the volume of the solids in the human body. The morbific virus is supposed to infect the blood, and thus produce the cutaneous eruptions of the zymotic diseases, the specific organic changes of the plague, and of various fevers. The discoveries of Dr. Semelweiss as to the mode of the propagation of puerperal fever by the cadaverous poison, and Dr. Budd's discovery of one mode of the dissemination of cholera by a poison evolved in the early stage of the decomposition of the specific secretions, are facts which indicate, though they may not prove, the influence of *virus* on the constitution of the blood, and the action of that fluid in a state of disease on the solid parts. But, perhaps, the *experimentum crucis* of this department of observation consists in the discovery of Jenner. The efficiency of vaccination in substituting a mild disease for one most virulent and fatal resulted

from that careful inductive system of observation which has unlocked so many secrets in nature.

To this mode of investigation, patiently pursued, it appeared, that the virus of the small-pox, introduced into the body of the cow, was so modified in its character, that though the new virus of the small-pox was capable of propagating the disease, it had lost both its virulence and its power of diffusion through the air. Yet the two diseases were not only etiologically the same, but both were distinguished by the remarkable law, that, in the vast majority of cases, they exhaust the noxious influence of their virus on the constitution, by one infection. This marvellous result may continue through a life of sixty or eighty years unchanged, though, in that time, every particle of the organic structure of the body has several times been renewed. The mild infection thus became a security against the virulent. In the modification of the virus in the body of the cow, and the mitigation of the disease, consequent on this change, it is surely not rash to discern a great fact in humoral pathology.

Thus, also, all observations on these external causes of disease, which are under the influence of sanitary precautions, point either to the influence of specific poisons, or to the depraving effects of malaria and other noxious influences on the blood. The microscope shows not only that the simplest animalcular organism is a sac imbibing fluid, but that the tissues of animals have a cellular construction of like simplicity. Dr. Alison, in his Papers on Vital Affinity, points out that the functions of the globules in the blood may have a similar direct relation to the health, and therefore to the chemical constitution of that fluid, as the cells of tissues, or the sacs of infusoria, to their structure and contents. In support of this view, it may be stated, that the hæmatine of the red corpuscles is a result of chemical action taking place in the cells themselves, for no substance resembling hæmatine, and scarcely a trace of iron, can be found in the liquid in which they float; while, on the other hand, the fluid portion of the chyle contains a large proportion of iron in solution, which appears to be absorbed by the red corpuscles, and to aid in the formation of hæmatine.

We may in this way conceive how a morbific virus, a miasm, or malaria may operate, not as a leaven in the blood, but, through the medium of the corpuscles, the vital action of which on that fluid may be suspended, or modified, or even destroyed. It is quite clear, from the state of the clot in blood drawn from patients suffering from inflammation and chlorosis; from the non-coagulation of the fibrine in blood drawn in malignant fevers, in scurvy, purpura, glanders,

asphyxia,—in sudden death from lightning, or from concussion of the brain; or when it is exhaled, like perspiration, as in "*the bloody sweat;*" from the colour and quality of the serum in other maladies; from the bright scarlet of arterial, and the dark chocolate of venous blood, that, even the qualities of that fluid, sensible to the naked eye, are remarkably changed in disease, and by respiration and nutrition. By chemical tests, and the microscope, lithic acid and oxalic acid may be discovered in it; and the quantity of fibrine is found to be greatly increased, sometimes to be doubled in severe inflammation; and that of albumen diminished in disease of the kidneys.

By the microscope the number of the red corpuscles is found to be diminished to one-fourth in chlorosis, and greatly increased in plethora from too rich diet. Those globules are contracted, and their walls are thickened, by oxygen and saline solutions; and they are dilated by carbonic acid or water. Their proportion to the whole mass of the blood corresponds, in different classes of animals, with the energy of the respiratory function, and, as they probably act as carriers of oxygen from the lungs to the tissues, and of carbonic acid from the tissues to the lungs, the vital force of every structure must greatly depend upon them. Their stimulus is especially necessary to the vigour of the muscular and nervous systems.

A short time only will elapse, ere the means of detecting the seeds of disease in the blood, and ascertaining whether the elements necessary to the due activity of the functions are in their right proportions, will be among the common modes of diagnosis in daily use.

Among the most familiar facts of physiology, the failure of the liver to separate the bile, or of the kidney to remove the urea from the blood, are the sources of an ultimately fatal irritation. In like manner, the circulation is arrested in the pulmonary capillaries, if the carbon be not removed from the blood; and a cholera patient may be strangely recovered from an apparently death-like collapse, by the infusion of a saline solution into the veins.

But we are at present as little acquainted with the mode in which quinine acts as an antidote to marsh fever, as with the nature of that change in the constitution which prevents the recurrence of small-pox after one infection.

Among the subjects of investigation, therefore, are the chemical changes which occur in the fluids and solids, under the successful influence of many therapeutic agents, familiar examples of which are the action of lemon-juice in scurvy or rheumatism; or of animal food in diabetes.

The whole mass of therapeutic facts result, with rare exceptions,

from empirical observations, and, even where the use of remedies is suggested by the analogies of experience, this is but one step removed from empirical experiment. The facts of therapeutics are, in some degree, generalized by the comparison of groups of phenomena; but we cannot hope for the scientific analysis and classification of the action of remedies, without much further success in chemical and histological research, both in structure, and in physiology and pathology.

Another sphere of investigation in chemical pathology lies in those probable chemical changes of structure, which evade both the naked eye and the microscope, in diseases of the brain, spinal cord, and ganglia, whether marked by debility, or suspension of functional power, by the irritability of weakness, spasmodic or intermittent action, or irregular distribution of force. Among *solidists*, these maladies have been commonly attributed, almost exclusively, to disordered or irregular vascular action; to dilatation of vessels; to extravasation; or some other purely mechanical change. Just as the microscope has discovered the result of inflammation in the brain, which had heretofore escaped the eye of the pathologist;—so, chemistry will doubtless discover that the phosphorus of the vesicular portion is exhausted, in some cases; that some diseases depend on a molecular change in the cinneritious, and others in the medullary, part of the brain, or the spinal cord, or the ganglia.

The researches into the functions of the nervous system have hitherto been chiefly prosecuted by means of structural pathology and experimental physiology. We are now approaching a period when those discoveries which tend to group light, heat, electricity, and magnetism as modification of the action and manifestation of one subtle agency, may enable us to define the part which they play in the animal economy, under the influence of the vital force. We cannot hope, however, to advance in this direction, unless we know both the chemical constitution of the solids and fluids which are to be acted upon, and also something more of the molecular combinations in the organs in which this force is evolved.

We know that without light carbonic acid is not reduced (the carbon fixed and the oxygen evolved) from the leaves of trees and plants; but that, on the contrary, free carbonic acid transpires unchanged in the night. How many diseases in the human body may depend on the imperfection of chemical changes, in the assimilatory, or respiratory, or excretory organs, or in the tissues, dependent on deficient innervation! Already we know that albumenuria, oxaluria, the phosphatic diathesis, and several diseases of the liver and stomach, manifest themselves by peculiar chemical changes in the

secretions; but we have not as yet ascertained whether they depend, in any degree, on imperfect or disordered innervation.

Bernard's experiments on the effect of wounds in certain portions of the medulla oblongata, in causing sugar to appear in the secretion from the kidneys, is an example of what remains to be done in this line of inquiry.

The modern science of vital statistics is of special importance in the vast field of etiology, and in the comparison of therapeutic and pathological observations. Some of the laws governing the diffusion of the epidemics which have of late prevailed, have been revealed almost solely by the comparison of facts collected over a wide field of observation. Other hypotheses remain to be tested by prolonged inquiry. Will such experience confirm the law suggested by the late Dr. Henry, that the plague ceases to be epidemic when the temperature of the air rises above a certain standard? Are all contagions and every morbific *virus* decomposed by a heat of 140°? What are the conditions under which cholera appears to propagate itself along the courses of rivers? Are these conditions among the causes which have secured the comparative immunity of high lands at the sources of rivers? Can the method of observation of Semelweiss and Budd, as to the modes of propagation of puerperal fever and cholera, be extended to the zymotic diseases and fevers? To these questions, and to a multitude of others of a similar character which will suggest themselves to your minds, vital statistics provide the only method of solution.

But vital statistics cannot be successfully prosecuted without careful meteorological observations,—without a knowledge of all telluric influences,—without the power to speculate on all the sources of disease which the vegetable world may propagate by its spores, or which may be diffused by animalcular life. The social condition of man cannot be studied apart from the growing science of *political*, nor this, separated from the higher region of *moral economy*. The physician, therefore, in the study of vital statistics, is not less an universal natural than a moral philosopher.

Medicine rises from an Art to the dignity of a Science, in proportion as it employs every power for the observation of nature which general science yields. No art is so immediately the offspring of all the sciences, for vitality presides over all matter which ministers to it, and with which, for the present, it has a mysterious connection. Nothing in nature is foreign to man. The light which vibrates like a golden web from the sun and the remotest stars; the upper ocean of air and vapour; the great sea, heaving with tides and storms; the

crust of the earth, now molten by the central fires, now shaken by the throes of Titanic forces,—all affect his physical well-being. So also, all the fair scenes of vegetable and animal life; their fruits, their flowers, their products; the birth and decay alike of ephemera and monsters; the seasons, the rivers, and the clouds which minister to them; all the deadly plagues of the marsh, the desert, the tropical delta, and estuary; every scene of ignorance or vice in which degraded man festers in the filth of his own pollution; the pestilence which flies by night, and the blight which falls unseen:—there is no region which science can explore, in which we do not approach some agency affecting the phenomena of the vital force.

The Physician, therefore, is preëminently the student of nature. The whole range of the natural and physical sciences form the indispensable substratum of his education. Nor can he omit to take cognizance of whatever affects the moral and social condition of man.

Medicine is an Art, which is the flower and fruit of all other sciences. For the education of a complete Physician, we have to suppose a man as much elevated above the ordinary range of acquirements, as Hippocrates was in his day, or Humboldt in ours; and though we cannot hope that every member of the profession should have an intelligence as vast as that of the Father of Medicine, or the Author of the *Cosmos*, yet this illustration may serve to show how wide is the scientific basis on which his education rests. It is not wise to regard the preparation of a Medical Practitioner as a mere specialty. The art can never be generally raised into a science, unless the Schools of Medicine be regarded as parts of the great University of Learning. The Physician, who has charge of the phenomena of vitality, ought not merely to be able to grasp every instrument which science puts into his hand, but should, by the highest cultivation of his own intellect, and the moral dignity resulting from that culture, exercise the authority of a faithful minister to man, in all the great crises of his existence, and also of a great teacher and witness among his fellow-men.

Deeply impressed with this view, I cannot address this School without pointing out its dependence on the preparation which the students receive before they enter its classes, and the precautions taken that throughout their entire course they shall not have too strong a tendency to be drawn into a merely special career, by which their observation shall be chained down with microscopic power, but also with microscopic limitation, to the narrow circle of an art. No profession is so intimately allied with the sciences, and none can

derive greater dignity from all learning. Your School ought, therefore, to breathe the atmosphere of collegiate life, in which your students should have opportunity to possess themselves of all the circle of human thought; and where, even if the mass fail to raise themselves above the lower conceptions of their career, minds of superior power and elevation may (by the golden opportunities which you place within their reach) vindicate the true dignity of their profession.

On these grounds I cannot regard the provincial Schools of Medicine separately either from the institutions of middle-class education, or from those provincial colleges which the steady growth of our modern civilisation has a tendency to evolve. I do not consider myself at liberty to address this School on its external relations without referring to the means of education which exist in this great city, to fill your classes with students well furnished with all elementary instruction; or without asking how your School could be surrounded by all the phenomena of collegiate life, so as to place within their reach every branch of human learning.

The spontaneous origin of these schools is one of the most encouraging proofs, not merely of the more general diffusion of high cultivation through the profession, but of some advance of the middle classes in education. A medical apprenticeship in a city like Manchester becomes, by means of these schools, not merely a practical initiation in the humbler routine of the art, but an introduction to its science. That routine ceases to be an irksome drudgery when it is perceived that the manual dexterity which it cultivates may be developed into the most subtle tact, and the most delicate chirurgical skill. Opportunities of clinical observation are many times more useful to a mind instructed by lectures, demonstrations, and reading, than to an untrained intelligence. The Provincial School prepares the student to enter the European University, and to complete his studies at each centre of civilisation. The position which these Provincial Schools now hold, as parts of a National College of Medicine, opens some prospect of the future which lies before us. You have a right to demand that the institutions of medical education be not left in their present discordant condition. The Ministry of Education which will soon exist in England must apply itself to combine them into one harmonious college, presiding over medical education and public health, and forming one department of the great University of Learning. You have a right to demand *uniformity of qualification* throughout the United Kingdom in each of the three ranks of the profession; a *perfect freedom of practice*, untrammelled by mediæval privileges;

and *a representative system* which shall provide for the *incorporation of the profession into one great self-governing body, over which the Ministry of Education shall represent the central power of the State.* In such a *University of Medical Science* the Provincial Schools, if they are careful to seek their development on broad principles of national utility, are destined to play an important part. I therefore do not scruple to call your attention to some matters of general education which appear to me deeply to affect the interests of these schools.

To enable the pupil to enter these Provincial Schools, a preliminary training is required. I shall not detain you by more than a brief critical examination of the character of the schools in which the middle classes of this country are at present brought up. The foundation which has been laid for the construction of a thoroughly efficient system of primary schools, renders a complete reformation of middle-class education inevitable.

The Grammar Schools of England owe their origin to the Reformation, and were intended to establish that great change in our religious polity, by creating institutions on a civil foundation for the diffusion of polite learning. Their scheme of studies was derived from the revival of classical literature in Europe, and they have fed the Universities with scholars chiefly prepared for a course which was, at the Reformation, considered the only true discipline of the mind, and to afford the only solid treasure of a learned man.

Since that time, the whole face of this country and of Europe has been changed by social and political revolutions. The vast extension of maritime discovery, commerce, and colonization; the great advance of physical science, and the consequent growth of industrial arts, which have made so many of the great powers of nature obedient ministers to the wants of man, have caused the rapid increase in wealth, in intelligence, and enterprise of cities like Manchester, so that this has been described as the age of great cities. In the great struggle of rival nations for the commercial dominion of the world, a necessity has arisen that science and art should be so diffused through every class of society, as to place its prosperity under their guidance.

The first steps have been taken toward such a change in the course of studies at the Universities, as may meet these wants of modern civilization; and the Grammar Schools, if they would not be dislocated from their ancient connections, must make corresponding changes in their preparatory schemes.

I will not detain you with the self-evident proposition of the deep interest which you have, that your students should have passed through the discipline of a sound grammatical and classical instruction, and

should enter upon their course in this School with an earnest determination to make themselves familiar with all the great models in classical literature. But you have also an absolute need, that, as students of nature, your pupils should at a very early period have cultivated *habits of observation*. They should have so far mastered the rudiments of the exact sciences, as to relieve your professors, or those of any college with which you might be incorporated, from all elementary instruction. Now this at present the Grammar Schools do not pretend to accomplish.

Even were their course of studies more complete, the revenues of these Grammar Schools are often quite inadequate to the task of educating the children of the middle class, in the great towns in which they are situated. When the trustees have the command of sufficient resources, they are often prevented by the restrictions of the trust, by the consequences of previous mismanagement, and by the general apathy as to every thing relating to a foundation, buried in the discredit of its own inefficiency, from making a wise and bold effort at reconstruction. Two recent Acts of Parliament confide powers to commissioners to aid trustees in remodelling these institutions; but it is greatly to be regretted that the commissioners have little or no opportunity of beginning reform, and also, that when their aid is invoked, their power to remedy abuse is jealously restricted.

What might be accomplished by such institutions, adequately endowed, and under the guidance of intelligent trustees, is sufficiently demonstrated by the remarkable success of the King Edward's Schools at Birmingham, in which the present Bishop of Manchester laboured as an administrator, with an ability almost as great as that which his learning and experience enabled him to put forth as the head of that school.

In cities like Manchester and Birmingham, it is important that the middle classes should have an opportunity of combining domestic training with public instruction. This would not only render such instruction accessible to a much larger portion of that class than can at present afford to send their children to private boarding schools, but would combine the advantage of the moral discipline of the family with that of the school. The private boarding schools have generally been founded on the model of the Grammar School, and their course of studies is equally restricted, and generally much less efficient. They combine all the disadvantages of an expense approaching that even of Eton or Harrow, often with a very imperfect instruction in classics, and almost an exclusion of science and art. In Manchester you have a Grammar School which has been governed with more

than usual wisdom and success, but this great city has far outgrown the resources of that school. The time is arrived when you must entertain the question of forming Borough or High Schools, so situated in all the suburbs, as well as in the heart of this great city, as to be accessible in every neighbourhood. Besides the usual discipline of classical literature, the course of studies in these schools must comprise everything required for the application of science and art to trade and commerce, or needful for such schools as that which I now address. The proprietary schools which have been created in some towns, imperfect as is their course of studies, are a sign that this want is acknowledged. In Scotland the Burgh and High Schools are governed by the Town Councils, and have in a remarkable degree promoted the enterprise and intelligence of the middle class. They deserve an adaptation to the modern wants of our commercial society by a liberal infusion of appropriate studies.

The future progress of trade and commerce, and the development of the art of Medicine, are equally dependent on the existence of a comprehensive and efficient system of middle class education, which, while it neglects nothing which can be learned from the ancients, places all the treasures of modern science and art within the reach of the scholar. While, on the one hand, the improvement of primary education will in a short time place the classes supported by manual labour in a position to be envied by the humbler tradesmen; the growth of superior elementary schools abroad, the foundation of technical schools of industrial science and art in foreign countries, and the existence of such colleges as the "*Ecole des Arts et Metiers*" at Paris, together with the evidence presented in the Universal Exhibition at Paris of the influence of this education on the progress of invention and taste in manufactures;—these are all among the proofs that the relations of middle class education to science and art cannot be neglected, without national evils which no far-sighted government can encounter. In like manner, in order that these Provincial Schools of Medicine may yield a proper harvest of benefit, every pupil who enters them, ought to have passed through the preparatory discipline of schools in which the instruction in science should be rendered as efficient as its great recent development and the improvement of the methods of instruction require. So little has been done in this direction, either in the reformation of the Grammar Schools, or in the private establishments of education, that some great effort of public opinion, expressed through Parliament, and issuing in the foundation of Borough and Rural Schools, seems to be required as a remedy for the acknowledged evil.

By the reorganization of primary instruction, and the solution of the problem of the respective spheres of the religious communions and the civil Government, the successive Ministries which have superintended the proceedings of the Committee of Council on Education, have prepared the way for the foundation of a Ministry of Public Education. This Ministry has before it the task of reorganizing the instruction of the middle classes, by the reformation of the Grammar Schools, and the foundation of borough and rural schools, in which the courses and methods of instruction shall be such as to afford to commerce and trade, and to the industrial and medical arts, every resource that can be derived from the great era of discovery in experimental philosophy which has succeeded the revival of letters, and from the diffusion of an acquaintance with ancient, mediæval, and modern art.

But you have a right to expect more than an efficient preparatory course. You have a right to demand that what is technical in your Schools, should not be regarded as a narrow specialty, but as a part of a course of collegiate discipline and learning. You have a right to be aided to place your School in a provincial College, in which your students may inhale a vital force, raising them above the limited sphere of an art, into the atmosphere of the most liberal learning, the higher philosophy, and universal science. You have already, in this city, in the foundation of Mr. Owens, the germ of such a College. I have purposely avoided all consultation with any of your professors, and I have made no communication to the trustees of that College, but I do not hesitate to express a personal opinion, that Owens College and the Medical Schools of this city ought to be incorporated. The College would derive the advantage of a large accession of students to classes common to it and to the Schools. The trustees would doubtless be ready to make arrangements for that tutorial discipline of your students which you would probably wish to combine with the professorial course. The rent of separate buildings and other expenses of management might be got rid of. But these and other incidental advantages apart, the Medical Schools would thus secure a large increase of the public sympathy and support, which would not fail to attend them as part of a provincial College; and especially for their professors and students the advantage of combining their technical course with that comprehensive scheme of learning which such a College ought to be enabled to afford.

From such public sympathy, might we not hope that the Museum of Natural History and the Botanical Gardens would be developed *into well-endowed Professorships*, connected with the College of Man-

chester; and that the Library of Chetham's College, the Free Library, the Philosophical and Medical Libraries, and other public institutions of a like nature, would be accessible to the students, under the regulations of a strict collegiate discipline.

If this plan of incorporation should be brought about, let me urge upon you to afford to parents and guardians every security, by the adoption of a tutorial discipline, and frequent reports of conduct and progress, that the whole career of your students would be under the most vigilant and jealous guidance. A scheme of middle-class education comprising Borough and Rural Schools, with efficient and comprehensive courses of instruction, preparing scholars for the completion of their studies in the provincial Colleges of cities like Manchester, might be made to harmonise well with the habits of our middle classes. By combining home education with the public discipline of the school and college, the parent would have security, not only for the moral training of his child, but that the traditional habits and maxims of his class should retain at least such hold upon him, that the resources of literature, science, and art would, if he were destined to trade or commerce, be exerted *within* that sphere. For there is a natural jealousy that schools and colleges, chiefly frequented by children of parents not connected with manufactures, may engender tastes and habits, if they do not establish maxims, which may wean their scholars from commercial pursuits. These dangers would be avoided if private were combined with public education; and if the discipline of trade and commerce were, in the latter part of the scholar's career, mixed with that of the college.

Then, with respect to the art of Medicine, great advantage would arise if the education of the medical student could be so ordered as that, while in school and college the widest range of classical learning and science were within his reach, the gentle but salutary restraints of the family should guard our youth from those temptations to licentiousness, both in speculation and conduct, which peculiarly beset their path.

In Owens College, and in these excellent Medical Schools, you have the elements out of which to create a Provincial College, and you have a right to seek the support of a thoroughly efficient system of Borough Schools.

This is not the time to discuss the sources whence the revenues of such institutions should be derived, nor their mode of local government, nor the relations which they ought to hold to the central authority which would regulate the qualifications of Professors, and the mode of granting degrees, &c. I can only say, that such arrangements would be incompatible with the present chaotic state of the

medical profession; and that the creation of such institutions ought to be contemporaneous with the organisation of medical education, together with all its discipline, sanctions, and rewards, into one harmonious institution throughout the United Kingdom.

In contemplating the external relations of the art of Medicine, I have hitherto chiefly solicited your attention to the action of national philosophy and modes of thought on the art, and to its intimate relations to the progress of general education and science. It would, however, be impossible to correctly estimate the position of schools like that which I address, if we were to keep out of sight their social relations.

Physicians discharge a function in the family similar to that formerly fulfilled by the Confessor. While watching the health of the body, they are witnesses to all the mental and moral conditions which are intimately connected with it.

A new *Religio Medici* ought to be written, in which should be set forth, with the convictions of faith, what is the duty of him who is necessarily present at all the crises of existence; who is the interpreter of that natural religion which is revealed in the laws of life; the censor of all the errors by which the sacred treasure of health is wasted; the teacher, to aid the conscience to throw off the slough of sensuality, and to put on the new life. He is at hand when the most iron will learns submission to weakness, pain, and wasting disease. The lessons taught by those natural laws need a gentle, sympathising, but faithful interpreter; and, without invading the province of the Priest, who shows that the mystery of this economy cannot be solved without a future life, the Physician stands in the position to teach, even from the book of this life, the first steps of the ascent to a more spiritual existence. His relation to the community is in harmony with that which he holds in the family. He has to watch the natural agencies by which the town in which he lives is surrounded. He has to discover those which are noxious to life, and to ascertain how far they can be removed. It is strictly within his province to observe the influence of local customs, employments, and habits in curtailing the mean duration of life, causing excessive mortality at particular ages, or degeneracy in stature, strength, and health. The comparative liability of different classes to peculiar diseases,—the seats of the ravages of endemic, zymotic, or epidemic maladies,—the laws which regulate their diffusion, and the mode and time in which they become extinct, can only be determined by patiently recorded observations over the widest fields. The progress of sanitary improvement is

peculiarly under the direction of the combined observations of the whole body of practitioners of the art of Medicine.

The last time that I addressed any public assembly in Manchester, was during the first visitation of cholera in 1832, when it became my duty to explain to the Commissioners of Police in the Town Hall, the steps which had been taken to mitigate the virulence of that epidemic.

Manchester, at that time, had no Corporation. The streets of a vast portion of the town were neither sewered nor paved. The houses of the humbler classes were often built *back to back*, and though the street was the receptacle of refuse, scavenging was almost limited to the principal thoroughfares. There were crowded burial grounds; very numerous cellar dwellings; over-peopled lodging-houses entirely uninspected; slaughter-houses equally without supervision; size works, tanneries, bone mills, chemical manufactories of the most offensive kind, and other noxious trades scattered through the town. The hours of the labour of women and children had not then been limited; infantile mortality was excessive; the mills of humane and intelligent manufacturers had not been accepted as models for ventilation, for the regulation of temperature, and the removal of dust and cotton fibre from the air. The vast works which the Corporation has recently completed, at an almost unparalleled municipal outlay, for the supply of pure water to every cottage in the city, had not been projected. The parks which have been provided for the recreation of the people, and the Saturday's half-holiday, had indeed been suggested in a letter to a Committee of the House of Commons, but were regarded as Utopian schemes. Schools were fewer and far less efficient, even, than they now are. The consumption of beer, spirits, and tobacco was then, as now, excessive. The police force was a feeble restraint on the abuse of the power which bestial ignorance has to make itself a pest.

In this condition of the town the visitation of the cholera occurred. It was the duty of the physician to examine and lay bare these evils; it was the function of the municipality to correct them.

I have in my mind an indelible picture of the horrors of that epidemic, in such scenes as the following:—A low lodging-house, crowded with sixty inmates, forty of whom were seized with cholera in one night, where twenty-seven died before the morning: a close by the river Irk, surrounded by tanneries and size manufactories, ill-ventilated, undrained, and reeking with effluvia;—in this poison-house, thirty-six victims were sacrificed in one night: a street inhabited by prostitutes, nightsoil-men, and persons of desperate character, from

which fifty were carried in one night to the hospitals. The details of these scenes are too shocking for description.

I am glad to stand here again, after the lapse of more than twenty years, and to congratulate the Corporation of this great city, upon all that it has accomplished for the removal of these great evils.

I wish I could speak in as satisfactory terms of the attendance of the youth of this great city at its schools, and of the disuse of beer, spirits, and tobacco, as I can of the public spirit which has regulated its police, sewered and paved its streets, removed nuisances, and, above all, expended the wealth of a principality on its magnificent water supply.

This sketch of the external relations of the art of Medicine would be incomplete if I failed to remind you, that it is not merely in the attitude of an observer of nature that you watch the great phenomena of life, and stand in the presence of the dread reality of death, Man is not a mere variety of the animal creation, whose instincts, habits, organisation, and physiology you have to study. It is true that, in the attitude of a student of nature, your success depends on high powers of generalisation, on patient vigilance, calm fidelity, humility in the presence of great natural laws, which you can only learn to interpret by the collection of facts, which become the sources of those divine combinations of genius which enabled Newton to predict the combustibility of the diamond from its great refracting powers. This is all true. But the physician would be untrue to the high moral relations of his profession if he could live only as an observer in the infirmaries and fever wards of cities; if he could attend the *ambulances* or the hospitals of armies,—watch the cholera, the plague, the yellow fever, or typhus fulfil their mission as angels of death among the inhabitants of foul places, in which the race would degenerate if they were not cleansed out with the besom of destruction,—without some inspirations of deep sympathy for the destiny of that great mass of mankind whom ignorance, poverty, and a life of toil have made the earliest victims of epidemic and contagious diseases. Remember how much of what you have to do formed (I say it with a reverential recognition of his supernal power) part of the mission of Christ. "When John sent his disciples to our Saviour to inquire, Art thou *he* that should come, or do we look for another? he replied, Go, and show John again those things which ye do hear and see. The blind receive their sight, and the lame walk; the lepers are cleansed, and the deaf hear; the dead are raised up, and the poor have the gospel preached unto them. And blessed is he whosoever shall not be offended in me." It is of the very essence of Christianity to have a

deep sympathy for the lot of man; and you would neglect the highest moral dignity of your profession, I will not say if you regarded it as a means of accumulating wealth, but even if, in the pure and noble office of an interpreter of nature, you shut your hearts to the voice of suffering humanity.

There is much which a physician knows which is hidden from the eye of the political economist and the statesman. Observe the advantage which Scotland derived from Dr. Alison's demonstration, how much the recklessness of misery is to be dreaded, as a cause of the increase of the population beyond the means of subsistence. See how the Government has become the protector of those who labour in our mines and manufactories—of helpless infancy and suffering womanhood; because there have been able men, chiefly of your profession, who have fearlessly told what need there was to restrain the greed of gain, in order that the people might, in vigour, in virtue, and in intelligence, be worthy of the British race. Do not forget that the municipalities of England have been enlightened by physicians as to the existence of sanitary evils, which kept alive the embers and accumulated the fuel of pestilence in our great cities. In all these respects you may be the pioneers of civilisation. But you may do much more; you may become the agents of great moral and Christian progress in society. You, more constantly than any others, witness the consequences of intemperance in starving the family of the labouring man; depriving his home, not only of comfort, but of the necessaries of life; prodigiously increasing the rate of infantile mortality; ruining domestic peace; sowing the seeds of debauchery and crime among the children; wasting the strength, maddening the brain, undermining the constitution of the victims; filling our workhouses and gaols, and preventing the moral and social progress of the class which spends upwards of fifty millions annually on beer, spirits and tobacco. You can do more than any other class to expose this plague spot; and to awaken all the authority of law, of public opinion, and private example and influence, to extirpate it, as the most malignant ulcer in the body politic.

In like manner, a physician is not at liberty to be indifferent to any social evil which depraves the health or degrades the moral condition, and thus causes the race to degenerate. He is the enemy of pauperism, cretinism, the maladies peculiar to certain employments; and he is the indefatigable promoter of every improvement in the drainage of malarious districts, in the construction of the houses of the poor, in the amelioration of their forms of labour, and in that mental and moral culture which prolong and elevate their being. He ought to be the companion of Howard and Fry in the prison; of the ladies of England

in the hospitals; of Clarkson and Buxton among the slaves; of Martyn, in preventing infanticide, the suttee, and Thuggism; of Williams, in protecting the aged Polynesian from the selfishness of the young; everywhere, of those who strive to elevate the race from oppression and barbarism.

Never forget the great work of Christian charity and genius which Dr. Howe wrought in restoring Laura Bridgeman to the region of intelligent humanity. Have in veneration the labours of the Abbé Sicard for the deaf and dumb. Visit Guggenbuhl on the Abendberg, and learn how he has taught Europe to rescue infants from idiocy and cretinism.

There are few things to my mind so unsatisfactory, as that the charge of the sick in our great hospitals should be confided to nurses whose highest praise, when faithful, is that they have acquired a certain mechanical skill in fulfilling the directions of the physician, but whose moral relations with the patient are, even in favourable examples, limited to patience and vigilance. No one can have watched the self-denying ministrations of the Sisters of Charity in foreign hospitals, without wishing that our Protestant faith had produced such a flower. The beds in our public wards are too much exposed to promote private devotion, to facilitate the ministrations of religion, or even to protect the patient from painful, if not humiliating observation, when under examination for disease. Simple expedients, consistent with perfect ventilation, might prevent these evils.

Then, the physician and the minister of religion act too little in concert in the hospitals and in the houses of the poor. Even in great epidemics, which call forth occasionally the most chivalrous self-devotion, this union of effort is too rarely seen.

Never forget that, although you are not charged as priests with the great message of Revelation to man, you follow the steps of disease and death alike to the palace and the hut; you are witnesses of the equality of man in the eye of God; before you, more than before any other class of men, is revealed the great mystery of the drama of life from the cradle to the grave; and that, though it is your duty rather to heal the body than to be physicians to the soul, yet, when you come in age or in sickness to make up the great account of life, nothing will console you if you have been deaf to the great voice of humanity, or if you have closed your eyes to the sublime spiritual destiny of man.

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