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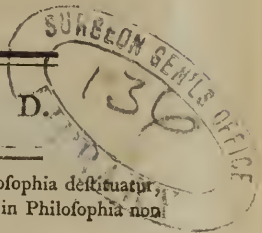
Washington, D. C.

THE
PROXIMATE CAUSE
OF
DISEASE:

BY INDUCTION FROM THE
LAWS OF ANIMATED NATURE.

WITH AN
EXAMINATION OF THE THEORIES
OF
TOWNSEND, REICH, DARWIN, RUSH,
AND WILSON.

BY JOHN MACE, M. D.



Artem Medicam denique videmus, si à naturali Philosophia destituatur,
Empiricorum Praxi haud multum præstare.—Medicina in Philosophia non
fundata, res infirma est.

LORD BACON.

Philadelphia :

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1802.

TO
DOCTOR WILLIAM HAYES,
OF MARYLAND.

DEAR SIR,

IT has always been the custom with authors to prefix a few lines of dedication to their writings when they laid them before the public. For this purpose some have addressed themselves to *Deities* both *Pagan* and *Christian*. It is however common among enlightened nations, to dedicate to some illustrious human character whose fame has spread through the scientific world. But I am bound to you by more silken cords than could bind me to such a character, and you might justly reproach me were I not, on the present occasion, to pay you a tribute of gratitude and respect. Permit me thus
publicly

DEDICATION.

publicly to declare, that under your direction I commenced the study of medicine, and that I have often witnessed your skill and judgment in practice, but particularly in saving my own life. Your unwavering friendship, and your ardent desire for my prosperity and happiness, have been much greater than I had any right to expect. Should my endeavours on the present subject, or on any other belonging to medical science, meet with approbation and success, I shall ascribe all to you. That health, happiness and prosperity may attend the remainder of your days, and that you may ever prove successful in all attempts to relieve the pangs of human nature, is the fervent wish of

Your grateful

Friend and Pupil,

THE AUTHOR.

TO
DOCTOR ENNALLS MARTIN,
AND
DOCTOR STEPHEN THEODORE JOHNSON,
OF MARYLAND,
THE FOLLOWING PAGES
ARE INSCRIBED,
AS A TESTIMONY OF REGARD,
BY THEIR
SINCERE FRIEND,
AND HUMBLE SERVANT,

THE AUTHOR.

PREFACE.

THE proximate cause of disease has generally been considered as a subject of the most difficult inquiry. Without surveying the labours of more distant times, to prove the truth of this remark, it will be sufficient to recollect the unsuccessful attempts of Stahl, Boerhaave, Hoffman, Cullen, Darwin, and Rush. So great have been the exertions of men of the most splendid talents in this research, that perhaps all further endeavours may be considered as entirely fruitless. Such a consideration, however, cannot satisfy an inquiring mind and one who will only view for a moment the present state of medical science.

This study which includes the dearest interests of man, his health and existence, was in the primitive ages of the world considered with other branches of knowledge, as an offspring of the sage parent philosophy. Hippocrates was the first who broke the parental tie and caused it to be a particular and independent profession; but it is much to be feared that this great man by this act did more injury than all his labours were afterwards able to repair. For
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though medicine might have kept pace with the illusive flights of many ancient philosophers, yet when the immortal Bacon, as a Columbus in philosophy and a giant in the intellectual world, unfolded the true path to knowledge, it would then have enjoyed a glorious opportunity of receiving the most brilliant improvements.

The separation of medicine and philosophy at this important period, is much to be regretted, and perhaps this useful branch of science has suffered an irreparable loss. It is from this separation that so many ghostly and unconnected doctrines have since prevailed among physicians. These illusive meteors have only served to glitter for a while and excite the attention of mankind, but have then disappeared forever.

If physicians had followed the method of induction prescribed by Lord Bacon, medicine would never have been disgraced with such rambling whims of the brain, and might have obtained all the advantages of its connection with philosophy. But however mortifying to the dignity of medical science, and however shameful in the eyes of the true philosopher, no systematic writer from the time of Lord Bacon to Dr. Brown has followed this glorious method: and it must ever excite pain in the scientific mind to reflect, that while the cultivators of
almost

almost every art and science have been guided by certain determinate rules, those whose province it is to restore the health of man should assume a peculiar and independent rank, and allow themselves to sport in the fairy fields of conjecture.

Indeed systematic physicians have not done even so much as to let those for whom they were writing know what the rules of induction are, and whether it is necessary to follow them in investigating subjects of medical science. To this day, reason and observation in conjunction are said to be highly necessary; but in what manner the reasoning is to be conducted has not been pointed out by any goodly physician. The mind is left to rove about in all the mazes of uncertainty and knows not where to find a resting place.

To suffer medical researchers to follow their own propensities is surely a deplorable circumstance, but it must be still more regretted that a respectable writer should make any remarks which have a tendency to excite with redoubled force such propensities of the mind. Dr. Darwin in the preface to his first volume of *Zoonomia* observes, "There are some modern practitioners who declaim against medical theory in general, not considering that to think is to theorize, and that no one can direct a method

of cure to a person labouring under disease without thinking, that is without theorizing; and happy therefore is the patient whose physician possesses the best theory." Ah! 'tis this *thinking* in such an irregular and confused manner that has so much obstructed the progress of knowledge, and caused physicians to build so many baseless fabrics in medical science. Such superstructures as these have ever been liable to fall into ruins, and while theories and systems of medicine are formed in such a manner it is vain to expect they will stand.

This is the only reason why the doctrines of many ancient and modern physicians have sunk into oblivion; and had the authors of them possessed the foresight of a philosopher, they might have known that the fame of such doctrines would have been short. It discovered the utmost vanity and at the same time a bewildered imagination, to expect that they would command a lasting reputation.

It was perhaps the love of fame, which unfortunately for mankind too often prevails over the love of truth among physicians, that prevented systematic writers since the days of the great Bacon, from giving their readers a view of the new and only certain path to knowledge so happily pointed out by this immortal genius. While those writers erected their idols,
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if they had laid open the grounds of belief, the votaries of medical science would have been too apt to refuse homage to such creatures of human invention. The mind must be purified from false imaginations and perverted notions before it is prepared to reflect the light of truth, and a mind thus smoothed and polished would not have been disposed to worship such false gods as have been constructed by Stahl, Cullen, Darwin and other fanciful authors.

But I am happy in turning my eyes from such flimsy structures built upon materials more subtile than air, to view a more solid edifice upon a foundation firm as the existence of man himself. This is the system of the late Dr. Brown, a man who for his stupendous talents and improvements in medical science, will long be remembered with admiration and regard.

In forming his system this author proceeded as every physician should have done, that is, he proceeded like a philosopher. He began not with wild conjectures, but with collecting facts and making inductions from them. Viewing the state of man, Dr. Brown saw that he was an *active* being; he therefore concluded that he had a *capacity* of action. But as this action ceased and death was produced, when

when the substances surrounding man were withdrawn, he concluded that they acted upon him and supported his existence. Life therefore appeared to be a forced state. The action of the living system Dr. Brown denominated *excitement*, and the capacity or disposition to action he called *excitability*. This disposition he perceived allowed of more action at one time than another by the substances surrounding man; when these substances produced more action the excitability was said to be *accumulated*, but when they occasioned less action it was said to be *exhausted*; and when all action ceased and death occurred, it disappeared altogether. The absence of excitability or the capacity of action by substances applied to the body, therefore, distinguishes the dead from the living state. When man was deprived of a part of the agents which surrounded him he became weak, and as this weakness was immediate upon the withdrawing of those agents, without the operation of any thing else, this debility was denominated *direct*; but when all the agents had been applied for too long a time and the capacity of action had become less, debility was also occasioned; but as this debility was produced in a more circuitous manner by the stimuli wearing away the excitability or capacity of action, it was called *indirect*. As

a capacity of action and the substances which surround man were sufficient to account for the motions of the animal machine, Dr. Brown rejected as superfluous all such ghostly beings as an *Anima Medica* or a *Vis Medicatrix Naturæ*.

Such are the fundamental principles of the Brownonian system; the reader will readily perceive that they exhibit a complete specimen of philosophic induction from facts which occur under daily observation.

It is much to be wished that Dr. Brown had preserved the same character of a philosopher throughout his whole doctrines; but he has sometimes departed widely from it. To point out the errors and imperfections of this author is a task which cannot be performed at the present time. I shall only observe, that his doctrine of *diseased* excitement being nothing more than a different degree of *healthy* excitement, is totally overthrown by what occurs in millions of instances, as will be seen hereafter, and that his treatment of many diseases from the action of excessive stimuli by the action of excessive stimuli is contrary to his own principles as well as the established maxims of philosophizing. This treatment instead of *driving out one devil by another* is adding *devil to devil*.

But reason and experience both tend to show that in cases of great debility *after* the excessive action of stimuli, as occurs in some instances

of bilious pleurisy and other forms of malignant fever, stimulants are highly necessary, and are the only remedies to be depended upon. Here the excitability appears to be accumulated as in other cases of indirect debility, which occasions the stimuli to act with such advantage. This accumulation of excitability with the weak action of the system which attends it, appears to arise from a deficiency of the usual quantity of oxygen received into the system, as will appear more clearly hereafter, and hence the administration of this substance promises to be of the highest utility. Blood-letting is generally hurtful in such cases, as might be expected from the view of the subject that has been given. But to return to the consideration of the doctrines of Dr. Brown.

It was not to be expected that this writer could form a system so complete as to withstand all further observation and inquiry. The rude and imperfect state in which he found medical science, together with his want of practice, must have greatly retarded the progress of his improvements. Had he possessed an opportunity of making extensive observations, his enlightened and philosophic mind was well calculated to form the most useful inductions.

But when all the errors of Dr. Brown's doctrines shall have sunk into oblivion, there will

be enough left to serve for the foundation of a future structure which will be as lasting as medical science. Still it may be said to this profound author,

- “ Hail creative genius, by whose sense divine
 “ Sprung forth a glorious system ever form'd to shine.
 “ Envy and prejudice in vain oppos'd thy might
 “ And Æsculapius' self acknowledg'd all thy right.”

A system founded upon the fundamental principles of Dr. Brown, with the discoveries in chemistry and the other auxiliary branches in medicine, which shall be finished off by strict inductive reasoning, will not be liable, like the baseless fabrics that have gone before it, to moulder into obscurity, though it may receive improvements from succeeding observations and discoveries.

After Lord Bacon had pointed out the true road to knowledge in medicine as well as every other branch of philosophy, and especially after Dr. Brown, by availing himself of Lord Bacon's researches, had unfolded the true laws of the animal œconomy and laid the foundation of a true system of medicine, it might have been expected that medical writers would have engaged in the proper method of investigation: but however humiliating to the dignity of science, it must be admitted that they have been too much disposed to *go the way of their fathers*, and that many visionary notions
 infect

infest the doctrines of the day. For the benefit of mankind and for the honour of physicians, it is to be hoped, that such notions will have but a short existence, and that no doctrine will be suffered to appear in medical writings, but what is founded upon real phenomena and those inductions that can be fairly drawn from them.

Taking the advantage of the laws of the animal œconomy, together with those facts that occur under daily observation, I have attempted to unfold the proximate cause of disease by such inductions as appear to be consistent with sound philosophy. The opinion contended for was formed at an early period of my medical studies by contemplating the doctrine of animal life. Whether it is just is to be left to future decision. *Magna est veritas et prævalebit.* Should therefore the proximate cause of disease which I have delivered, be founded in truth, it will do doubt, from the importance of the subject, be received with candor and attention; but if proved erroneous, I hope it will not meet with even a momentary support, and for the advantage of medical science be speedily hurried away into an everlasting oblivion.

J. MACE.

April 12th, 1802.

PROXIMATE CAUSE, &c.

THERE have been various theories of the proximate cause of fever delivered by physicians, but only two authors have ventured to lay down a theory of the proximate cause of disease in general. These authors are the illustrious Dr. Darwin and the celebrated Dr. Rush. The principle which is contended for in the following dissertation, will be applied to fever as well as every other form of morbid action, and it may therefore be expected that some notice should be taken of the different theories of the proximate cause of fever that have been delivered by authors. This is what I shall proceed to do, and shall afterwards hazard a few remarks upon the opinions of Dr. Darwin and Dr. Rush.

In prosecuting this design, it will be needless to go back into ancient times; neither will it be of any use to take notice of many of the modern theories upon this subject. The doctrines of Stahl and of Boerhaave now sleep with the authors, who had the boldness and ingenuity to bring them forward. The spasmodic theory of Hoffman and Cullen, after

being refuted and banished from the schools of medicine, has lately been revived by Dr. Currie of Liverpool; who attempts to support it by a train of hypothetical reasoning.* This author appears to have adopted this doctrine in preference to any other, merely because of his success with the cold and warm bath in febrile affections; and affords an example of the slight grounds upon which physicians have often proceeded in admitting and constructing theories. With all due deference to Dr. Currie as a learned and intelligent physician, his labours upon this subject seem to exhibit a specimen of the efforts of an ingenious mind in pleading a bad cause; and though his new modification of the spasmodic doctrine of fever should glitter like a bubble for a moment, it will soon be hurried away into that oblivion which awaits the final reception of all imaginary speculations.

Indeed no hypothetical theory of the proximate cause of fever can be expected to stand. An opinion upon this subject must be founded in fact, or a philosophic induction from real phenomena, and a superstructure of this kind will not be liable to moulder away into the elements of which it is composed. But to come to some original sentiments that have lately been advanced.

The Reverend Mr. Townsend after rejecting the Cullenian doctrine says, “ For the proximate cause of fever, therefore, I would assign the morbidly increased irritability of the heart and arteries, and this

* See Medical Reports on the Effects of Water, cold and warm, as a Remedy in Febrile Diseases.

this with either strong marks of vascular excitement, or with symptoms of nervous weakness and distress; the former constituting synocha and the latter typhus.”*

It is difficult to understand what this reverend and respectable writer intends to signify by “ morbidly increased irritability;” but it would appear to be nothing more than morbid action, as he says in the above quotation it is attended with strong marks of *vascular excitement*, and afterwards, that it arises from “ the *stimulus* of acrid bile, indigested food, viscid and corrupted mucus, worms, virus, and other *stimuli* in the stomach and first passages.” The examination of this theory will therefore come more properly in place hereafter, when a similar one though much more perfect will be considered.

The next theory to be taken notice of is that of Professor Gottfried Christian Reich of Erlangen, who places the proximate cause of fever in a deficiency of oxygen in the system. His words are, “ The generic character or essence of fever, the symptoms of which I presume are already known, consists in an unnatural and general separation and re-union of the most simple particles of the human body, effected by the unnatural, absolute or relative, local, or universal diminution of oxygen.”

The author then goes on to explain how this diminution of oxygen may take place, and the chief causes he assigns are miasma and the impurity of the atmosphere in general, all eruptive poisons; and
impressions

* Therapeutics, or a Guide to Health. London, 1801.

impressions on the mind which diminish the exertion or activity of the muscles, nerves, and vessels.

After these considerations he says, “ The proximate cause therefore of all fevers lies either in the prevention of the reception of oxygen, or in an unnatural application of it, or in an accumulation and evolution of carbone, hydrogen, septon, sulphur, phosphorus, and of all other particles of the human body supposed to be simple, and in the conjunction of these matters, among themselves, in binary, ternary, quaternary, and quintuple forms ; and with such matters as have their access externally, which we comprehend under the names of caloric, light, magnetism and electric matter.”*

In support of his opinion, the learned professor has related his success in all the varieties of fever by the administration of oxygen in the form of acids.

That a deficiency of oxygen does take place in fever appears from the most correct reasoning upon the subject. Dr. Cullen observes, that in the cold stage of this complaint the respiration is small, frequent, and anxious, and is sometimes attended with a cough. This function never returns to its ordinary state during the whole paroxysm, and after this is over it is still exercised with more difficulty than in perfect health, as almost every person must have experienced. Here it should be recollected that respiration is nothing more than a mechanical process, depending entirely upon the vigorous contraction of the diaphragm and the intercostal and abdominal

* Medical Repository, vol. iv.

abdominal muscles, which are occasionally assisted by other powers. From the debility which precedes the attack of fever these muscles are deprived of a part of their energy, the thorax is thereby not dilated to its ordinary extent, and the inevitable consequence is that the usual quantity of atmospheric air is not received into the lungs. Hence a deficiency of oxygen occurs in the system. This is what happens in common cases; but suppose a person to be debilitated by excessive heat, cold, intemperance, fear, or exercise, and exposed to the impure atmosphere of a foul ship, jail, hospital, or city, the consequence of such an exposure would be still worse.*

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* I know of nothing that makes a *pure* atmosphere except a proper proportion of oxygen gas or *pure air*; and when a chemist or a medical writer mentions an *impure* atmosphere, if he does not mean one in which there is a *deficiency of pure air*, I take it for granted that he is speaking of something like a mathematical point, for the phrase signifies nothing. There are but two ways in which the surrounding air can be contaminated; one is by such substances as form a chemical combination with the oxygenous portion, and the other by substances which are capable of existing in a gaseous form without any combination, and therefore operate by simple dilution. In either of these ways the proportion of *pure air* will be less, which will constitute an *impure* atmosphere, and it is presumable that every one who knows what takes place in respiration will admit, that in a given quantity of this atmosphere inhaled into the lungs there will be less of the pure air received into the system than there is in ordinary cases from a *pure* atmosphere. It appears to be a deficiency in the oxygenous portion of common air that forms what physicians

Let it not be said that these considerations are visionary and hypothetical; the paleness and livid appearances of the skin, the want of ordinary heat, the languid circulation and dark colour of the blood, which take place in many varieties of fever but particularly in the typhus, scorbutic, and synochus or malignant states, all warrant the above conclusion. The reverse of these occur from supplies of oxygen carried into the system in health: and when it is said

have pleased to call a *pestilential constitution*, for diseases of this character invariably occur in moist seasons and calm weather, both of which tend greatly, as every chemist knows, to occasion combinations of the *pure* air in putrefaction, as well as to dilute it, and prevent those vital streams which flow from abroad. All writers agree that an *impure* air is necessary to the existence of malignant diseases; and indeed it has been asserted, that without such an air they can no more exist than combustion without the presence of *pure* air. If reasoning from analogy and the attributes of the Deity, be allowable, there appears to be nothing which would lead one to suppose that the Creator of man should permit a subtle agent, such for instance as electric matter, to issue from earthquakes or volcanoes and destroy millions of human creatures, without any possibility of being controuled by the power of man; but if pestilential diseases cannot occur as they say without an *impure* air, men may prevent themselves from inhaling this air by diffusing *pure* air obtained from manganese throughout their habitations, which leads to a pleasing view of pneumatic medicine. Accurate experiments might be mentioned in direct proof of a deficiency in the oxygenous portion of the atmosphere, in places where typhus and malignant fevers have occurred, but this subject must be deferred until a future period. Vide Hales on the Ventilator, or Thornton's Philosophy of Medicine, vol. iv. p. 436.

said that the above phenomena are produced from a deficiency of this substance, the opinion is not drawn from feigned hypotheses but from real facts, and is agreeable to the most correct method of philosophizing.

This deficiency of oxygen in the system, promises hereafter the explanation of many circumstances attending acute as well as chronic diseases, which cannot be accounted for in the present state of medical science. But to return to the subject of fever.

Although a deficiency of oxygen does occur, I do not intend to assert that it constitutes the proximate cause of this morbid affection, nor that it is produced in the manner mentioned by Professor Reich; for he appears to consider the human body as nothing but a chemical machine, the elementary parts of which are subject to the laws of elective attraction, as in mixing septon (azote) and oxygen to form septic acid, or sulphuric acid and soda to form glauber's salt. This however is by no means warrantable in the present state of chemical physiology, and it is much to be feared that amidst all the pneumatic projects of the day, man will still be man, and chemical researchers will never be able to decompose and recompose him at pleasure, as they do the phosphoric and carbonic acids.

The Creator of the world appears, for valuable purposes, to have kept certain secrets to himself which are not for mortals to pry into, and if it is allowable to judge what is of the most hidden nature among visible beings, the animating property
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of man would perhaps present itself to the mind. If man was capable of forming himself, he would at once be exalted to an equality of creative skill with his Maker, and what would be the consequence every serious and thinking person must know. Smollet observes in his *Humphrey Clinker*, that “There are mysteries in physics as well as in religion, which we of the profane have no right to investigate. A man must not presume to use his reason unless he has studied the categories, and can chop logic by mode and figure.” This remark is well worthy of its ingenious author, and deserves the attention of every pneumatic physician.*

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* It is hoped that no person will consider this as an attempt to depreciate the laudable endeavours of Beddoes, Thornton and Townsend. In a more enlightened age these benevolent characters will certainly meet with just applause; and while they continue to cultivate the objects of pneumatic medicine in conformity to the known laws of the animal œconomy, they will ever be successful. It is from this splendid region that medical science will receive its last and most brilliant improvements. All I aim at is the project of considering the phenomena of animated beings as nothing more than the consequences of a chemical compound. In the extensive range of chemical science there does not appear a single analogy to lead to this conclusion. If the elementary parts of the human body were all mixed together they would form combinations according to the laws of elective attraction; so that instead of having one body there would be several; but if these elementary particles are prevented from obeying the laws of affinity, as happens during the living state, every chemical philosopher will readily grant that it is not by a chemical agent, and therefore will forever elude all researches upon the principles of this science. Vide Beddoes on Consumption and Scrophula, p. 189. London, 1801.

The chemical combinations of the elementary parts of the body mentioned by Professor Reich, do not appear to be at all proved by any analysis the Professor has made in the time of fever, and as being mere flights of the imagination should be rejected in all researches after truth.

The success of this learned and ingenious author by means of acid remedies, does not afford any support to his opinion of the proximate cause of fever. This complaint has often been cured by calomel and jalap, but no physician ever supposed that its proximate cause consisted in a deficiency of these substances in the system.

I come now to consider the theories of Dr. Darwin and Dr. Rush. But before entering into the subject it may be necessary to observe, that it is with great diffidence I venture to approach the doctrines of these eminent authors. They have long been accustomed to explore the regions of medical science, and their splendid talents entitle their opinions to the utmost candor and respect. Even the very errors of such respectable gentlemen deserve attention, for at the same time that they show the fallacy of human reason they point out the necessity of pursuing another road in search of truth. While therefore a youthful votary of science should venture to dissent from such authority, he will be influenced by proper sentiments of respect; and should he hazard any remarks upon the doctrines supported by these respectable writers, he will not proceed upon frivolous grounds, but will endeavour to offer only

such objections as appear to be inspired by the genuine spirit of philosophy.

The theory of Dr. Darwin will first be considered. According to this author, "All diseases originate in the exuberance, deficiency, or retrograde action of the faculties of the sensorium as their proximate cause; and consist in the disordered motions of the fibres of the body, as the proximate effect of the exertions of those disordered faculties. The sensorium possesses four distinct powers or faculties, which are occasionally exerted and produce all the motions of the fibrous parts of the body; these are, the faculties of producing fibrous motions in consequence of irritation which is excited by external bodies; in consequence of sensation which is excited by pleasure or pain; in consequence of volition which is excited by desire or aversion; and in consequence of association which is excited by other fibrous motions. We are hence supplied with four natural classes of diseases derived from their proximate causes; which we shall term those of irritation, those of sensation, those of volition, and those of association."*

The faculties of the sensorium Dr. Darwin supposes are caused by the presence of a subtile elastic fluid, which he imagines to be secreted by the brain, and is therefore denominated sensorial power or the spirit of animation. "The similarity of the texture of the brain," says he, "to that of the pancreas and some other glands of the body has induced the
inquirers

* Zoonomia; part second. Caldwell's edition. Preface page 17.

inquirers into this subject to believe that a fluid, perhaps much more subtile than the electric aura, is separated from the blood by that organ for the purposes of motion and sensation. When we recollect that the electric fluid itself is actually accumulated and given out voluntarily by the torpedo and the gymnotus electricus, that an electric shock will frequently stimulate into motion a paralytic limb, and lastly, that it needs no perceptible tubes to convey it, this opinion seems not without probability; and the singular figure of the brain and nervous system seems well adapted to distribute it over every part of the body.”*

The phenomena of animal life are truly astonishing, far beyond any thing that exists in the visible creation. The actions of the human body have at all times been considered as difficult of explanation. To relieve this difficulty, physicians have called in the aid of a very attenuated fluid possessed of great mobility, and distributed throughout the various parts of the nervous system, which however only serves to make the subject more difficult, and involve it in still greater obscurity.

This subtile fluid was supposed by the ancients to be of an oily and spirituous nature, and they therefore denominated it “animal spirits.” Sir Isaac Newton first suggested the opinion that it resembled electric matter, and at the end of his Principia he has the following query. “Is not all sensation performed and the limbs of animals moved in a voluntary

* Zoonomia, vol. i. p. 6.

tary manner, by the power of a certain subtile fluid resembling electricity which we call æther.”* Dr. Cullen appears to have taken up the hint thrown out by Sir Isaac Newton, and called the substance “nervous fluid,” and in his writings, but particularly the *Materia Medica*, he has carried the consideration of it in explaining various phenomena of the animal œconomy, to the greatest extent of which his ingenuity was capable. Dr. Darwin next comes forward as an improver in this point of difficult research, and he has with more plausibility given this wonderful being the name of “sensorial power,” because it is supposed to be secreted in the sensorium. Since Dr. Darwin has published his *Zoonomia*, physicians have been so much persuaded of the electric nature of this substance, that they have called it “the electroid fluid.”

The arguments in favour of this opinion, after all that has been said, do not appear to be satisfactory. The luminous flashes before the eye which have been supposed to give countenance to it, may, as Dr. Elliot observes in his *Medical Philosophy*, be
accounted

* The notion of this great man, when considered in connection with the doctrine of those who think the human body nothing more than a composition of inanimate matter, forms a beautiful representation in the mind. The æther or electroid fluid appears to produce the motions of the planets round the sun, and it might be expected that people instead of strolling about would move in continual ellipses. This would exactly form Mr. Woodward’s *perfect and living orrery*, and answer all his purposes in proving the substance of the sun, without any further trouble.

accounted for upon the principles of optics. The fluid which produces the phenomena of galvanism, has been proved by the electrometer to be nothing more than electric matter, and consequently is no more concerned in muscular motion and sensation than the sparks which issue from a prime conductor. The motion of a paralytic limb by an electric shock can give no support to this opinion. It is impossible to produce motion and give a capacity of it in animal bodies by the same substance at the same time. Hence the electric fluid cannot at one moment both stimulate and renew the sensorial power or spirit of animation; and hence the fallacy of that theory which supposes oxygen, one of the most durable and diffusible stimuli in nature, to be the principle of irritability. It appears strange, that Dr. Darwin should suppose that an electric shock applied to a paralytic limb, could instantaneously renovate a fluid which he contends is secreted from the blood. The existence of an electric fluid in the torpedo and gymnotus electricus, is no proof of its being produced by a secretory action in the brain of these animals. This fluid pervades many bodies both animate and inanimate, and it is not improbable but the œconomy and structure of the torpedo and gymnotus electricus may give rise to the accumulation and necessity of more of it than many other created beings. Philosophers say, that when an effect is produced the cause of that effect must always be present, and indeed there is an absolute necessity that it should be so. Electricity appears to be much concerned in

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the production of auroræ boreales, fire-balls, shooting stars, ignes fatui, water-spouts, whirlwinds and earthquakes. In thunder-forms it has been proved to be present. Yet there does not appear to be any animal in the atmosphere or the earth, who in paroxysms of tremendous fury should be capable of secreting from his sensorium such enormous quantities of electric matter, to spread terror and destruction among the human race! Metals and many similar bodies possess the electric fluid, but no person ever imagined that they were provided with a brain for the production of this substance.* The opinion of
a very

* It is not intended by these remarks to assert that electric matter is ever generated or formed, and the expressions here made use of are only conformable to the theory of its secretion in the sensorium of animals. This substance existed originally, and appears to be nothing more than a modification of the same fluid which in different circumstances produces heat and light; for as an ingenious philosopher observes, it has all the old properties of fire and some of its new ones too. A very learned Rabbi affirms, that the Hebrew Shehekim signifies both heat and light, or more properly the ethereal or electroid fluid which causes these phenomena, and which pervades the universe, producing the revolutions of the heavenly machine. He says that as air in motion is wind, and in undulating vibrations sound, so the shehekim or subtil ether in motion is light, and in vibrations by friction, &c. is heat or fire. He believes that this fluid existed in the original chaos out of which all material beings were formed. The opinions of this learned Hebraist and philosopher will appear more evident, if it is recollected, that heat and light are absolutely necessary to the existence of all animated beings, and that none of these were created until every thing was

a very attenuated matter similar to electricity being secreted in the brain, is therefore wholly unphilosophical, and leads to conclusions which no one would ever dream of admitting.

But perhaps it may be said, that the brain, as appears by its glandular structure, does secrete a fluid for the purposes of sense and motion, although this fluid may not resemble electricity. The existence of a glandular structure by no means proves the occurrence of such a secretion, or the liver, pancreas and kidneys, as well as other glands, would send forth refreshing streams of this animating fluid.

Admitting the secretion of a fluid in the brain which is distributed through the nerves, it is probable that this fluid is intended to prepare these organs for sensation, as the fat which lubricates the muscles, the synovia which is secreted in the joints, and the lymph in the cavities of the abdomen and thorax, are destined to assist the motions and functions,

formed for their support. And if the shehekim causes the motions of the planetary orbs, there was an absolute necessity for its pre-existence, or these bodies would all have rushed into confusion as soon as they were created. The same learned Rabbi says, "the great conflagration shall happen by a conversion of all the ethereal matter into devouring fire, a tradition of which went early into the world." What a grand reflection! People in ancient times have been supposed to be very ignorant, but this was not the case in the first ages of mankind. He who received an account of the creation from the Author of it, and he who gave a suitable appellation to the subtile fluid which causes heat and light, must have possessed the most sublime principles of philosophy.

tions of those parts.* But to suppose that the fluid secreted in the brain is the *sine qua non*, or primary cause of motion and sensation, is proceeding upon a very uncertain ground, and trespassing upon the boundaries of just reasoning. If all motion in the animal body is owing to this fluid, as the advocates for its existence teach, no secretory action of the brain could take place until this organ had previously prepared some of the fluid it was intended to elaborate, which all will grant to be an impossibility.

Many animals exist without a brain, and still they have sensation and motion. In the embryo before this organ is formed, and in vegetables where it has not been discovered, motion is found to occur. If then sensation and motion, the effects attributed to the sensorial power, both take place where there is no possibility of its existence, to say that those phenomena are caused by this substance is contrary to the established maxim of reasoning, which requires that the efficient cause should always be present at the time an effect is produced.

The idea of a nervous fluid or spirit of animation, appears to be only a remnant of ancient notions in medicine, and it seems strange that the most enlightened physicians of the present day, while they have rejected all other errors derived from this source, should still adhere to such an opinion.

This fluid never has nor never will be discovered, if it is of such a subtile nature as the advocates for
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* Hence the state of the brain in insanity. See Cullen's Practice.

its existence suppose. Every one accustomed to travel the alluring paths of true science, will readily agree to the first rule of philosophizing laid down by the great Newton, which is, that no more nor any other causes of natural effects ought to be admitted, but such as are both known to exist and are sufficient for explaining their appearances. This is a golden rule; it is the true and proper test to distinguish what is founded in nature and truth, from what rests only upon the illusive dreams of the imagination. The doctrine of an animating spirit or nervous fluid, must therefore be discarded as the offspring of an unbridled fancy.

Indeed Dr. Darwin himself, after all his reasonings, appears to have been in great doubt concerning the existence of this subtle agent; for, says he, "this opinion seems not without probability," an expression which denotes the lowest degree of belief. Yet this very respectable author considers the proximate cause of all diseases to consist in the various states of this fluid, as appearing in morbid irritation, sensation, volition, and association. From his diligent researches this ingenious writer must have been aware of the fate of hypothetical doctrines in all the different branches of philosophy, but particularly in medical science. The vague and innumerable conjectures which were formed in ancient times concerning the structure and functions of different parts of the human body, have all been discovered by anatomists to be destitute of foundation. The *Aura Vitalis* of Van Helmont; the *Vires Conservatrices et*

Medicatrix Naturæ of Gaubius and Cullen; the *Anima Medica* of Stahl and Nichols; the *Mechanism*, *Obstruction*, *Constriction* and *Lentor* of Boerhaave; and the *Spasm* of Hoffman, have all vanished before the rays of succeeding light.

It is therefore surprising that Dr. Darwin should have trusted the *Zoonomia*, and what he calls a *natural* classification of diseases, upon a foundation acknowledged by himself to be nothing more than *probability*, especially as these subjects engaged so much of his time and attention, and bid so fair to stand as lasting monuments of his talents and comprehensive views. An excellent philosopher observes, that to believe firmly what has but a small degree of probability is a manifest abuse of the understanding. It would be treating Dr. Darwin too severely to apply this remark to him, although he appears, notwithstanding his acknowledgement, to have believed firmly that his theory of diseases was founded in nature; and perhaps it may more justly be said, that in forming this theory he was fired with too much of that brilliant imagination which adorned with such beautiful scenery the lines of the Botanic Garden.

Of all the discoveries in science none have ever originated from conjecture. They have always been made in consequence of patient observation, by accurate experiments, or conclusions drawn by strict reasoning from observation and experiments; and these have at all times tended to refute, but not to confirm, the theories invented by men of genius and

warm imaginations. To suppose that the brain secretes a fluid similar to electricity, is proceeding too much into the fairy fields of conjecture. If this fluid really had an existence, to conceive that it could produce muscular motion alone by the action of stimuli, would be going very far indeed: but to suppose it capable of performing all the offices assigned by Dr. Darwin, surpasses the utmost comprehension. The whole doctrine concerning animal spirits, a nervous or electroid fluid, a sensorial power or spirit of animation, should therefore be considered as a fiction which ought to have no place in genuine philosophy.

Indeed there appears to be no necessity for calling into consideration a subtile fluid in explaining the phenomena of animated nature. It must be admitted that all bodies possessed with life and motion are endowed with a peculiar organization. In addition to this they have an excitability or a capacity of vital action by the impression of external agents, which excitability, if not immediately produced by the organization, is at least intimately connected with it. If these were perfectly understood, all the phenomena of animated beings would then be brought to light; and until they are, clouds and darkness will forever involve the subject.

Whether it is intended by the Benevolent Creator of man that physiologists should ever arrive at this state of knowledge, time alone can decide. But to call into consideration an unknown substance before what is already known to exist is understood, instead

instead of making a nearer approach, tends only to obstruct the road to truth.

But perhaps it may be said that there are diseases produced by Sympathy or Affociation, which may occur without the presence of an animating spirit or sensorial power. This opinion however, it is presumed, will, upon an accurate survey of the subject, appear to be destitute of foundation.

Dr. Darwin considers the sympathetic or associate motions of much importance in explaining many morbid phenomena in the human body. Upon these he has formed his theory of fever, which indeed may be regarded as the most complete specimen of his doctrine upon the subject.

Of all the different parts of the system under the influence of sympathy, Dr. Darwin seems to consider the stomach as entitled to the greatest attention. The importance of this organ in the human body may with great plausibility be inferred from a variety of circumstances. It exists in most if not all animals, while the brain, heart and lungs, are found to be deficient. It is of the utmost necessity to the constitution of man, for beside being the receptacle of his aliment, whereby an agreeable and powerful stimulus is immediately diffused over the whole system, it prepares a substance which by being assimilated to his organization augments his bulk, gives him new vigour, and supports the vital flame.

But 'by reasoning *a priori* from the anatomical structure of this organ and its dependence upon the arterial, nervous and muscular systems, it would not
appear

appear to possess primary and independent action, but to be entirely of a secondary nature in influencing the movements of the animal machine. To this consideration may be added, that in the foetus in utero the brain and spinal medulla first appear after the heart, and the stomach with the other abdominal viscera are only evolved just before the extremities. These parts are probably formed according to their importance in the animal œconomy, and from this view it might be concluded that the stomach is of less importance in the actions of life than either the vascular or nervous systems. But the human mind is incapable of reasoning with any degree of certainty from first causes, and upon this subject as well as every other which regards the nature and health of man, experience is the only sure ground on which to seek for truth. It will therefore be necessary to have recourse to the phenomena which take place in the system in its healthy and morbid states, in order to see whether the action of the stomach is of a primary and independent nature, or whether it does not depend upon the state of the arterial, nervous, and muscular systems.

It is a fact established by the experience of many, that the healthy state of this organ becomes impaired by passions of the mind, by excessive cold or heat, and by the influence of too much exercise; but whether these act directly on the stomach itself, or indirectly through the medium of the systems that have been mentioned, is the question now to be considered.

If a person under the sensation of hunger, in consequence of the sudden information of some agreeable news is seized with a paroxysm of joy, the heart immediately begins to beat with increased energy, the circulation of the blood becomes more rapid, in consequence of which an unusual glow of warmth is diffused over the whole body, muscular motion is more vigorous, the cheeks acquire a red colour, and pleasure is depicted in the countenance. After this tumult of the system has in some measure subsided and the person begins to return to his ordinary feelings, his appetite then and not before is found to be greatly diminished, if not entirely gone.

If on the contrary the system is assailed by an unexpected paroxysm of fear, grief or sorrow, the strength all at once seems to flee away, the heart feels a sudden sensation of weakness and appears as though something was wanting for its support, the circulation becomes slow and languid which occasions a diminution of heat, while the countenance acquires a paleness and by its downcast look expresses the mournful state of mind. After these phenomena occur the stomach is found to be affected, and the appetite is often wholly suspended; but if the afflicting cause is not of a durable nature, the system returns to its ordinary state and this affection disappears. If, however, the depressing paroxysm is often renewed, a torpor of the whole arterial, nervous and muscular systems occurs, and the stomach thereby becomes more permanently impaired, constituting

tuting the various symptoms which occur in dyspepsia and hypochondriasis.

Here the state of this organ is clearly seen to depend upon the condition of the other vital parts of the system, as produced by the operation of a stimulant or sedative passion.

The phenomena which attend the action of heat and cold as well as exercise, also prove the dependent nature of the stomach in the most satisfactory manner. The *modus operandi* of these causes is however well known to every one acquainted with medical science, and it is not necessary here to enlarge upon the subject.

But to meet Dr. Darwin on his own ground, and come to the consideration of fever itself. Dr. Cullen who for his accurate description of diseases will obtain immortal honour, says, that upon the first approach of a paroxysm of fever, "the person is affected, first with a languor or sense of debility, a sluggishness in motion, and some uneasiness in exerting it, with frequent yawning and stretching. At the same time the face and extremities become pale; the features shrink, the bulk of every external part is diminished, and the skin over the whole body appears constricted, as if cold had been applied to it. At the coming on of these symptoms some coldness of the extremities, though little taken notice of by the patient, may be perceived by another person. At length the patient himself feels a sensation of cold, first in his back, but from thence passing over the whole body."*

This:

* Vide Cullen's Practice with Rotherham's notes, vol. i. page 28. American edition, 1801.

This chilliness is what constitutes the beginning of the cold stage, upon the approach of which, says the same faithful observer, “ the appetite for food ceases, and does not return till the paroxysm be over, or the sweat has flowed for some time. Again he observes, “ as the cold stage advances there frequently comes on a sickness and nausea, which often increase to a vomiting of a matter that is for the most part bilious.”

Here, in a morbid as well as a healthy state, the dependent nature of the stomach upon the primary moving powers of the system is plainly to be discerned. The sense of debility, the paleness of the face, the shrinking of the features, the sensation of cold, to which may be added the slowness and weakness of the pulse, occurring upon the first approach of languor, all show that the affections of the muscular and arterial systems are entirely of a primary nature, while at the same time the unimpaired state of the stomach until all those phenomena have taken place, proves in the most convincing manner, that the morbid conditions of this organ are of a secondary or symptomatic kind.

Upon this ground alone Dr. Darwin’s opinion of the sympathetic influence of the stomach appears to be without foundation. But to come to a closer examination of the subject. This ingenious author supposes that a torpid state of the above-mentioned viscus is the cause of continued fever with weak pulse, by producing a debility of the heart and arteries in consequence of direct sympathy, while the action of the

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the cutaneous capillaries is increased by reverse sympathy. This he imagines is more especially the case when this fever arises from contagious or infectious matter received into the stomach.

But with all acknowledgements to Dr. Darwin's superior abilities, this opinion appears to be formed from a very inattentive view of the first phenomena of fevers. During the rage of malignant epidemics, such for instance as the yellow fever, it is a well known fact that the infectious cause, if indeed it is received into the stomach, exists there without impairing its functions, and without producing any material injury in the system, until by the operation of excessive heat, cold, fatigue, fear, or intemperance, a state of debility or predisposition is brought on, by which the excitability becomes excessive and enables the infection, before innocent, now to act, and occasion all the symptoms of fever. The immortal Cullen, in his character of fevers, which he applies to all the exanthemata as well as those of the intermitting, remitting and continued forms, says, "*Prægressis languore, lassitudine et aliis debilitatis signis pyrexia sine morbo locali primario.*"* A torpor of the stomach as the

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* *Synopsis Nosologiæ Methodicæ. Cl. I. Ord. I. Febres.* The reader will please to excuse the small repetition here given of what was before quoted in English from this author. *Pyrexia sine morbo locali primario* are words so expressive and so well suited to the present purpose that I could not forbear to mention them. A more detailed account of all the symptoms of fever may be seen in the first Chapter of Dr. Cullen's Practice.

first or primary affection of the system in any idiopathic fever whatever, is therefore nothing more than an imaginary existence. To say that this state of the stomach may take place without its being perceived, is a manifest abuse of the understanding; because the same reason would justify the conclusion, that it never can occur.

Dr. Darwin's explanation of the above state of fever with weak pulse, is by no means satisfactory. He mentions the quickness of the pulse and weakness of the heart and arteries, induced by breathing an atmosphere with a diminished proportion of oxygen gas, as related by Dr. Beddoes, and after illustrating the subject a little in his own way, he exclaims, "How exactly this resembles a continued fever with weak and quick pulse!" And "How exactly this fact overthrows Dr. Darwin's theory of this state of fever!" Because, if a weakened action of the heart and arteries is induced by breathing a reduced atmosphere or by a deficiency of oxygen, from the debility which precedes and accompanies this fever, the cutaneous capillaries having that "mobility" which Dr. Darwin mentions, will consequently be excited into action by the heat which surrounds the body. Hence all the phenomena of the fever will be produced without the assistance of any previous torpor of the stomach, or association; and therefore to call these into consideration is quite superfluous, and not consistent with accurate reasoning.

Dr. John Clark in his *Observations on Fever*, printed in London in 1792, has radically proved that

that this complaint is always the same. Dr. Darwin admits this opinion. He also grants that the stomach is affected secondarily in fevers with strong pulse; and if he had recollected the eternally established rule, that effects of the same kind are always produced by the same causes, he would never have thought of a torpor of this organ as the primary cause of any variety of fever whatever.

Indeed the facts adduced in support of a sympathetic theory of disease are by no means sufficient, and almost all of them may be explained in a satisfactory manner upon principles which are more firmly established. Some affections however occur, which cannot be accounted for in the present imperfect knowledge of the animal frame; such for instance as a pain of the right shoulder in an inflammation of the liver, and a spasm of the legs in cholera, which are no more than symptoms or effects of a morbid state of the system; and no advantage is obtained by considering them as produced by sympathy, a term which only serves to express the fact of their occurrence. Indeed such a conclusion appears to be very unwarrantable, because it is by no means evident that the causes of the original affection do not also produce those which are of a secondary or associate nature.

One of the most remarkable instances of sympathetic motion in the human body, occurs in the phenomena of respiration. At the same time that the diaphragm by its contraction is drawn down, the intercostal muscles contract, which elevate the ribs,
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and by these means the dimensions of the thorax are increased, when the true *pabulum vitæ* by triumphant springs flows into the lungs. Here the motions are in direct opposition, and to assert that one is the cause of the other, would be almost as contrary to reason, as to say, that when the flexor muscles of the hand contract, they excite the action of the extensors.

Instead of actions in the human body exciting, they always tend to destroy each other according to the one which predominates in the system, except in those instances where they serve a common purpose, as in the motions of the respiratory muscles. This principle, which was first brought to light by the bold and original genius of Mr. John Hunter, is well established and supported by daily experience. But the facts which confirm this principle, tend entirely to subvert the doctrine of associate motions, and admit of no other explanation, according to this doctrine, than that which is wholly of a fanciful nature.* Dr. Darwin has granted every thing necessary to overthrow his sympathetic theory. He admits, that before a part becomes diseased, torpor or debility takes place, which is followed sooner or later by an increased disposition to act by the impression of ordinary stimuli, except in those instances where there occurs an irreparable exhaustion of the vital capacity. This debility is either of a direct or indirect

* See Zoonomia, vol. iii. page 49, where some facts of this kind are mentioned and explained according to Dr. Darwin's method.

indirect nature, in whatever part of the system it is produced, and will always be according to the circumstances of the part affected, and the disposition and force of the cause by which it is induced.

How disease is excited in these instances, may be readily explained. Dr. Cullen long ago taught, that in consequence of the extended state of the vital principle, substances applied to one part of the system excite motions in every other part; an opinion which will not be denied in the present state of medical science. But without calling into consideration such a general operation, it is sufficient for the purpose of producing disease, if those parts in a state of debility have their capacity of action increased, a fact which is confirmed by daily observation. In consequence of this increased capacity, when any stimulating agent is applied to the system, it is obvious that its effects will be exerted principally upon those parts which are the most susceptible of its operation; and hence inordinate or diseased action will occur without the assistance of any sympathetic affection whatever.

Dr. Darwin's theory of morbid associations, when *weighed in the balances* of reasoning, is therefore *found wanting*. The same golden rule of philosophizing which overthrows the doctrine of an animating spirit secreted in the brain, applies with equal force to this theory; for if the production of the above morbid affections can be accounted for upon known laws of the animal œconomy, to call into consideration a sympathetic action, is totally inconsistent with

with true philosophy, and in fact appears originally to have existed no where but in the imagination of its ingenious author.

The theory of Dr. Rush next comes in order to be considered. But before making any observations upon the subject, it will be proper to take a short view of the morbid state of the human body, as a preliminary to what will be delivered hereafter.

If the *Almighty fiat* was only to withdraw for a moment the various agents surrounding man, all would then be calmness and repose. But in the present state, a variety of stimuli tend to support the vital capacity, and prevent the flame of life from being extinguished. The heart, by its never-failing contractions, conveys the vital stream through all the body, which repairs the wasting frame, gives muscular energy, and prepares the nerves for receiving those affections which give rise to sensation in the mind, while the intellectual and moral faculties, by their reverberating action, impart new vigor to the animated machine.

This is what constitutes health, which like every other phenomenon in nature, has its degrees, and in which, though some parts from possessing more of the vital capacity may be more active, yet an equal balance between the stimuli and excitability is preserved throughout the whole frame.

This nicely balanced machine is not easily deranged, and hence man is capable of bearing without injury, a small proportion of what is either too much or too little. His action may be more or less, and still

still be healthy. But when the vital frame becomes debilitated, the scene is changed. By some of the ordinary stimuli ceasing to act, the excitability prevails to an excessive degree. But how is the aspect then varied! The agents which are still permitted by the *Almighty fiat* to continue, instead of producing harmony in the whole machine, occasion nothing but deranged motions, which give rise to uneasy or painful sensations in the mind: and now the whole frame rushes with more than redoubled speed, towards destruction!

This is what constitutes disease. But still the machine is in motion, and as there is but one healthy, so there can be but one diseased action. This morbid, like the healthy state of the system, has its degrees. The action is sometimes strong and sometimes weak: the former is the sthenic and the latter the asthenic affection of Dr. Brown. When disease belonged to the last head, he called it a disease of debility, because the excitement of the system was weak; for he expressly declares that as long as any of the stimulating agents act, they have the same effect.*

The diseased, like the healthy action of the body, occurs more in some parts than in others, or in other words, it is always more or less partial.† This depends as in health upon the degree of vital capacity possessed

* Vide Brown's Elements by Dr. Beddoes, page 5. See also page 78, note.

† Brown's Elements, page 22 to 27. Also page 85 to 91.

possessed by each part, and upon the nature of the agents which produce the morbid action. But although the grade of excitement considered in itself, is more in one part than in another, yet in relation to the excitability present in each, and the stimuli applied, it is of the same degree throughout the whole system, whether disease is either excessive or deficient in action.

It has been supposed that these opposite states of disease, from a *transfation* of excitement or some other cause, often prevail in different parts of the system at the same time; but this appears to be a great mistake, and would lead to the employment of two very contrary modes of practice; that is, to the use of depleting and stimulating remedies at the same time, for if the opinion was well founded, either of these would increase the disease when applied alone.

The *transfation* of excitement rests on nothing more than the presence of an imaginary nervous, or electroid fluid, and there does not appear to be any other cause capable of producing a disease of both weak and strong action at the same time, while the living state of the parts is preserved.

When the primary moving powers of the system, such as the sanguiferous vessels, nerves, and muscles, are affected, it is presumed that all will admit, that the other parts are in a correspondent state. This is remarkably illustrated in cases of fever, attended with great morbid action, when in consequence of the debility which precedes the attack, the excitability becomes excessive in many different parts of the
system

system, giving rise to a variety of morbid affections, which are all so easily removed by depleting remedies that have a general operation.

From this it appears that the want of muscular energy in these cases which is so soon removed by blood-letting, is of the same nature with the morbid action which prevails in the other parts, and seems to be unusually deficient by the predominating excitement of the heart and arteries.

The same correspondence of excitement in different parts of the system, occurs in diseases of weak action, but especially in hypochondriasis, when a deficiency of excitement pervades the whole body. This deficient action is produced by an impaired state of the arterial, muscular, and nervous systems, in consequence of sedative passions, and is only to be removed by stimulating remedies which have a general operation.

Local affections also correspond with the general state of excitement. This has been confirmed by the success which has attended the treatment of ulcers of the legs, in consequence of remedies which operate on the whole system, by Dr. Rush and Dr. Physick.

These opinions are agreeable to experience and to the well known direction, that the state of the system and the state of the pulse are to regulate all prescriptions.

Dr. Brown has divided all diseases into two kinds, which he calls sthenic and asthenic; but by the same rule he might have said that there was but one dis-

case, for it is well known that a different degree or magnitude of an effect does not constitute a difference in the nature of it, and besides he acknowledges that these states of the system are apt to be converted into one another.

Dr. Cullen in his Nosology observes, that all diseases may be considered of the same kind that arise from the same causes, that differ only in degree, and that are cured in the same manner.

In the time of this illustrious author, physicians were accustomed to view the laws of the animal machine in a very complex and irregular manner; they consequently conceived the diseases of the human body to be of many genera and species, and to be produced by many causes which were supposed to act in a very different manner. But happily for mankind a more perfect light has since shone upon medical science. By accurate reasoning from real phenomena, the true laws of the animal œconomy, and the manner in which diseases are produced, have at length been unfolded. Physicians of the present day consider all the different varieties of morbid affection, as occasioned by causes which act in the same way.

The causes of disease are predisposing, exciting, and proximate.*

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* Medical writers have generally given place to a *remote* cause of disease, but this does not appear to be necessary or admissible in the present state of medical science. The first deviation from health, consists in debility, which is the predisposing cause; and as all the ordinary stimuli produce healthy action until this occurs, there appears to be no room for a remote cause, unless the agents which occasion an equable ex-

The predisposing cause is always debility. This allows the excitability to accumulate to an excessive degree. It occurs in one or more parts of the system at the same time, according to the circumstances of the parts, and the nature of the cause which produces the debility. Without debility and the consequent accumulation of excitability, disease could never be produced, except in some instances, from the application of preternatural stimuli, which are as much of the nature of accidents, as a concussion of the brain or a fracture of the cranium. The accumulation of excitability occurs in cases of indirect as well as direct debility, or the torpor of the system would continually increase, until the flame of life was entirely extinguished. Besides, if this accumulation did not take place after indirect debility, no exciting cause could act to occasion disease, which experience proves to be the case.

The exciting cause of disease is always of one kind and that is a stimulus. Cold nor any other sedative can never be an exciting cause, for this is plainly denied by the term itself. Such agents only act by producing a greater aptitude in the system, to be acted on by stimuli which excite the disease, though this is sometimes performed so quick as to lead to deception.

Dr. Rotheram in his Practical and Explanatory Notes on Dr. Cullen's Practice of Physic, when speaking of the causes of disease, very justly observes, that

citement, can be considered as tending to bring on disease, which is a downright contradiction.

that “ the predisposing is that which renders the body liable or capable of being affected by disease when the exciting cause is applied. No disease can exist without an occasional or exciting cause, yet it is necessary that at the same time, the state of the body should be such as to admit that cause to take effect or act.” Debility is therefore always the predisposing cause, and stimulus always the exciting cause of disease.

The proximate cause of disease will be considered hereafter. It is sufficient for the present purpose to observe, that it is at all times the same.

Disease consists always in morbid excitement. This appears from the consideration, that the animal machine is always in action while life lasts; and as this action is at all times ordinate or inordinate, except during the short period of predisposition, it follows that there is but one diseased, as there is but one healthy action. This diseased, like the healthy state of the system, can therefore only vary in degree, and, like it, can never be reduced to classes, orders, genera, and species.*

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* Medicine is likely to become a curious medley of ancient notions and modern doctrines, and physicians are too fond of amusing themselves with single symptoms of disease. When all the functions of the body are exercised in a natural manner, every one considers this as the effect of a healthy action of the system; and consequently the phenomena which appear after a diseased action is produced, are the effects or symptoms of this diseased action. The causes which occasion the morbid action will then be considered as the causes of the disease,

The cure of disease is always in the same manner, and that is by removing the morbid excitement of the system. When this excitement is excessive it is reduced by abstracting stimuli; the system then returns to its healthy state by the operation of ordinary agents, except where the habit of body is weak, in which case it becomes necessary to administer some of the stimulating medicines belonging to the *Materia Medica*. When the excitement is deficient, it is removed and the system restored to its ordinate action, by the latter remedies alone. All the various means of subduing morbid excitement operate by tending to remove its proximate cause; for until this is done, the healthy state of the system is never restored. This will be considered more particularly hereafter.

Thus it appears, that according to the rules of Nosology there is but one disease. The classification of the morbid affections of the human body must therefore cease, because there is no foundation for orders, genera and species, but only for varieties. This is the way in which Dr. Cullen would have to proceed in considering the subject, if he were now
 alive

and not those causes which produce particular and distinguishing symptoms, as in hæmoptysis and obstructions of the liver. The latter method of proceeding was adopted at a time when the movements of the animal system were but little understood, and when such vague theories as morbid matter were the order of the day, and therefore it is wholly inconsistent with sound philosophy to follow it at the present time. It is a pity but what physicians, like philosophers and logicians, would distinguish between causes and effects in their investigations.

alive and to follow the rules laid down in his own Nosology.*

Let it be remembered, that all cafes of afphyxia are here excluded from belonging to the morbid ftate of the fyftem. To include this affection in the catalogue of the morbid conditions of the human body, is contrary to the doctrine of animal life, and the

* It is hoped that no perfon will confider the above remarks on nosology as any endeavour to leffen the value of a fympptomatology of difeafe. It is the fashion of the prefent day to difregard all nosology, which has a tendency to lead the mind from ftudying the hiftories of the various morbid affections of the human body. The laws of the animal œconomy, it is true, are very fimple and eafily known in the prefent ftate of medical fcience; but the effects of the action in the living fyftem are much diversified by the complicated ftructure of the animal machine. In difeafe, experience fhows that all prefcriptions are to be regulated according to the ftate of the fyftem. This ftate can be known only by its fympptoms or effects, and however varied the protean monfter may be in its courfe, the degree of morbid excitement muft be afcertained, or the phyfician muft prefcribe in a random manner. To diftinguifh the morbid conditions of the human body is fometimes difficult, but in moft cafes it is poffible; for, as Dr. Cullen juftly obferves, if any one denies this, he might as well have faid that there is nothing in the medical art. It is unfortunate for mankind, that the votaries of medical fcience are ever difpofed to carry a favourite doctrine to extremes, and in fupporting of it, to neglect the advantages which attend the oppofite fide of the queftion. But when the fashionable opinions of the day fhall be moderated into their proper ftandard, the labours of Sauvages and Cullen will be again referred to as hiftories of the morbid ftate of the fyftem, and will ftand as monuments of their talents and diligent application, until difeafe fhall no more afflict the human race.

the propriety of it is expressly denied by the very signification of a diseased state. Asphyxia is a total suspension of all the powers of life; and if it had never been discovered that persons were capable of resuscitation in this state, they would always be considered as radically dead and accordingly consigned to interment. Hence this affection has been properly called "suspended animation" by Hunter, Forthergil and other writers. Many animals, it is well known, continue in this condition in cold countries for the greatest part of the year, and yet no person ever considered them as under the influence of disease, for pain and misery would then appear to be their most natural state.

Having premised these observations on disease, the theory of its proximate cause as delivered by Dr. Rush, comes now under consideration. The theory of fever taught by this respectable author, has been applied by himself to disease in general, and therefore to state this theory, will serve as a specimen of the whole of his opinions upon the subject.

In order to render his theory of fever more simple and intelligible, Professor Rush lays down a few general propositions.

" 1. Fevers of all kinds are preceded by general debility. This debility is the predisposing cause.

" 2. Debility is always succeeded by increased excitability, or a greater aptitude to be acted upon by stimuli.

" 3. The diminution or abstraction of one stimulus is always followed by the increased action of others."

The connection of excitability with debility, the Professor says, has lately been pointed out by the French physicians in the terms “*laxité vibratile*,” by which they mean a liability in the system to be thrown into vibrations or motions by the predisposition of debility. He then observes, “That this vibratility, or disposition to preternatural motion in animal matter, is the *predisposing cause* of fevers, is evident from their occurring in those stages of life in which it is most common, as in infancy, childhood, youth and middle life.”

“ 4. The stimuli which are the remote or exciting causes of fever, act in a manner wholly different from what they do upon a body in which there is no predisposition to fever.

“ 5. The stimuli which induce the irregular action or convulsion of fever, act, for the most part, primarily upon the sanguiferous, and particularly upon the arterial system.

“ 6. There is but one remote cause of fever, and that is stimulus.*

“ 7. There is but one fever.

“ 8. All ordinary fever being seated in the blood-vessels, it follows of course that all those local affections we call pleurisy, angina, phrenitis, internal dropsy

* The remote cause here appears plainly to be the *exciting cause*. Professor Rush had before mentioned the causes that produce debility, which are commonly called remote causes. He is now treating of the fever after the debility or predisposition has taken place, and the excitability has been accumulated.

dropfy of the brain, pulmonary confumption, and inflammation of the liver, ftomach, bowels, and limbs, are fymptoms only of an original and primary difeafe in the fanguiferous fyftem.

“ Having premifed thefe general propofitions I go on to remark,” fays the profeffor, “ that a fever (when not misplaced) confifts in a morbid excitement and irregular action in the blood-veffels, more efpecially in the arteries.” He afterwards fays, “ This irregular action is in other words, a convulfion in the fanguiferous, but more obviously in the arterial fyftem.” That this is the cafe he infers from the ftrict analogy between fymptoms of fever and convulfions. He mentions the particulars of this analogy, and finds it to hold good in no lefs than nineteen inftances.

After thefe propofitions and remarks, Profeffor Rufh then fays, “ From the facts and analogies which have been mentioned, I have been led to believe, that irregular action or a convulfion in the blood-veffels, is the proximate caufe of fever.”

Such is the theory of the proximate caufe of fever and of difeafe in general, as taught by Dr. Rufh.

Before proceeding to make any remarks upon this theory, I think it juft to pause awhile and pay a tribute of refpect to its enlightened and benevolent author. As a phyfician, a profeffor, and a benefactor to mankind in general, the name of Dr. Rufh, it is hoped, will be tranfmitted with the higheft efteem to the moft diftant pofterity. Hundreds of the medical profeffion in the United States muft ever

bear in mind, with the finest feelings of gratitude, what abundant stores of the most useful knowledge they have received from this excellent physician, in the most agreeable manner, and sufficient to inspire the highest intellectual and moral exertions. The improvements which he has made in medical science, and especially in the treatment of the diseases of this climate, will long stand as monuments of his talents for extensive observation and diligent research. His love of truth, which often leads him to reject opinions that he thinks upon a more accurate survey of the subject were too hastily adopted, must impress the scientific mind with noble sentiments of respect. It is the business of physicians to reason from facts and experience, and according to these he must alter his opinions, if he would wish to discover truth which is so desirable in whatever regards the health of man. To change an opinion under these circumstances, is the true characteristic of a philosophic mind. But while I express all possible acknowledgments to Dr. Rush's superior talents and dignity, I must beg leave to differ from him upon the proximate cause of disease, and I flatter myself with receiving that mildness and indulgence, which flow from the sweetness of mind inspired by viewing the delightful walks of science. This is the more to be expected, as this justly celebrated physician has closed his theory with a distinguished humility by saying, "It is imperfect from its brevity as well as other causes. I commit it to my pupils to be corrected and improved."

The objections to Dr. Rush's theory are the following.

1. The proximate cause is confounded with the disease itself. They both consist, it is said, in morbid excitement or irregular action. This method of reasoning upon the subject has long prevailed in medical science. It was adopted by Dr. Boerhaave, who was followed by Van Swieten, Gaubius, and many other physicians. The proximate cause or the disease according to them, was the result of all the other causes united together. The causes which in conjunction made up the proximate cause, they denominated proegumenal or predisposing, and procatartick, occasional or exciting causes. But in order to find out the propriety of Dr. Boerhaave's method of reasoning, it is only necessary to recollect the foundation upon which it was built. This illustrious author considered the human body to be composed chiefly of a conic, elastic, inflected canal, divided into similar lesser ones proceeding from the same trunk. These tubes are destined for the conveyance of the animal fluids, in the circulation and undisturbed motion of which he supposed life and health to consist, but when the fluids became obstructed in their passage it constituted disease. This obstruction he supposed to consist for the most part in a lentor of the blood, which he called the proximate cause or the disease. Plethora or debility, as tending to favour the generation of this lentor, he called the predisposing cause, and heat or cold operating in conjunction with plethora or debility to produce the proximate

proximate cause or lentor, he denominated the occasional or exciting cause. Thus it appears, that Dr. Boerhaave, from the chain of causes he conceived to be concerned, was under the necessity of considering the disease and its proximate cause the same. He imagined the disease to consist in obstruction or lentor, and when this was removed a cure was completed. There were but two other causes concerned, which he called the predisposing and exciting, and therefore to give the proximate cause a place, it was necessary to make it the same as the disease. It is an established maxim in philosophy, that reasoning from one error always leads to another. Dr. Boerhaave's obstruction or lentor, it is well known, had no other existence but in his imagination, and therefore all reasoning built upon it must be equally destitute of foundation. Truth in every branch of science is always consistent with itself; and if Dr. Boerhaave's opinions had not been erroneous, there would have been no necessity for him to contradict himself, by saying that the disease and its proximate cause, or the predisposing and exciting causes in conjunction, were the same. In medical science as well as every other branch of philosophy, no one will pretend to deny, that all reasoning or inductions must be founded upon facts and experience or real phenomena. Van Swieten himself very wisely remarks, that "in the consideration of diseases the discoveries that observation has made are the data from which, when examined with attention and judgment, the ingenious physician infers numberless and

and most useful truths :”* and if this author, as well as Dr. Boerhaave, his illustrious preceptor, were now alive, they would accordingly throw off their old way of reasoning and adopt a method conformable to the discoveries that have lately been made in medical science. To follow the rules prescribed by Dr. Boerhaave in investigating the causes of disease, is not inferring truths from observation, but reasoning from the unfounded and exploded notions of lentor and obstruction. It is acknowledged that medicine has, within a few years, undergone a complete revolution. The physician who amidst the light of the present day, adopts the rules of reasoning dictated by an imaginary lentor, acts therefore as inconsistent with sound philosophy, as a chemist would do to advocate the ancient doctrine of the elementary nature of the atmosphere, or the astronomer who would adopt the vulgar notions of the Ptolemaic system. This is what every medical philosopher must grant, and it is useless to insist any more upon the validity of the present objection.

2. There appears to be a great inconsistency in Dr. Rush’s theory. He observes that the proximate cause of disease consists in morbid or irregular action, but in speaking of syncope he says, that its proximate cause is an absence of motion.

3. This theory does not appear to be agreeable to logical accuracy. The cause and the effect are both said to be one thing ; but he who mentions a
cause

* Commentaries on Boerhaave’s Aphorisms, vol. i. p. 29.

cause of any kind, whether remote or immediate by his own expression, denies the possibility of its being the same with the effect it produces. A physician who reasons in this way, is like a chemist, who in explaining the manner in which carbonic acid or fixed air is formed, should say it was formed of itself. Indeed it would be as good logic to say, that every phenomenon in the universe was the immediate cause of every phenomenon.

4. It is superfluous and useless to say, that disease and its proximate cause consist in the same thing.

5. According to this theory, fever has two predisposing causes, debility and "a disposition to preternatural motion in animal matter," or a connection between excitability and debility. Dr. Rush observes, that this connection of excitability with debility, occurs in all other varieties of disease as well as fever, and therefore if fever has two predisposing causes, all other complaints have the same. But he also says that there is but ONE predisposing cause of disease, and that is debility alone. According to his own doctrine then, a disposition to preternatural motion is not a predisposing cause, for he distinguishes between this and debility.

6. The analogy between fever and convulsions, affords no support to this theory of the proximate cause. According to the second rule of philosophizing, effects of the same kind are produced by the same causes. Admitting the analogy between convulsions and fevers, and that they are different effects, it cannot therefore be concluded that the convulsions

vulsions or one effect is the cause of the other. The only deduction according to the established rule just mentioned, is that the two effects are produced by similar causes.

7. This theory of the proximate cause does not appear to be sufficiently adapted to the cure of disease. It has always been the practice among physicians, not only to administer those remedies which subdue morbid action, but likewise to give stimulating medicines, in order to restore the strength of the system and remove the disposition to a relapse, which is apt to occur after all complaints, even from the ordinary proportion of stimuli, while debility remains.

From these considerations it must be clear to every medical philosopher, that Dr. Rush's theory can by no means be admitted, and it therefore becomes necessary to investigate the subject still further. This can only be done with certainty by strict reasoning, founded upon real phenomena of the living system, and it is in this way alone that the proximate cause of disease, as well as all other subjects belonging to medical science, can be brought to light.

The word proximate is derived from the Latin verb *proximo*, which signifies *to be next*. A proximate cause then is that cause next to an effect, and therefore the proximate cause of disease is that cause which is next to the disease. This cause comes now under investigation.

Except in some few instances of idiosyncrasy, and other similar affections, disease is always preceded by debility, or such an inability in the system as renders

ders a person unable to perform ordinary occupations, without symptoms of languor and weariness. Those idiosyncratic affections have generally been excluded from the catalogue of diseases, because the term disease, almost universally implies a more permanent disturbance of the system. There are also some other affections produced by the application of violent stimuli, which are entirely of the nature of accidents, and accordingly have been viewed in this way, as well as different from diseases, by all medical and surgical writers. But when these stimuli occasion an action in the whole system, indirect debility and a consequent accumulation of excitability occurs, and the complaints they produce are then in the same state with those which at first arise from this kind of debility. That indirect debility and an accumulation of excitability does occur, from the action of preternatural stimuli, is proved by the intervals of pain and ease which are always experienced in such cases.

But in general the morbid states of the system are *preceded* by debility. This has before been proved to be the predisposing cause. When the debility is direct, the excitability is immediately accumulated, but when it is indirect, this does not take place until some time has passed away. But in both cases the excitability is in a quite different state from what it is in an ordinary accumulation, such as occurs during sleep in a healthy state of the system. Here the common stimuli occasion ordinate or healthy action; but after debility is brought on, there is such a morbid

bid disposition in the system, that they produce inordinate or diseased action.

This disposition to diseased action is what I have called a morbid excitability, and that such a state of excitability takes place, appears very evident for the following reasons :

1. It occurs after debility.
2. It is in too great a proportion to the excitement.
3. When the ordinary stimuli are applied, they produce a different effect from what they do in a sound state of the system, occasioning an inordinate or diseased, instead of a healthy action. Dr. Rush himself observes, that “ the stimuli which are the exciting cause of fever, act in a manner wholly different from what they do upon a body in which there is no predisposition to fever.” As the stimuli continue to be of the same nature, the difference in their mode of action must be referred to a different state of the excitability or disposition to produce action, as induced by the predisposing cause or debility.

4. When the disease is subdued, there is a disposition to morbid action even from the ordinary proportion of natural stimuli, until the strength of the system is restored. Hence physicians have at all times cautioned their patients against returning too soon to their usual habits of life, and hence the many relapses and deaths which have occurred from not attending sufficiently to this caution.

5. This principle must be admitted agreeably to the known laws of the animal œconomy. Excite-

ment is the living principle, or excitability brought into action by stimuli. A certain state of excitement is then preceded by a correspondent state of excitability. Therefore a morbid excitement cannot occur without a morbid excitability.* This morbid excitability or disposition to diseased action, as being next to the disease, is therefore the proximate cause of the disease.

Some have considered the stimulus that excites the disease as the proximate cause; but an exciting cause must

* The above conclusion is drawn from the doctrine of excitement and excitability, as taught by its illustrious author. "In the first promulgation of his doctrines, Dr. Brown did not sufficiently distinguish between the actions of the living body and its powers. *Excitement* and *Strength* were at first considered by him as synonymous terms; and on the state of excitement his distinction of diseases was entirely founded. To the last he had but two classes; diseases of increased and diminished excitement. After many discussions of his doctrine, in which the distinction between the powers and actions of the living body was pressed upon by him, he adopted the term excitability, to express the *disposition in action*." Beddoes's edition of Brown's Elements, page 110. "Contemplating the condition of man, Dr. Brown observed that he was surrounded by external agents, which acted upon him while alive, and their effects ceased when dead. These he called stimuli; and the living principle *brought into action* by these, excitability; and the word excitement was used to express the *action* produced by stimuli." Philosophy of Medicine or Medical Extracts, vol. 1. page 137. This is the only light in which excitement and excitability can be considered, so as to be consistent with sound reasoning and destitute of imaginary notions. It was thought proper, in order to render the above argument plain, to state it in a syllogistic manner; and he who admits Brown's doctrine, must also admit the deduction drawn from it.

must necessarily be admitted, and besides, the stimulus is more remote than the morbid disposition, because it is applied to this disposition, and acts on it in exciting the morbid action.

But perhaps it may be said, that disease may be prevented in cases of debility by diminishing the quantity of ordinary stimuli, and therefore the excitability is not in a morbid state. This objection, so far from being of any weight, is evidently in favour of the above principle; because there would be no necessity for such a diminution if a morbid disposition had not taken place in the system.

It might afford additional support to this doctrine, to investigate the predisposing, exciting and proximate causes of health. The first of these is however involved in the utmost obscurity; and as I think it necessary always to confine myself to a statement of facts, or real phenomena, and such deductions as can fairly be drawn from them, I shall not offer any considerations upon it. The exciting cause of health is the same as that of disease. The proximate cause of healthy excitement, is a sound or healthy state of the excitability. This conclusion is undeniable, from the fact, that excitement and excitability are always in a correspondent condition.

Since commencing the subject of this dissertation, and stating the above arguments in favour of a morbid excitability or disposition to diseased action, I have met with a late Treatise on Febrile Diseases, by Dr. Alexander Philips Wilson. This ingenious author has also taken notice of an alteration of the excitability,

citability, and has considered this alteration as the proximate cause of fever. His words are, "The laws of excitability are changed in fever. This change is sufficient to account for the phenomena essential to fever, without supposing any change induced on the fluids.

"We know that the laws of excitability, in fevers, are different from those which prevail in health; because the same external agents, the same degree of exercise, the same degree of temperature, the same quantity of food, of light, of sound, &c. which in health occasion moderate excitement, followed by exhaustion, in fever produce excessive excitement or atony. The state of the living solids being thus changed, there must be a correspondent change in the effects of the internal agents, the circulating and other fluids; hence the phenomena of fever.

"The proximate cause of fever, therefore, is a change in the laws of excitability; in consequence of which the same agents no longer produce the same effects.

"How the remote causes of fever act in inducing this change, and on what change in the living solid this change in the laws of excitability depends, we neither can nor ever shall, perhaps, be able to determine. This part of the subject is involved in the utmost obscurity. From the facts which have been stated, it is certain that the causes of fever do effect this change; and it is evident that such a change in the living solid must occasion the phenomena of fever."*

But

* Vol. 1. page 529. See also vol. 2. Preface, page xvi.

But there is by no means a coincidence of opinion between Dr. Wilson and me upon this subject. He considers the excitability as changed in the degree of its action, as appearing in atony or excessive excitement; whereas I say it is changed in its very nature or disposition, and is capable of producing the same degrees of excitement according to the stimuli which are applied, as in the healthy state of the system. His expression is, that the *laws of excitability* are changed in fever. But this is certainly a mistake. The laws of excitability, or the laws of the animal œconomy, are the following: 1. When the excitability is not excessive, a moderate degree of excitement is produced by a due proportion of stimuli. 2. An accumulation of excitability ensues from a deficiency of direct stimuli. 3. The excessive action of stimuli exhausts the excitability. 4. When an exhaustion is brought on, the excitability after a while becomes accumulated.*

In

* Whoever considers the ascendancy which the stimuli have over the excitability in cases of exhaustion, must readily perceive, that if all the stimuli were to continue their action, the excitability could never accumulate, but the torpor of the system would continue to increase until life was extinguished. It has before been observed, that in debility the respiratory muscles became weak, and the usual quantity of oxygen was thereby not received into the lungs. This appears to be the only stimulus which is deficient, after indirect debility or exhaustion takes place; and as it is a very powerful stimulus, a want of the usual quantity may allow the excitability to accumulate. The sensation of cold, the paleness of the skin, the weakness of the pulse, and other phenomena of debility, seem clearly to show that this deficiency of oxygen does occur.

In order to be satisfied that all these laws take place in disease, it is only necessary to recollect the phenomena of an intermitting fever.

The two last laws of the excitability are exemplified in the first paroxysm and subsequent return of this disease. At the latter end of the first paroxysm, the excitability is exhausted, and before the commencement of the next it becomes so accumulated, and at the same time so morbid, as to occasion excessive and preternatural action again by the ordinary stimuli. Between this exhaustion and accumulation; it is obvious that there must be a time at which the stimuli and excitability are in due proportion, and produce a moderate diseased action. This state of the system is however more stationary in many other morbid affections, where there is a change from excessive to weak action. In these cases of moderate diseased excitement, stimulant medicines are apt to be hurtful, and physicians are under the necessity of using depleting remedies in order to produce a weak action, so that those medicines may be exhibited. This is often the case in Rheumatism which is about to alter from the acute to the chronic form, and is generally said to partake of both these forms together. The accumulation of excitability from a deficiency of direct stimuli, is shewn by the effects of depleting remedies at the commencement of an intermitting, and after a cure has been completed: in the former case the paroxysms are protracted, and in the latter a relapse is apt to occur. These effects arise from the accumulation of excitability; while the depletion, by increasing the debility, renders this

fever

this excitability still more morbid, and hence the ordinary stimuli more readily occasion preternatural action.

Many other morbid states of the system, besides those mentioned above, likewise show, that the excitability is subject to the same accumulation and exhaustion in disease as in health.

Dr. Wilson is therefore mistaken, in supposing that the *laws* of excitability are changed in fever, or indeed in any other diseased affection: these laws evidently continue the same, while the excitability is altered from a healthy to a morbid state. This change in the disposition or state of the excitability, is the reason why the ordinary stimuli produce diseased instead of healthy action.

The fact is, that Dr. Wilson, although he has ventured to give some strictures upon the Brunonian system, has still adhered too closely to the principles of its original and profound author. He does not admit of any such thing as predisposition to disease, which however is required upon the doctrines taught by Brown himself; for if no state of the system favourable to the production of morbid excitement by the natural stimuli ever occurred, these stimuli would never occasion an excitement of this kind. But if such a state of the system is brought on, it is evident that this state is predisposition or the predisposing cause. Debility has before been proved to act in this manner.*

Dr.

* Every physician must have noticed, that persons often say they are neither sick nor well, but weak. This is the ac-

Dr. Wilson has followed Dr. Brown, by considering disease as consisting in nothing more than a different degree of the same excitement which constitutes health. Health, he says, consists either in moderate excitement, or such an exhaustion as daily occurs when the sleeping state of the system is brought on by the various occupations of life ; while excessive excitement, or atony, which he observes is produced by excessive excitement that lasts only a short time, constitutes disease. According to this plan he forms his indications of cure. When the excitement is excessive, it is to be removed by changing it into moderate excitement by depleting remedies, which diminish the quantity of the natural stimuli ; but when atony occurs, he says it is to be removed by inducing moderate excitement by the application of stimuli, especially those which are of a diffusible nature.

It might excite surprise, to reflect that Dr. Brown, and those who have adopted his principles, should consider disease as a different degree of healthy excitement, did not two circumstances occur to the mind. The first is, that speculative men in general are as fond of their opinions as an epicure is of dainty dishes, and suffer their minds to be deluded and led away by them in the same manner. The
second

count that patients generally give of the state of their system, previous to an attack of disease ; and this state is what constitutes predisposition. If the predisposition is not removed, it seldom or never continues long without producing morbid action.

second is, that physicians are always disposed to follow one another, without putting their opinions to the test of facts and philosophic inductions, or to use a phrase from Dr. Cullen, they are for the most part a fervile herd of imitators. It was before observed, that the human body was capable of bearing without injury a small proportion of what is either above or below the usual standard. This is what every one must have experienced; and if man had been so flimsily made as to be liable to disease, from every slight accident or deviation from his ordinary course of life, he might justly complain against the goodness and wisdom of his Creator; for he would then be below the beasts that perish. He could never maintain his rank and perform the duties and offices assigned to him upon the globe. But if it can be shewn that every grade of excitement ever known to occur in disease, can take place in a healthy state of the system, the unavoidable conclusion will then be, that disease does not at all regard the degree of excitement; and therefore the opinion of Brown and his followers upon this subject, must be destitute of all foundation.

For this purpose it is only necessary to survey for a moment the different nations in the world, consisting of men, women and children. It is obvious, that in the different circumstances in which all these are placed, every degree of excitement known to take place in disease, must occur in a natural or healthy state of the system. But if those robust inhabitants of the globe, which have lived at differ-

ent times and been exposed to hard labour, are considered from their émbryo state, when they received the first feeble motion of life, until the vital flame has been extinguished by old age, it will then appear that every possible degree of excitement has taken place. Yet in every one of those instances, all the necessary functions are carried on in a pleasant, easy and exact manner, which according to Dr. Brown himself constitutes perfect health.

The doctrine of disease consisting in a certain grade of excitement, either above or below the healthy standard, must therefore, from the facts that have been mentioned, be acknowledged by all who are guided by just principles in philosophy, to be wholly imaginary.*

Neither does disease consist in the irregularity of excitement alone, as has been supposed. This may be easily proved by considering the manner in which the different labours and occupations of life are carried on in different parts of the world. In the prosecution of these it must be obvious, that the greatest irregularity of excitement occurs; but no person will pretend to say, that the different employments
amongst

* It is not a little curious, that those who have adopted this doctrine should be so inconsistent with themselves as to plead for the existence of remote predisposing and proximate causes of *disease*; whereas if disease was only a different degree of healthy excitement, as they say, there could only be the same causes to produce it which occasion health. The immortal Brown, who was in general more consistent with his own principles than any other physician, accordingly rejected those causes of disease.

amongst mankind are diseases.* Besides, it has before been proved, that the excitement in disease is in a correspondent state throughout the system, according to the excitability in each part and the stimuli which act upon it. In order to prove this matter still further, it is only necessary to observe, that physicians and surgeons directed by the never-failing guide of experience, always prescribe according to the condition of the system. When the excitement is excessive they use depletion, and when it is weak they employ stimulating remedies. But it must be acknowledged that this would be a preposterous as well as a pernicious method of proceeding, if the system was not in a correspondent state of excitement.

Upon the whole it clearly appears, that disease depends upon some other change in the living body besides an alteration in the laws of excitability, a different degree of healthy excitement, or an irregularity

* The reader will please to observe, that if irregular excitement is mentioned as synonymous with disease, it is not meant that this excitement constitutes the nature of disease; for this doctrine is nothing more than the unguarded flight of some active imagination, not supported by any facts and inductions whatever. It is intended here to maintain, that the excitement in disease is essentially morbid, and of as many different degrees as can possibly occur in a healthy state of the system, from the period of infancy to that of death by old age. This is amply proved by only recollecting what appears in the different morbid affections of the body, from the gigantic exploits of the furious maniac, to the feeble and placid movements of the atrophic patient.

gularity of action. What this change is has been proved before.

After having thus established by undeniable facts, and inductions drawn from them, the principle of a morbid excitability or disposition to diseased action, I shall now conclude by making a few remarks upon the application of this principle to medical science.

1. It may perhaps be suggested to the mind, to inquire into the nature of this morbid excitability, in order to ascertain in what it consists. This however does not appear to be necessary for the regulation of those remedies employed for the cure of disease, and it is sufficient for the purpose to be acquainted with the fact. How debility occasions this disposition to diseased action, what is its particular nature, and how the natural and artificial stimuli operate so as to remove the debility on which it depends, are subjects of the utmost difficulty; and I am persuaded that all the medical luminaries which are yet to shine, will not be able to dispel the clouds of darkness that hang around them.

2. This principle is happily adapted to the cure of disease, and is agreeable to the practice which has generally been followed, from the days of Hippocrates to the present time. When the disposition to disease is so great as to occasion excessive excitement, it should be counteracted by abstracting the natural stimuli by bleeding and other depleting remedies. But at the same time, if the depleting plan is carried too far, it will bring on debility, which is the very cause that first occasioned the morbid disposition.

position. A fear of this should, however, not lead to the employment of stimulants too soon, which might bring on inflammation, congestion, effusion, and all their dreadful effects. When this disposition to disease exists in a smaller degree, giving rise to a moderate morbid excitement, it will be best to abstract some of the natural stimuli so as to produce a weak excitement; for the application of stimuli at first would be apt to occasion excessive action, and the consequent risque of disorganization in those parts most essential to life. In all cases where the morbid excitement is weak, stimulating remedies are to be employed alone; and as the disposition to diseased action is never strong in these cases, they may be given without danger to remove the debility, when this disposition will cease altogether and a healthy one occur in its place. After morbid excitement has been subdued in any manner, it must be obvious that stimulants are of great necessity to remove the debility and diseased disposition which remain, and thereby prevent a relapse. Success in the practice of medicine can only be obtained by a proper attention to these circumstances.

3. The knowledge of a morbid disposition is of the utmost importance in the prevention of disease. It proves in the most satisfactory manner, the absolute necessity of abstracting or avoiding some of the natural stimuli when debility has taken place. This may be best accomplished by abstinence, and by rest in a horizontal posture, until the system is restored to its usual vigour, when the disposition to diseased action

tion will entirely be removed. It is only by the diffusion of this knowledge, that the morbid affections incident to mankind can ever be prevented with any degree of certainty, where a weakness of the system has been brought on. It may perhaps be said, that feeble constitutions require the addition of stimuli in order to avoid diseased action. This however does not appear to be the case; because the morbid disposition is always excited by stimuli, and there are no constitutions when not oppressed by too many of the means of excitement, but what have sufficient powers of restoration for warding off disease. But after the powers of the system have been exhausted by the continuance of diseased action, stimulants are of the greatest necessity in such constitutions, and indeed are the only remedies to be depended upon.

4. The doctrine of a disposition to diseased action or a morbid excitability, leads to a pleasing view of the ultimate perfection of medical science. This will be accomplished by teaching mankind in general the true laws of the animal œconomy, and the nature of those causes which weaken the system and thereby give rise to this morbid disposition. In the latter department of instruction, chemistry will hold the most distinguished rank. In order to prove the importance of this study, in the perfection of the Healing Art, it is only necessary to recollect, that almost all, and certainly the most destructive diseases of the human body, arise from varieties of heat and cold and from noxious effluvia in the atmosphere.

mosphere. This noble science, by teaching the effects of temperature, and by discovering adequate means of guarding against local impregnations from putrefaction, combustion, exhalation and respiration, will confer the greatest and most lasting benefits upon the human race. The learned and elegant writers of the *American Review*, when speaking of the advantages of chemistry in medical science, very justly observe, that "this fair and fertile region constitutes the medical *land of promise*, inviting attention by the splendor of its scenery, and alluring our hopes by the profusion of its riches. To us perhaps it will not be permitted to go over and possess the land; but we entertain no doubts of that blessing being enjoyed by a more sagacious, inquisitive and fortunate posterity."* Let it not be supposed that the above remarks upon the perfection of medicine are the wild reveries of a heated brain. Reason and experience both combine to show, in the most ample manner, that as long as the animal machine is subject to weakness, disease with all its numerous evils will be the consequence; for however mournful the reflection, those means which before contributed to the health and existence of man now become the instruments of his destruction!

* *Monthly Magazine and American Review*, vol. iii. page 371.

Med. Hist.

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