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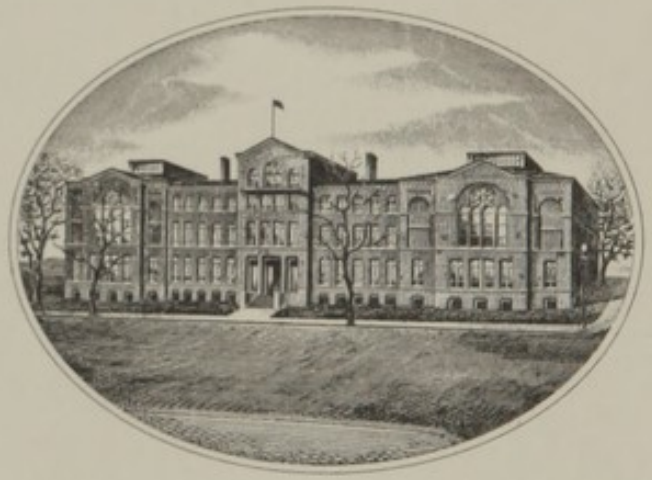

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Public Health Service

MATERIALS

FOR

AN ALPHABET

TO THE

SCIENCE OF MEDICINE;

EMBRACING

AN ENQUIRY INTO THE NATURE OF THE MIND AND PASSIONS.

ADDRESSED TO THE MEDICAL SOCIETY OF PHILADELPHIA.

BY JAMES PENDLETON JUN. OF VIRGINIA,
MEMBER OF THE PHILADELPHIA MEDICAL SOCIETY.

Aliquid semper ad utilitatem afferendum. CIC.

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1804.

TO

JOHN RANDOLPH, ESQ.

OF VIRGINIA.

ACCEPT, Sir, this dedication as an inadequate, though cordial tribute to talents, energy and purity of motive. That you may live in the day of your retribution, when the support of truth will not come under the ascription of policy, ought to be the warm wish of all friends to the progression of virtue.

THE AUTHOR.

AN ESSAY.

Truth has been improperly imagined at the bottom of a well; it lies much nearer to the surface.

DIVERS'S PURLEY.

GENTLEMEN,

THE object of this Essay, is to offer opinions that have remained in silence, involving the most important principles in medical science; an accurate knowledge of which is indispensable for the proper treatment of disorders. Without an Alphabet, or a correct view of fundamental principles, we must continue in darkness, though aided by the experience of a thousand years. The science of medicine has this great advantage over the science of government; that it admits of a permanent and correct system from the invariable laws of animal economy; whereas the mind and passions are continually changing from physical operations, and nothing can be more absurd than to believe that any political theory will guard against the revolutions that muſt appear in the unlimited and eventful volume of time.

It must be admitted that theories in all ages of the world have been more frequently received from the warp of authority,than from a conviction of their propriety. This truth, so fatal to the progression of science, induced the immortal Cullen to say ; that he wished the doctrines of great men could be delivered by persons low in authority ; by which the free enquiry of others would be excited, and all errors thereby detected. The sentiments that I shall oppose may be chiefly found in the medical elements of Dr. Brown; whose information and inventive genius are as highly appreciated by me, as by any person ; but doubtless no one ought to surrender his judgment to any mere authority, however respectable ; if so, but few publications would appear ; and as the accurate St. Pierre observes, a child raised on the shoulders of an adult, may command a more extensive view than the person who supported him. I will now proceed to the points in view, and having no other object than truth, shall avoid the unnecessary and misleading complexity of Darwin, in modifying the erroneous compression of Dr. Brown.

I shall first endeavour to prove that excitability is a compound of matter and quality, or of animal and mechanical power : Secondly, that debility is only a predisposing cause to disorder; and shew wherein the indentity of direct and indirect debility consists : then conclude with an inquiry into the materiality of the mind and passions.

As every disease proceeds from a change in the solids and fluids, and as I shall prove that *excitability* is composed of an animal and mechanical power, it follows that a knowledge of it enables us to meet every phenomena of the body. It is not my intention to follow Dr. Brown through the application of his principles; as it is alone sufficient to prove that his data were false, and consequently his conclusions. He asserts that excitability is an aptitude for action, resting on nervous influence only, and that it is increased by the abstraction of stimuli; which sentiments it is the first object of this Essay to displace.

Life is acknowledged to be a forced state, and the circumstances on which it rests, are stimuli and excitability; life, therefore, is excitement, and all the phenomena in health, pre-disposition and disorder, are entirely referable to the same causes.

By excitability, I mean that great principle in animal matter, that may be excited by stimuli, and is composed of stimulability and vibratility.*

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* An inanimate chord possesses an excitability that only consists of vibratility, and demands a mechanical power to throw it into action, but stimulability is a necessary component part of animal excitability.

By the former, I mean sensorial power, nervous influence, or sensibility, which alone discriminates animate from inanimate matter. By vibratility, I mean that aptitude in animal fibres of being thrown into contraction through stimulability and stimuli, or in other words, elasticity or contractility, and *vis restitutionis*, and may be properly called the proximate cause of excitement, or life. Stimuli, are those agents that are capable of calling into contraction the excitability, or aptitude for action above defined, otherwise to give rise to fibrous motion through the animal and mechanical power.

Debility is both direct and indirect. By the former is meant that state of the system, which follows the abstraction of stimuli: Such is the effect of cold, venesection, abstemious diet, &c. all of which tend to diminish the excitement. By indirect debility, is meant that state which is induced by excessive action, or is that disease which succeeds the preternatural operation of stimuli.

I will now proceed with the consideration of that important surface on which stimuli act, and which is properly called excitability.

It may be proper for me first to offer one of the fallacious conclusions of Dr. Brown, produced by his false opinion of excitability. He says that if the excitability, (by which he meant nothing

more than nervous power) was increased by the application of stimuli, death could never appear. This continual increase of nervous influence, would surely be a preventive to death if (as he says) life depended on nervous influence and stimuli alone ; but I shall make it manifest that to these, he must add the contractile power of the vessels : for man under this increasing sensibility, without a proportionable increase of tone* would in ten days after birth be subjected to convulsions, and all the ligaments of life would be ruptured.

Such is the importance of this mechanical power, (a principle never valued) that the sensorial influence, and consequently life itself could not exist without it.

I have said that excitability was composed of an animal and mechanical power, or of the matter of sensibility, and of the quality of contracting on sensation ; † to elucidate which, let us first direct

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* I shall frequently use the word tone, for the sake of brevity, and by it mean, the mechanical power, or vibratility.

* By sensation I mean the first effect of stimuli on sensibility, or the first degree of motion that precedes or invites contraction. Next to contraction come the diseased links of sensibility, which are, irritability; irritation, and inflammation, or disordered action.

our view to aphthalmia. In this disorder, we see the serous vessels distended with red globules, the admission of which must not be ascribed to a diminished sensibility, but to a prostrated tone; for the sensorial power is preternaturally increased, the vessels being much more sensible of the operation of stimuli, than previous to the inflammation, but they cannot contract from the application of stimuli, because their mechanical power is lost. An increase of sensorial power, though attended with a departure of tone, may be readily seen in the inflammation of all delicate vessels. Doctor Hunter, in speaking of the felon, says, there is an increased action but a decreased power;* by which he could mean nothing more than increased sensibility and an injured tone. This prostration of tone, with an increase of sensorial power, is not confined to delicate vessels, but may be seen in all cases of indirect debility.

An increase of sensorial power in fever is very manifest, when the tone is much injured, for the pulse may be quickly raised by a stimulus that would effect no alteration in health. And I may here ask, if indirect debility was attended with a diminution of sensorial power, (which is the estab-

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* It is very easy to conceive that increased excitement may attend a lessened tone, but the pulse is feeble, because the contraction is not full or complete; which I shall prove to be the most favorable state for the increase of secretions.

lished opinion) how can we account for this excitable state of the system in fever, and how can we explain the truth, that old persons are less liable to fever than the youthful, if we grant that direct debility produces an accumulation of animal or sensorial power?

It must be universally admitted that the sensorial power is a nervous secretion, and the following fact is a sufficient evidence. Compress a nerve and the parts to which it is attached are immediately paralyzed. It may be said that the division or compression of an artery produces the same effect. To which I reply, that if the action is destroyed, the nervous secretion must be also. The blood constitutes no part of animal or sensorial power; being merely intended to afford heat and distension, with visceral secretions, &c. And I may add that this nervous power is not a stimulus, but the surface on which the other secretions and all stimuli operate*.

If then the sensorial power is a nervous secretion, and if secretion depends on action, it follows that indirect debility is attended with an accumulation of sensorial influence; which is particularly evident in that involuntary action of the muscles, improperly called the shaking palsey, and in the

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* Granting that the nerves prepare their fluid from the blood, it does not follow that the blood contains a vital power.

nervous state of fever. Since the animal power is supported by the mechanical, it follows that if the latter was not destroyed by action, man *would never die**.

When fever reaches irregular action or ends in disorder, it is the consequence of a prostrated tone, and a morbid increase of animal or nervous influence. We find that the oppressed pulse that follows a morbid increase of action cannot be raised by stimuli, only for a short time; but if we take the oppression from the vessels by the lancet, the excitement is immediately restored, and the stimulus that could produce no change in the pulse, now increases it much. This must not be ascribed (as it universally is) to an increase of the sensorial power, but of the mechanical power or spring. The vessels previous to the abstraction of blood, were as sensible of the operation of stimuli as afterwards, but the pulse could not be raised until the tone was restored by depletion.

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* A late ingenious writer on the Zoonomia, wishes to know from whence proceeds this sensorial power, since action is necessary for its existence, and this action cannot take place without it. I reply, that the process of generation furnishes the sensorial power, which is afterwards supported by action. Farther than this we cannot go, nor is it necessary; for we may behold principles and know how to apply them, without being able to account for their remote cause. We know that matter is supported by motion, and that motion cannot exist without matter; and here we are abruptly met by inexplicable arcana. In short, the above question is nothing less than a demand of the first cause of all creation.

An increase of secretion invariably follows the application of stimuli, and the continuation of that increase is supported until the tone is nearly destroyed. Though the material part of excitability, or the secretion of sensorial power rests on action, yet we may discover it to increase, when the action is much weakened, and it is in an accumulated state, when death has made a near approach. A morbid increase of all secretions is produced by a preternatural increase of action, and the most favourable state for this morbid secretion, is the quick and feeble pulse that invites that state of fever properly termed nervous, which is attended by an alarming secretion of sensorial power, and a prostrated tone. A moderate action supports the secretion of sensorial power, and a feeble and imperfect contraction lessening the resistance of the vessels, favours its diffusion. This truth is strongly supported by the speedy and beneficial effects of depletion in nervous twitching, which restores the contractile power, and thereby lessens the efflux of the sensorial influence.

If the diminution of excitement produced an increase of censorial power, why do not stimuli instantly seize a part that has lost its excitement from the influence of cold? Not even fire will produce the least sensation at first; but when the sensorial power is roused, and the excitement revived, then the influx of blood is rapid, and the sensation great. Why is depletion used to lessen

the excitement, if the abstraction of stimulus produced an increase of sensorial power?—Surely the lancet would produce an effect different from what was intended, by encreasing the aptitude for action. In short, it is impossible to account for inflammation without we admit, that the nervous power is increased by stimuli; and to believe otherwise is not less absurd than to contend that a compression of the femoral nerve produces an increase of nervous influence in the parts below, and to adduce the torpor of the vessels as an evidence.

I confess that if blood is abstracted in an advanced state of indirect debility, the weakest stimulus will instantly raise the excitement: but this is owing to the presence of a morbid quantity of sensorial power, which was produced by the previous preternatural action and rendered useless by the prostrated tone.—I may further observe, that the diminution of excitement from the abstraction of stimuli, produces a contraction of the vessels, and the influx of blood that follows the renewal of action, by suddenly distending the fibres, creates a preternatural sensation, with half the quantity of sensorial power, that a healthy state demands. This truth is strongly manifested in the effect of stimuli after the influence of cold, or after the loss of blood in a healthy state; when the sensation is very great, with less than a healthy quantity of nervous power.

The departure of mechanical power uniformly precedes the exhaustion of sensorial secretion.—The system may be suddenly prostrated by the operation of a powerful stimulus, which *appears* to suspend the excitement from the exhaustion of nervous power, before the tone of the veſſels could be much injured. But this conclusion is wrong; for the suspension of action is induced by the violent distension that leaves the vessels in a struggling state, and from which the lancet will relieve them, by restoring their spring. It is very easy to conceive that the influx of blood may be so rapid as to prostrate a mechanical power in a few hours, that might have supported a moderate excitement for more than one hundred years.

Disorders proceeding from an increase of secretion, are exclusively attached to indirect debility, and those that require not this secretion, may be induced by either of the debilities. The operation of stimuli may be so powerful as to prostrate the excitement before a morbid secretion can be produced; but the usual increase of stimuli finally produces that increase of sensorial power on which inflammation depends, and death cannot take place until inflammation is induced*. As inflammation depends on a morbid secretion, it

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* Inflammation is the handmaid of disorder in all cases of indirect debility, that are not suddenly induced.

follows that it cannot attend direct debility; for when a preternatural increase of action appears, direct debility becomes superceded by indirect. From what I have advanced two facts may be deduced; First, that disease very seldom reaches inflammation or disorder; Secondly, that death is preceded by inflammation in all cases, excepting those induced suddenly by powerful stimuli, and those from a direct diminution of excitement, which very seldom appear†.

Since morbid secretions depend on preternatural action, we must conclude that indirect debility is the precursor to bilious diseases; and it is of importance to know that any fluid morbidly secreted, becomes the nourishing and supporting cause of fever, and ought to be dislodged as soon as possible. It may be said that we frequently find a preternatural quantity of bile, without being attended with fever. To which I reply, that the secreting system may be under a morbid excitement for some time, before an increase of arterial action takes place; and a moderate action will

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† I have met with only one instance of disorder from direct debility, and the same may be induced, (though requiring a different treatment) by the sudden operation of a powerful stimulus. The case was Epileptic, brought on by a direct and gradual diminution of excitement, without the interposition of fever, in which, depletion would have produced death.

produce a morbid secretion, when the mechanical power is weakened by heat, or any relaxing cause*. Thus we explain why cold so speedily checks bilious complaints.

Moderate distension is a counter-agent to the sensorial power, and prevents even the usual and healthy quantity of sensorial power, from producing pain; nor can diseased sensation take place, until the action becomes so high and continues so long, as to overcome or weaken the mechanical power.

I believe that the greatest part of mankind depart with more than a necessary quantity of nervous power, and the cause of their death is a complete prostration of tone. This may be readily seen in persons who go off with inflammatory complaints, in whom the destruction of tone renders that remaining sensorial power useless, which would require but common stimuli to support long and healthy action, could it be translated to contractile vessels.

This view of excitability would have convinced the medical characters who attended our illustri-

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* May we not consider bile, not only the supporting, but the exciting cause of the fever attached to it; since we uniformly find a preternatural quantity on the approach of a bilious fever?

ous Washington, of the equal propriety of stimuli and the lancet. Bleeding was expedient to displace the obstruction, and that bleeding lessened the sensorial power, already too low from an advanced life.

I think it will be acknowledged that the animal power is increased by stimuli; that excitability is composed of an animal and mechanical power, and that to ascertain at any time the measure of *excitability*, and the proper treatment; it is necessary to know the change that has taken place in its component parts. The chief object of the physician ought to be, to keep the sensorial and mechanical power on a par, which necessarily adapts the excitement to the excitability.

I will now gentlemen, present to your view, the impropriety of terming debility, disorder.

By disorder, we conceive an inordinate action, error loci, or an incapacity of the vessels to propel their fluids in a regular manner; which is produced by debility. Disease and debility, which generally accompany each other, invariably precede disorder and may exist a great length of time before disorder appears. Let us direct our attention to the first stage of fever, when there is debility, and an absence of ease; but irregular excitement or disorder does not appear until that debility injures the excitability so much as to

render the vessels unable to support their natural operations. Doctor Brown in attempting to prove debility to be disorder, defines good and bad health. The former he says, is an easy, pleasant, and exact use of all the functions of the body, and bad health consits in an uneasy, difficult or disturbed exercise of all or any of the functions. As to the accuracy of this statement we consent, but it does not follow that debility must be attended with unequal excitement, or that the absence of vigorous action, is necessarily a morbid one. The doctor had acknowledged, what he seems here to forget, viz: that the phenomena of life, were health, predisposition and disorder. I ask, what can constitute this predisposition if not debility? Manifest it must be, that disorder cannot appear unless preceded by debility; and we may see instances of debility not even attended by disease; as is strongly evinced by those in the decline of life, who feel perfectly easy under a manifest debility. If the excitement is proportionable to the strength of the vessels, as much regularity exists in the functions, as in the most healthy state of the system. The most emaciated and delicate persons may have health as well as the most robust, though they are not so far from disorder. An equalized excitement constitutes health, be that excitement at any degree in the scale of life. The abettors of Doctor Brown, say, that death frequently appears from debility alone, and ask how a liability to disorder can alone

produce death. I reply that I have seen death from old age or a natural diminution of excitement, but with evident symptoms of the interposition of irregular action or disorder; for a certain grade of debility must produce an unequal excitement, and death cannot take place until that disordered action is produced: consequently no one can die with debility alone.

Doctor Brown extends his inaccuracy much farther, by saying that debility induced by high morbid action, is the highest grade of disorder, and the immediate precursor of death. He evidently puts the cause in the place of the effect, for morbid action (as I have proved) is the consequence and not the cause of debility.

As disorder then, is an irregularity of action produced by debility, it must be granted that debility is only a predisposing or inviting cause to disorder.

I am now led to consider the unity of the two debilities, which Doctor Brown and others have opposed from their being induced by opposite causes, one by an abstraction of stimulus, and the other by the application of a preternatural quantity. To their opposite causes I assent, but their difference does not neceſſarily follow. It cannot be difficult to conceive that different causes may terminate at the same point by an extension of

operation. An increase of action as to the mind, or body, muſt finally produce the same debility, as a direct diminution of action, and a difference of causes must make an identity of debility, before disordered action can appear. Doctor Brown confesses that they are attended with an equal diminution of excitement, and consequently with an equal derangement or disease of excitability,* which establiſhes their identity beyond the reach of doubt. This equal loss of excitement, or aptitude to inordinate action, is doubtless the inosculating point of the debilities, and the invariable precursor of disorder; for morbid action from indirect debility cannot take place until the excitement is as far below the standard of perfect health, as it must be from direct debility.

Life is supported by circumstances resting on each other, and the preternatural increaſe or diminution of either must finally produce the same loss of action, or an equal aptitude to disorder.

May I not extend the identity of the debilities farther than the predispoſing point, and say that the same disorders may be produced by either? We have but little more than theory to support this sentiment, as direct debility is seldom suffered

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* The derangement in the excitability is equal, if not the same.

to reach the point of irregular or disordered action ; unless united or superceded by indirect †

As it is allowed that the two debilities terminate in an equal diminution of excitement, and that inflammation or inordinate action of any kind is the immediate consequence of that lessened excitement or incapacity of the vessels to propel or govern their fluids ; then must their equal predisposition to disorder, or their identity be also granted.

This identity of debility, or unity of disorder presents the key, by which we may with safety and ease enter those numerous apartments in the temple of medical science, which have for ages required a separate one.

Having enquired into *excitability* as far as it respects the healthy and diseased action of the body ; we are now unavoidably led to consider its connection with the mind and passions.

It must be universally granted, that the mind of man is coeval with the senses. For sooner ought we to expect vegetation from the earth without seed, than ideas from the brain without senses. We must then conclude, and a few facts, will incontestibly prove, that the mind is nothing more

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† In describing excitability, this question was noticed.

than the sensorial power, or the effect of external agents paſſing through the organs of sense, to the great source of sensorial secretion.

If the mind was spiritual or immaterial, surely no age whatever could effect it; and how often do we behold persons, completely deprived of intellectual power, from the debility of an advanced life? The dependence of the mind on the nervous power is strongly manifested in those, who have been subjected for a length of time to a chronic rheumatism in the head; by which not only the memory but all the mental attributes are much weakened, from a diminution of nervous secretion. Many who have reached their great climacteric, still retain a clear perception and correct memory; but this must be ascribed to the stimulus of reflection, (being uniformly persons of extensive information) which supports the necessary quantity of sensorial power for the mind: but the passions are invariably brought down, or moderated by old age; as they depend on that vigor or mechanical force which is not the concomitant of an advanced life. Since the mind rests on the sensorial power, and since the latter is increased by action, it follows that the mental vigor may be increased by stimuli. This truth is very evident in the first stage of fever, and after a few glasses of wine, before the vessels are under an *unpleasant distension;* when the imagination

is more fertile, the perception more acute, and impressions are revived, that have been displaced for years. But when the action becomes high, and the vessels much distended, then the dominion or power of the mind is transferred to the heart, and converted into passions, or rather, an aptitude for receiving them. The passions depend on a mechanical force, or a flux of blood to the heart, that stifles or weakens the intellectual power ; for two perfect or perceptible actions cannot exist at the same time. If a beautiful woman is presented to my view, the heart is instantly excited, and the mind remains inactive, or is incapable of a correct examination into her merit, and the propriety of the attachment, until the passion retires into a quiescent state : but if her beauty is not sufficient to rouse my heart, then my mind may examine her merit, and if it decides forcibly in her favor, the decision will be translated to the heart, and passion will exist. An agent that is not great enough to excite the heart, may rouse the mind, and the mind is always enfeebled proportionably to the increase of a passion. From what has been said we must conclude that the passions may and may not be indebted to the mind.

It may be asked why the mind should not be deposited in the heart, or diffused through the body, since it depends on the sensorial power ? The obvious reply is, that there is not a sufficient

quantity of nervous power in other parts of the body to produce ideal sensation; and if there was more in the heart than in the brain, the violent action of the heart and its appendant vessels, would prevent perception. When we reflect that the passions depend on a mechanical power, we may readily see, why they are attached to the heart, where the greatest action exists. From what has been advanced, two facts may be deduced. First, that if the vessels of the brain were as large, or the action as great, as in the heart, our minds would be converted into passions; as the passions depend on an influx of blood or a mechanical power, that would stifle the mind: Secondly, that the formation or character of the mind depends much on the passions and organism of the vessels. Such is the alliance of the sensorial and mechanical power with the mind and passions, that the character of a person may be known by the constitution of the body.

A physician of great celebrity and extensive knowledge of the world, told me that he seldom erred in forming an opinion of the natural capacity and disposition, from the pulse, in its usual and healthy state. Why should not the same experience empower us to pronounce with equal accuracy, the liability of a person to some particular sentiment or passion, that enables us to decide on his aptitude to some particular disorder; since the mind, heart and body are reciprocally depen-

dant, and controuled by the same natural law? I confess that acquirements make great changes, but will not prevent our seeing the fundamental principles and natural tendency of a person.

What then can be of more importance than a knowledge of *excitability*, since it not only enables us to meet every phenomena of the body, but to explain the keen and quick perception of some, and the slow, though extensive research of others; and to account for the irritable and violent, the moderate and phlegmatic temper?

Before I retire from you gentlemen, permit me to observe, that in approaching the objects of this essay, I have been concise, and perhaps irregular; leaving an improvement of the way to others. I may add, that I do not expect my sentiments will be readily received, having opposed authors of exalted fame, and supported a simplicity that is hostile to the pride of science.

JAMES PENDLETON, JUNR.

J. B