A Lecture ON

MAN IN HIS ANATOMICAL, PHYSICAL, AND PHYSIOLOGICAL ASPECTS.

*Introductory to a Course of Lectures on the Institutes of
Medicine (Physiology).*

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(Concluded from p. 6.)

HUMAN ANATOMY derives its fullest interpretation from comparative anatomy and zoology. Man has so many points in common with the lower animals that he cannot conveniently be separated from them. The anatomists of the seventeenth century were so fully convinced of this that they laboured incessantly at comparative anatomy. They comprehended the great fact that man is to be regarded as the epitome of the whole animal kingdom, and that what is obscure in him is illustrated and simplified by an examination of corresponding parts in the animal series. Impressed, moreover, with the dignity of man, they sought, by observation and experiment on the lower animals, to discover the functions performed by the several parts of the human body, with a view to founding thereon a rational system of medicine. Apart from the interest which attaches to the study of comparative anatomy and zoology, there is a very tangible and positive gain. No one can fully appreciate what is meant by human anatomy who is not familiar with the leading principles of zoology and comparative anatomy. Comparative anatomy is to human anatomy what a mirror is to an object reflected in it. In like manner, no one can intelligently administer medicine to a human patient who is ignorant of the effects produced by it on the lower animals. A perfectly educated physician should also be master of the veterinary art. Scientific medicine rests directly on anatomy, human and comparative. To know the function of a part we must be conversant with its structure; to understand disease we must be familiar with the laws of health; to comprehend what is meant by death we must grasp all that is included in the term life.

By anatomy, in its widest sense, is meant a knowledge of all the structures which enter into the formation of all plants and all animals, man in particular. By physiology, in the same sense, is meant a knowledge of the function performed by the several parts of all plants and all animals, man included. Physiology begins where anatomy ends.

An anatomist is expected to know, not only the actual structure of the parts entering into the formation of plants and animals, but their mutual relations in every individual and throughout the organic series. In like manner, a physiologist is expected to be familiar with the functions performed by the parts composing all plants and all animals. Physiology teaches us the nature of life and the laws which govern it. The simpler the form, the lower the life; the more complicated the organism, the higher the life. In man every organ has its peculiar life—the life of the individual representing the aggregate life of all the parts. A living being is living and dying throughout its whole substance and throughout its whole existence. In it “we observe an uninterrupted admission and assimilation of new, and a correspondent separation and expulsion of old particles. The form remains the same; the component particles are continually changing. While this motion lasts, the body is said to be alive; when it has irrecoverably ceased, to be dead.”*

The idea of death is terrible to sensitive minds; but, after all, death is only an idea—it is not annihilation. As we did

not make ourselves, neither can we annihilate ourselves, or be annihilated. The body, even when full of life, is in great part dead. Seventy per cent. of that body is indeed water—a by no means stable substance; and some recent observers even go the length of asserting that only one-fifth part of the body lives. Granting that only a fifth part of the body lives, even in the heyday of youth, and that dead particles are constantly passing into the body as food and out of the body as excreta and effete matters, the balance, it will be perceived, inclines rather in the direction of death than of life. Assuredly the being of to-day is no longer the being of yesterday. If this be so, it behoves us to familiarise ourselves with death, this representing the major part of our sublunary existence. All will admit that the body instinct with life is a mechanism instinct with beauty; few will deny that that same body is beautiful in sleep. As an anatomist, I will go further and maintain that it is beautiful in death. The pale skeleton leaf is more remarkable in its intricate tracery than the leaf as seen on the tree; and so of a body in death. Of a truth we are fearfully and wonderfully made; and if we wish to behold the absolute perfection of our bodies we must remove the delicately flushed skin and expose bloodvessels, nerves, muscles, and bones in endless and perplexing succession. There is nothing terrible in all this to one who seeks knowledge for its own sake, and who is resolved to know things as they really exist. We do not shrink from the presence of a shell; why should we shrink from the presence of a skeleton? The one is an external, the other an internal support. Equal familiarity with both would make both equally pleasing. The skeleton is ghastly only to the uninformed; to the philosopher it is full of beauty. The dome of the head (that marvellous arch which contains the brain) is one of the finest domes ever constructed: the face is full of buttresses, supports, and side arches, which delight the very soul of the architect; the vertebral column displays Hogarth's line of beauty to perfection, and gives to the trunk its graceful curves and attitudes; the thorax, broad, rounded, and burly, encases as with bars of steel the vital and delicate organs of the heart and lungs; the limbs, slightly curved and twisted and tapering as they run, terminate in fingers and toes of transcendent agility and grace. In a word, the skeleton is to be regarded as a perfect mechanical marvel. It is an epitome of all architecture. It is stronger, firmer, and lighter than any similar structure hitherto devised by man. It displays in itself every form of joint and every form of support, surface, and lever employed in mechanics. Did not the illustrious Paley show that in the skeleton the Deity himself was reflected? What holds true of the skeleton or hard parts of the body is equally true of the soft parts. The bloodvessels and nerves (the one planted in the heart, the other in the brain) ramify from within and from without, like twin trees, whose branches intertwine and interweave with an infinity of love at innumerable points. The bloodvessels convey nutrient material to the tissues and carry effete matters from them; they are to the body what a river is to a city. The nerves convey impressions from all parts of the body to the brain, and the brain through them flashes back intelligent movements to all parts of the body; the nerves are to the body what telegraphic wires are to a people. The muscles, full, rounded, and swelling, give strength, symmetry, and beauty to the form; they are to the body what a steam engine is to machinery. The lymphatics meander everywhere and overlie the body in a rich network; they are to the body what the leaves and roots are to a plant—they absorb the food on which the body lives. If we go deeper we find other systems. There is the respiratory system, where the blood is purified and changed from a dark purple to a bright scarlet; the digestive system, where the food is cooked and metamorphosed so as to be readily assimilated; the reproductive system, where the future being is mysteriously elaborated; the secretory system, where certain silent-working glands manufacture juices which give a piquancy to all the fluids and solids of the body; and the excretory system, which may justly be termed the scavenger system, inasmuch as it removes from the body politic the effete matters which if retained would prove injurious, if not destructive.

To see these several systems, and to make out and comprehend their mutual relations, we must anatomise. We must draw aside the veil. But this unveiling reveals a higher, or, if you will, a deeper beauty—deeper because

* Lectures on Physiology, Zoology, and the Natural History of Man, by Sir Wm. Lawrence, Bart.; p. 83.

hidden. The interior of a watch is more remarkable than its exterior, and this is a hundredfold more true of our own bodies. The painter and sculptor seize upon externalities, and enchant us with their glowing colours and flowing outlines; the anatomist lays bare the beauty which the integument imperfectly conceals. No one can be a painter or a sculptor who is not also an anatomist; and no one can admire the living body as he ought who turns away from and despises the dead body. Every part of the dead body is replete with beauty. If I were to show you the structure of the heart, or indeed of any one of the organs, you must admire.

As a knowledge of anatomy is necessary to a knowledge of physiology, so a knowledge of physiology is necessary to a knowledge of health. Disease is health perverted, and can only be understood through anatomy and physiology, human and comparative. Anatomy in the present day relies for its advancement upon the scalpel and microscope; physiology upon physics and chemistry. To know the structure and uses of a part, we must be able not only to anatomise and analyse its substance, but also to explain its movements. As in anatomy and physiology we cannot escape from matter, so we cannot escape from physics. Everything that lives is material. But material living things display physical properties: living plants and animals are heavy, elastic, porous; many animals display in their bodies the various forms of levers, the pulley, hydrostatic and pneumatic arrangements, and a host of mechanical contrivances. While we inhabit the earth, we are as much a part of it as any of its mountains or rivers. In this sense we are citizens of the world—sons and daughters of the universe. It is this intimate connexion with the matter and force of the universe which makes us amenable to climatic changes; which makes us laugh in the sunshine, and weep in the shade. There is nothing in nature which does not find an echo in man. If the wind whispers in the woodland or softly trembles in the *Æolian* harp, a responsive chord is instantly struck; and if the lightnings flash and the thunders roll, an innate dread, commensurate with the sublimity of the occasion, is at once engendered.

As the matter of which our bodies is composed is to be regarded as a special contribution from our Maker, so the mind which actuates our bodies is to be regarded as an emanation from the great Mind which rules the universe. In our bodies we behold the perfection of matter; in our minds, alas! only the refuse of a divine attribute. Man, great and grand as he is, is somehow disjointed and broken. Whereas external nature holds on the even tenour of its way, he is liable to disease and dissolution. Whereas the vast mind of the great Lawgiver is true to his sublime purpose and the final issue of things, the mind of man is painfully vacillating and weak. It is as a stray beam to the mighty effulgence of the sun. Still man, even fallen man, is a mighty creature; and that science which deals even with his physical part is a great science. No form of education, however exalted, can afford to set aside anatomy and physiology, and, by implication, natural history, physics, and chemistry. The leading spirits of the great European universities have long seen and felt this, and it seems to me the day is not far distant when these subjects will be taught in every seminary in the land. Already Cambridge has what is known as its "Natural Science Tripos," in which a Master of Arts degree is conferred for efficiency in natural history, geology, chemistry, anatomy, physiology, physics, botany, and cognate subjects.

The physicist and chemist are necessary to the anatomist and physiologist; and I cannot help observing that the founders of the chairs in the University of St. Andrews have shown much sagacity and wisdom in combining anatomy and medicine, and in associating therewith natural history and chemistry, and indirectly natural philosophy. The circle of the sciences widens every day, and Britain begins to feel that unless every department of learning is sedulously cultivated she will cease to be a leader among nations and a pioneer in civilisation and progress. In this we have an explanation of the not unreasonable clamour for science schools, education chairs, and—last, not least—State medicine and hygiene. The period has at length arrived when a knowledge of the laws of health is imperative, not only as regards the leaders of the people, but the people themselves. Ignorance of these laws has already produced incalculable mischief; and civilisation cannot hope

to advance in squalor and filth, for these are synonyms of disease and death. Our large manufacturing towns are scourged with pestilential fevers which science can well avert, and there is no reason why the stunted populations of hard-working and crowded centres should die prematurely. It is lamentable to find comparatively well-educated people wholly, or next to wholly, ignorant of natural history, botany, chemistry, and physics, and—what is more inexplicable—of the structure and uses of their own bodies. How, I might inquire, as a medical man, can a people hope to be healthy who are unacquainted with the laws of health? How can brains be functionally active which are imperfectly nourished, or, what is just as bad, overfed? Is it possible to have a healthy mind in an unhealthy body? Is there no truth in the Latin maxim, *Sana mens in corpore sano*? The alarming increase of insanity of late years conclusively proves that a knowledge of medicine is becoming imperative, not only in professional men, but in all classes of society. The clergyman and jurist should know medicine, if only for the purposes of illustration. The question frequently asked of late years is, "But how is medicine, and the subjects included in medicine, to be made interesting to the many?" I reply, By making them all-embracing. Let us look at man not as an isolated individual, a knowledge of whom can only be acquired in the dissecting-room. Let us look at him as one of the great animal series, and let us contemplate that series in its infinite ramifications and in its totality. Let us regard animals as the indirect product of plants, and plants as the direct product of inorganic matter. Our interest will increase as the subject widens. The more we look into Nature the more we shall love her. No one who observes and thinks can be insensible to the beauty of the mineral kingdom with its galaxy of precious stones; no one who watches the flower open up its innermost recesses to the sun but must feel there is a sympathy between them; no one who looks into the clear blue waters and observes the sea-anemones coquettishly conceal and as coquettishly display their delicate charms, but must know they are in perfect harmony with their surroundings. There is a poetry in the plant and the lower forms of animal life, clinging to the ground like living anchors; for fixity begets helplessness, and helplessness sympathy. But there is a far higher poetry in plants and animals which move, for here there is sensibility and reciprocation. The sensitive plant responds to your touch, and is aware of your presence. The floating medusa pulsates with life and joy. The sunlight and the breeze evoke activity where there is life. The plant throws off its seed to be scattered by the winds. The same wind ravishes one flower and fructifies another. The bee, on busy wing intent on gathering nectar, assists in the fructifying process. The bird, flitting from tree to tree, swallows the dainty fruit and plants it in some inaccessible but suitable region. The sunlight, the breeze, the flower, the fruit, and the bird are all for man. Is it possible, then, that one so highly favoured can take no interest in the beings among which he lives and moves? I hold apathy on this head to be wholly inexcusable. If apathy does exist, I believe it to be entirely due to the fact that we are not taught when young to study the great book of Nature. The mighty volume is not unfolded as it ought to be when our minds are most susceptible. We are not encouraged to examine plants and animals as living things which have a mission to perform, which have a geographical distribution in time and space, and which are useful to man, not only as affording healthful recreation to the mind, but aliment and clothing to the body. Where would man be if left to himself? He is only great as the greatest of all created beings. It is dependence and interdependence which make life enjoyable. We must live, not for ourselves only, but for others; others in the widest and best sense—to wit, the whole animated kingdom. Happiness flies from us in proportion as we narrow our sympathies. The more I reflect upon the subject of education the more I am convinced that one of the grandest avenues of human knowledge is at present all but blocked up by ignorance, superstition, and prejudice. I refer to the great avenue of natural science. Languages, logic, arithmetic, mathematics, &c. are all necessary; but they should have as their foundation natural history, anatomy, physiology, chemistry, botany, and physics. What more natural than to teach children that there is a world outside of themselves—a sky, a sun, a moon, a plethora of stars, a wide expanse of land, a vast ever-changing ocean.

an arcadia of plants, and an interminable series of animals which live and die as they do.

A child, when introduced into the world, should be taught his place in nature. The flower, the butterfly, the bird, and the beast are the natural companions of the child; why should they not be properly introduced to each other? If children and youths were taught to observe the habitats of plants and animals and the purposes subserved by them, they would naturally be tempted to examine their structure. In this they would have congenial occupation, and would form habits of close observation and reflection, which could not fail to be eminently serviceable to them in after-life. When mind and body are both expanding, healthful recreation should be blended with study. I can conceive nothing more painful than to see a ruddy energetic child puzzling over a sum in a corner. The same child, a thousand to one, would take delight in pulling a flower, or in catching an insect, and very little coaxing would be required to get him to dismember and examine one or both. This tendency to break up, and in some senses to destroy, only requires direction to produce a race of anatomists and physiologists of which Britain would be justly proud. Book lore is all very well; I have nothing to say against that. Everything is good in its own particular season. What I complain of is the rearing of British youth as if there were no green fields, no flowers, no birds, no beasts, no design, no great First Cause. We do not want mere bookworms—men who dogmatise from their closets and contemplate everything through coloured glass. We want active, earnest, practical workers, who take nature as she is, and who observe, think, reflect, and act for themselves. We ought to know, not only our place in nature, but how to keep it. We ought to work at, and not dream about, art. Nature and art are both practical. If there is power in us, it ought to manifest itself in a practical form; it ought to resolve itself into motion in one direction or other. Whichever direction this motion takes ultimately, I sincerely hope that in our youth, at least, it may be spent in contemplating God's most marvellous works. Let us seek, and we shall assuredly find

"Tongues in trees, books in the running brooks,
Sermons in stones, and good in everything."

ON THE TREATMENT OF ACUTE ORCHITIS BY PUNCTURE OF THE TESTIS.

BY HENRY SMITH,

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IN the year 1864 I brought before the profession, in the pages of THE LANCET, a method of treating acute orchitis, which in my simplicity I imagined to be original. This consisted in puncturing the body of the inflamed organ by a single incision, extending in depth to half or three-quarters of an inch. My friend, Dr. Bumstead of New York, very properly took me to task in his work on Venereal Diseases for assuming it to be original, and pointed out that Vidal de Cassis had already long before advocated a precisely similar mode of treatment, had adopted it "with impunity in four hundred cases, and claims for it preference to all other modes of treatment."

Since this period I suppose I must have performed this operation in more than one thousand cases, and with results which have satisfied me equally with the French surgeon. Hundreds of my pupils at King's College Hospital have witnessed this treatment, and thus the results have been pretty satisfactorily ascertained, and I think I am correct in stating that the majority of these gentlemen have carried with them into their practice the conviction that this plan is the most speedy and efficient mode of treating this painful affection.

It is only in cases of the most acute form of the disease that I recommend this treatment, and in by far the majority of these instances I have found that the relief given to the pain in the testicle itself is very marked, and almost instantaneous; in fact, so much so that patients who come to the hospital in severe agony are enabled to

walk out of the building comparatively free from pain, and in many instances joking about the treatment to which they have been subjected. I have had patients return to me for similar treatment to the other testis, after undergoing the operation on the one at some previous time, and than this there can be no better proof of their estimation of the relief which is produced by the puncture.

When questioned by pupils as to the *modus operandi* of the remedy, I have answered that the sudden relief from acute pain is due to the circumstance that the unyielding tunica albuginea is freely incised, and that the tension is thus taken off the compressed and swollen testis; in some instances there is more or less serum effused into the cavity of the tunica vaginalis, and the withdrawal of this greatly assists in giving relief, but in many instances there is hardly any effusion of serum. In most cases undoubtedly the loss of blood produced is an important factor in the rapid subsidence of pain, but in some cases so little bleeding is produced that the relief cannot be explained in this way. Vidal de Cassis explained the sudden relief by the compression being taken off the testis through division of the tunica albuginea. In the old-fashioned treatment which I was taught to adopt, large quantities of leeches and nauseating doses of antimony were the chief ingredients; yet nothing like the speedy and effectual relief from puncture was produced, and every now and then a violent attack of erysipelas would be brought about by the leeches. As a general rule the puncture is productive of so much relief to pain that no other treatment is required, except to support the part, and occasionally to use compression by strapping—a means well calculated to diminish the swelling, which is scarcely at all reduced by the puncture, and the persistence of which annoys the patient.

I have seen none of the bad results from puncture as have been portrayed by the fertile imaginations of alarmists, who were haunted in their dreams by visions of hernia testis, atrophy of the organ, and emasculation. I had once a case of a slight protrusion of the "tubuli seminiferi," well known to my pupils; but this occurred in a young strumous man who, on the day following the operation, received a severe blow on the scrotum.

I have not met with a case of atrophy of the testis, but I have seen two cases in private practice, in young healthy persons, where the testis was quite destroyed from the violent inflammation of the organ, and where the good old-fashioned plan of leeches, &c., was used; in all probability puncturing the testis in these cases would, by relieving the inflammation, have prevented the destruction of the organ.

On looking into Mr. Holmes's new work on Surgery, I find, at page 797, the following remarks in reference to the treatment of orchitis:—"I never saw any need for puncturing the testicle, nor have observed any relief from following the practice in the very few cases in which I have seen it tried, nor can I see why it should relieve the pain." I must confess I was much astonished to read this statement when it was pointed out to me by one of my old assistants who had seen me practise this operation in a great number of instances; and it is difficult to reconcile it with that enunciated by Vidal de Cassis, and with the conclusions arrived at by myself after the experience of a thousand cases. Either the French surgeon or myself must have been grievously deceived if Mr. Holmes be correct in his observations, or the difference in our conclusions about a simple matter of fact, so capable of demonstration, must be accounted for in another way; and the only explanation I can conceive to be at all reasonable is that Mr. Holmes, in the very few cases in which he has "seen it tried," did not have the opportunity of witnessing the remedy applied in the cases for which it is adapted, or that the operation itself was not employed in the manner pointed out by Vidal and myself. It does not appear, too, that Mr. Holmes has actually practised the treatment himself with his own hands, but has merely "seen it tried" in "very few" cases. This, possibly, may be the reason for the great difference in the results noticed. Possibly, however, I may have been too much and easily pleased by the treatment especially advocated by myself, and have seen results with too favourable eyes, and thus have been led into error. With a view, therefore, to prevent this error, and to see how far independent observers agree with me, I have asked for the opinions of several independent witnesses—gentlemen who