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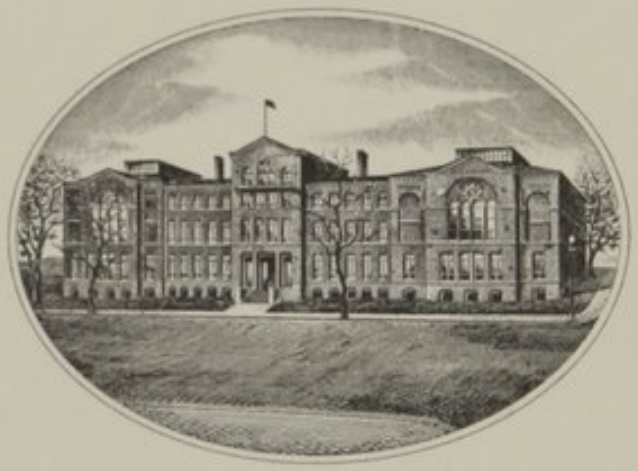

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U. S. Department of Health, Education, and Welfare

Public Health Service

AN

INAUGURAL DISSERTATION

ON

INFLAMMATION.

To Doctor Samuel L. Mitchill

from his friend the author

No. 13

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ON

INFLAMMATION.

SUBMITTED TO THE PUBLIC EXAMINATION OF THE

FACULTY OF PHYSIC

UNDER THE AUTHORITY OF THE TRUSTEES OF COLUMBIA COLLEGE,
IN THE STATE OF NEW-YORK,

The Right Rev. BENJAMIN MOORE, D.D. President;

FOR THE DEGREE OF

DOCTOR OF PHYSIC,

On the first Day of May, 1804.

BY DANIEL D. WALTERS.

NEW-YORK:

Printed by *T. & J. SWORDS*, Printers to the Faculty of Physic
of Columbia College.

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The first and principal reason which occasioned the choice of *Inflammation*, as a subject for discussion, was the impossibility which existed in my own mind to accept the theory advanced of this disease by the principal writers of the day. The second was, that I believed that if I could excite some inquiry on the subject, it would not be altogether useless, however far I *myself* may have fallen short of proving the correctness of the opinions advanced. For a just theory of inflammation once attained, it appears to me would be the unravelling of [illegible] motions in which that great scourge of our existence, fever, consists; a theory more to be desired by the scientific physician than that of all other diseases put together.

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Many, no doubt, will observe, that I have taken some things for granted, the truth of which they themselves question. For instance, I have constantly spoken of the fibres of which the brain and nerves are composed, as contractile. Now, notwithstanding these fibres have not been seen to recede from the edge of the surgeon's knife, yet, when we cease to

talk about the nerves contracting, we must also cease to talk about the nervous influence, vis nervæ, &c. For even admitting for a moment that the nerves act by a fluid, passing with infinite velocity from the brain to their extremities, the difficulty still remains the same; for this fluid, in order to act, must be in motion; a moving power must, therefore, be admitted. This power is presumed to be nothing short of contractility in the nervous fibre.

It may also be observed, that I have said in the Introduction, that it is necessary for relaxation to alternate with, or soon follow spasm, on account of the great quantity of the vital principle expended by the energy of such contraction.

The principle here contended for is believed to be well founded, notwithstanding a case of trismus may seem to point to a different conclusion. For, in order to account for the continued state of contraction of the muscles concerned in trismus, we must refer to the great quantity of action, and proportional quantity of blood, to which a habit of acting constantly has inured them. I have said that sensibility, irritability, &c. were diminished in inflammation. Some may, perhaps, urge the great sensibility of the retina in cases of opthalmia as an objection to this theory. Such, however, may be answered, that the retina is not the seat of the disease, but so near to it as to be highly excited by it. So in all other cases of increased sensation.

INTRODUCTION.

INTRODUCTORY to the following Dissertation, I shall briefly consider the structure, as well as several of the motions of the solid parts of animal bodies, so far as these, from their vascularity, or from their being made up of irritable and contractile fibres, are enabled to perform all those motions which peculiarly belong to life. I do this, because it appears to me that the proximate cause of every degree of health is to be found in peculiar changes of motion, and correspondent variations of structure, of the parts above-mentioned.

The contractile fibres entering into the structure of animal solids generally, are of two kinds, viz. the *muscular* and *nervous*. The former of these, while they enjoy a large portion of the living principle, possess the power to contract, on the application of a stimulus, without producing sensation; nor are they capable of acquiring such power by frequent stimulations and contractions. The latter, while they enjoy a large portion of the living principle, possess the power to contract in like manner, on the application of a stimulus; but by their contractions they produce sensation, or by frequent

stimulations and contractions, *acquire* the power to produce sensation.*

These different kinds of fibres are differently disposed of throughout the several parts of animal bodies, according to the various requisites of sense and motion. Hence, in some instances, the muscular fibres chiefly contribute to the formation of parts, as in the locomotive muscles; while in others they are mostly made up of the nervous, as in several of the organs of sense. These fibres, whether muscular or nervous, are all, at least as far as inquiry has been made on the subject, connected together laterally by the cellular membrane, and are every where interspersed with the fine extremities of the arteries which supply blood for the following purposes, namely, for the secretion of lubricating fluids, that the parts may move easily over each other, for the secretion of materials to cause the growth and reparation of the solids, and for the secretion of the vital principle and of sensible caloric.

The secretion of the fluids last named, and their connection with the contractile fibres, must be further noticed, after observing that I do not hesitate to adopt the opinion of the illustrious JOHN HUNTER, with respect to the vitality of the blood.

Like all other secretions made from the blood, those of the vital principle and sensible caloric will

* Daily observation teaches us, that the nerves, from frequent stimulation, very much increase their power of producing sensation: this is called habit. May we not thence infer that all sensation was originally acquired?

be greater or less in proportion to the quantity of blood perfectly circulated; that is, the greatest quantity of blood circulated by the greatest arterial action, affords, in all cases, the most copious secretion of the vital principle and sensible caloric. The evidence of this fact is observed on the *general system*, in the first effects resulting from the administration of general and diffusible stimuli, as alcohol or exercise; *locally*, in those accumulations of life and heat which often occur in the neighbourhood of inflammations.—But more of this hereafter.

The quantity of blood, however, remaining the same, it is easy to increase the action of the arteries to a certain extent, by the application of stimuli, thereby increasing proportionably the secretion of the vital principle and sensible caloric. On the knowledge of this fact medical prescription is principally founded.

The vital principle *simply*, connected with the contractile fibres, cause their irritability, that is, their capability to contract when stimulated; and may, therefore, in this state of union, be considered as the remote cause of fibrous contraction. And their irritability is increased or diminished in proportion as the quantity of the vital principle with which they are connected is greater or less; and the quantity of the vital principle was shown above to correspond to the quantity of blood circulated, and the action of the arteries conjointly. From all this it appears that there can be no accumulation of

the vital principle, irritability or excitability, in any part of the system, when the action of the arteries is suspended, as in syncope.

Hence a fundamental part of the doctrine of BROWN and DARWIN is believed to be erroneous. This doctrine, however, will obtain a further consideration below.

Having already hinted at the remote cause of fibrous contraction, I shall, in this place, inquire what other causes more immediately conduce to that curious phenomenon. These I shall divide into *proximate* and *exciting*.

The proximate cause of fibrous contraction I conceive to be some motion or affection of the vital principle in or through the contractile fibres. This opinion is strengthened by the following fact—*in fibrous contractions the vital principle is expended.* Now, it seems probable that, in order to expend the vital principle, it is only necessary to separate it from its connection with the contractile fibres: but to separate it is to move it: no separation can take place without motion, and this motion, which ends ultimately in its separation and expenditure, appears to be, in all cases, the proximate cause of fibrous contraction.

The exciting causes of fibrous contraction are the impulses of external bodies. Now, as all bodies stimulate or affect the contractile fibres, by peculiar, commonly called sensible qualities or properties, the fibrous contractions which they excite must also be peculiar; and as the fibrous contrac-

tions thus excited are the ideas of sensation, these ideas will be as different from each other as the impulses of the bodies exciting them, whether they bear any resemblance to the bodies which excited them or not. The essential characteristic of all impulses is motion; impulses may, therefore, be defined the peculiar or sensible properties of bodies in motion; and as these impulses lead us to an acquaintance with the external world, it may be queried whether any body exists in nature in a state of rest or inactivity.

An attempt to enumerate all the causes of impulse would be fruitless; yet some of those most constant in their operation may be pointed out; as the blood and other circulated fluids, in their appropriate vessels and glands; as food and other matters in the stomach and intestinal canal; and as fibrous contractions, especially those which constitute the ideas of extremely painful or pleasurable sensation, in the neighbourhood of other contractile fibres, which are liable to be excited, and in their turn excite other fibrous contractions, constituting what has been called sympathy, at least as far as that habit of action appears to be well founded.

So necessary is it that the exciting causes of fibrous contraction should constantly operate, that it may not only be said of them that they force life through every moment of its existence, but that they constantly vary it as they act more or less intensely.

The above doctrine may be applied, by way of

illustration, in the following familiar example; the heart as ordinarily employed in the circulation of the blood. The heart is largely supplied with blood, principally for the secretion of the vital principle, whereby it is rendered irritable, or fitted for the operation of an exciting cause; which is, in this instance, the stimulus of distention during its diastole, and which, operating upon the vital principle, excites its motion and ultimate expenditure in the systole of that organ. Physiologists have in vain inquired for peculiar qualities of the blood, whereby it stimulated the heart to contract; but from this view of the subject it will be easily seen that it would as readily circulate any other fluid capable of distending it as the one it does, provided it could be regularly supplied with the vital principle. From a further view of the above example, I am led to make the following conclusion; that the quantity of motion that the whole body, or any part, is capable of sustaining, is regulated altogether by the quantity of blood which the whole body, or any part, circulates: for there is no muscle in the body which circulates so much blood, and performs so much motion, in proportion to its quantity of matter, as the heart, and none so badly supplied with nerves; which argues the quantity of motion to depend upon the quantity of blood, and not upon the abundance of nervous influence.

It was above proposed to consider, in a more particular manner, a part of the doctrine advanced and supported by Brown and Darwin, which it

is believed they carried to an unwarrantable length. The part I allude to is this, " That in direct debility the excitability becomes accumulated;" or, in other words, " if fibrous action is diminished or suspended by withholding, in a greater or less degree, its exciting causes, the excitability becomes proportionably accumulated." By an accumulated excitability I understand an accumulation of the vital principle, or some state absolutely dependant on such accumulation. The excitability is supposed to be measured by the quantity of action that follows the application of any stimulant power to the contractile fibres. Now, if the stimulant power is defined and applied under ordinary and known circumstances, and the quantity of action which follows this application is also estimated, it is easy to calculate from these data the quantity of the excitability. Thus, if I apply alcohol to the ordinary and healthy surface of my body, a certain quantity of action and sensation is excited; the power of the alcohol, which is the exciting cause, may be reckoned as one; the quantity of action excited, which is compounded of the power of the exciting cause, and the quantity of the excitability, may be reckoned as two: therefore, from a knowledge of the exciting cause, and all the circumstances relating to its application, as well as from an estimation of the quantity of action following such application, I conclude the sum of excitability, in this instance, to be equal to one. If, however, the same exciting cause be applied under circumstances ap-

parently the same, and a quantity of action follow equal to four, I must, of necessity, ascribe the increase of action to an accumulated excitability; for we could not charge more agency to the exciting power in this instance than in the former, because the circumstances attending its application were apparently the same. Such accumulations of the excitability do take place, but not in consequence of diminished excitement of the heart and arteries. If, however, I vary the circumstances, and apply the same exciting power to a surface, denuded of its cuticle, and a quantity of action should follow equal to four; I could not, in this instance, ascribe the increase of action to an accumulated excitability, (for no evidence of such accumulation exists) but to the power of the exciting cause, which has been very much increased by the mode of application. The instances, I believe, are not very unfrequent where deception obtains on this ground; for we are very apt to attend to the quantity of action or sensation, and judge from these an accumulated excitability to exist, without taking into our account any of the circumstances which might have doubled or tribled the power of an exciting cause.

Having admitted that accumulations of the vital principle, and consequently accumulations of the excitability, do take place in some portion of the contractile fibres, under certain circumstances, it now becomes necessary to point out the portion liable to such accumulations, and the circumstances under which they obtain.

All that portion of the contractile fibres, whether muscular or nervous, as the brain and voluntary muscles, which are not immediately employed to circulate the blood, are liable to accumulations of the vital principle, when the contractions of these are diminished in comparison to the action of the arteries. Hence increased excitability and activity after sleep, which is the suspension of voluntary motion; hence, too, increased susceptibility to light and sound, after the eye has been confined to darkness, or the ear to silence. It must, however, be recollected, that in sleep, silence, and darkness, the blood is regularly circulated; therefore the vital principle is regularly secreted. If this was not the case, but the action of the arteries diminished in as great a degree as the contractions of the voluntary muscles and organs of sense are in sleep, &c. no accumulation of the vital principle could occur, therefore no refreshment would follow sleep, nor would our organs of sense experience increased susceptibility to the impressions of their appropriate stimuli, after such stimuli had been, for a time, withholden. All that portion of the contractile fibres which is immediately employed to circulate the blood, suffers no accumulation of the vital principle that can exist a longer time than from one pulsation of the arteries to the next immediately succeeding; because every contraction can be only equal to the power of its causes, and its causes were given and limited by the contraction immediately preceding. Hence, every contraction of the heart

and arteries will be greater or less, in proportion as the quantity of the vital principle secreted in the preceding contraction was greater or less, or in proportion as the preceding contraction was greater or less. Hence, too, it will be easily seen, that the heart and arteries cannot be rendered more irritable during sleep, and that no accumulation of the vital principle can take place in consequence of their action being diminished; therefore no such accumulations occur in syncope, hæmorrhage, or exposure to low temperatures.

It must be observed before quitting this subject, that all the contractile fibres, during life, are liable to exhibit, at different times, different degrees of contraction, or modes of existence, each of which gives a peculiar density to the solids, (for the degree of density is in proportion to the degree of contraction) and is marked by peculiar degrees of pleasureable or painful sensation.

The first of these states to be noticed is one which often obtains in disease, when, from the small quantity of blood, or weakened action of the arteries, the secretion and expenditure of the vital principle is very small. The greater degrees of this state exhibit the most inconsiderable quantity of action compatible with life, and are distinguished by the words, " loss of tone, or laxity of fibre."

The second state to be marked is one usually exhibited by the fibres in health, and commonly distinguished by the words, " tone, or tonic state;" which is a moderate degree of contraction, de-

pendant on a considerable secretion and expenditure of the vital principle.

A third state is that exhibited by the involuntary muscles, in the performance of their healthy functions, as the heart and arteries in the circulation of the blood; and by the voluntary muscles in their ordinary motions. In this state the contractions are so great as to expend the vital principle faster than it is ordinarily secreted; therefore frequent relaxations become necessary.

A fourth state is that exhibited by the contractile fibres in spasm. The violence of the contractions in this state chiefly depends on the intensity of the exciting cause, and expends much of the vital principle; hence relaxations alternate with, or soon follow such contractions.

Now, as the power of the exciting causes of fibrous contractions is diminished in proportion as the density of the solids is increased, it will be easily seen why spasm so often occurs in atony, and why violent contractions, once excited, (whether of the muscular or nervous fibres, as in spasm and reverie) are not affected by ordinary exciting powers. If the smaller degrees of atony exist, and, at the same time, a paucity of exciting powers, ennui will be the consequence.

The second and third states described above are attended with pleasurable, the fourth with painful sensations.

INFLAMMATION.

TUMOUR and redness of any part constitute inflammation. I am aware that CULLEN, BELL, and others, have added to the above symptoms those of pain and increased heat; but as these do not always occur, and when they do, are merely accidental, I cannot admit them in the general definition of the disease. However, as pain and increased heat have so often attended inflammation as to have contributed largely towards obscuring the real character of that disease, I shall pay them a more particular attention.

Inflammation takes place in any part of the body, if the red vessels of such part are by any means deprived of a portion of their contractile energy, and their powers of action are thereby reduced below the similar powers of the system generally. This condition, it must be observed, is absolutely necessary to the production of inflammation; for if all the vessels in the body were, at the same time, and to the same extent, deprived of their contractile energy, though much atony might follow, inflammation could not; for the quantity of action being equal throughout the whole, the distribution of the blood would also be equal: and inflammation cannot exist in all the vessels of the body at the same time, for the quantity of blood is insufficient to produce the necessary distention.

Inflammation then consists in a loss of tone, and consequent weakened action of the vessels diseased. Loss of tone of the muscular fibres is always attended with diminished secretion and excretion, consequently diminished irritability of the nervous fibres with diminished sensibility; therefore, diminished secretion, excretion, irritability, and sensibility, are the consequences of inflammation to the part diseased.

Although inflammation is, in itself, weakened action, as described above, it is a direct stimulant power to every other part of the system. Hence the consequences to the general system will vary according to the extent of the disease and the part affected. When inflammation comes on in the neighbourhood of many nervous fibres, as in the vessels of the skin, cellular membrane, or voluntary muscles, pain will attend in proportion to the tumefaction; because the greater the tumefaction, the greater will be the pressure; consequently the greater the stimulant power of the disease on the surrounding parts. The pain, in this instance, is not to be referred to the nerves immediately involved in the disease; for these, notwithstanding they are operated upon by a powerful exciting cause, have their sensibility so much diminished, in considerable degrees of inflammation, as to be hardly excitable; but to the nerves immediately surrounding the diseased part, which have their sensibility increased in consequence of such stimulation. In some cases, the pain is removed still farther from

the seat of the disease; as in inflammation of the liver, with pain in the shoulder, or in the bladder, or at the extremity of the urethra. The increased heat, which often attends inflammations of these parts, is to be referred, in like manner, to the pressed upon and highly excited arteries, in the neighbourhood of the disease. And that the heat, after being secreted by these vessels, should accumulate on the diseased part, is not unaccountable, seeing the secretion of the perspirable matter is suspended, or very much diminished, which is known in ordinary cases to carry off a large portion of the sensible caloric. If parts, with few nerves, as the liver, lungs, &c. become inflamed, the pain will be proportionably small; if without nerves, as the pleura, tendons, &c. pain will be altogether absent.*

Inflammations, while confined to a point, and not very painful, by their gentle stimulant power often invigorate weak constitutions: hence the good effects of setons, issues, blisters, &c. but when much extended, whether very painful or not, their stimulant power becomes so much increased as to excite a quantity of action incompatible with health, and one therefore which cannot be continued. A very great quantity of action seems to be incompatible with life and health; for this reason, that secretion being in proportion to the quantity of action, the blood becomes rapidly diminish-

* See the Experiments of Mr. Monro.

ed, removing thereby not only an exciting cause of vascular action, but diminishing the secretion of the vital principle; which, under certain circumstances, becomes both the remote and immediate causes.

Every organ entering into the composition of animal bodies, must be considered in two points of view; first, as performing its own functions as an individual; secondly, from its connection with, and action upon the other parts, as a stimulant power, exciting every other organ to increased action. Some organs, therefore, as the brain, stomach, intestines, and lungs, from the great quantity of action which they perform in themselves, and excite throughout the body, have been called centres of association to the motions generally. Now, notwithstanding inflammation is a stimulant power, and as such generally increases the action of every part not immediately involved in the disease, yet being in itelf diminished action, if it affects any of the organs above named, the quantity of action of the whole system will be thereby diminished; for the body sustains a greater loss of stimulant power from any one of its capital organs becoming inflamed, and its motions thereby suspended, than it gains from the inflammation itself. Hence weak pulse, and frequently diminished heat, in phrenitis (if such disease exists), gastritis, enteritis, and some cases of peripneumonia.

In setting down phrenitis, or inflammation of the

brain, as a disease of general decreased action, I have differed materially from CULLEN, as may be seen by turning to his history of that disease. But I am not the first who have ventured to question the existence of a perfect case of such inflammation, upon the ground that life would be discontinued long before it became universal. Some partial cases of inflammation of the brain I have seen in the latter stages of malignant fevers; but they have been in every instance marked by stupor and loss of voluntary motion. I have also seen some cases of disease where the brain appeared to be highly excited from inflammation of the neighbouring parts. These cases assumed the character of CULLEN's phrenitis.

From not discovering or attending exactly to the seat of inflammation, physicians have sometimes been led into other errors of opinion, of the nature of the above. For instance, Dr. DARWIN asserts that the liver inflamed performs more secretion than in health. The principle I have laid down will, however, explain all such mistakes. Physicians have also misled themselves and others, with respect to the nature of inflammation, by gathering symptoms for it from parts in which it did not exist. For instance, JOHN HUNTER says, " The act of inflammation would appear to be an increased action of the vessels. Inflammation in a part is not only an action of the smaller vessels in the part itself, but in the larger vessels leading to it. This is proved by a whitlow taking place on

the end of a finger; for although inflammation itself shall be confined to the end of a finger, and the inflammatory sensation or throbbing be situated in this part, yet we can feel by our hands, when we grasp the finger, a strong pulsation in the two arteries leading to the inflamed part; while no such pulsation can be felt in the other fingers."*

But Dr. HUNTER might have observed, that while there was no evidence of increased action in the vessels of the diseased part, these arteries of which he has spoken were not themselves actually diseased, but in the *neighbourhood* of the disease, and therefore stimulated by it; and that the increased action of highly excited, but healthy vessels, could not be admitted as evidence of increased action of vessels in other situations, and under other circumstances: and although no such pulsation existed in the arteries of the other fingers, yet the action of these, as well as of every other artery in the body, was increased in proportion to the violence and extent of, and the distance from the diseased part.

Inflammation is most easily excited in weak and delicate habits, and therefore occurs oftenest in such; it is also liable to accompany other diseases of debility, as dropsy, &c. as was well observed by Dr. RUSH.† Nor need those who know that in all cases of debility every cause of inflammation always

* See HUNTER on Inflammation.

† See Medical Inquiries.

exists, except the proximate, be alarmed at the frequent occurrence of that also. Hence the opinion advanced by Dr. Mease, ought not to *startle* any one, unless correct opinions among medical gentlemen be allowed to startle on account of their rarity.*

It will be observed, that I have often used the word secretion, in the course of this dissertation; and have endeavoured to show that it was diminished in inflammation, as well as in every state of vascular debility; it therefore becomes proper to explain what I mean by that term. Secretion may be defined an action of the vessels, whereby the blood is decompounded, and new compounds formed, for the peculiar and healthful purposes of the animal. I am aware, that if any fluid secreted in health should be found to correspond exactly in all its properties to some portion of the blood, it would form an objection to this definition; but until such fluid be pointed out, I must continue to believe it accurate.

If, however, a great degree of relaxation at the extremities of the vessels should suffer some parts of the blood, from their greater tenuity, to run off unchanged, this could not be termed secretion, with any more propriety than we should call ordinary hæmorrhage by that appellation. Therefore, those discharges which often obtain from inflamed surfaces, as well as those which are made beneath

* See Med. Rep. vol. i. p. 149.

the skin, into the cellular membrane, &c. in cases of extreme debility, as the vibices of malignant fevers, and the blisterings frequently preceding gangrene, are not to be termed secretions, as they are not the result of vascular action, but suffered to take place merely through debility; and the different discharges in these cases mark the degree of debility very exactly. Thus, where the serum only, which is the finest portion of the blood, is discharged, the most moderate degree of inflammation exists, and one which may continue a long time under the same appearances; as in fistulous ulcers, gonorrhœa, &c.

If, however, the degree of inflammation is by any means a little increased, a second portion of the blood will also be poured out with the serum, and the condition of the part thereby materially changed; manifesting all the phenomena of adhesive inflammations, as in the healing of wounds, ulcers, &c. for this second portion, or the coagulating lymph, is the fluid of which the animal solids are formed, and to which, whether in the vessels or not, life is pre-eminently attached. If the degree of inflammation is carried still higher, a state of debility is induced incompatible with the life of the vessels; therefore spreading of the ulcers, or mortification of the part, must follow.

CAUSES OF INFLAMMATION.

A quantity of action so great as to expend the vital principle faster than it can be supplied, is the most frequent remote cause of inflammation. Those stimulant powers which excite this great quantity of action, are the pre-remote causes. The subduction of the stimulant powers, as in the exposure of a part to cold, and the consequent loss of action, are frequently, too, the remote causes of this disease. In short, whatever induces debility immediately, may cause inflammation remotely.

Debility, then, by whatever means induced, stands next in order to be considered as a cause of inflammation: it, however, from its apparently passive nature, cannot be well called exciting or disposing, and having no other appellation at hand, I shall leave it to the reader to name.

The proximate cause of inflammation is pointed out by the condition laid down above; which was, that the vessels of the general system should possess sufficient power to push on their contents, and distend such vessels as were unable, through debility, to rid themselves of such contents after receiving them. For it will be easily seen, and may be seen every day, that the remote cause of inflammation has acted, and ended in debility; yet the disease does not appear, unless the debilitated vessels become over-distended with red blood: the

power, therefore, which distends these vessels is the proximate cause, and this power is the activity of the other parts of the system. But in order to the distention taking place, it is not necessary that the healthy parts should act with unusual energy, or that blood be derived to the weakened part in greater quantity than usual; for if it is derived at all, and retained in greater proportion, the disease must necessarily take place.

By way of illustration to my general doctrine, I shall set down the causes of inflammation in the order of their occurrence, and the production of the disease in question.

These I expect to find happily arranged to my purpose, in the case of inflammation spreading from a point to the surrounding parts. Nor can the taking of a case of inflammation, which is to be considered as having existed for some time, form any objection to the statement, because, while the disease continues to spread, all the causes are presumed to be in full operation. Now, the inflamed point which stimulates the surrounding parts is the pre-remote cause; the quantity of action which is excited by the pre-remote, and ends in indirect debility, is the remote cause: in consequence of this debility, thus induced, the vessels suffer themselves to be over-distended by the proximate cause, and the disease appears. That redness and tumefaction which often attend the exposure of a part to cold, appear to be a perfect case of inflammation, and throw much light on the nature and production of that disease.

CURE.

The cure of inflammation may be attempted on several grounds: first, by the removal of the proximate cause, as in bleeding, purging, &c. secondly, by diminishing the power of the remote cause, as in the application of cold and other sedatives to the part affected: thirdly, by removing the debility of the diseased vessels, by the application of astringents and stimulants to them.

THE END.