PSYCHICAL OR PHYSICAL.*

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We live in an age of scientific surprises, especially within the realm of those sciences which have to do with the origin and nature of man, and are "making grand and not altogether fruitless efforts," as Mr. Herbert Spencer‡ truly says, "to unroll the secret of the human mind," but thus far the microscope, the ophthalmoscope, the reagents of an advanced and advancing chemistry, and all the appliances of modern psycho-physiological and psycho-pathological research, have seemed to reveal to us but dimly, the neurotic pathway over which thought travels within the brain, or the actual dwelling place and origin of our specific mental actions. With these telescopic aids to mental vision, the cerebro-histologist obtains an enlarged, although not altogether satisfactory view.

As Moses was permitted to look over into the promised land, so we are enabled to look within "the dome of thought," and locate the dwelling place of mind *in the aggregate*, in the free surfaces of the ventricles, and convolutions of the hemispheres of the cerebrum, but not to possess and occupy the particular portions of the brain, concerned in the special functions of mind.

* We have purposely chosen the language of Dr. Maudsley, wherever we could substitute it and express our own views, hence the number of quotations from this author in the paper.

† Read before the Association of Medical Superintendents of American Institutions for the Insane, at the meeting held in Nashville, Tennessee, May 19, 1874.

‡ Preface to philosophy of style.

We always discover an intimate relationship between psychical manifestations and physical action, but how mind acts with and through, and how it is influenced by and with the molecules of the brain, we have not been enabled to determine in a manner so satisfactory as to leave the reason and consciousness no room for dissent.

As the field of scientific research enlarges, and investigations increase therein, it is not improbable that some of the earnest votaries of psycho-pathological and physiological science may yet trace the actions of the mind to their true locality in the brain, and reveal in very truth the ideational, emotional and sensory cells, their chemical, anatomical and isomeric states, by perhaps an enlargement and multiplication of our present methods of research. The thought molecule, if it ever be found, will probably be discovered to be more subtile and infinitesimal in its organization, than any nerve cell yet revealed to us by microscopic vision. The ideational cell may ever remain what the atom is to chemistry, a thing of conjecture, resting solely upon plausible supposition. That there are, however, cerebral thought molecules which have to do with the evolution or manifestation of thought in *mens sana* and in the manifestation of *mens non sana*, investigation up to the present day, gives us just warranty for the conjecture, and whether we shall ever be able to demonstrate the fact or not, beyond the possibility of doubt, we may as safely assume this, as to assume the ultimate atom.

The conjecture is as plausible as the undulation, or the emanation theory of light, or the undulation theory of sound, or other theories in physics or chemistry. The doctrine of molecular disintegration accompanying the manifestation of thought, is the analogue of that other doctrine, first advocated in 1852, by my

gifted friend and preceptor, Dr. I. H. Walters,* late Professor of Physiology in the St. Louis and Missouri medical colleges, that muscular disintegration is the condition of muscular action, and which was incorporated by Dr. Carpenter in his physiology, and is now generally accepted as true by all physiologists.

There can be no doubt that the general result of cadaveric examinations, whenever mental derangement leaves any pathological sequelæ, is to discover lesions of the cineritious matter and the ventricles, along with those destructive changes elsewhere found in the cerebral mass, (extensive softening and other lesions of the white matter being often unaccompanied with insanity,) though Rokitansky, Andral, Virchow, Vanderkolk, Leidersdorf and others speak of inflammation of the duramater in connection with insanity; and circumscribed affections of each and all the meninges, and every part of the brain have been described co-existing with partial or general mental aberration, by accurate and creditable investigators in psycho-pathology. This is, perhaps, the experience which all of us have gained in the dead house, and though we are not in a position, as regards our knowledge of the morbid appearances of the brain, to frame a proper nosology, embracing all the forms of insanity, as discovered to us in the different symptomatic manifestations; and though we cannot find an absolutely unerring definition of the disease, based solely upon the pathological evidences, it is nevertheless reasonably certain that the whole brain being the recognized organ of the mind in its healthy, natural action, does not cease to be the organ of the mind when its manifestations are disordered and unnatural; and it is, perhaps, beyond a reasonable doubt that "im-

* Thesis for degree of Doctor of Medicine, by I. H. Walters, University of Pennsylvania, 1851.

portant molecular changes do take place in those hidden recesses of the brain," or those nervous channels of communication which lead to and from the mind, but to which we have not yet, by sight of science, been enabled clearly to penetrate; but which the scalpel, the microscope, and the re-agents and appliances of advancing chemical physiology and pathology, may probably some day more intimately and clearly reveal to us, and that those atomic changes *accompany, precede and follow* the rational and irrational manifestations of mind. That they will be found to be the media through and by which both the healthy and morbid, or natural and unnatural impressions and expressions find access to and egress from the mind. "Matter" and "force" in this sense, are to us "necessary co-existents in human thought; to speak of change in one may be admitted, as Maudsley asserts, to imply change in the other;" and I think we may confidently look to future revelations, through psychopathology and physiology with the chemical, microscopic and other aids which future science is to bring to our assistance, for a correct and satisfactory material explanation of all the *phenomena* of the mind, natural or unnatural, healthy or diseased, manifest to the world without. I mean the *manifestations only of mind, not the mind itself*. I apprehend that mind can never be demonstrated to be the product of matter, any more than matter can be proved to result from mind. Neither of these propositions seem to us capable of demonstration.

It is not always necessary, however, to demonstrate a proposition before we can accept it as true. A proposition* may be accepted as true when the mind cannot conceive of its negation by the facts of science. It may not be reachable by a process of reasoning, and yet be

*Herbert Spencer.

an admitted truth to our consciousness. We have in this world to accept many such unreasonable but irrefutable truths.

Forms of matter may depend upon mind for the appearances they present; so may and do forms of thought depend upon matter for their manifestation or expression. The germs of thought and thought molecules may have a simultaneous birth, (if we can conceive of the birth of either,) and together develop and mutually act and react upon each other in their manifestations. In this sense we agree with Dr. Maudsley—that brain and thought are co-existent. That they are so, will perhaps always remain to finite comprehension as great a mystery as that God and matter co-exist, and which we regard as creator and created. It would be as logical to assert that God came *from* matter because he is only manifest *through* it—the matter and force co-existing so far as we can discover by the light of science alone—as to assert that mind proceeds *from* the matter with which, by the aid of science, we discover it to be invariably in association. We glean from revelation that “the world by wisdom knew not God,” nor has the wisdom of unaided science yet revealed to us more of the knowledge of the nature of God than we received before science had its birth. Science can not, by any of the revelations it has thus far given, show to us the priority of either God or matter. Through the teachings of revelation and the argument of design and designer, we may believe that God created matter; but science, by its own light alone, can neither affirm nor deny that “the heavens declare the glory of God, or the firmament sheweth his handiwork.” Science deals with tangible and material facts, and its conclusions must ever be essentially material. It may, however, with the light of revelation before it, confirm the truth

of revelation that God preceded matter and created it,* without disjoining any of its established truths, or retarding its progress toward a solution of all those problems which it is reserved for man yet to solve in the arcana of nature.

By light of revelation and the attestation of the general innate consciousness of mankind and not by scientific investigation, we perceive that "there is a spirit in man," which though it manifest itself in "as we see by the sight of science," and is impressed, by decaying cerebral molecules, is nevertheless to be recognized in man, in the same manner as the impress of the Creator's spirit may be seen in the works of animate and inanimate nature.

We do not prove the precedent or consequent of God and matter, or mind and matter, but may assume either, from the facts which science, unaided by revelation, gives us, and be equally correct in our logic. We believe in the importance of science on the subject. We do not know that mind is the highest development of force to which all the lower natural forces are indispensably prerequisite.† We would rather alter the phraseology and say the highest development of matter is indispensably requisite for the perfect manifestation of that intangible and immaterial force we call mind, though it may assuredly be laid down as a truth, that "whatever may be the real nature of mind and of its nature, we shall probably forever remain ignorant" while retaining our own mortality. "It is most certainly dependent for its every manifestation on the brain and nervous centres, and scientific research is daily disclosing more clearly the relation between it and its organ."†

* In the beginning God created the heavens and the earth. † Maudsley.

Anatomy and physiology teach us pretty thoroughly what are the nature and function of the brain, as a whole, but the mind, as Maudsley correctly observes, cannot be observed and handled and dealt with as a palpable object, like electricity or gravity, or any other of the natural forces, (if these may be properly termed "palpable objects.") "It is appreciable only in the changes of matter which are the conditions of its manifestation." We may concede the pre-existence or co-existence of mind in connection with its manifestations through matter, as we accept an axiom as a self-evident truth, incapable of and not requiring demonstration by process of reasoning; and we are still prepared to admit the truth of the revelations which modern science seems to have made in regard to the change taking place in the substance of the brain during thought; that "in the performance of an idea as in the performance of a movement, there is a retrograde metamorphosis of nerve element, and that the display of energy is at the cost of the highly organized matter, which undergoes degeneration, or passes from a higher to a lower grade of being," and that the retrograde products are, so far as is at present known, very nearly the same in cerebral as in muscular disintegrations, "under the influence of functional activity, and arrive at the logical and perhaps correct conclusion, that disintegration of the cerebral molecules is the law of the display of mental power."

We can subscribe to the doctrine, that with each display of mental power there are correlative changes in the material substratum, (if we choose so to designate the brain,) and admit without subscribing to the doctrine, that mind is the product of matter, under any condition of change, that every manifest *phenomenon* of mind is the result or accompaniment to our senses, "of

some change molecular, chemical or vital in the nervous elements of the brain." This is only making the brain (what has long been admitted, and what science seems fully to demonstrate,) the material organ of the mind,—a material medium through which it impresses itself upon matter, and through which it communicates with other minds.

The proposition that nerve change precedes mental action, is surely not proven in the fact that, "chemical analysis of the so-called extractive of nerves testifies to definite change or waste through functional activity," surely this is not proven in the fact that, "the products of retrograde metamorphosis are lactic acid, creatin, uric acid, hypoxanthin, formic and acetic acids," or that the products of the metamorphosis of nerve element after prolonged mental exercise are recognized by an increase of phosphates in the urine, or that the contents of nerve and muscle, neutral during rest in the living state, become acid after death, or after great activity during life, nor by any other of the chemical facts connected with the decay of nerve tissue, with which we have of late years become familiar.

We may explain the exhaustion following excessive mental labor, and the breaking down of brain in extreme cases, "as in recognized insanity, by supposing an idea to be *accompanied* by a correlative change in the nerve cells,"* and yet the supposition brings us not much nearer to a correct comprehension of that "marvellous energy which can not be grasped or handled, and which we call mind," than if we had not made the supposition.

We may concede the supposition to be a universally admitted fact, established by adequate and indubitable proof and still mind remains unobserved, unfit, un-

* Maudsley.

probed by any of the implements of science; and as science can probably never devise methods of investigation, as delicate and subtle as mind itself, it is probable that mind, aided by revelation, and the testimony of consciousness will have to be the interpreter of its own nature, employing all the lights which science emits to illumine the avenues which lead to and from it, interpreting by sight of science and self interrogation, the influences which operate upon it, and the laws which govern its manifestation, and "the display of its powers."

Science will doubtless reveal to us, if the present evidences of the fact are not adequate to convince us, that the birth of every idea (if we may so speak,) to the outer world and to self-consciousness, is accompanied with the death of cerebral cells, and that the death of these cells is the condition and accompaniment of the manifestation of thought.

Under this view (so speaking for want of better phraseology,) we may consider that * "matter and the power of intellectual manifestations, have co-ordinately developed, during the ages that have passed and are still in the process of development;" or, with Dr. Maudsley, we may say that "man's life truly represents a progressive development of the nervous system, none the less so because it takes place out of the womb than in it," and that "co-ordinate action always testifies to stored up power, either innate or acquired," by which I understand latent nerve capability for *manifestation of power*, without abandoning the idea maintained by the ablest physiologists of the day, that mind has also a presiding power over matter.

* Dr. Henry Landor, paper on Insanity in relation to Law, July 16, JOURNAL OF INSANITY.

Under this view we may admit that "just as a good liver secretes good bile," (provided the conditions of the blood are favorable,) "a good candle gives good light, and good coal a good fire," (provided the two latter have a good supply of oxygenated air, and the primary conditions to the development of light and heat, *ab initio* friction, chemical action, origination,) so does a good brain (all other conditions being favorable,) give the manifestations of a good mind, without admitting that * "when the brain is quiescent there is no mind," and without regarding the mind as nothing more than "the result of cerebral action," as maintained by those who would merge the psychical in the physical in man.† "Granted that a definite thought and a definite molecular action in the brain occur simultaneously, we do not possess the intellectual organ, nor, apparently any rudiment of the organ which would enable us to pass by a process of reasoning, from the one phenomenon to the other; they appear together but we do not know why."

There is a power which precedes and ignites the flame and the fire. There is a spark of mental and spiritual light in man, which antedates as well as accompanies the disintegration of the cerebral mass.

We are persuaded that there is a mental vision in man, superior to that of the eye and the microscope, a mental touch, penetrating further into the nature of mind than the scalpel of the histologist, or the reagent of the chemist can reach, by which he sees and feels and knows that he is something more than matter, or the offspring of matter. Our consciousness attests this, we feel it to be true, and consciousness is as the poet has said of faith, "a higher faculty than reason,"‡ or rather more accurately, we might say, the basis of all the higher mental faculties. Saying that I feel pain, or

* Hammond.

† Tyndal.

‡ Bailey's Festus.

hear a sound, or see one line to be longer than another, is * "saying that there has occurred in one a certain change of state, and it is impossible for me to give a stronger evidence of this fact, than that it is present to my mind. The tissue of every argument is resolvable into affections of consciousness that have no warrants beyond themselves. When asked why I assert some mediately known truth, as that the three angles of a triangle, are equal to two right angles, I find that the proof may be resolved into steps, each of which is an immediate consciousness that certain two qualities, or two relations, are equal or unequal; a consciousness for which no further evidence is assignable than that it exists in one, nor, on finally getting down to some axiom underlying the whole fabric of demonstration, can I say more than that it is a truth of which I am immediately conscious. * * * *

For each truth of geometry we are able to assign some under truth in which it is involved; for that under truth, we are, if required, able to assign some still under and so on.

This being the general nature of the demonstration by which exact knowledge is established, there has arisen *the illusion that knowledge so established is knowledge of a higher validity than that immediate knowledge which has nothing deeper to rest on.* The habit of asking for proof and having proof given in all these multitudinous cases, has produced the implication that proof may be asked for these ultimate dicta of consciousness into which all proof is resolvable.

Consciousness is the primitive rock upon which must rest every secure fabric of reason, and we may say here what † Herbert Spencer says of all philosophy, "if it

* Herbert Spencer, Test of Truth, p. 384.

† Test of Truth, p. 412.

does not avowedly stand on some datum underlying reason, we must acknowledge it has nothing on which to stand." "The result of refusing to recognize some fundamentally proved truth is simply to leave its fabric of conclusions without a base."

In one creative act, the material and the immaterial in man were brought forth, (according to the story of revelation,) and they have ever since been so intimately blended, that science,—though prying into the secrets of nature since the world began,—has not yet discovered where the one ends and the other begins. Corpuscles, molecules and cells may constitute the whole of man, but science has not demonstrated it to be so.

If science should ever demonstrate thought to be material, it would probably be found to be of so subtle a form of materiality, and possessed of so much volition in many of its manifestations, as to confound, confuse or abolish our present ideas of matter, and alter our definition of its properties; a form of matter much akin to that something which we all recognize as existent from all eternity, and to which we could, perhaps, give no better name than mind,—the impress and image of God.

Perhaps we should then find our logic justifying us in accepting the idea as true, that so subtle a form or "force of matter" as thought, would have to be entitled to precedence in the order of existence over the cruder forms manifested to our senses. The formative stages of matter, (so to speak,) and the doctrine of disintegration as the origin of "mind viewed in a scientific sense," might have to be reversed or exploded. We should view mind in relation to matter much as we now do, and as Locke viewed God in relation to mind and matter. "There is no truth more evident than that something must be from all eternity. I never yet heard

of any one so unreasonable, or that could suppose so manifest a contradiction, as a time wherein there was perfectly nothing. This being of all absurdities the greatest, to imagine that pure nothing, the perfect negative and absence of all being should ever produce any real existence."

The chemical and microscopical study of brain and nerve cells may possibly yet reveal to us the exact line of demarkation between purely physical and psychical phenomena; but so long as consciousness exists to attest the truth of conclusions derived from facts, and volitional power remains to the human mind to pursue investigations and accept or reject as truth, their results, so long will psychology and physiology go hand in hand in the study of mind. We cannot by any process of science account for the birth of tangible matter. Science can only deal with its forms; its varied and ever varying changes of state.

The study of the universe of matter, its disintegrations, aggregations and motions, leads to God. Here science must ever stand awe-stricken and confounded in the presence of the incomprehensible, omnipotent, immaterial, who either gave matter its existence, and impressed upon matter its laws, or received from matter, and its laws His existence, if the light of revelation be excluded. We believe, not from science, but from revelation, that matter came from God; and all the facts which science teaches relative to the material universe, do not disprove this belief. The study of the brain cells, their structure, development and decay, leads us in the same manner to view the incomprehensible, immaterial, volitional mind; and man stands in the presence of his own immortal spirit, so intimately blended as mind is with matter, astonished and confounded.

We choose to accept as true the revelation that "there is a spirit in man," in the sense in which the

term is now distinguished from matter, until science shall give us more light; and to regard that spirit as influencing and influenced by (in its manifestations to the world without,) the material media,—the brain, nervous and whole physical system. Accepting this view as true, all the facts revealed by science only tend to confirm it.

A part of that "divinity which shapes our ends" resides in the power within us, which disposes of and distributes the thought molecules of the ideational centers; forming ideas, impressing them upon consciousness, and transmitting them as "tangible thought products," through molecular disintegration of the cerebral cells to the world without, or storing them away as the carriers of reserve mental power, for still further use by the ideational centers. Man both uses and is used by his brain; he both modifies and is modified by his organization.

The tyranny of a good or bad organization and the power of the most indomitable human will, both play their respective, but mutually dependent parts, in the drama of life. Nevertheless, man is to a great extent the creator of himself; and has been not inaptly termed "the architect of his own fortune." Within the limits which God has assigned him, he may dwarf or enlarge his capacity and powers, through changes in the convolutions and structure of the brain he employs, which to the mind is as the weapon to the warrior, the pencil to the artist, or the implement to the mechanic. The volitional mind by its manner of using the brain, may add to or take away cerebral atoms, and thus diminish the power of mind manifestation. The one process is mental neglect, the other is education. The volitional part of the mind, by the manner in which it makes use of material agencies and immaterial impressions—by the man-

ner in which it throws the whole mind in contact with, or withdraws it from material and immaterial influences, may cause the mind to grow in power of manifestation through changes in the substance and quality of the brain. The volitional part of the mind in youth may predetermine to a great extent what it shall be in age, and what the body shall be.

Perhaps by "taking thought man cannot add one cubit to his stature," but by taking thought of the kind and amount of mental and physical exercise, and quality and amount of food, and rest and sleep, essential to the development of the fullest manhood, he may make himself as a man, almost what he will. His power to accomplish will be limited only by the limits God has assigned to the human race, and modified only by the degree of perfection or imperfection inherited in his organism.

The physical state of the body or brain at any particular period of life, serves to encourage or depress action and modify results, but they have not been proven to be the origin of mental volition, though they influence or modify its manifestation.

We have admitted the invariable connection between brain power and the power of mental manifestation; but the brain is still, in our view, the servant of the mind, though the latter is influenced by the states of the former, in the manifestations it makes to the world. The brain serves the mind, and yet the mind is dependent upon the brain, just as the master is, in a sense, the servant of his servants and dependent upon them.

A good general's success depends upon the number and condition of his men as to health, position, equipment, &c. They are the exponents of his military skill. He may have the power and be capable of overthrowing the enemy with the means at his command,

but if an epidemic attack and decimate his forces, impairing the organization upon which he depends, he cannot demonstrate his power—failure may take the place of what might otherwise have been victory.

The physical brain of man, in our opinion, can no more be demonstrated to be the origin of mind, than can an army be proven to be the commanding general, though every integral part of it be power or a source of its manifestation. Through the material organization of man he impresses himself upon the material world, and communicates his spirit's thoughts and emotions to his fellows.

An intelligent power presides over and is influenced by the destructive material changes, by which the power of steam is made manifest in the ten thousand forms of mechanical adjustment, known to the world; so an intelligent and voluntary power, influenced in its communication with the material world by cerebral states—molecular disintegration and brain imperfection—is manifest in the action and communication of mind upon and with the material and moral world.

There are many more things in the reciprocal action of mind and organic element, than “are yet dreamed of in our philosophy,” and we fully concur with Dr. Maudsley that—

“Notwithstanding we know much and are daily learning more of the physiology of the nervous system, we are only on the threshold of the study of it as an instrument *subservient* mental function.”

We regard it as too probable for the successful refutation of science, that He who ordained the sciences as He ordained the planets to revolve in their orbits, has set a line of demarkation between finite and infinite penetration, and said to mind as he has said to the sea, “thus far shalt thou go and no farther,” though we

may never discern the boundaries of that omnipotent limit.

We may, without surrendering pre-existing views, regard mind, as manifested to us, as so closely blended with matter in the form of brain cells, that we can not tell where one ends and the other begins—can not draw a line of demarkation. We may therefore even speak of mind and brain as practically identical. We may consider a living, material organism as essential to the manifestations of mind, and the different manifestations or expressions of mind in health and in disease, as dependent upon the physical condition of that organism, just as the will power is dependent upon the healthy state of the organs which it controls for its expression or manifestation.

We consider mind in relation to cerebral molecular disintegration of the brain, and will power in relation to the muscular decay, which precedes or accompanies the "display of force," what the throttle valve is to the steam engine, or the power which regulates the galvanic battery is to the disintegration of the galvanic plates and the display of electric force. Defective machinery always works wrong, and if we see a steam engine out of fix and working contrary to its usual manner, or not working at all, we do not conclude that the engineer is sick, or dead, or absent, but that some screw is loose, or pivot is broken, or the fire is out, or the steam is down.

In the machinery of the mind and the physical organism, as in the machinery of God in the physical universe, the motive agent is hidden from our view. If the brain does not act aright, we may infer that some cerebral screw is loose, some lack or irregular distribution of sanguine fire, some disproportion in the waste and repair of cerebral molecules exists, but we can not logically conclude that the mind itself, which we see not, handle not, is impaired or diseased, because we can not know.

Diseased mind is a convenient form of expression by which the mind, in its manifestations to our perception, is altered, just as the stars are obscured to our sense of vision, when the light of the sun veils them for the day. The emotions and manifestations of mind to the individual and to those about him, are changed by the obscuration or destruction of his senses.

The individual is not the same with sense of sight, or touch, or taste, or smell, or hearing impaired or destroyed, as before; and sometimes the change as it manifests itself to us is so marked, that we call it insanity.

In the language of Dr. Maudsley again, "We recognize how entirely the integrity of the mental functions depends upon the bodily organization;" and as physicians we cannot afford to lose sight of the physical aspects of mental states, if we would truly comprehend the nature of mental disease. We "recognize the existence of an intelligent mental force, linked in harmonious association and essential relations with other forces, but leading and constraining them,* and led and constrained by them in its manifestations."

We must also recognize the fact that the conscious mind of man is blended, in unity of development and action, with the unconscious life of his physical nature. We need neither assume that "mind is a function of matter," or that "matter is a realization of mind," in order to arrive at a correct general understanding of mental disease.

"We do not assume an immaterial liver behind the hepatic structure in order to account for its functions,"† but we assume and do know of a material fluid out of which the bile is secreted, and we may as logically assume the existence of an immaterial mind, manifest through the function of the brain, as to assume the ex-

* Maudsley.

† Maudsley, B. & M., p. 61.

istence of a material pabulum in the blood before demonstrating it, out of which is formed all the special fluids secreted by the glandular organs of the body. The one is as self-evident as the instinctive knowledge upon which the existence of the soul is based, the other is evident to the senses. The one is simply an ocular demonstration, the other a fact evident to consciousness. The hepatic secretion is a tangible product, and we could reasonably infer, if we could not demonstrate, that it came from a tangible source. Thought is intangible and we may more reasonably infer that its source is intangible than that it is the product of tangible matter.

Nevertheless we may, for the purposes of a correct understanding of what we term disease of the mind or insanity, acknowledge "the essential unity of mind and body," as mind can not be manifest to us except through the medium of a living physical organism.

This view of the relationship between mind and body enables us to approximate to a correct understanding, in a general way, of the nature of the disease of mind as we term it.

The proof that the brain is the organ of the mind, whether the latter be an intimately blended psychical entity, or an emanation from the former, and therefore physical, is pretty satisfactory to all physiologists; we need not, therefore, reproduce the proof, and the evidence has also been deemed quite sufficient, by modern psycho-pathologists, to warrant the belief that the cerebral seat of insanity, is oftenest if not invariably, found in some direct or indirect involvement of the gray matter, or free surfaces of the brain, though with our present means of investigation and the still comparatively meager light reflected from the dead house, we do not detect cerebral lesions in all cases of mental derangement.

We do in a majority of instances, and we probably should in all instances if our means of investigation were more accurate and satisfactory. I think we need not conclude that the probability of finding definite lesions in the brain to account for ante mortem changes in connection with deranged mental manifestation, is "outside the realm of possibility," as Leidersdorf has conjectured.

Maudsley most happily expresses the prevailing sentiment of the profession, in regard to the dependence of deranged mental manifestation as witnessed in insanity upon morbid physical states of the brain, whether detected in our examinations of the cadaver or not.

*"There may be, unknown to us, save as guessed from their effects the most important modifications in the molecular activities of nerve element, changes in the chemical composition and actual defects in the physical constitution of the nerve centers."

"Close to us, yet inaccessible to our senses there lies a domain of nature—that of the infinitely little—the operations of which are as much beyond our present ken as those that take place in the remotest region of space to which the eye with all its aids can not reach, and of which the mind can not conceive." Or, as John Locke says: †"if a great war for the greatest part of the several ranks of bodies in the universe escape our notice by their remoteness, there are others that are not less concealed from us by their minuteness." This is as true to-day as it was in the days of the great philosopher. What lies within our ken is but a small part of the universe of mind and matter, and "our reason carries us very little, if any beyond certain matters of fact."‡

* Maudsley, "Body and Mind," p. 61. † Lockes' Essay, book IV, chapter III.

‡ Maudsley.