The scientific place and principles of medical psychology : an introductory address : by T. Laycock.

THE

SCIENTIFIC PLACE AND PRINCIPLES

OF

MEDICAL PSYCHOLOGY:

AN INTRODUCTORY ADDRESS.

BY

T. LAYCOCK, M.D., ETC., ETC.,

PROFESSOR OF THE PRACTICE OF MEDICINE AND OF CLINICAL MEDICINE, AND LECTURER ON MEDICAL PSYCHOLOGY AND MENTAL DISEASES, IN THE UNIVERSITY OF EDINBURGH.

Δεῖ μιτάγειν τὴν σοφίαν εἰς τὴν ἰατρικὴν καὶ τὴν ἰατρικὴν εἰς τὴν σοφίαν.

"Philosophy must be infused into Medicine, and Medicine into Philosophy."

EDINBURGH: PRINTED BY MURRAY AND GIBB.

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REPRINTED FROM THE EDINBURGH MEDICAL JOURNAL, JUNE 1861.

THIS is the third summer session in which I have delivered a course of lectures on Medical Psychology, combined with practical instruction at an asylum in the management of the insane. For the medical student such a course naturally resolves itself into two divisions,—namely, the principles of medical psychology, and their practical applications to corporeal and mental diseases. But the principles of the science are capable of a general application to human affairs, and, in particular, to the duties of the clerical, legal, and scholastic professions. In the original plan of the course, I had in view the attendance of members of these professions; for I was not without hope that the more energetic and enterprising of them would discover how much the knowledge it includes would tend to their professional success. In this respect I have been disappointed. I shall, therefore, make the present course more purely medical, and open a special class for the non-medical students if such come forward in sufficient numbers.

It must be considered a remarkable circumstance that so little attention is paid in this country to a department of science so generally available. The education of youth can only be considered complete when it secures the full development of all the faculties of the human being, as well as the communication of knowledge. Yet it is conducted, for the most part, either on empirical principles or under the guidance of superficial and mischievous dogmas. I would not, in even the slightest degree, undervalue the worth and labours of the scholastic profession; we see on every side what zeal, high

talent, and enterprise is brought to bear on the education of youth. What I object to is this, that its members are not educated more systematically with a view to their calling, by careful training in the physiology and mental hygiene of childhood and youth; and thus that constant correction of errors in detail which science gives to experience is not secured. Now, in truth, a thorough knowledge of medical psychology is as necessary for success in education as for success in the practice of medicine. The capability of directing the attention, strength of memory, docility, and fitness for various branches of knowledge, are primarily dependent upon physiological laws, which the teacher must know thoroughly if he would discriminate in teaching. Even the effects of action and rest of the muscles, and of confinement in a close atmosphere, upon the intellectual powers and moral qualities of children, can only be estimated in a practical way on physiological grounds. So important a matter as the proper supply of air to scholars and teachers while at work (without which there must of necessity be imperfect results), is hardly attended to systematically, from an imperfect knowledge of scientific principles. Our own College class-rooms, as many of you know, are very defective in this respect. But perhaps it is most lamentable to see the overcrowding in preparatory schools for young children, usually held in what are or have been private houses, and in which the air-supply is wholly insufficient for even maintaining health at all. If schoolmasters were thoroughly imbued with the simple but fundamental truth, that more oxygen is necessary for the brain in action than in repose, they would never rest until they had secured for themselves and their charge at least as ample a supply of air in the class-rooms, as is thought necessary for the sleeping-rooms of paupers and prisoners. I mention this as a mere illustration of what medical psychology would teach the schoolmaster on one point only for the successful exercise of his profession; but I will venture to say, that, if he had a systematical training with appropriate scientific culture, as we members of the medical profession have, the scholastic profession would occupy the very highest position amongst the learned bodies. In the cases of children or youth with impaired or perverted faculties, from ill health or imperfect cerebral development, the duties of the two professions approximate very closely. How much may depend upon a correct diagnosis on the part of the teacher is proved by many sad instances of suffering and death inflicted on children at school. I need only refer to the case of Thomas Hopley as an illustration of this. That unfortunate schoolmaster never intended the death of the poor imbecile boy committed to his care, but the contrary. It is well known that he was a zealous and energetic sanitary reformer; and, at the time his career was cut short, was full of schemes for improving the hygiene of education. To him, with his pushing temperament, it was a "little knowledge" which was the "dangerous thing." He imagined that a defective intellectual will, manifested by inaptitude for mental effort, was a "powerful" will; he mistook

the *vis inertiæ* of cerebral imperfection for the *vis viva* of vigorous action. Locke (he found) had laid down categorically, that "an obstinate disobedience must be mastered with force and blows; for this there is no other remedy." And, accordingly, the sole remedy, in obedience to Locke's dogma, was duly administered, even to death. It is hardly necessary to say that the "remedy" is just as rational in the treatment of imbecile youth as the stripes formerly prescribed by Cullen for the cure of insanity. Now a thorough training in the principles of medical psychology would have directed all this energy and zeal in the right channels, and would thus have saved this unfortunate man from the distressing and ruinous results of his superficial dogmatism.

It is not otherwise with the clergy. I lately paid a visit to the Southern Counties Asylum, near Dumfries, and was informed by my friend, Dr Gilchrist, the able superintendent, that there were then five persons under treatment in the institution who had become insane in consequence of the excitement of "revival" meetings, and that others had been received into the Asylum who had been rendered insane from the same cause within the last twelve months. But Dr Gilchrist pointed out to me the important practical fact, that the cases of insanity thus induced came exclusively from certain localities where the clergymen placed no restraint upon the religious excitement which these meetings developed, but rather encouraged it. Similar meetings had been held in other districts without any bad results to the intellect, but in these the clergymen judiciously moderated and controlled the excitement. It cannot be doubted that the clergymen in the first mentioned localities acted in ignorance of mental laws; for it is inconceivable they would knowingly and deliberately encourage proceedings which necessarily lead to one of the most terrible afflictions of humanity. A moderately practical knowledge of medical psychology would have preserved them from these sad results of their ministrations; and they would have secured, like their more judicious brethren, the use of the means without the abuse.

Look next at the administration of justice. The important question of civil and criminal responsibility turns, like discrimination in the education of youth, upon a diagnosis of the mental condition of the individual, founded upon physiological and pathological laws. The skilled physician is the proper person to be intrusted with this important duty; yet such is the present state of the law in Scotland, that if he performs it honestly and well in the case of insane persons for whom restraint is necessary, he incurs the risk of harassing law-suits. So, also, as to the treatment of criminals. Every year thousands are let loose from prison, the authorities being well aware, when doing this, that they will certainly and speedily again commit crime, and be tried, sentenced, and imprisoned, and finally released as before. Justice is wholly helpless to restrain or amend these men; and the evils they inflict on society are borne because they are believed to

be inevitable. But that positive mental science which medical psychology develops, would teach the legislator both why these criminals are incorrigible, and how they may be made useful members of society. None of the great social reforms of the day would be easier than the development and application of sound principles of mental science to the management of incorrigible vagabonds, thieves, and drunkards.

This neglect of mental science and its applications extends, I regret to add, to our own professional culture. No intelligent physician or surgeon really doubts, or can doubt, the value of medical psychology in the treatment of diseases generally, as well as in its special applications to mental disorders. Yet neither the Medical Council of the empire, nor any of the national examining boards, requires a knowledge of the subject as a part of the professional curriculum. The medical student is expected to know the nature of plants and animals; but the highest knowledge—a practical knowledge of human nature—is not required.

Doubtless one reason of this neglect of so important a branch of modern knowledge is, that psychology, considered as a practical science, has but lately been developed in this country in its applications, while speculative psychology was found almost useless. Perhaps, too, the neglect is partly due to a misconception as to what medical psychology as a science consists of. It is generally thought, even by persons otherwise well-informed, to be identical with that department of the practice of medicine which treats of the causes, nature, and treatment of insanity; and that it has no wider application to the practice of medicine, or to human affairs in general. On the other hand, the layman, entertaining very similar ideas, thinks the subject is of no interest or importance beyond purely professional circles. The main cause, however, is the well-known fact that public bodies rarely lead public opinion, but are led by it; otherwise our educational boards, convinced as their individual members must be of the practical importance of medical psychology, would, long ago, have diligently fostered it, for this could have been effectually done simply by making it a part of the professional curriculum.

I venture, however, to express the opinion, that many years will not elapse before medical psychology, or (what is the same thing) a practical mental science, will be as much cultivated as chemistry. For it is, in truth, nothing more than the chemistry of human nature; and as such, when rightly understood, will be made a subject of study by every intelligent man. In the meanwhile, it is an obvious duty to endeavour to hasten the progress of the science, and therewith all those beneficial applications of which it is capable. We will, therefore, inquire into the place which psychology proper occupies amongst the sciences in relation with medicine, so that we may be able to have a definite idea of the fundamental principles, the objects, and the methods of medical psychology, in so far at least as they are taught in this course.

The place of psychology amongst the sciences auxiliary to medicine is fixed by a general principle long recognised, namely, that a science is in intimate relation with medical science and art in proportion as it is available to the uses of the physician. Now, the physician applies the sciences generally with two distinct objects,—namely, first, to advance his art by rendering them subservient to practical ends, such as pathology, therapeutics, dietetics, and hygiene; and, secondly, to develop the great science of life itself (termed biology), because it is upon this that medicine itself rests as a science. Botany and zoology purely are subservient to biology, or the science of life, as subordinate branches of it, and through it to the science of medicine; but *medical* botany and *medical* zoology describe the plants and animals, or parts of them, which cause or cure disease. They thus only advance the art of medicine. The question, therefore, as applied to psychology, is simply this: What are the relations of psychology to medicine, considered from this twofold point of view? or, in other words, how far does psychology serve to develop the great science of life (or biology), and how far is it applicable to the practice of medicine in its various branches of pathology, therapeutics, dietetics, and hygiene?

A very short consideration of these questions will serve to show that psychology, as compared with the other natural sciences, stands in a wholly exceptional position in relation to medicine, whether studied as a science or an art; and this because it is hardly to be classed with the natural sciences at all. In the largest meaning of the term, psychology is cultivated according to two distinct methods, namely, the metaphysical and the physiological. Now, the metaphysical psychologists (by far the most numerous) investigate the laws of consciousness and thought wholly apart from the laws of life; and for the express reason, either that the soul, while active on earth, is or may be independent of the living body; or else—admitting the necessary connection between life and consciousness—because that connection is wholly mysterious and inscrutable. Thus it happens that, by both classes of metaphysical psychologists, psychology is severed from biology or physiology; logically by the one, of necessity by the other. The one class positively forbids the union, as contrary to first principles; the other virtually forbids the union, as contrary to possibilities. Hence medicine, as founded on the great science of life, derives no help, directly at least, from metaphysical psychology; it can only use so much of the knowledge of the laws of thought and consciousness in the abstract as metaphysics has attained to.

Physiological psychology is only of recent origin, and has arisen concurrently with the advances made in neurology. It has been cultivated in two modes,—namely, as a department of the science of life, and as a system of philosophy. Of late years, eminent physicians and surgeons (as Sir H. Holland, Sir B. Brodie, Dr Carpenter, and others) have cultivated psychology from a physiological starting-

point. These, however, have not developed a system, but have rather leaned to speculative psychology as the basis of their researches. The school of phrenological psychology is also of this class, but it claims to be systematic. Under Gall and Spurzheim it sprang, like the other sciences of life, out of medicine; and, if it had remained in connection with medicine, might have attained an equally high position as any of them. But, unfortunately for its progress, it was too quickly severed from the medical sciences, and constituted into a distinct and popular art, as cranioscopy. The practice of it then fell into the hands of persons either, for the most part, devoid of physiological training, or else who had a stronger bias towards philosophy than biology. In this way it became wholly unscientific, or took an ethical and philosophical development; and its progress, consequently, as one of the biological sciences, was checked. It is for this reason that phrenology has hardly made any progress as a science since the days of its founders; and not to advance is to recede.

The philosophical school of physiological psychologists is variously constituted, but may be divided into two divisions, the German and British. The German is highly speculative, and is perhaps best represented by Oken; the British school offers less of the speculative, and more of the practical element. As examples, I would name my friend Dr Morell, Professor Bain, and Mr Herbert Spencer. Mr Spencer is now engaged upon a most elaborate system of philosophy, which will include principles of a physiological psychology, not differing, according to the programme, very widely from those developed in my Text-book, published last year; and Dr Morell is completing what will probably be a very valuable system of psychology. It would have been better, perhaps, if this school of physiological psychologists had adopted more decidedly the fundamental principles of the phrenological; but it has manifested so distinct a leaning to the metaphysical or speculative method, that it remains yet to be seen how far it will develop the physiological side of psychology so as to bring it within the group of the biological sciences available to medicine. And with this uncertainty as to the biological basis of the school, the principles which have been developed have not as yet been shown to be capable of special applications to medical science and art, as the principles of phrenology are; and I here wish to distinguish phrenology from cranioscopy. To this end psychology must take up, I venture to say, a more decided position in the group of biological sciences.

Be all this as it may, however (for the subject admits of great difference of opinion, and I offer these considerations suggestively only), I do not hesitate to affirm the practical conclusion, that psychology in general, of whatever school, is not as yet in the same position in regard to medicine as the other sciences, whether we consider it as one of the sciences of life, or in its practical applications to pathology, therapeutics, dietetics, and hygiene. And it necessarily follows

that the position of medical psychology must be in accordance. Looking at the position of psychology proper, it is clear that medical psychology must take an independent place between biology on the one hand, and metaphysics on the other. It cannot ignore the vast labours of the metaphysicians; it must, of necessity, take in all that biology has accomplished. Hence its method must be eclectic, to the end that every solid result of every kind of inquiry may be made available to its scientific and practical development. It must virtually be a science of mind developed as a science of life.

Or, briefly, medical psychology must be cultivated independently as a positive and practical science, and not as a mere offset from speculative, metaphysical, or philosophical systems of psychology. For it is this positive and practical element alone which will secure not only a solid foundation, but also the best materials for the superstructure of a science of mind, since it demands definiteness and clearness as to principles and facts. Such an element, medicine, whether considered as a science or an art, affords; and hence it is that she has been the fruitful mother and the nurse of almost all the natural sciences, as I trust she will yet be of psychology.

These preliminary considerations and conclusions enable us to mark out some, at least, of the objects and fundamental principles of a science of medical psychology as thus defined. In the first place, its object is living man; that is, as he exists on earth, and not as a disembodied soul, or as thinking, feeling, and willing, independently of his organization. It absolutely excludes, therefore, both a speculative ontology and a mystic spiritualism. Medicine, being founded on the science of life, deals exclusively with the laws of life; consequently, medical psychology, as I propose to teach it, examines mental states exclusively in correlation with the vital states with which they are necessarily coincident in the living man, and without which they cannot take place. If we enter at all upon speculative questions, it is solely to get a starting-point for observation and induction; and this is required in all the natural sciences.

2. Its object is man in all states of consciousness whatever, and not restrictedly to those in which he acts as a rational or intellectual being. As practically considering human happiness and human suffering, it includes therefore all corporeal as well as all mental conditions in reference to these. And to this end it holds the fundamental principle that consciousness is one, whatever the conscious state of the man may be, or however caused. Pain or pleasure, of every kind, consists only in different modifications of the same consciousness; and its excitation or relief, therefore, whether it be mental or corporeal, depends on a knowledge of the same general laws.

3. Medical psychology affirms the fundamental principle of physiology, that no change whatever arises in the consciousness without a corresponding change, or series of changes, of some kind in the organism. And the practical conclusion necessarily flows from this prin-

ciple, that to determine what changes in the organization coincide with changes in the consciousness must be its fundamental object, without which no truly practical science of mind is possible, but only speculative systems. In this particular, medical psychology differs wholly from speculative psychology (which expressly excludes this inquiry), and follows therein its own independent course; for it teaches that, devoid of this knowledge, we can never attain to a science of consciousness at all,—that is, to a knowledge of the order of vital events, in virtue of which those changes in the consciousness known as pleasure, pain, desire, aversion, perception, thought, impulse, passion, will, and the like, arise, are intensified, are disordered, or cease. Neither, devoid of this fundamental basis, can we have any sufficient theory of neuralgia or melancholia, of delirium or of insanity, or of the influence of climate, diet, regimen, and drugs on the mental powers; nor can we establish otherwise a scientific basis for mental hygiene and mental training, or education. In short, without a knowledge of the mutual relations of vital and mental changes, no practical mental science is possible, and therefore no true medical psychology.

4. While we affirm as a fundamental principle, that changes in the organization necessarily coincide with mental changes, we are not materialistic; on the contrary, we postulate Force as the first cause of these changes. It is not matter, but the forces of matter as manifested in living things, upon which these changes immediately depend. This general principle only affirms a recognised general law of creation. Unless the forces of matter were ever operative in inducing change, the phenomena of creation would cease. Ceaseless change within the limits of its laws is the order of creation. When the changes cease which constitute the phenomena of life, it is death. But still this is only a change in the mode of being; and if medical psychology do not follow the inquiry further, it is because it recognises the impossibility of any scientific inquiry being instituted in that direction. The order of phenomena beyond the grave is matter of faith, and not of science or observation.

5. The unity of the phenomena of life and consciousness in man implies a unity of forces and laws. Hence the laws of the mental and vital forces should correlate each other. Now, the highest development of consciousness is the Reason, or a knowing direction of all the powers to the attainment of desired or desirable ends; consequently, the laws of reason itself must be correlative with the laws of life and organization. But the converse of this proposition is also true, so that the principles of biology must correlate the principles of mental science.

I wish to dwell upon this fundamental principle very emphatically; because I think, so long as physiologists hold vital forces and laws to be wholly distinct and independent of mental forces and laws, both biology and psychology will make but slow progress; and I think I shall be able to prove to you how simple are the general

laws common to the two classes of phenomena, and how capable they are of application to an infinite variety of changes in both health and disease, and whether of the body or of the mind. But, to attain this clear view of the general principles of mind, we must take a wide sweep of the horizon of life. I shall not, however, lead you through a trackless desert to this higher standing-point. I shall endeavour to apply to psychology the sure and comprehensive method which has been found so available in life and organization. According to this method, we investigate from below upwards; thus passing from the most generalized and most homogeneous organisms to the most evolved and most heterogeneous, and tracing the evolution of structure and function from below upwards, till we concentrate all our knowledge on the study of man. Palæontology shows that thus organisms have been developed on this earth; philosophical zoology shows that thus they exist; comparative anatomy and embryology show that thus each individual is developed. Nothing is more certain than its results as applied to these departments of biology. This method, therefore, so successful in its application to the other sciences of life, so natural and, I may add, so logical, we will apply to medical psychology. We will trace, from below upwards, the evolution of the instincts, passions, emotions, sentiments, intellectual powers of man, as we would trace the evolution of the nervous system or of the organism. We will commence with the simplest forms of life, and show what community there is between the instincts of the zooid and of humanity, and what relation between modes of vital action and mental action; drawing our illustrations mainly from pathology. In this way we shall attain to a knowledge of the law of psychological development and mental differentiation, just as the biologist attains to a knowledge of the laws of corporeal development and physiological differentiation, while at the same time we apply them. In short, we shall bring man into unity with other created things, and thus avoid a multitude of obstacles to a knowledge of human nature, which prejudices, preconceived notions, and hypotheses founded upon the narrow basis of a restricted metaphysics, raise up on all sides.

We shall not forget, however, that we have to deal with degeneracy and disease, and shall therefore endeavour to develop the principles of a psychological pathology out of our psychological biology. In attempting this, we shall have to reverse our method, and inquire by what laws retrocession takes place from the higher to the lower forms and modes of life, and organization, and consciousness. This is a branch of science little cultivated as yet; but I hope to be able to show you that the principles of mental pathology are as easily comprehended as those of biology or psychology, when the phenomena we investigate are examined by the light of great general laws.

I will now, in conclusion, direct your attention to one or two primary correlations of biological and psychological laws, as illustra-

tions of the principles we shall develop and apply. You are aware that the fundamental or primary element of consciousness is the feeling of being one, or an individual—the "Ego" of the metaphysicians. It is this one, this "I," this individual, that is the subject of all the various changes in the consciousness; *I* feel, desire, think, reason, etc., etc. But it is only as a living man—an organized being. Now, what is the corresponding or correlative vital or biological law—equally primary and fundamental, and equally inclusive? It is the same law of unity, in virtue of which all the multitudinous elements of the body and all the different organs are developed in such fitting relation to each other, that they not only constitute one thing—*i.e.*, an organism—but so combine in function and duty, however diverse, that the one identical thing continues to exist in time and space, until the object of its existence is attained, whatever that may be. This law of union of many parts into a harmonious whole is, in fact, not only the law of all life, but of all creation—of the universe—that One absolute, which includes all created things whatever. The results of the law are manifested in the consciousness, as the idea, notion, or feeling of being one.

This law of unity is to medical psychology what the axiom—the whole is equal to the sum of all its parts—is to geometry. The simple law, that unity of consciousness correlates unity of organization, is an essentially fundamental principle. I shall not dwell upon it now, because you have access to abundant illustrations and applications of it in my Text-book, Part iv., chap. 9.

The second law is that of *self-consciousness*, in virtue of which the individual not only feels as one, but also as being not another. He divides the things that come under his cognizance into the "me" and "not me," to use the phrases of the metaphysician. This is the vital law of duality and dichotomy. Developed by the metaphysician, it reappears as the law of "relativity;" it is the foundation of the "dualistic" theories of metaphysics, and is applied in a great variety of modes by speculative philosophers and physicists, to hypotheses and theories. Without the dual relation of things there could be no change, no phenomena, no life, no thought. Hence it is that we put soul in relation with body, force with matter, the Creator with creation, in all our inquiries; for out of relation to each other there can be no satisfying inquiry into these things.

But let us inquire,—To what fundamental biological law can we refer pain, and pleasure, and desire? We discover, when observing the functional activity of living organs, that if their machinery works perfectly, there is no pain experienced; but usually, on the contrary, a sense of pleasurable enjoyment of life. But if their functions be disordered, then suffering and disease arise. Now, it is for the exercise of these functions that, according to physiology, they are constructed, and undergo never-ceasing change; or, in other words, they are formed and act for certain ends. We, therefore, formularize the results of our experience and observation, and say that

pleasure arises when the results of the operation of the vital forces accord with the ends aimed at; pain is felt when the results are imperfectly attained, or not attained at all.

As to desire—it is felt when the man seeks after these ends; or, in other words, is that state of consciousness which accompanies the effort of the organism, as a whole, to attain to the ends for which it is constructed, in whole or in part. The state of consciousness which coincides with the effort or act of energy, is what Sir W. Hamilton terms a "conation;" and is that which is known commonly as an act of will. But the "conation" may be without a knowledge of the ends or of the means for their attainment, in which case it is instinct; or there may be full knowledge of both, when it is reason. Between the two extremes there is every conceivable degree of knowledge and desire. Now these fundamental doctrines as to the correlation of the laws of life and mind imply that ends are aimed at and attained in creation; and that the forces of matter act according to laws, the results of which are the ends thus aimed at and attained. Or, in other words, without affirming an absolute doctrine, we lay it down as an induction, drawn from observation and experience, that design, and therefore a designing power, guides the vital forces, as subordinate things, to the attainment of certain ends. This is the fundamental doctrine of teleology. I cannot understand how any biologist can deny the principle; but it is denied by men who look upon the doctrine of ends as little better than a superstition, or, at the very least, as a doubtful hypothesis. Every physician knows, I think, that the uses of organs is the main question in anatomy and physiology; and that, if their uses be not known, their pathology and therapeutics are defective. I need only refer to the spleen and suprarenal capsules as illustrations. We are still in doubt as to the functions or uses of these viscera, and are therefore equally in doubt as to their diseases. And this would be a sufficient reply to the anti-teleologists. But I must add also, that unity of science is impossible if a law of design be not admitted; for I apprehend none will deny that every rational being designs, and plans, and arranges, before he acts as an organized being. Now, the *law* of design in vital energies correlates the *consciousness* of design in mental energies. Just as we feel we are one, and energize or act as one, in accordance with the vital law of unity, so we feel we act to ends as rational beings, in accordance with the vital law of design. If we separate, in observation and inquiry, the laws of consciousness from the laws of life, when thus inseparably united in fact, we not only fall into an error of method, but render impossible that unity of all the sciences which is now believed to be the final and fitting result of all human knowledge.

These general doctrines will suffice as examples of the fundamental principles which we shall have to develop and apply to mental diseases especially, and to the practice of medicine generally. The opportunities we shall have for practical observation of the insane at

a large asylum, will enable you to test their capability of application to the former; while in the wards of the Infirmary you will have cases under daily notice, which will enable you in like manner to apply the principles at the bedside of the sick; and at the close of the session I shall invite you to examinations, which will test your knowledge both of the principles and the practice of medical psychology, in especial relation, however, to mental diseases.

[The text-book referred to[1] (p. 10) is necessarily encyclopædic in its character, to meet the present aspects of mental science. It first develops an appropriate Method; for, without this, neither progress nor a useful arrangement of what is known is possible. It then summarizes the results of Experience, whether attained by common sense or metaphysical inquiries, with a view to the elimination of principles. Proceeding from these as a starting-point, it teaches the fundamental correlations of the physical, vital, and mental forces and laws, under the two heads of Teleology and Biology. These subjects occupy the first volume.

In the second volume, the principles and laws thus evolved are applied to the development of a scientific psychology in the first place, and then of a mental physiology and organology. In this part of the work all the more recent discoveries in natural history and zoology, in comparative anatomy, in the development, structure, and physiology of the nervous system, and in mental physiology and pathology, find their appropriate place. By this plan the study of the connection of body and mind is placed on the broadest scientific basis; and the work is made to constitute a systematic summary of our present knowledge of life and organization and thought in their reciprocal relations.]

[1] *Mind and Brain; or, the Correlations of Consciousness and Organization: with their Applications to Philosophy, Zoology, Physiology, Mental Pathology, and the Practice of Medicine.* 2 vols. 8vo. With numerous Illustrations. Sutherland and Knox, Edinburgh; and Simpkin, Marshall, & Co., London.

MURRAY AND GIBB, PRINTERS, EDINBURGH.