**An inaugural dissertation on fever : read and defended at a public, medical examination, holden before the Hom. John Wheelock ... and the Governors of Dartmouth College, for the degree of Bachelor in Medicine, July 21, 1802 / by Cyrus Perkins.**

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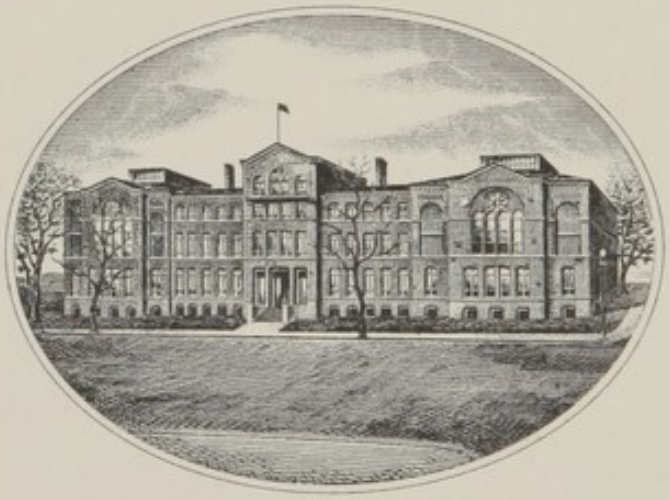

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Public Health Service

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AN

# INAUGURAL DISSERTATION

ON

# *FEVER,*

READ AND DEFENDED AT A

## Public, Medical Examination,

HOLDEN BEFORE THE

HON. JOHN WHEELOCK, *LL.D.* PRESIDENT,

AND THE

GOVERNORS OF DARTMOUTH COLLEGE,

*FOR THE DEGREE OF BACHELOR IN MEDICINE,*

JULY 21, 1802.

BY CYRUS PERKINS, A. B.

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1802.

TO

# NATHAN SMITH, M. D.

PROFESSOR OF MEDICINE AT DARTMOUTH UNIVERSITY,

AND

*CORRESPONDING MEMBER*

OF THE

## LONDON MEDICAL SOCIETY,

THIS

# Dissertation

*IS VERY RESPECTFULLY INSCRIBED*

BY HIS

OBLIGED AND GRATEFUL PUPIL,

*THE AUTHOR.*

# *Dissertation on Fever.*

THE great importance and intricacy of the ſubject have given riſe to numerous eſſays, on the production and phenomena of fever; and more time has been taken up, by medical philoſophers, on this ſubject, than on all the other diſeaſes to which animal bodies are incident.

In treating of fever, authors have generally endeavoured, in the firſt place, to give a definition of their ſubject. In doing this, they have enumerated certain cauſes, and fever as an effect, which, with other nearer or more remote effects of the ſame cauſe, go to make up their definition of fever.

The abſurdity of introducing *anorexia*, *nauſea*, *vomiting*, *dry ſkin*, *thirſt*, &c. as conſtituting a part of a definition of fever muſt, on reflection, appear to every one.

In the preſent treatiſe, a *definition* of fever will be attempted; an enumeration of its moſt important *concomitants*, or what have been improperly called phenomena of fever; an eſſay on its *cauſes;* with a few obſervations on the *prognoſis* or judgment of its termination, and method of *cure*.

## DEFINITION.

FEVER, conſidered as a diſeaſe, is a morbid exceſs of temperature, in the animal ſyſtem, ariſing from a certain chemical change there taking place.

Fever may be local, that is, confined to ſome particular part of the ſyſtem; or it may be general, when the affection is apparently extended over the whole. When we ſpeak of general fever, we would not be underſtood to mean that the febrile action pervades every part of the ſyſtem, at the ſame time; but that ſo great a part of the body aſſumes this action, as to deſtroy the balance, and place the ſyſtem in a condition to be called general diſeaſe. So that our diſtinction, between general and topical fever, amounts to no more than this, that the former or general fever is that, in which the ſyſtem, *from the beginning* of diſeaſe, appears to be generally affected; and that the latter or topical fever, is a circumſcribed inflammation, in any part of the body; the cauſe of which was either inſufficient, in itſelf, to draw the reſt of the ſyſtem into diſeaſed action, or there was a want of febrile prediſpoſition to aid it in its operation. Though when a ſimilar cauſe is more powerful, or when the ſyſtem favours its operation, this topical may terminate in general inflammation.

There are, no doubt, certain limits within which the temperature and other circumſtances of animals may vibrate, without being in a condition which ſhould be called diſeaſe. When any animal body, however, is in a ſtate or condition, in the leaſt varying from that which is natural, in a ſtate of health and repoſe, that animal, in ſuch a variation, approximates diſeaſe.

When, by the application of a ſtimulant power, or in any other way, the action of the ſyſtem, or a part of it, is ſo far increaſed as to produce irregularity or diſagreeable ſenſation; or when there is a diminution of action, by the abſtraction of ſtimulus, ſo as to produce the ſame effects, it may then be ſaid, there is diſeaſe in the ſyſtem. For that which produces irregularity or pain cannot be called a healthy action.

As ſimilar effects are produced by ſimilar cauſes, and that in proportion to the cauſes, we believe it is the ſame kind of action which produces fever, that produces the healthy temperature in animals; that it is the healthy action, morbid in degree, tending to deſtroy the ſyſtem. And the ſame action, as far as can be determined, takes place in topical as in general inflammation or fever. For if a *powerful* ſtimulus is applied to any part of the body, in its natural ſtate, or if a *common* ſtimulus is applied to a local increaſed excitability, topical fever is induced; and the ſame cauſe, contin-

uing to operate with ſufficient force, the febrile action is extended over the ſyſtem, ſo as to produce what is denominated general fever. Inſtances of this we not unfrequently witneſs, in caſes of wounds, phlegmons, &c. where the topical affection gradually extends itſelf, till the ſyſtem becomes generally affected; and the ſeveral ſtages, in the progreſs of a fever from this origin, are as regularly marked, as thoſe in a fever from any other cauſe whatever.

Thus, from our definition and notions of fever, it will appear, that we conſider the names which have been applied to the ſuppoſed varieties of fever, ſuch as, *nervous*, *putrid*, *bilious*, *malignant*, *jail*, *hoſpital*, *worm*, *yellow*, *puerperal*, &c. as being entirely without natural foundation; and, that fever, whatever phenomena may attend it, is ever one and the ſame.

Some fevers are ſaid to be inflammatory, others, not inflammatory; which is a ſoleciſm. Fever is an inflammatory diſeaſe, ſometimes attended with ſtrength, in the ſyſtem, and ſometimes with debility.

The epithets which have been applied to fever are of greater conſequence than what ariſes from mere impropriety of expreſſion. Improper names have, in many inſtances, led to wrong theory and wrong practice; thus, to the terms *putrid* and *bilious*, thouſands have fallen victims.

The idea of a multiplicity of fevers, doubtleſs, had riſe in the various phenomena attending this diſeaſe, at different times. This variety was ſuppoſed to be owing to ſome peculiarity in the fever. Whereas, it is to be attributed to the peculiarity of the patient's habit or ſtate of body, at the time of the attack of diſeaſe; to the variety of remote cauſes; and to the accidental attendants, during their operation. Which laſt circumſtance has great influence on certain parts of the body; and on the degree and mode of action.

It ſhould not, however, by this be underſtood that there is more than one kind of action to produce fever, immediately; but that there is a prediſpoſition, in certain parts of the ſyſtem, to diſeaſed actions, which the cauſe of fever itſelf, or other cauſes, operating at the ſame time, may produce; and that irregularity of action, in the ſyſtem, will take place, whenever any part, which has leſs power to reſiſt diſeaſed action, fails, or when the balance of the ſyſtem is deſtroyed. And this happens, in a greater or leſs degree, in moſt caſes of fever which continue for any length of time.

Theſe circumſtances, with others which might be mentioned, being taken into conſideration, it is by no means ſurpriſing that fever, though always uniform in itſelf, ſhould be attended with ſuch a variety of appearances.

Dr. Ruſh has aſſerted the unity of fever; but by ſaying, at the ſame time, that it exiſts in different ſtates, without having any reference to degree, it appears he has left it with nearly its former incumbrances. How fever, being a unit, can exiſt in different ſtates, and in the ſame degree (as may happen according to him) can hardly be conceived. Nor can it be readily underſtood what he would have fever to be. He firſt tells us* that fever conſiſts in an irregular or convulſive action of the blood veſſels; and after relating ſeveral facts and analogies, he goes on to inform us‡ that he has been "led to believe, that irregular action or a convulſion in the blood veſſels, is the proximate cauſe of fever;" which, had it come from an author leſs worthy and reſpectable than Dr. Ruſh, we ſhould have been more ready to pronounce an inconſiſtency. The proximate cauſe, and fever itſelf, he has made the ſame thing.

Inſtead of Dr. Ruſh's terms, "*Gangrenous*, *Typhus*, *Typhoid*, *Eruptive*, &c. *ſtates of fever*," thoſe which better agree with the notion of its unity might be adopted; ſuch as, *The Gangrenous*, *Typhus*, *Typhoid*, and *Eruptive* STATES OF THE SYSTEM, *with fever*. This change ſhould be carried through the whole catalogue of ſtates of fever.

It might have been mentioned before, that there is, at certain times, as after a glaſs of ſpirits with

* Medical Enquiries, Vol. iv. Page 134, Philadelphia, 1796.

‡ See 139th Page ſame Volume.

a full meal and violent exerciſe, more heat in the ſyſtem, without the leaſt attending irregularity, than, at other times, would be accompanied with the moſt dangerous commotion. In ſuch caſes, there being no prediſpoſition to fever, and the circumſtances which render it deſtructive not being preſent, the ſyſtem again acquires its accuſtomed degree of action, without apparent injury.

The uſe to be made of theſe laſt obſervations is to ſhow, that the increaſed action, occaſioned by an over ſtimulus on *ordinary* excitability, is of a leſs dangerous tendency, than that, which ariſes from the application of a common ſtimulus to *increaſed* excitability.

## PRECURSORS AND CONCOMITANTS.

THERE are commonly conſiderable changes, in the ſtate of the ſyſtem, previous to the acceſſion of fever. The phenomena, which for the moſt part immediately precede it, and have been called ſymptoms, are with more propriety called precurſors of fever. Some of theſe are the following: A feeble, and ſometimes irregular pulſation of the arteries; languor, with frequent yawning and ſtretching; decreaſed activity of the intellectual functions; a diſagreeable ſenſation of preſſure, in the region of the ſtomach; paleneſs of the ſkin, and coldneſs of the extremities; reſpiration ſmall, frequent and anxious; cold rigours ſhooting down the back and loins, thence over the body, attend-

ed with tremor of the whole frame; copious flow of urine, pale and tranſparent; pain in the head, back, joints, &c. anorexia, nauſea, vomiting, diarrhœa, &c. After moſt of theſe have taken place, we notice an increaſe of action in the ſanguiferous and glandular ſyſtems; and, at the approach of fever, there is generally a florid countenance, with increaſed intellectual powers; a dry and parched ſkin; great thirſt, with a dry and coated tongue; a decreaſed quantity of urine, high coloured and without ſediment. Theſe moſtly take place, as concomitants of fever, in every caſe, which is ſaid to have a regular courſe.

There are many other phenomena ſometimes attendant on fever, which are peculiar to the circumſtances of the ſyſtem labouring under diſeaſe. Some of theſe are ſtupor; delirium, with a weak, fluttering, and irregular pulſe; epiſtaxis; hemorrhoidal diſcharge of grumous blood, with obſtinate diarrhœa; petechiæ, vibices, &c. Others are ſuch as depend on the peculiarity of their remote cauſes; for it is well known that two very different cauſes may both produce fever, yet their other effects will be as different as their cauſes. Thus the phenomena attending fever, which ariſes from the introduction of variolous and certain other contagious matters into the ſyſtem, are very different from thoſe which attend fever from marſh effluvia. Among other concomitants attendant on fever, from the former cauſe, are to be

reckoned eruptions, ſuch as appear in *ſmall-pox*, *chicken-pox*, *meaſles*, *raſh*, &c. which have as juſt claim to a place among concomitants of fever as any of the others before mentioned.

## THEORY OF THE PROXIMATE CAUSE.

AS we have defined fever to be ſimply a morbid exceſs of temperature in the body, it will follow of courſe that the immediate cauſe of this heat be conſidered the proximate cauſe of fever.

Caloric or anticrouon, we ſuppoſe to be an extremely ſubtle fluid, which, in a certain ſtate, has an affinity for all bodies, and on which the fluidity of all other bodies depends.

When this igneous fluid or matter of heat is combined with any other body, it is deſtitute of ſome of its otherwiſe leading characteriſtics; and may be ſaid to be neutralized. It appears as evidently to be ſo, as acids do, when combined with alkalies; for, when caloric is in a ſtate of combination, it diſcovers no diſpoſition to combine with any other body; which is all we mean by neutralization.

This neutralized anticrouon is the ſame as Dr. Black's latent heat; and that which is ſimple, diſengaged, and in a ſtate to form new combinations, is ſenſible heat.

The converſion of latent into ſenſible heat, by a decompoſition of that body, of which the former is a part, and by which it is diſen-

gaged from the other part, is to be conſidered the proximate cauſe of fever. For,

As caloric, in its natural ſtate, is combined with ſome other body, it appears, that ſenſible heat can be produced in no other way, than by decompoſition; ſo that the heat of animals is produced in the ſame way as that, which appears in the ignition of combuſtible bodies. The manner of this decompoſition may be briefly explained.

Fluids, ſuch as the various gaſes, are compoſed of ſome one or more ſimple ſubſtances, combined with anticrouon or caloric. Theſe gaſeous bodies, by being brought into contact, or within the attractive ſphere of ſome other body, may ſuffer a decompoſition, by the operation of either a ſingle or a double elective attraction. The conſtituent parts of the compound, in favour of which the elective power of attraction is exerted, will enter a new aſſociation or combination, and one or more may be ſet at liberty. The latter takes place in combuſtion, where there is a decompoſition of oxygen gas; the oxygen combines with the burned body, while the anticrouon is diſengaged in form of ſenſible heat.

The air which we reſpire is a heterogenous fluid, compoſed of oxygen, azote, carbonic acid and caloric. The oxygenous part, however, is the moſt important in reſpiration; for it is a decompoſition of this, whoſe conſtituent parts are oxygen and caloric, by which the heat of the body

is chiefly produced, and other important purpoſes of the animal economy are accompliſhed. Without this conſtant decompoſition, animal life could no more be ſupported than without animal organization. For the caloric, thus in its ſimple ſtate, as we ſhall again have occaſion to mention, is that without which the different parts of the body could not receive the principle, which, in its different modifications, produces both irritability and ſenſibility; and the oxygen is the ſtimulus by which the blood produces that powerful and important action of its own veſſels.

That the contraction of the heart and arteries depends on the ſtimulus of oxygen, operating on their excitability, is evident from experiments.

Von Humboldt took the heart of a frog, from the pericardium, which was left till it ceaſed to pulſate more than once on the application of mechanical ſtimulus. Its upper veſſels were tied, and it was hung perpendicularly in oxygen gas. It inſtantly began to beat of itſelf; and when, after four minutes, it was brought back into the atmoſphere, it beat fourteen; and ſixteen minutes after, it beat only five. It was again hung in oxygen gas, and the pulſation increaſed in eight minutes to twelve, in twenty to ſeventeen, in twenty-ſix to twenty, and in ſeventy-three to twenty-nine ſtrong contractions.

Another heart was tied up and ſuſpended in atmoſpheric air; in the firſt minute it beat 9 times;

carried into oxygen gas, in four ſucceſſive minutes it beat 23, 30, 35, and 38; brought into the atmoſphere again, its contractions were diminiſhed. Other experiments might be related to ſhow the importance of oxygen in the animal functions.

To return more directly to our ſubject, we may obſerve, that it is not in the lungs alone, that the important decompoſing proceſs is carried on; but likewiſe, in a degree, over the ſurface of the whole body; or a part of it, as in topical inflammations. This will not be diſcredited by any one who will be at the trouble to conſult the experiments of the ingenious Dr. Beddoes. Thus as the decompoſition of oxygen gas, on the ſurface of the body, is the ſame as that in the lungs, only differing in degree, by explaining the latter, the former will be explained; which may be done in the following ſimple manner.

The blood of animals and oxygen poſſeſs a certain affinity for each other. This appears evident by expoſing a quantity of venous blood to ſubſtances from which oxygen is readily diſengaged; a combination immediately enſues, and the blood aſſumes a beautiful ſcarlet colour.

The action of the muſcles of the thorax enlarges its cavity, which, upon a well known principle, is immediately filled with atmoſpheric air. The oxygen of which, being thus brought within the attractive ſphere of the blood, there diſpoſed for the purpoſe, combines with it, while a portion of

anticrouon or caloric, either healthy or morbid according to quantity, is diſengaged. As this anticrouon, thus in its ſimple ſtate, has a tendency to equilibrium; or, as was before obſerved, has an affinity for all bodies, it readily enters and communicates warmth to the oxygenated blood and parts about the organs of reſpiration; and thence pervades the whole body.

Thus the ſimplicity of nature is ſuch that the blood is oxygenated, the animal warmed, and ſeveral other important purpoſes anſwered by the ſame proceſs.

Having thus conſidered the *proximate cauſe of fever*, it will now be proper, and according to our order, to make a few obſervations on the

## PREDISPOSING CAUSE.

THE prediſpoſing cauſe of fever is that, which gives a diſpoſition to a part or the whole of the body, to carry on the proceſs of decompoſition to ſuch a degree, as to produce the morbid temperature aforementioned. What this is, we ſhall endeavour to explain.

In the formation of animals, the part firſt formed, is that important viſcus, the brain. Its ſubſtance, figure, and the various phenomena attending its action lead us to a belief, that it is a glandular organ; which, like the other glands, ſecretes its fluid, to be diſtributed over the body.

The brain we ſhould call the ſenſorial gland; which we ſhall find gives origin to the principle of animation or animal-vital power.

The excitability, as it has been called, or that ſuſceptibility of which an animal body, in health, is poſſeſſed, viz. of being brought into action by the application of ſtimulant powers, has, very evidently, its origin in the brain; for by whatever means the communication of any part of the body with that organ, by the nerves, is either partially or totally deſtroyed, the part becomes paralytic or inſenſible in the ſame proportion.

The term animal-vital power, or principle of animation, is proper to be applied to that, whatever it is, which gives to the animal body a ſuſceptibility of being ſtimulated into action. And this we believe to be a fluid ſecreted by the ſenſorial gland; which is therefore to be called the ſenſorial fluid. The reaſons for believing it to be a fluid, ſince it cannot be ſubjected to the ſcrutiny of the ſenſes, are, 1. Becauſe all other glands, with whoſe uſe we are acquainted, ſecrete fluids. 2. The greater facility with which certain phenomena may be accounted for on this principle, than on any other, which has been adopted; and 3. It ſeems more analogous to other parts of the animal economy, with which we are better acquainted.

The nerves are to be conſidered as excretories to the ſenſorial gland; and as they give direction

to a fluid extremely ſubtle, and like the electric fluid inviſible, conſequently not requiring viſible tubes for its circulation, may be called ſenſorial conductors.

The preſence of the ſenſorial fluid is abſolutely eſſential to life; for no animal motion can be performed without expending or changing a portion of it. So that the action of all the other organs in the body depends on the action of the ſenſorial gland. This ſecretes its fluid, which is conveyed by the proper conductors to the different parts of the body, producing irritability or a ſuſceptibility of ſtimulation.

If it ſhould be aſked, how the prime animal gland firſt acquired its ſuſceptibility of being actuated to ſecrete the ſenſorial fluid; it may be anſwered, that it was derived from the parent organ; and that its action is kept up by the operation of electricity, and perhaps oxygen, with ſome other ſtimulants, on its excitability; which laſt is conſtantly ſupplied by the fluid ſecreted in its own body. The ſtimulus of electricity on the ſenſorial ſyſtem is ſeen in the uſe of electric ſhocks, in apoplectic and paralytic affections.

Should it be further enquired, from what the ſenſorial fluid is ſecreted, we may venture to conjecture, that it is ſecreted from the electric fluid, or ſomething analogous to it; of which, what has been called animal electricity or galvaniſm may probably be but an excrementitious

modification ; and yet, of itſelf, anſwer no unimportant purpoſe in the animal economy.

The many experiments, which have been made by Von Humboldt and others, go to prove, that the ſimilarity between galvaniſm and electricity is very conſiderable, though in ſome reſpects they are different. This we take to be not unfavourable to the idea ſuggeſted, that the galvanic fluid is a modification of the electric, or produced from it, by a glandular action in the body ; that the ſenſorial fluid is ſecreted from the electric, and that the galvanic is the refuſe. Or as may, perhaps, appear more probable to ſome, that the galvanic is the ſenſorial fluid ſomehow changed, as was before hinted, by the part it has acted in the animal motions.

We would not ſuppoſe, as ſome have done of excitability, that every animal, at the commencement of life, has a certain quantity of ſenſorial fluid laid up in ſtore, which is to laſt till life is finally extinguiſhed ; but that the ſenſorial gland is continually ſecreting its fluid ; and, that without this continual ſecretion, the animal body would ſoon become an inirritable maſs.

Much the greater part of the ſenſorial fluid, which is ſecreted, is expended by the involuntary motions ; as is evident by the rapid and ſometimes dangerous accumulation of it, occaſioned by a partial or total ceſſation of them, in any part of the body ; which circumſtance is of much im-

portance to be attended to, in the doctrine of diſeaſes. Thus the application of cold to the ſurface of the body, the excluſion of light and ſound from the organs they are calculated to ſtimulate, or the abſtraction of any ſtimulus already preſent in the body, by decreaſing the action, produce an accumulation of ſenſorial fluid, and conſequent increaſed irritability in thoſe parts, whoſe action has thus been diminiſhed. For the ſenſorial gland continues its ſecretory action, and the nerves conduct the fluid; while but a ſmall part of it is expended, during this deficiency or under proportion of ſtimulus applied. And as the action of a part or the whole of the body is in exact proportion to the product of the ſenſorial fluid there accumulated, multiplied into the degree of ſtimulus applied; it is very evident, that caſes may frequently occur, where a ſtimulant power, not exceeding what has been ordinarily applied, will produce alarming conſequences.

Increaſed action and heat on the ſurface of the body, while the vital motions are performed with leſs than ordinary energy, we inſtance in many caſes of fever. In others we obſerve an increaſe of heat on the ſurface of internal cavities; or violent action in the ſanguiferous ſyſtem, while the ſurface of the body is at little more than natural temperature.

That partial accumulations of the ſenſorial fluid not unfrequently happen, we conclude from

the caſes laſt inſtanced; where violent action, in certain parts of the ſyſtem, is a conſequence of the application of common ſtimulants over the ſurface of the body generally; while the ſame cauſe produces very little if any effects on other parts, not ſo circumſtanced.

From this conſideration we are led to believe, that in almoſt every inſtance of diſeaſe, except thoſe induced by the application of ſome violent ſtimulus, there is a diſproportion in the body with regard to the irritable fluid, which occaſions a diſproportion and irregularity of action, with a tendency to the deſtruction of the whole animal machine.

The quantity of fluid ſecreted by the brain is ſometimes inſufficient to ſupport that degree of action, which is neceſſary to the health and vigour of the ſyſtem; or ſome particular part of the body may, from a partial accumulation, have acquired an increaſed action, which, in a certain manner to be mentioned, is kept up, deſtroying ſo great a proportion of the ſenſorial fluid, that the ſyſtem, generally, becomes illy ſupplied. Either of which conſtitutes a ſtate of debility; the one, where there is a deficiency ſecreted, the other, where there is a miſapplication.

The manner, in which an over proportion of the vital power or ſenſorial fluid is conducted by any particular nerve or branch of nerves, and expended or changed, robbing other parts of their

neceſſary ſupply, may be thus explained. The increaſed action of decompoſition commences at the extremity of a conductor or its branches, by the application of a powerful ſtimulus, or the reapplication of a common ſtimulus, to an increaſed irritability. The caloric or anticrouon, together with the oxygen diſengaged in this decompoſition, have the power to ſtimulate or increaſe the conducting power of the nerve, above what the other nerves of the body poſſeſs; while the oxygenated blood and other ſtimulants operate, through the medium of the veſſels and organs of the part, to expend or change its properties, as it arrives.

Thus there is formed a kind of circle of motions. By the decompoſition, the flow of the ſenſorial fluid is increaſed; while this fluid increaſes the attractive power of the blood for oxygen, by which the decompoſition is ſupported. This circle of motions thus ſupports itſelf till the ſtate of the ſenſorial conductors and parts concerned in the action is ſo changed, that they gradually ceaſe to obey the ſtimulus applied to them, which leaves ſo much of the body, as has been thus affected, in a condition, termed by Dr. Brown, indirect debility; while the reſt of the body, by being deprived of much of its portion of the ſenſorial fluid, and at the ſame time not being under the operation of more than its natural ſtimulus, will be found to be in a ſtate of de-

bility, different from either the direct or indirect of the above named author.

As was before ſtated, by whatever means there is an accumulation of the ſenſorial fluid, more or leſs extenſively in the ſyſtem, certain parts are ſubjected to greater action than the healthy, while under the operation of common ſtimuli. Among the other organs, whoſe irritability is increaſed by this accumulation, we muſt frequently reckon the blood veſſels; theſe being ſtimulated, by their proper fluid the blood, throw their contents with increaſed momentum to the ſurface of the body, while the action of the ſecerning veſſels is, at the ſame time, proportionally increaſed. All which favours the decompoſition of gas and the evolution of anticrouon; which laſt is the ſtimulus for keeping up the flow of ſenſorial fluid.

We might have mentioned before the further evidence of an accumulated ſenſorial fluid in certain parts of the body, which is derived from the increaſed ſenſibility there, in inflammations.

This accumulation or increaſed quantity of ſenſorial fluid, by increaſing the power of the blood to attract the ſimple principle of oxygen, as it evidently does; thus giving a tendency to an increaſe of the decompoſition before ſpoken of, we conſider the prediſpoſing cauſe of fever.

## REMOTE CAUSES.

THE remote cauſes of fever are numerous. They are all thoſe, which directly or indirectly lay a foundation for an accumulation of the ſenſorial fluid.

With regard to the various ſubſtances, which, when applied to the body, operate to produce fever, we may obſerve, that it is by no means neceſſary to ſuppoſe that their immediate operation is in any way to increaſe the action of the ſyſtem. They may, and for the moſt part probably do, operate to *diminiſh* the quantity of action. This may be effected in ſeveral different ways. 1. They may combine with a portion of the ſenſorial fluid and deſtroy its mobiliferous quality; thus immediately rendering the part incapable of being actuated by the ſtimulus preſent. When a part, however, has, in this way, acquired a torpid ſtate, a conſiderable accumulation of ſenſorial fluid will happen, before it will again be rouſed by natural ſtimulus; though the action, when commenced, will be in proportion to the accumulation which had taken place. 2. They may enter into combination with the natural ſtimulus and render it inactive. 3. They may take the place of more active ſtimulants, as when we inhale air leſs pure than the atmoſpheric. 4. They may imbibe the ſtimulus of ſenſible heat, in paſſing from a ſolid to a flu-

id ſtate; as when ſoluble ſubſtances are taken into the ſtomach, &c. &c.

We would enumerate among the moſt frequent remote cauſes of fever, human and marſh effluviæ; expoſure to a temperature below 62 degrees of Farenheit, or a leſs degree of cold accompanied with moiſture; intemperance; exceſs in venery, &c.

We are ſenſible that ſome of the above operate to the exhauſtion of the ſenſorial fluid rather than to the accumulation of it. This, however, can be no objection to our theory; for we contend, that an exhauſtion of the ſenſorial fluid may, and frequently does, lay a foundation for its ſubſequent accumulation; as was before hinted.

Very much to our advantage, on this ſubject, we have the authority of the juſtly celebrated profeſſor, Dr. Ruſh; he obſerves* that increaſed excitability does not take place in caſes of *direct* debility alone, as Dr. Brown ſuppoſed; but that it happens, likewiſe, in every caſe of indirect debility; where it is ſuddenly induced upon the ſyſtem. So that we need not heſitate to ſay, that what we have mentioned as remote cauſes of fever, either directly or indirectly, produce an accumulation of the ſenſorial fluid.

* See Medical Enquiries, &c. Vol. 4.

## PROGNOSIS.

WITH regard to the judgment we form, concerning the termination of diſeaſe in patients afflicted with fever, we ſhould be influenced by various circumſtances. All the concomitants ſhould be taken into conſideration; and the balance and power of the different parts of the ſyſtem, accurately obſerved.

Some of the appearances in the ſyſtem with fever, which ſhould lead us to predict an unfavourable termination of diſeaſe, are the following: Twitching of the tendons; inflamed eyes with ſtaring; ſpeech quick and ſtammering, with an unnatural voice; violent delirium; perpetual watchfulneſs; conſtant naufea and vomiting; obſtinate diarrhœa; pulſe ſlow and the diſorder of the head increaſed; eye-balls fixed and ſunken; cold extremities and tremor of the tongue; blindneſs; difficult deglutition; a ſtrong diſpoſition in the patient to lie on his back; frequent attempts to ariſe from bed without being able to aſſign any reaſon; involuntary and extremely fetid ſtools; hemorrhagies attending extreme debility; and, indeed, violent action in the ſanguiferous ſyſtem, as it leaves dangerous debility, ſhould be conſidered alarming.

Some of the ſymptoms, indicating a favourable termination, are, the raiſing of the pulſe by cordials; abatement of ſtupor, tremor, and other affec-

tions of the brain; turbid urine, in the decline of the diſeaſe; a gentle ſweat or moiſture over the body, or even a ſoft ſkin, with a moiſt tongue; looſe ſtools ſucceeded by diaphoreſis. Theſe, too, are to be conſidered more eſpecially favourable, when they happen on the third, fifth, ſeventh, ninth, eleventh, fourteenth, ſeventeenth, or twentieth days, of the diſeaſe.

## CURE.

TO diminiſh or deſtroy the morbid exceſs of temperature, in the ſyſtem, the management may be exceedingly ſimple. As ſenſible heat has a tendency to equilibrium, by applying to a heated body one of a lower temperature, the heat of the former will be diminiſhed. The evaporation of fluids likewiſe from the ſurface of the body, by the combination and neutralization of anticrouon, in that proceſs, has a powerful effect in diminiſhing the heat of the ſyſtem.

Since we conſider the fever, in itſelf, of a leſs dangerous tendency, than many of its concomitants, much attention, in the treatment of diſeaſe, ſhould be directed to the latter.

An immoderate degree of action, in whatever part of the ſyſtem it may have taken place, is pernicious; it is, therefore, an important indication of cure, to diminiſh this action; which is anſwered by removing or diminiſhing the ſtimulant powers, which are either operating themſelves, or

aſſiſting others in their operation, to produce it.

One of theſe ſtimulant powers is the oxygenated blood; which may be diminiſhed by veneſection. But as this evacuation is very permanent, in its effects on the ſyſtem, it ſhould be practiſed with the greateſt caution. For whenever any conſiderable quantity of blood is taken; and eſpecially if this practice is reſorted to in a late ſtage of the diſeaſe, a dangerous debility is very liable to enſue.

To veneſection, we would generally prefer evacuations of the firſt paſſages, by emetics and cathartics; and likewiſe a diminution of external ſtimuli; though in ſome caſes all theſe may be found neceſſary. Impreſſions on the external ſenſes, as much action depends on their ſtimulus, ſhould, as far as poſſible, be avoided; more eſpecially ſuch as give pain and uneaſineſs to the patient. External heat ſhould be attentively guarded againſt, as well as every thing, which has a tendency to increaſe the heat of the body; except, when ſomething of this kind is neceſſary, in producing diaphoreſis.

Exertions of the body and mind are to be diſcouraged; and aliment given in ſmall quantity, with as little ſtimulus as poſſible. The thirſt which ariſes in high fever, with increaſed action of the ſanguiferous ſyſtem, is to be allayed with cool and perhaps acid drinks; while that attend-

ing debility is to be treated with warm and ſtimulating cordials.

To remove the irritation ariſing from a preternatural retention of the fœces, we prefer mild enemas to purgative medicines; as the object is accompliſhed by the latter, with much leſs uneaſineſs to the patient, than by the former.

The uſe of opium in diſeaſes with arterial ſtrength we believe to be pernicious, unleſs from exceſſive reſtleſſneſs and watching it may be given to diminiſh the irritability; ſo that the effects of other ſtimulants may be avoided.

We have ſo far mentioned the uſe of what may perhaps properly be called negative means of decreaſing action; or thoſe which decreaſe it, by the abſtraction of ſtimulus. It may now be proper to ſpeak of certain powers, which, if we miſtake not, are immediately active in producing the ſame effect. Some of theſe are the different gaſes when taken into the lungs, ſuch as the hydrogenous, carbonaceous, ſeptous, &c. Any other air, which contains leſs oxygen than the atmoſpheric, may be ſerviceable, by giving leſs ſtimulus than the latter, which would otherwiſe have occupied the ſame place.

Certain medicines, under the name of refrigerants, have been much employed for the ſame purpoſe, ſuch as the neutral and metallic ſalts; but their efficacy, in the quantities generally adminiſ-

tered, is very doubtful; and when given in large quantities, are frequently injurious.

Acids, and eſpecially the vegetable acids, may be ſerviceable; not in decreaſing the fever, already preſent in the ſyſtem, but in diminiſhing the febrile action. This we ſuppoſe to be effected by means of the blood's being partly ſaturated with the oxygen of the acid: for which, as before ſtated, it has a ſtrong affinity. The blood, being thus partially ſaturated with oxygen, has a leſs powerful affinity for that ſubſtance; and by this mean the decompoſition which produces the fever is diminiſhed.

Ipecacuanha and other emetic drugs given with cool drinks, in doſes to produce nauſea or even vomiting, are many times ſerviceable.

The diſproportion of action between the arterial and venous ſyſtems, with fever; as alſo between theſe and the glandular ſyſtem, is many times conſiderable; and to diminiſh or remove this ſhould be conſidered among the indications of cure; which may be anſwered by the uſe of a variety of medicines, ſuch as opium, mercurials, foxglove, &c. &c.

When there is general debility and torpor in the ſyſtem, with fever, every unneceſſary expenſe of the ſenſorial fluid ſhould be carefully avoided; and ſuch remedies uſed as are ſuppoſed to increaſe the power of the ſyſtem; ſuch are opium, bark, wines, various preparations of iron, ſnake root,

orange-peel, camomile, bark of wild cherry (prunus ceraſus) columbo, cantharides, ſinapiſms, a moderate degree of heat, electricity, &c. &c.

To enumerate all the remedies, which are proper to be uſed, in the different ſtates of the ſyſtem, with fever, with the particular circumſtances of the patient to which each is properly adminiſtered, and the various modes of exhibition, it would require limits to be ſet, far beyond thoſe of an inaugural diſſertation.

We have, therefore, contented ourſelves with general remarks; and cloſe, on this head, by juſt obſerving, that when appearances indicate a diſpoſition to putreſcency, in the ſyſtem, fixed air and alkalis are proper to be adminiſtered.

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WITH regard to the *operation* of particular *remedies*, in the cure of diſeaſes, we would here juſt obſerve, that we believe many of the moſt valuable ſubſtances, in medical uſe, produce their good effects, in the diſeaſed ſyſtem, merely by commencing and continuing, for a time, an action peculiar to themſelves; and not (as according to the faſhionable theory) by being more or leſs *ſtimulating*, and producing a greater or leſs *quantity* of action.

No matter what their action is, provided it be different from that meant to be cured. For there is evidently, in the ſyſtem, a tendency to healthy action; and whenever any cauſe is operating to keep up a diſeaſed action, if a remedy ſufficiently powerful to overcome that action, by producing one peculiar to itſelf, be adminiſtered, and its operation begins to diminiſh, then the efforts of the ſyſtem are to paſs into a natural and healthy action. By repeating theſe remedies, at proper intervals, the particular diſeaſed action is repeatedly ſuſpended, till the ſyſtem becomes ſo far inſenſible to the ſtimulus of its cauſe, that the reſtorative power overcomes it, and the healthy action is at length re-eſtabliſhed.

Thus the operation of mercury, in the cure of ſyphilis, is by producing an action, *different* from that produced by the venereal virus; not merely by increaſing or diminiſhing the *quantity* of action.

In certain other diſeaſes, mercury has been found an effectual remedy, when there is proof of its operating in the ſyſtem; its action, however, cannot always be produced. When this happens, the morbid power muſt be ſuppoſed to be greater than that of the mercury; ſo that the latter cannot produce its own action, in the ſyſtem, on account of the ſtrength with which the morbid action is carried on. All we have to look for, in ſuch caſes, is ſome ſubſtance which is more power-

fully active, and which has no peculiar quality detrimental to the powers of the ſyſtem.

Where there is diſeaſed action, in the ſyſtem, it is not improbable that ſome ſubſtances operate as remedies, by deſtroying its exciting cauſe.

We may mention, likewiſe, that there are inſtances where, though no *diſeaſed* action appears, the *quantity of healthy* action is either deficient or exceſſive; and there are ſubſtances proper for anſwering the indications under both theſe circumſtances. Theſe are ſuch as operate merely to *increaſe* the quantity of action, and ſuch as immediately *diminiſh* it.

From theſe conſiderations, we are induced to believe, that all remedies may properly be divided into *four claſſes;* 1. Comprehending all thoſe ſubſtances, whoſe operation is merely an *increaſe* of healthy action; 2. Thoſe which, immediately, *diminiſh* the healthy action; 3. Thoſe which deſtroy the exciting cauſe of *diſeaſed* action, by a chemical combination; and 4. Thoſe which operate to produce a *peculiar kind* of action. Theſe claſſes ſhould be again divided into *orders*, according to the degrees of power, which different ſubſtances poſſeſs.

FINIS.

Three young gentlemen received the degrees of Bachelors of Medicine at D. Univers[ity] at this commencement (1802) Daniel Osgood, Cyrus Perkins, & Jon[a] H. Sparhawk — The first read a diſſertation on Conſumption & the ſecond on hemorrhagy — (not published)