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.

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.

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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

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.

TO

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

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. Bloodletting 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

infeſt

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.

THE

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 ſubtile 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 phyſic 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

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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-ſtorms 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 ſubtile 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 its

* 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 ſubtile 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*

Medicatrices 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

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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,

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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 Aſſociation, 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

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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 fœtus 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, conſti-

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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 langour 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."*

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* 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 langour, 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

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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

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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 *tranſlation* 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 *tranſlation* 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

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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-

eaſe, 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 caſes of aſphyxia are here excluded from belonging to the morbid ſtate of the ſyſtem. 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 perſon will conſider the above remarks on noſology as any endeavour to leſſen the value of a ſymptomatology of diſeaſe. It is the faſhion of the preſent day to diſregard all noſology, which has a tendency to lead the mind from ſtudying the hiſtories of the various morbid affections of the human body. The laws of the animal œconomy, it is true, are very ſimple and eaſily known in the preſent ſtate of medical ſcience; but the effects of the action in the living ſyſtem are much diverſified by the complicated ſtructure of the animal machine. In diſeaſe, experience ſhows that all preſcriptions are to be regulated according to the ſtate of the ſyſtem. This ſtate can be known only by its ſymptoms or effects, and however varied the protean monſter may be in its courſe, the degree of morbid excitement muſt be aſcertained, or the phyſician muſt preſcribe in a random manner. To diſtinguiſh the morbid conditions of the human body is ſometimes difficult, but in moſt caſes it is poſſible; for, as Dr. Cullen juſtly obſerves, if any one denies this, he might as well have ſaid that there is nothing in the medical art. It is unfortunate for mankind, that the votaries of medical ſcience are ever diſpoſed to carry a favourite doctrine to extremes, and in ſupporting of it, to neglect the advantages which attend the oppoſite ſide of the queſtion. But when the faſhionable opinions of the day ſhall be moderated into their proper ſtandard, the labours of Sauvages and Cullen will be again reſorted to as hiſtories of the morbid ſtate of the ſyſtem, and will ſtand as monuments of their talents and diligent application, until diſeaſe ſhall 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, Fothergil 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."

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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 liableneſs 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.

dropſy of the brain, pulmonary conſumption, and inflammation of the liver, ſtomach, bowels, and limbs, are ſymptoms only of an original and primary diſeaſe in the ſanguiferous ſyſtem.

"Having premiſed theſe general propoſitions I go on to remark," ſays the profeſſor, "that a fever (when not miſplaced) conſiſts in a morbid excitement and irregular action in the blood-veſſels, more eſpecially in the arteries." He afterwards ſays, "This irregular action is in other words, a convulſion in the ſanguiferous, but more obviouſly in the arterial ſyſtem." That this is the caſe he infers from the ſtrict analogy between ſymptoms of fever and convulſions. He mentions the particulars of this analogy, and finds it to hold good in no leſs than nineteen inſtances.

After theſe propoſitions and remarks, Profeſſor Ruſh then ſays, "From the facts and analogies which have been mentioned, I have been led to believe, that irregular action or a convulſion in the blood-veſſels, is the proximate cauſe of fever."

Such is the theory of the proximate cauſe of fever and of diſeaſe in general, as taught by Dr. Ruſh.

Before proceeding to make any remarks upon this theory, I think it juſt to pauſe awhile and pay a tribute of reſpect to its enlightened and benevolent author. As a phyſician, a profeſſor, and a benefactor to mankind in general, the name of Dr. Ruſh, it is hoped, will be tranſmitted with the higheſt eſteem to the moſt diſtant poſterity. Hundreds of the medical profeſſion in the United States muſt 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."

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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 procatarctick, 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

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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 ren-

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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 predifpoſing 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 mor-

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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.*

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* 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 ſervile 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 ſlimſily 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 embryo 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 diſ-

poſition.

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.

FINIS.