

**An introduction to the study of medicine : a lecture delivered at the opening of the medical session of 1871-72, in King's College, London / by William Rutherford, M.D.**

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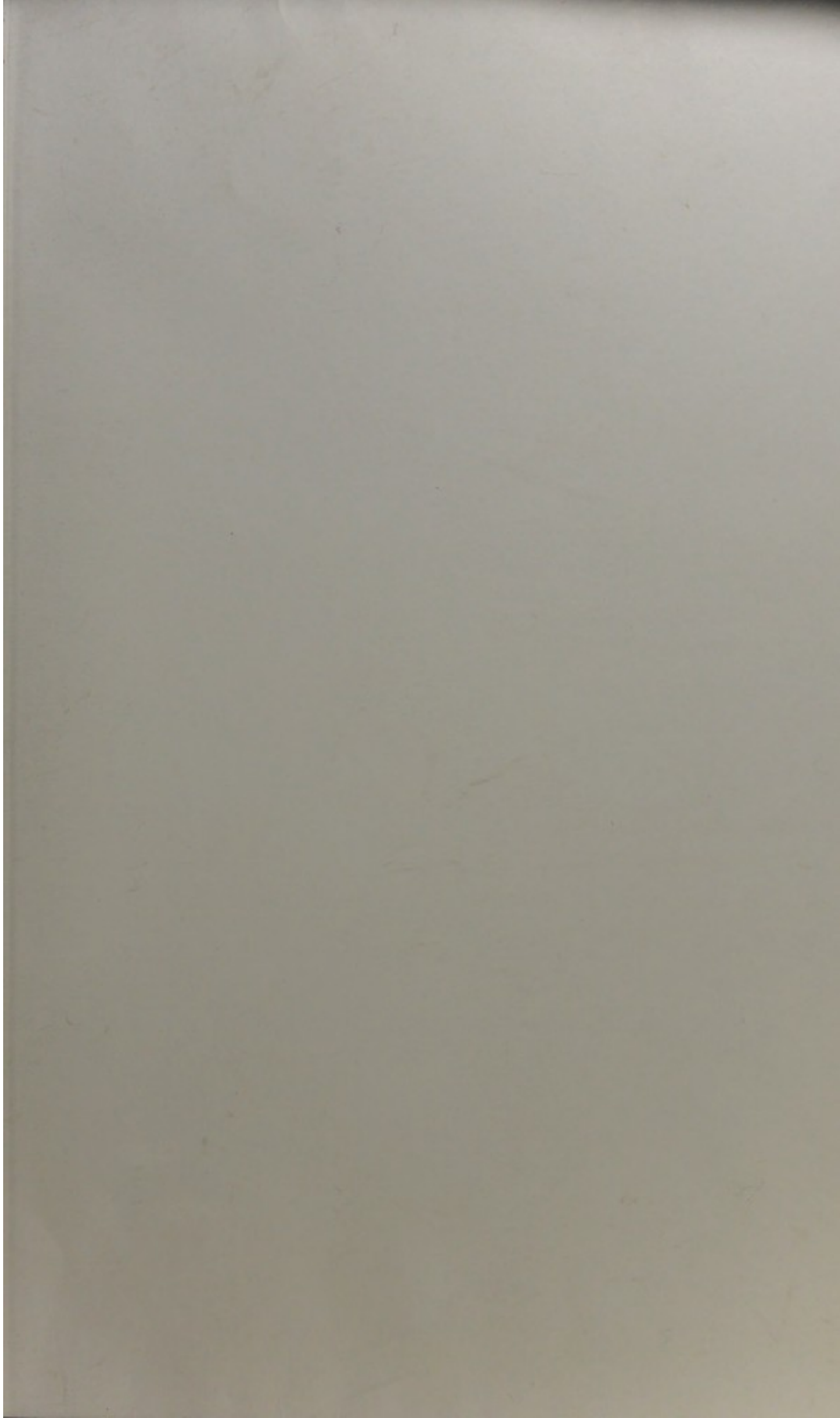
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CXIXO  
AN INTRODUCTION

7

TO THE

# STUDY OF MEDICINE:

A LECTURE

*DELIVERED AT THE OPENING OF THE MEDICAL SESSION  
OF 1871-72, IN KING'S COLLEGE, LONDON.*

By WILLIAM RUTHERFORD, M.D., F.R.S.E.,  
PROFESSOR OF PHYSIOLOGY.

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1871.

THE HISTORY OF THE  
CITY OF BOSTON  
FROM 1630 TO 1800

BY  
JOHN H. COOPER

NEW YORK  
1845

## INTRODUCTORY LECTURE.

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GENTLEMEN,

WITH a firm and unrelenting voice the beginning of October bids us leave the field and the hillside, the river and the lake,—bids us lay aside the implements of holiday amusements, and summons us to resume the stern labours of the winter.

The opening of the session always vividly recalls to my memory the day on which I found myself, like many whom I now address, entering upon the study of medicine. I remember well the strange feeling of loneliness which hovered about me as I sat in a crowd of strangers, listening to what happened to be a somewhat gloomy and not altogether very intelligible address, that whirled me headlong into a world that was altogether new to me; a world, too, which appeared to be widely different from that which I had pictured to myself. On that to me most memorable occasion it was the lecturer's humour to dilate upon the vastness and excessive difficulty of the knowledge which medical students must needs acquire in a short space of time, the capriciousness of the examiners before whose awful tribunal they must needs in due time appear, and the terrible nature of the con-

sequences that would certainly follow upon a failure to satisfy the demands of those horrid inquisitors. My spirit sank within me as I surveyed the terrible world into which I was thus summarily introduced. It seemed to abound in steep mountains, whose peaks were enveloped in clouds; it appeared to be covered with forests draped in impenetrable gloom; its seas were filled with sunken rocks and horrid whirlpools, which only dexterous navigators could avoid. My fancies had suggested to me very different scenes; I had pictured to myself seas devoid of rocks and whirlpools, mountains with summits sharp and clear against a cloudless sky, forests not too dense, valleys filled with exuberant life, bright sunshine lighting up all. By a delightful peculiarity which belongs to youth the future is ever painted in colours the most glowing; the sky has no clouds, the sun sheds a light which is the brightest, and everything sparkles with the freshness of morning.

These recollections naturally lead me to address myself on this occasion to the student portion of my audience, and more especially to those of them who find themselves for the first time within these walls. Remembering my own difficulties and deficiencies, when in a position such as yours, I shall beware of taking for granted that you know anything about medicine, lest I land you in regions of despair instead of helping you over the threshold of the great subject which you are about to study. I shall endeavour to exercise aright my privilege of addressing you this afternoon by tracing for you an outline which may help you to

recognise the true features of the land which lies before you.

I need scarcely say that the chief objects sought for by those who profess medicine, are—to preserve health and to cure disease. What is health and how can it be preserved? What is disease and how can it be cured? are the questions which will naturally suggest themselves to you, and they are precisely the problems which we propose to help you in some measure to solve.

Before you can comprehend the diseased states of a living being you must study the conditions which characterise the state of health. When our watches go wrong they cannot be put right by persons unacquainted with the structure and with the normal or healthy action of these machines; so is it with the infinitely finer machines that live and die. We cannot understand nor can we remedy the unhealthy conditions into which they are liable to fall, unless we possess a knowledge of their healthy states and how these are maintained.

The phenomena presented by living beings belong to the great division of natural science termed Biology. This vast subject really embraces all the phenomena presented by living things whether they be in a state of health or in a state of disease. The events which characterise the state of health are embraced in the section of biological science termed Physiology, while those which mark the diseased condition belong to another section designated Pathology. You have then to study, first, the physiological or healthy state and then the pathological or diseased state. Proceed-



ing upon the knowledge gained by a study of physiology and pathology you will be in a position to study practical medicine, that is, you will be able to comprehend the means which are employed with a view to preserve an individual in the physiological or healthy state, and those which are adopted in order to rescue him from the pathological or diseased condition ; or, to speak in technical language, you will study Hygiene, that department of practical medicine which concerns itself with the prevention of disease, and Therapeutics, that department which deals with the cure of disease.

Physiology and pathology, hygiene and therapeutics, these are the four essential pillars upon which rest the science and the art of medicine.

These subjects are of such vast extent that they are for convenience subdivided and discussed under numerous titles ; you will not, however, get confused amid the labyrinth which has resulted from their subdivision if you remember what the fundamental subjects are.

Without a doubt no department of natural science presents to the student more glittering points of fascination than that which deals with the phenomena presented by living things. The exquisite beauty and marvellous variety exhibited by the endless forms of vegetable and animal being, the strange affinities which exist between the different individuals, the perfection that marks the simplest and the most complicated structures which they possess, the excessive ingenuity of the arrangements by which they keep themselves alive, by which some of them move, hear, see, think,

and feel, the remarkable modes in which new individuals are produced, and the curious changes through which most of them pass as they develop from the egg or seed into the perfect individual. These and many other points which will by and by strike you give to biological study infinite attractiveness. Unquestionably the study of life is not a little complicated; it affords ample scope for the display of the highest mental power. The pursuit of it leads us into many dark recesses which mortal eye has as yet failed to penetrate, but these, though they here and there interrupt our progress, only make us look back to the vast achievements which have already been made, and stimulate us to put forth still greater efforts to make the hidden things reveal their secrets.

The studies upon which you are now entering, although dealing to some extent with metaphysics, nevertheless chiefly concern the two great factors of the physical world, to wit, matter and energy.

Regarding the ultimate nature of matter and energy we are in the meantime totally ignorant; but with regard to many of their properties and many of their metamorphoses I need scarcely say that we possess a vast store of information.

The first great idea which those who enter upon the study of living beings should lay hold of is, that the matter and energy which are found in living beings are divided from the dead world around them; things that live, although they can transform matter and energy in the most marvellous ways, can neither create nor destroy these. A continual stream of matter and

energy flows from the dead into the living world, serves its time there, and returns to the dead world again. A steam-engine cannot do work unless it be supplied with appropriate fuel, unless it receive matter loaded with energy it is powerless. So is it with a horse or a man, he cannot work unless he eat; he must be supplied with matter stored with energy else he will waste away, become powerless, and necessarily die.

Seeing then, that the matter and energy found in the organic or living world, come from the inorganic or dead world, it might be anticipated that the changes through which they pass in the world of life, are subject to the same laws that govern them in the world that is lifeless. Such appears to be the case. The law that rules the chemical changes taking place in a muscle, does not differ from that which regulates the chemical actions going on in a steam engine. The laws that preside over the movement of the blood are just those which control the movement of any other liquid.

The metamorphoses which matter and energy undergo in the living world, are, many of them, infinitely more complex and difficult to follow, than those through which they pass in the inorganic world, it is therefore necessary that we should be acquainted with the character of the phenomena found in the inorganic, ere we attempt to follow or comprehend the more intricate nature of those which are found in the organic kingdom. In short, you must study the chemistry and physics which immediately concern lifeless things, before you can successfully study the chemistry and physics which

immediately apply to things that live. In other words, a knowledge of inorganic chemistry and inorganic physics must be acquired before organic chemistry and organic physics can be understood.

The medical studies on which you are now entering are extensive and without a doubt complicated. It is therefore very necessary, that those of you who are beginning these studies, should have some idea of the plan that is pursued in the investigation of any subject within the range of physical science.

Let us suppose for the sake of simple illustration, that we are going to study the action of some machine such as a watch. Supposing the watchmaker to have revealed to us nothing regarding the mechanism and the mode of action of the instrument, you must readily perceive that it would be difficult for us to find out all about it. Some things would be easily enough explained. We would no doubt readily come to the conclusion that the case merely affords protection to the delicate mechanism which lies within, but it would puzzle us not a little to find out the use of the mainspring, the balance-wheel, or the regulator.

Were we of a poetical turn of mind, we might sit down and invent any number of fictions purporting to account for the *modus operandi* of the machine. We might imagine anything regarding it. One thing is quite certain however, that, in the absence of a revelation from the watchmaker, a real knowledge of the instrument could only be obtained by the methods of observation and experimentation. We would require to use our eyes, and our ears, and our fingers, in order

to see, hear, and feel the actions that take place within the apparatus. We would dissect it in order to find out its structure. We would subject it to chemical processes with a view to ascertain its chemical composition. We would not however content ourselves with merely observing the action of the watch. We would not merely look at it, or listen to it, but we would try experiments, because the method of experimentation is very much more powerful than that of simple observation, in enabling us to ascertain the causes which give rise to events. In our experiments we might study the effect of removing certain parts of the apparatus, we might alter the regulator, give the hands a twist, put a spoke in some wheel, and so on. We would notice the results of our experiments, and if we were wise, we would as speedily as possible record them in black and white and not trust them to our memories, which unfortunately are in any case often most treacherous. The facts ascertained by observation and experiment, would serve as starting-points for ideas. We would use them as stepping-stones to get at an understanding of the machine. It would obviously be a very unfortunate business, if any mistakes were made by us in our observations and experiments. Suppose that from hasty observation, we concluded that the minute hand does not move twelve times as fast as the hour hand. Suppose that we moved the regulator to the one side or to the other, and from careless observation, declared that no effect is produced upon the speed of the machine's movement, we would utterly fail to arrive at right conclusions regarding the instrument.

Clearly our ideas would be altogether wrong if they proceeded from false facts. Our ideas too might turn out to be exceedingly ridiculous if we did not take care to make a thorough examination of the apparatus. Some one of us might be in such a dreadful hurry to obtain the applause of his fellows, that he, instead of patiently examining the whole machine, merely looked at the movements of the hands and jumped to a conclusion as to how these movements are brought about. Such an one might advance the startling hypothesis, that behind the dial plate, there sits a spirit who turns the hands. Indeed he might say that there are three spirits, one for each hand, he might say that when the hands fail to properly follow each other, the spirits are quarrelling, or, that when they cease to move, the spirits have become lazy or have flown away. Many persons would no doubt be highly entertained, possibly for a time even satisfied, by such an ingenious idea, but of course no further attention would be paid to it the moment an inspection of the interior of the watch revealed the delicate mechanism by which the hands are made to rotate. If then we would arrive at right conclusions, we must reason upon facts that are really facts, and our observations of the facts of any case must be sufficiently comprehensive.

The method which we adopt in investigating the phenomena of living beings, is precisely the same as that which I have just detailed in the simple illustration that I have placed before you. We are surrounded on all sides by machines that live and die—machines possessed of powers surpassing those of any machine

that ever was fashioned by human skill. The Designer of these living machines has not revealed to us anything regarding their structure, chemistry, or mode of action. Our knowledge regarding them has been arrived at by a pursuit of experimental methods. It was Hippocrates who, some three and twenty centuries ago, began systematically to investigate living phenomena, by the method of observation. Fortunate for us would it have been, had the path which he opened up been pursued by those who followed him. Ignorance and superstition soon however enveloped it in the thickest darkness, and it was not fairly reopened until our immortal countryman Harvey found his way into it, and Bacon shed upon it the light of his genius.

Two centuries and a half have indeed elapsed since Harvey, by observation and experiment, discovered the circulation of the blood, and thereby ushered in the modern era of Biology, but it was reserved for the German, Haller, to thoroughly adopt the Baconian method in Biological study. Haller lived only about a century ago, but the progress that has been made is indeed marvellous. Already the whole living world has been ransacked by eager investigators, and an amount of knowledge has been accumulated regarding living things which is so vast in its extent, that no human mind is now able completely to master it. Fortunately no one requires to master it all.

It is our business as your teachers to help you to study the more important facts that have been ascertained in biological science, together with the prominent theories and hypotheses that have been framed

regarding them. We have at the same time to teach you those methods of research that are needed, in order to test the accuracy of the facts already advanced, and in order to help you to make new discoveries. And we have also to teach you the methods employed for the purpose of preventing and curing disease.

In all your inquiries regarding living things, whether in a state of health or in a state of disease, you have to attend to (1) their physical or structural composition; (2) their chemical composition; and (3) the functions or actions which they or their parts perform. Although the ultimate aim of all your investigations is to preserve a human being in a state of health, and to cure his diseases, nevertheless your studies are not confined to man alone. Ere the healthy and the diseased actions of his body can be rightly comprehended by you, you must investigate the conditions of health and disease in other animals. For man, though standing at the summit of the scale of animal life, has nevertheless a multitude of things in common with forms of living beings which stand below him. The lowest forms of animal life are comparatively simple in physical and chemical structure, and in the actions which they perform. As we ascend the living scale, the structure, and the actions of the body and its parts become more and more complex. Happily, however, the various forms of living things are linked together. A scheme runs through them all. There is a gradation from the simplest to the highest, and so the complex is rendered more intelligible by a study of that which is simple. Much light has been thrown upon the



healthy operations of the human body, by a study of those that take place in the lower animals. Something too has been ascertained regarding the diseased conditions of man, by attending to the unhealthy states of the lower animals, but this subject has as yet received little attention compared with what it will certainly procure in years that are to come.

At the outset I stated that a study of the events which happen in living beings during a state of health belongs to physiology, while a study of the alterations of these events that constitute disease belongs to pathology. It is convenient to employ these terms in their widest significance. Physiology, in its widest sense, treats of the anatomy or structural composition, the chemical composition, and the actions which take place in a living being during health. Pathology, in its widest sense, includes the alterations in structure, in chemical composition, and in the actions of a living being during a state of disease.

Let me now endeavour to give you a general idea of the present state of these two departments of biological science.

Unquestionably the most advanced part of physiology and pathology is that which relates to the structure of the body in health and disease. The structure, so far as it can be ascertained by the unaided eye, has been fully made out. A prodigious mass of information has been arrived at regarding the minute structure as determined with the aid of the microscope; fresh facts are continually pouring in, but progress in this direction is now difficult owing to the excessive

minuteness and delicacy of the ultimate structures of which the body is built up. We do not know so much regarding the chemical as we do regarding the structural composition of the body. Progress in this department is particularly difficult; it involves a prosecution of the very highest chemistry. Indeed, the chemical processes which are necessary to reveal very many of the chemical changes that take place in living beings have yet to be invented. Moreover, the chemical constitution of living things is very unstable; it is continually undergoing some degree of change during life, and at death it rapidly alters. These things therefore conspire to retard the advance of physiological and pathological chemistry.

A great deal has been learned with reference to the actions that take place in the body in health and in disease. The healthy and diseased actions of the nerves, lungs, heart, stomach, and other organs, have been most carefully explored; but, extensive though our knowledge be with regard to these, there are many gaps yet to be filled up. We are not thoroughly acquainted with all that happens in any organ of the body. No stone, however, is being left unturned; the secrets are being sought out with the aid of the most refined physico-chemical instruments and processes. Now and then a great stride is made in discovery, but, inasmuch as most of the easy things have been done, our further advances are not very rapid although the army of investigators is a great one. Yet, nevertheless, in consideration of how difficult of access are the citadels which we are now attempting to storm, we have from

the sure though slow success which attends our efforts ample reason for pushing vigorously and hopefully onwards.

The causes that give rise to the phenomena of life have ever since the first glimmerings of science, formed a deeply engrossing subject for inquiry, and assuredly, as time runs on, the interest and importance that attach to such a question, so far from diminishing, continue if possible to increase. For centuries there has been maintained regarding this subject a keen controversy between the spiritualists and the physicists. The spiritualists first took up their ground; they ascribed the operations of the body to the agency of spirits. Healthy actions were attributed to good spirits, unhealthy actions to evil spirits. This idea has passed through many curious shapes, some of which it is worth while looking at.

Hippocrates, some three and twenty centuries ago, started the hypothesis that the actions of the body are presided over and directed by a principle or spirit termed by him Nature. He ascribed to this spirit the power of selecting what is beneficial and of rejecting what is detrimental to the body. Aristotle, after Hippocrates, gave to this spirit the name of Vegetative Soul. He considered that it is present in all plants and animals, giving to them the power of action necessary for their nourishment, growth, and multiplication.

Many centuries after Aristotle's time, when the dark ages that followed the fall of the Grecian and Roman empires had passed by, the spiritualistic idea regarding the cause of vital action was revived. Paracelsus, a

German of the fifteenth century, maintained that the bodily operations are due to a spirit that sits above the stomach; he called this spirit Archæus or the spirit of life. Archæus was supposed to superintend the preparation of the food; it selected the good and rejected the bad. But if this quaint little spirit chose he could at any time be not over nice in the preparation of the nourishing matters—he could accept the bad as well as the good—and so land the unhappy mortal in a sad plight. Archæus was supposed to have a number of minor spirits subordinate to him. Every organ of the body had its spirit, and Archæus reigned over them all. When the minor spirits obeyed orders these organs did their work properly, but sometimes they rebelled; the spirit in the liver became lazy, that in the lungs mayhap became violently excited, and so disease resulted.

About two centuries ago another German, named Stahl, started the notion that the vital actions of the body are all of them due to the direct operation of the rational soul. This idea did not avail much, for it was evident to most persons that the vital operations of plants at any rate could not be referred to the influence of a rational soul residing in them. Eighteen centuries before Stahl, Aristotle had been much more philosophical; he said that man alone possesses a rational soul, that all animals possess a sentient soul whereby they have the power of feeling, and that there is a third soul which is common to all plants and animals. This he named the vegetative soul, and ascribed to it the power of prompting the operations that are essential

for maintaining life. Although the doctrines taught by Paracelsus and Stahl did not long hold their ground, nevertheless, ever since their time, and even at the present moment, many physiologists hold and do still hold the doctrine that many of the operations which take place in plants and animals must be ascribed to the action of a spirit; various names have been applied to it. Wolff called it *vis essentialis*; Blumenbach termed it *nisus formativus*; modern physiologists have named it vital principle, vital force, vital power, force of organisation, architectonic principle, constructive agency. In truth, however, these are all but new names for what Aristotle termed the vegetative soul.

But the views of the spiritualists, or vitalists as they are now called, and it is well to give them the latter name; for it would be a pity to confound the sensible men, who believe in the existence of a vital principle, with the spiritualists of these times, whose manœuvres are an outrage to science and even to common sense. The views of the *vitalists*, then, I would rather say have not been allowed to go unchallenged. The physicists have from time to time made powerful thrusts at the vitalistic doctrines. Before chemistry and physics were understood the vitalists had naturally the best of it; yet, even then, Pythagoras ascribed the phenomena of life to the agency of heat, an idea which is even now looked upon by many with favour. It has not, however, been until comparatively recent times that chemistry and physics have become so advanced as to enable the chemist and physiologist to offer acceptable explanations of many of the events that take

place in living beings. With every advance in chemistry and physics the vegetative soul has been thrust more and more into a corner, and indeed many physiologists are at the present moment of opinion that a vegetative soul or vital principle may be committed to the limbo of old metaphysical curiosities. The physico-chemical theory of life has become particularly strong since the modern doctrine of the conservation of energy came upon the *tapis*. It has long been evident that the matter of which human beings are built up is derived from the inorganic world. It is only of late, however, that the conviction has seriously grown up in many minds that the forms of energy exhibited in the living have, like the matter, their source in the dead world.

This controversy between the physicists and the vitalists is still unsettled, and seeing that there is very much to be said on both sides it is likely to remain unsettled for many a long day to come. Ere I pass to another topic, however, I would caution you against the extravagant assertions that have emanated from some who uphold the vitalistic and some who uphold the physico-chemical views. Some vitalists have hurled the disagreeable name of materialists against even those persons who do not entirely see their way to firmly believing that a cabbage is possessed of a vegetative soul. Such persons seem to make no distinction between the rational soul which belongs to man and the vegetative soul which Aristotle placed in the lowest plant as well as in the highest animal; they have proclaimed the dogma that you

cannot abandon your belief in the soul of a cabbage without forfeiting your belief in man's rational soul ; and, not satisfied with this extravagance, some even go the length of alleging that if you refuse a vegetative soul to a cabbage you are only in jest if you say that you believe in a God.\* On the other hand, some upon the physico-chemical side have been not less extravagant and ridiculous in announcing that man's rational soul is all a myth, and that everything which is ascribed to man's nobler part should be simply referred to the

\* I desire it to be understood that this criticism is not at all intended to apply to the teachings regarding life, of my much esteemed colleague, Professor Beale, but to the views of some persons who criticised the introductory lecture to a course of Physiology in King's College, given by me in 1869. In this lecture I stated that "it seems to me a great mistake to suppose that if we refuse to believe that a vegetative soul exists in a cabbage or a snail, we must necessarily no longer believe in the existence within man of that rational soul which gives to him his true nobility. It appears to me that we may refer the vital phenomena of a cabbage to the agency of physico-chemical force, and yet none the less firmly believe in man's spiritual being. But in all this we must beware lest our fancy carry us beyond the legitimate interpretation of our facts. It of course becomes us as physiologists to view steadily and inquiringly the aspect presented by living nature, when viewed by the light which physics and chemistry already afford. By working with the aid of that light, we have some chance of rending the thick veil that as yet shrouds the nature of life in mystery. To the cardinal question of Physiology, What is life? we must as yet return the answer, we do not know. If we fold our hands and refuse to believe in anything but a hypothetical vital principle, we shall never know ; but when we have learned how to rightly comprehend the various forms of energy, and the transformations which matter may undergo, we may be able to say that we have found out the secret of vitality."

It seems to me that the above statement leaves the whole question open, although it shows that I look with favour upon the efforts of the physicists and chemists, and think it quite possible to believe in the existence of man's rational soul, even though they succeed in doing

physico-chemical constitution and action of his brain. Beware of such wild assertions, for they are entirely destitute of proof. In the years that are before you this subject will ever and anon force itself upon your attention. It demands a most searching investigation at your hands, and it especially requires that you shall not be hasty in making dogmatic statements regarding things that are more difficult to investigate, than perhaps any others that come within the range of scientific inquiry.

With regard to the causes that give rise to disease, very much has been learned, but, at the same time, we are far from knowing all about them. Diseases are now looked upon as unhealthy alterations in the physico-chemical constitution, and action of the body.

away with the vital principle or vegetative soul supposed to be possessed by all living things. Much to my surprise it was announced by certain persons that I am a "materialist," and that my pretending to believe in man's rational soul, and even in the existence of a God, is possibly very well-meaning, but nevertheless absurd!

I entertain no dogmatic views regarding vitality. The physicists and chemists, although ever explaining more and more regarding vital operations, have by no means explained everything. Nor have the vitalists done so. The question is undecided, but I look to the physicists and the chemists for explanations, and do not at all side with those vitalists, who maintain, that inasmuch as physics and chemistry do not already explain everything, they will never do so, and that the only way of getting at the explanation is to assume that in living beings the doings of matter and energy are controlled by a spirit or principle that has nothing to do with the manœuvres of matter and energy in the inorganic world. That is a way of looking at the question which may be reasonably adopted by the physiologists *of the future*, when they feel satisfied that they know all about the powers of energy, and are still unable to find an explanation of the doings of living things.



It was once the fashion to ascribe these alterations to the influence of demons, they are now attributed to material causes.

I have alluded to the spiritualism of the present time. As you are doubtless aware, we have been informed by a noble Lord, that a certain Mr. Home is able to defy the force of gravity to an extent, which is—to say the least—very remarkable. We have been seriously told that this Mr. Home has it in his power to fly through the air by a mere effort of his will. The number of those who possess this marvellous power of will seems to be very limited, and it is fortunate for cab proprietors and railway shareholders that the number is likely to remain small.

As yet Mr. Home and his disciples do not seem inclined to make a public exhibition of their wonderful powers. Probably they still continue to ride in omnibuses, cabs, and railway carriages, and find it safer to trust themselves to such modes of conveyance rather than to their newly discovered method of aërial flight.

Spiritualism of the sort now fashionable is not so very novel as the spiritualistic media would feign have us believe. Within the memory of most people miracle workers have been ever and again starting up, the tricks of the mesmerists, spirit-rappers, and table turners, made dupes of a great many simple-minded persons, possibly the media have now become so dexterous, that they can make dupes of persons whose minds cannot be exactly charged with simplicity, but nevertheless, it is probable that ere long their tricks will be exposed just as all similar tricks have been.

Hygiene (that department of medicine which is concerned in the preservation of health), is in a state of considerable advancement. We are well acquainted with the ordinary conditions that must be fulfilled in order to preserve an individual in a healthy state, but we have yet to learn a vast deal regarding the means to be adopted, in order to protect him from the influence of many of the malignant agencies that produce disease. But the brilliant success which has attended the practice of vaccination, leads us to anticipate that we will yet lay hold of means sufficient to prevent many of the diseases that still run rampant.

It must be admitted that Therapeutics, (the department of medical science that deals with the cure of disease), is not in so advanced a state as are the other subjects to which I have alluded. The surgeon no doubt has carried his branch of practical medicine to considerable perfection. He applies splints and bandages to wounded members, on the most scientific principles. When parts of the body that can be done without become hopelessly diseased, he removes them in a way the most cunning and dexterous.

The physician (dealing as he does chiefly with those ailments that cannot be got rid of by the aid of such mechanical appliances as a splint or a knife), is compelled to restrict himself in the main to the use of less potent agents for restoring the healthy physico-chemical constitution and action of the body. Unlike the surgeon, he can seldom remedy disease by the employment of mechanical force, but must trust to the influence of certain kinds of meat and drink, fresh air

and water, heat and cold, rest and exercise, electricity, drugs, and so on.

In truth, however, the surgeon, although he summarily disposes of a diseased member with the aid of a knife, just encounters the same difficulties as the physician, in his attempts to heal the diseases of any portion of the body without removing the diseased part altogether. It is doubtless a most fortunate circumstance that a diseased limb can be amputated, but after all, the amputation usually implies the confession that, as yet, we cannot always restore to health parts of the body that become diseased.

Patronius Arbiter was however quite wrong when he said that "a physician is nothing else than a satisfaction to the mind;" happily, there are many diseases which can be completely cured, and a great many more that can be influenced for good by the use of remedial measures; but still our achievements are enclosed by a circle, which though ever widening, is yet a narrow one. The chief reasons for this limited success are: that we are still unacquainted with many of the healthy actions that take place in the body. The causes of many diseases are still unknown. It is not yet possible to ascertain precisely what parts of the body are affected by some diseases. Obscurity still hangs over the significance of many of the altered bodily actions that are observed in disease. Some of these actions have a fatal, some have a beneficial tendency, and the difficulty is to know which to favour, and which to repress. The actions of many drugs and other remedial agents are only partially known, and even when those

actions have been ascertained there remains the difficulty, that the precise influence of a drug for example differs in different individuals, and in the same individual at different periods of his life. But we are not possessed of the power of ascertaining beforehand what are all the respects in which one person differs from another, and therefore we are not by any means always able to predict what will be the precise influence of the remedial measures which we adopt. Hence it is, that medicine does not present the characters of an exact science. We cannot in many instances say what is, or what will be. Nor can we always with precision wield those powers which we already possess for influencing the constitution of the body and its actions. We have for the present to weigh probabilities and to hit the mark as nearly as we can. This fact need not however dismay those of you who are entering upon the pursuit of medicine. She is daily becoming more exact, and the pleasure and satisfaction which result from an honest and earnest attempt to render her more scientific, will quite outweigh any disappointment you may be inclined to feel at finding that she lacks much of that precision which gives such charms to chemistry, physics, and mathematics.

The great fact to be remembered is that medicine must be pursued in a scientific spirit. Only by careful observation and experiment; only by cautiously comparing and weighing all the facts of any case, and coming to just conclusions from these, can we hope to advance medicine. You have to bear in mind that whenever you give a man a dose of medicine, you per-

form an experiment—an experiment which is important to the person and important to the science of medicine. Observe all the conditions and the results of the experiment, and write them in a book, in order that they may never be forgotten. Old Hippocrates showed us a splendid example. He wisely saw that to get at accurate facts is the backbone of all science. He did not content himself with merely “remembering his cases.” He inscribed their history upon tablets, so that he might not permit his memory to lead him into error regarding the events that had occurred. No nobler example could be followed. The old Hippocratic plan is still, and will ever be, the fashionable one amongst those who strive to advance medicine. If you will follow it, if you will be useful in ascertaining all the facts of a case, and cautious in the inferences you draw from these, you will in due time not fail to add many a stone, perhaps many a precious stone, to the as yet unfinished temple whose portal is now opening to you. The temple is indeed far from being complete. Many niches are still empty. Many stones lie strewn about. Some foundations are even yet unlaid. Yet all is activity, the stones are getting into their places, the walls are surely rising, here and there indeed a gilded pinnacle crowns a wing. Your ears may be at first somewhat dinned by the noise; your eyes, a little distracted by the hurrying to and fro of the workmen and their machinery. But you will soon forget the noise and the hubbub when you earnestly join in helping to raise an edifice so truly noble as that of Medicine.

A great and attractive feature, connected with the prosecution of medicine, is the open-handedness that everywhere prevails with regard to discoveries. The moment a medical man makes a discovery, however valuable, he tells it to all the world, so that every one may have the advantage of any good contained in it. In consequence of this absence of secrecy, it is in the power of anyone to acquaint himself with and to adopt any measure that is proposed for the treatment of disease. Nevertheless, although there is this free interchange of ideas between medical men in every part of the world, medical science presents somewhat different aspects in different countries. Diseases which are rare in this, are sometimes common in other lands. The type of a disease which may be rare here, may prevail elsewhere. The mode of treating some diseases, differs in different schools. The methods adopted in the tuition of medicine are not everywhere the same. It often happens that certain schools are famed for the facilities with which certain subjects can be studied, for example—although the surgery of England is in many respects decidedly superior to the surgery of France, nevertheless, students have greater facilities for the practice of operative surgery in France than they have in England. Although Physiology and Pathology are in many respects just as advanced in England as they are in Germany, nevertheless, many inquiries connected with these subjects can be prosecuted in Germany with less expense and greater ease than in this country, for, in Germany the imperial powers liberally support physiological and

pathological laboratories, and happily in that country physiologists and pathologists are not pursued by a herd of anonymous scribblers, who, while they wink at all manner of sports however cruel and meaningless, are ready to thrust their waspish stings into anyone who dares to decapitate a frog in the interests of the healing art. Seeing that the aspects of medical science are not everywhere alike, it is very important, that you should visit different schools of medicine, in order to get an education as comprehensive as possible. It is well, after having gone through a complete course of instruction at one school, to visit the chief schools of Germany and France. The Germans and the French have much to learn from us, but at the same time, we have not a little to learn from them. But apart from the mere gain of information, such travel is invaluable. It gives a breadth of conception that can scarcely be attained without it.

In conclusion, I will not detain you with any lengthened remarks regarding the school which you have selected. I think you will find yourselves in excellent company, for it is a notorious fact, that in mental and physical gymnastics, the students of King's College defy the world. I refrain from telling their deeds in the field, but I may be permitted to mention something regarding their ~~powers~~ <sup>travels</sup> in the halls of learning. I might allude to many brilliant feats, but I need go no farther back than the past year, and mention the almost unparalleled achievements of Dr. Curnow at the University of London, and of Dr. Pritchard at the University of Edinburgh. Dr. Cur-

now by his learning, Dr. Pritchard by his learning, and by the great ability and success with which he, in this College, conducted a research on the structure of the Internal Ear—a subject which every one knows to be one of the most difficult within the whole range of Microscopical Anatomy,—both of them have done the greatest credit to this school.

I would now ask you to throw yourselves, with all energy, into the studies that lie before you. Seeing that they are extensive, it is very necessary to proceed in a way that is methodical and persevering. You will assuredly never obtain a knowledge of Medical Science by working at it in fits and starts. Beware of those persons who pretend to learn things without study—they are imposters. Do not fall into the delusion that good luck will help you on, for it will be almost sure to play you false. As Goethe somewhere says,—“it never occurs to fools, that merit and good fortune are closely united.” Constant and careful work is needed from those who pursue medicine. The man who desires success must work for it in medicine, as in everything else. As old Epicharmus has it, “the gods sell everything good for labour.” Of course there are difficulties in studying medicine as in studying other things, but after all, as Marcellinus avers, “all difficulties may be got the better of by prudent thought.”

It is necessary to think much as you proceed. Medical Science needs much sifting and grasping thought. It is necessary ever to bear in mind the general as well as the special bearings of any fact or theory. Any one who does not think, and learn to think for himself too,



is sure to become a mere absorber of facts and ideas. We dont want a lot of dead black surfaces that merely absorb the light, we want surfaces well polished, able not merely to absorb but to reflect the rays.

You need not waste time in wondering what you are to do. The programme is all arranged, you have only to begin to work upon it. Things may be at first new and perplexing, but ere long the road will become comparatively easy to follow.

Above all things it is necessary to work vigorously, hopefully, enthusiastically. Noble deeds are, it is true, not always rewarded as they ought to be, but Cicero was right when he said that "there is a sufficient recompense in the very thought of them."

But even while we pursue the study of a science which surpasses in nobility all other natural sciences, it is ever essential that we cultivate those still nobler influences—

"That keep down the base in man,  
That teach high thoughts, and amiable words,  
And courtliness, and the desire of fame,  
And love of truth, and all that makes a man."

