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Publication/Creation

Boston : Published by Cummings and Hilliard ..., 1820.

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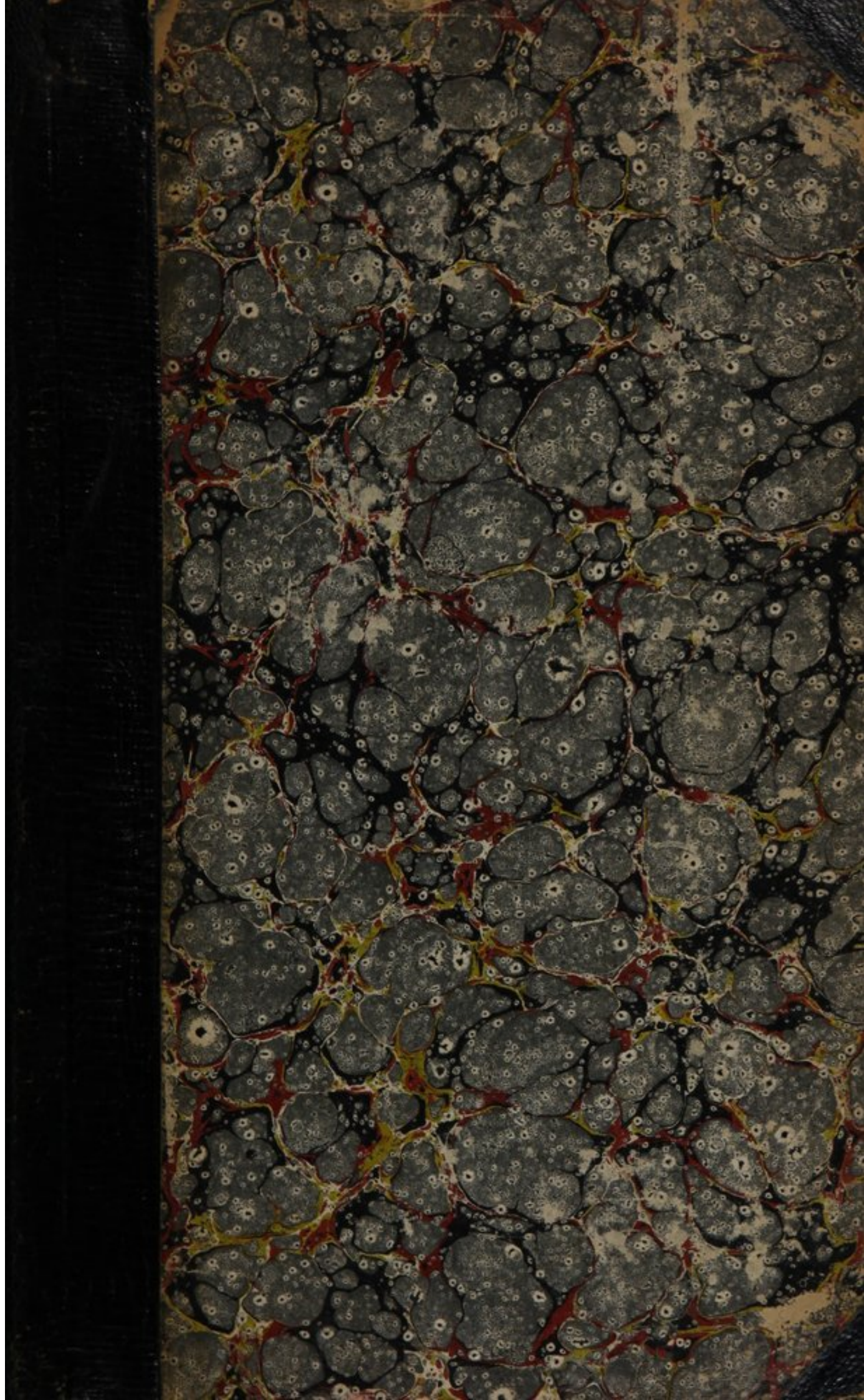
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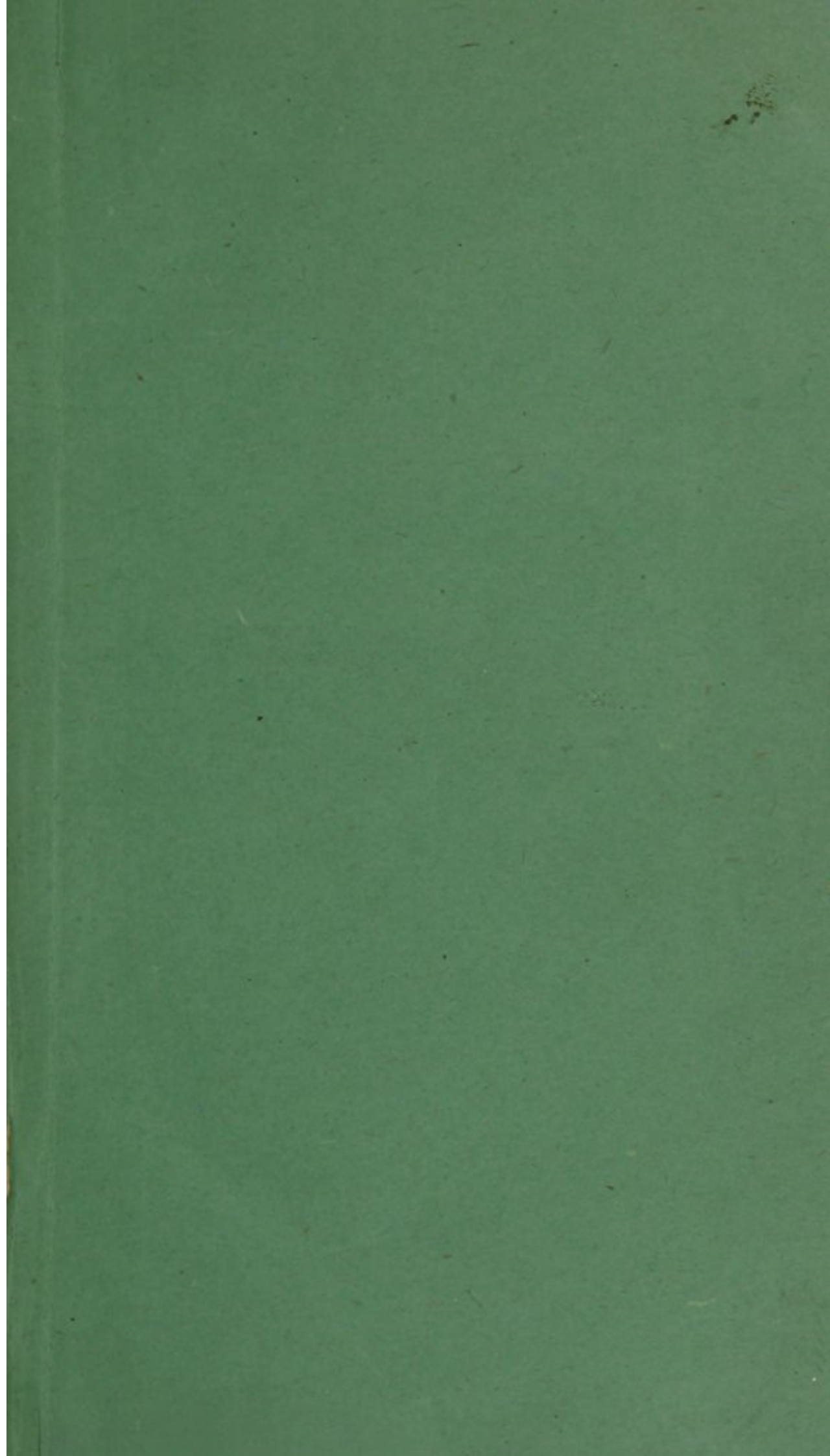
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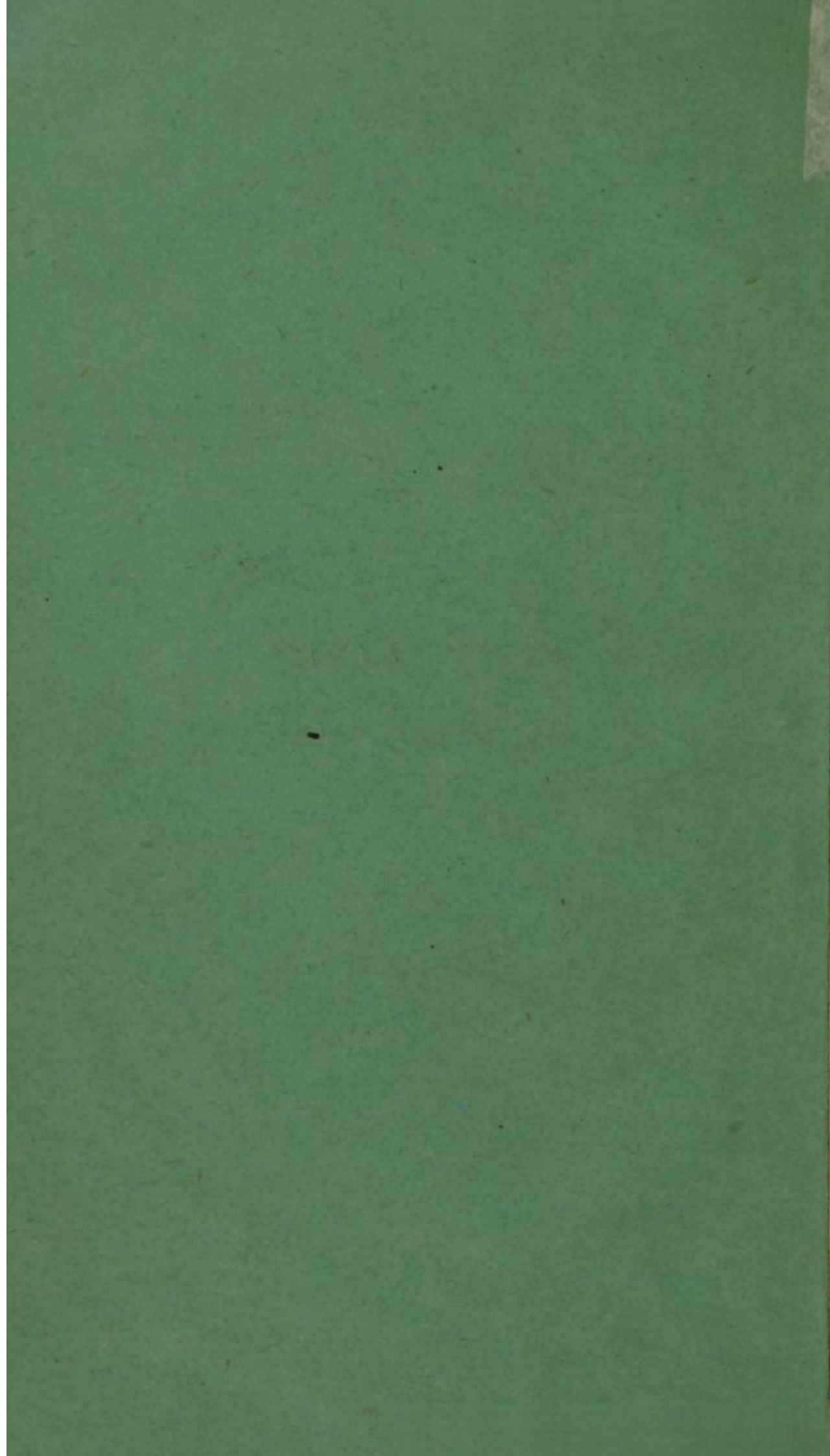
Section,

ANNEX

No. 26533

Hemorrhage





MEDICAL DISSERTATIONS

ON

HEMOPTYSIS

OR

THE SPITTING OF BLOOD,

AND ON

SUPPURATION,

WHICH OBTAINED THE BOYLSTON PREMIUMS FOR THE YEARS

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✓
BY JOHN WARE, M. D.

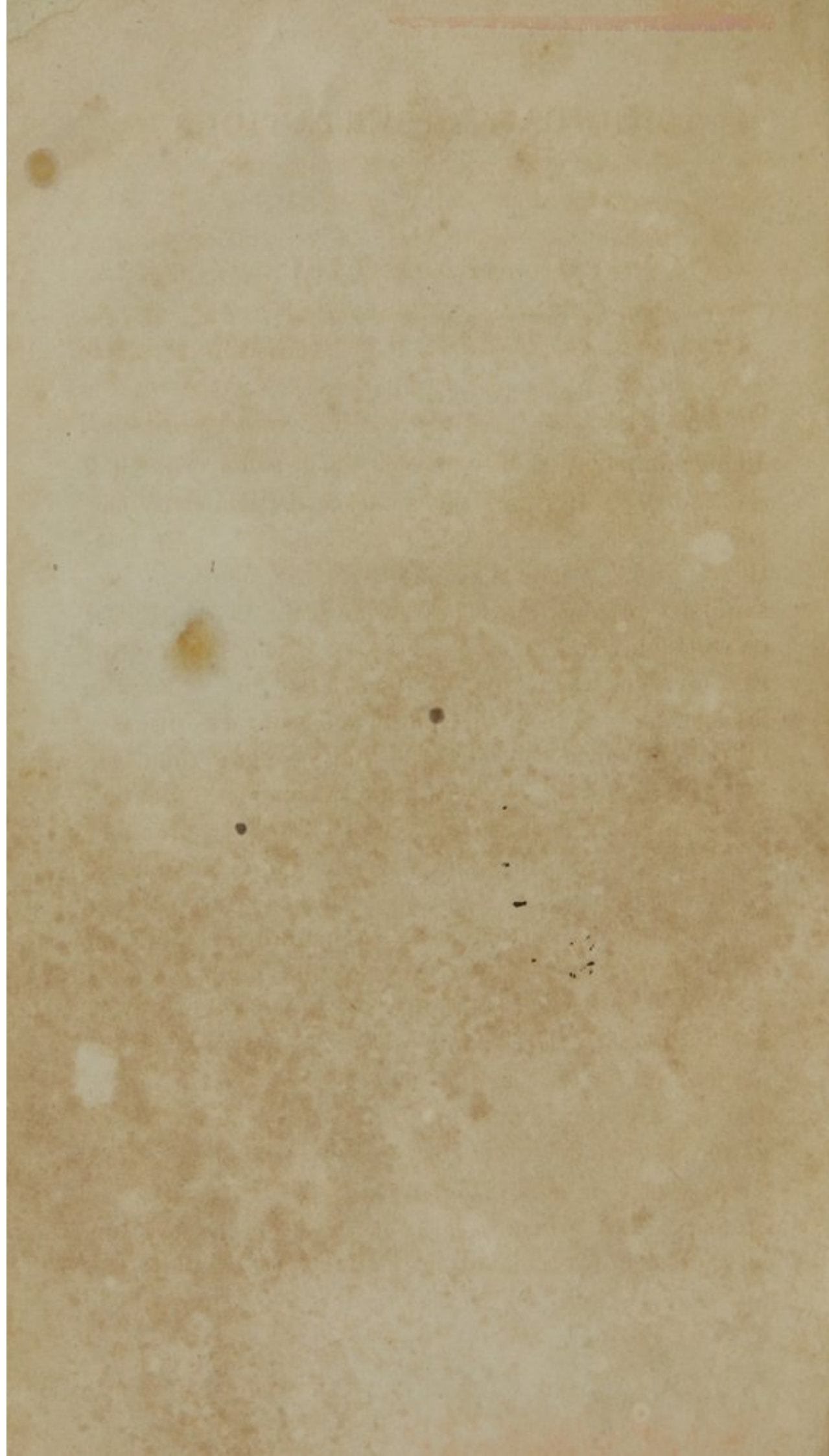
FELLOW OF THE MASSACHUSETTS MEDICAL SOCIETY.

BOSTON: 26533

PUBLISHED BY CUMMINGS AND HILLIARD,

Boston Bookstore, No. 1 Cornhill.

1820.



ON HEMOPTYSIS.

HEMOPTYSIS signifies literally, *a spitting of blood*, being compounded of the Greek words αἷμα, *blood*, and πτύω, *I spit*; but does not embrace, as commonly employed, every case in which the blood is spit from the mouth. Blood may pass from the mouth in consequence of bleeding from the nose, the fauces, throat or stomach, and be spit out as in Hemoptysis. But the term is restricted to those cases in which the hemorrhage is from the lungs, and embraces diseases of much more consequence and danger than the others which have this symptom in common. Scarcely any one disease excites so much alarm in the mind of a patient, or those of his friends, as pulmonary hemorrhage; and this not on account of any present and urgent danger which is to be apprehended on its first attack, but from the terrible nature of that disease of which it is so often the precursor. Phthisis Pulmonalis so seldom goes through its course without the appearance of some blood from the lungs, that we are apt to look on Consumption as the inevitable consequence of Hemoptysis, and hence the terror which is almost universally excited by its existence. And when it is reflected, that almost the only chance for combating Phthisis successfully, is

by resisting its very first approaches ; the treatment of hemoptysis, whether we consider it as a cause, or a symptom of this disease, becomes an object of the greatest consequence, and demands a corresponding degree of attention.

If we reflect for a moment on the structure, situation, and circulation of the lungs, we shall not be at a loss to discover why hemorrhage so much more frequently takes place from them, than from any other part of the system ; and why indeed,—to carry our remarks still farther—disease more frequently occurs in the lungs, than in any other single organ. Their internal surface is exposed to all the alterations of the atmosphere, and is more liable to be affected by them, than if, like the skin, it were constantly subjected to their influence. These organs are, from their structure, more full of blood, than any others. Their blood-vessels are more numerous, and the trunks of them larger in size. They are more immediately subdivided into vessels of the smallest size, and these are spread out amid the cellular membrane covered by a very thin tunic. The different functions of these organs and of the rest of the body, are constantly throwing into them an unusual quantity of blood, with which they become gorged—as in active exercise, coughing, speaking, singing, &c. In addition to these causes, we may include the relation which the circulation of the lungs bears to that of the general system. In speaking of this relation we have regard to the old division of the circulation, into the greater and the less ; and not to the modern, into the circulation of the red and that of the black blood.

The two circulations first mentioned are, as it were, placed in opposite scales and balance one another; and although one is more extensive and widely diffused than the other, yet they are so adapted by their peculiar arrangement, as to maintain an equilibrium. The general system necessarily contains the most blood; but its quantity does not so much exceed that of the pulmonary as a first impression would incline us to believe. There are many parts of it, in which the blood is nearly stagnant, or exceedingly slow and dilatory in its motion—and others to which it is very sparingly supplied. This system is also at a greater distance from the heart, the blood must therefore be sent farther and is of course longer before it returns, than in the vessels of the lungs. For there, although the force of impulsion to the circulating fluid from the ventricle is less; yet the distance which it has to run and the obstacles which it has to surmount, being less in a greater proportion, the circulation is actually accomplished in a shorter time. The two systems may be compared to the arms of a balance unequal in length, of which the heart represents the centre of motion; the shorter arm making up by its greater weight for the advantage which, by its length, the other would have had over it.

It is obvious from these remarks, if they be well founded, that any derangement in either of these systems, will affect the circulation of the other. It is consequently the case, that any circumstance, which shall cause a less quantity of blood to exist in the general system, will produce an engorgement of the vessels of the lungs. And the opposite effect is pro-

duced—that is, the quantity of blood in the pulmonary system is lessened—by causes which determine it to fill the vessels of the general system more abundantly than usual ; as is done by warm bathing, friction, &c.

There are four ways in which it has been supposed that hemorrhage might take place. 1. By a rupture of vessels either large or small—this received the name of *rexis*. 2. By an erosion of the vessels from the acrimony of their contained fluids, which was *diabrosis*. 3. By *anastomosis*, or a mere dilation of the mouths of the extreme vessels. 4. By *diapedesis*, or the transudation of the blood through the membranes of which the vessels are composed.

Hemoptysis is undoubtedly sometimes occasioned in the first of these ways, by a mechanical rupture of the coats of the vessels. And it has been the prevailing opinion, that it is commonly produced in this way. The grounds for a different belief will be given shortly, and in the mean time it may be observed, that only those cases of hemoptysis are produced by rupture in which some external violence has been applied, or where there has been some very violent efforts of respiration, as in coughing.

The existence of such a species of hemorrhage as *diabrosis* is extremely doubtful. We know of no such acrimonious states of the fluids as should make them sufficiently corrosive to destroy the coats of a vessel. The only cases which can possibly come under this division, are those occurring in the advanced stages of pulmonary consumption, where it has been supposed that the process of ulceration destroyed the coats of the vessels so as to give passage to the fluid which

they contained. But one fact relating to the phenomena of ulceration overthrows this opinion—viz. that the adhesive always precedes the ulcerative process of inflammation, and consequently the cavity of the vessel would be closed up, before the ulceration could penetrate into it.

The occurrence of hemorrhage by *diapedesis* appears equally improbable. It is inconsistent with all our knowledge on the subject of the animal system, that the membranes, while life continues, should permit fluids to pass through inorganic pores. If the pores are not inorganic, then this kind of hemorrhage would amount to no more than *anastomosis*, for the pores would be themselves small vessels from the mouths of which the blood issued. This explanation suggested itself even to Galen, who was the first to take notice of this species of hemorrhage; and he was therefore less confident in describing this, than the other kinds of hemorrhage.

The theory which best agrees with both physiological and pathological observations, is that which refers hemoptysis, as it commonly occurs, to *anastomosis*—that is, to an effusion of blood from the mouths of the exhalant vessels of the lungs. The mucous membranes are generally the seat of hemorrhages, and their occurrence may almost be considered as peculiar to those surfaces. I shall endeavour to show that the effusion of blood from these surfaces does not proceed from a rupture, but from an affection of the small vessels entirely different. This opinion has been advanced and defended by many distinguished physiologists and physicians. Let us state in the first

place, a few considerations which are offered by Bichat in defence of the position that hemorrhage is really an exhalation, and not the consequence either of erosion or of rupture.

He observes, 1. That in no instance, where he has opened the bodies of those who have died of hemorrhage, has he discovered any traces of erosion, although he employed the nicest care in washing and macerating the surfaces and examining them with a microscope. 2. That in squeezing the mucous surface of the uterus in women who have died during menstruation, a number of small drops of blood may be pressed out, which manifestly correspond to the extremities of exhalant vessels; but no sign whatever of erosion can be discovered. 3. That hemorrhages sometimes take place from free surfaces, as the skin, in which the blood manifestly comes from the exhalant vessels; this renders it probable that the same is the case with the mucous membranes. 4. That if rupture always preceded hemorrhage, the internal surface of the womb would be a mere collection of cicatrices, as we must suppose one or more ruptures to occur at every monthly period of the catamenia. 5. That even if in active hemorrhages where there is evidently a previous congestion of blood, we should admit the possibility of a rupture, how can we suppose it to take place in passive hemorrhage, where the powers of the vessels, almost destroyed by disease, permit the blood to pass freely from their orifices. 6. That it is difficult to reconcile many of the phenomena of hemorrhage—such as the extreme rapidity with which it is sometimes produced—its appearance in an other part, when it has disap-

peared from that in which it previously existed, and its subjection to the influence of sympathy—with the supposition that it is produced by rupture. 7. The irregularity of the appearance of the blood in the course of menstruation, its copious flow in one instant and its complete cessation the next, and so alternately many times in the course of one period, are difficult to be accounted for on the principle of rupture, for we must suppose the wounds to be opened and closed again at every alternation of the discharge. 8. If we compare hemorrhages allowedly proceeding from rupture, with others, they do not resemble them either in their phenomena or duration. Their cessation does not give rise to others; they are independent of all influence from sympathy; and the passions, which have a considerable effect on the common kinds, have none on these.

These are the arguments which are adduced by Bichat in support of this theory. There are other observations which may be offered that favour the same opinion. If we believe hemorrhage to arise in consequence of rupture, the quantity of blood which is sometimes suddenly effused makes it necessary to suppose either that a large vessel or a large number of small ones are ruptured. If a large vessel were ruptured, we ought, as Bichat observes, to discover it on the dissection of those who die from hemorrhage; and besides, this disease exists frequently in those mucous membranes which have no large vessels, as in those of the nose, ears, &c. In addition to these objections we may ask, how, if the blood be effused from a large vessel, can we account for its being

arrested by bleeding and astringents taken internally, remedies which have no effect on the orifices of vessels wounded in any other way?

If we recur to the other explanation, that the small vessels are ruptured, we shall not find this more satisfactory. The rupture must be produced by some internal cause, and the congestion of blood in the vessels is usually supposed to be this cause; even Bichat allows that this might possibly be the case. But how and why is this congestion to rupture the coats of the small vessels? To do this, it ought to be formed and supported by the *vis a tergo* of the large. But it is not probable that the large vessels can produce a congestion in any part, unless an affection of the small vessels themselves exist at the same time. The increased action of the large vessels is a consequence and not a cause of the engorgement of the small ones, and will therefore be only proportionate to the increased quantity of blood, which is demanded by them, to support their altered state of action. Since the congestion, then, is a consequence of the state of action, or of some modification of the vital properties of the extreme vessels themselves, it appears incredible to suppose, that an affection of their own should draw into them a quantity of blood sufficient to rupture their coats.

We do not meet with so much difficulty, if we ascribe the effusion of blood to the mouths of the exhalants. In their ordinary state, they have the power of separating and pouring out a mucous or aqueous fluid; this power depends, probably, on a peculiar modification of the vital properties which these vessels possess. An alteration in these properties would alter

or take away their function. The affection of the vessels in hemorrhage, probably consists in such an alteration, which draws to them an additional quantity of blood, and gives to their extremities the power of transmitting that fluid, instead of their accustomed exhalation. This change in the state of the vessels concerned in the disease would not be greater than takes place in inflammation. And indeed a strong and well grounded analogy has been pointed out between hemorrhage and inflammation. The two diseases seem to border upon, and run into one another. In an inflammation of the lungs, hemoptysis to a certain degree is a very common symptom; and after a hemorrhage has occurred, inflammation and suppuration succeed it so closely, that the line of separation cannot be drawn between the two diseases.

The phenomena in hemorrhage, and their explanation, resemble very closely those of inflammation. There is every mark of preceding irritation and congestion, as is evident from the symptoms of hemoptysis. Indeed, the first approaches of pulmonary hemorrhage might easily be mistaken for those of an inflammation of the lungs. The local affection differs principally in the circumstance of the effusion of blood, and were it not for this, the two diseases would be nearly the same. But is not the passage of the blood from the mouths of the exhalants a phenomenon of almost exactly the same kind, with some of those which take place in inflammation? In the serous membranes, for instance, the small vessels do not naturally give passage to red blood. Irritate them so as produce inflammation, and this fluid immediately penetrates

them. Now, would not a similar change, in the state of the exhalant vessels of the mucous membranes permit the effusion of blood, instead of that of mucus? These circumstances seem to me to stand on precisely the same ground, except that in the serous membranes, the vessels, whose vital state is thus altered, do not terminate in open mouths, as those of the mucous membranes do. A similar comparison might be made with respect to many other phenomena of inflammation; but I would only observe, that there seem to be sufficient grounds for regarding the admission of blood into vessels which do not commonly transmit it, the effusion of coagulable lymph and the secretion of pus, as circumstances of the same kind with the exhalation of blood from mucous membranes, and depending on a like cause. This cause, probably, consists in some increase, or alteration (of the nature of which we are entirely ignorant) in the vital properties of the part affected. These observations are confirmed in some measure by a symptom which has been often observed to precede hemorrhages. Before the discharge of blood commences, there is an effusion of a serous or mucous fluid in unusual quantity; and this seems to denote that a gradual change is taking place in the state of the vessels, from their ordinary degree of vital power, to that which enables them to discharge blood. This circumstance has been remarked in hemoptysis and with respect to the menstrual discharge. I have also observed it twice in bleeding from the nose. Dysentery affords much to confirm what has been remarked. The different appearances of the evacuations in this disease, vary-

ing from pure mucus to almost pure blood, with all the intermediate degrees of mixture, seem to be a consequence of the different degrees of alteration which the exhalant vessels have undergone in different portions of the intestinal canal. In this disease hemorrhage seems clearly to be only one among the symptoms of inflammation. Are we not therefore justified in adopting the same opinion with respect to hemoptysis, to say nothing of any other hemorrhage? This view need not interfere with any practical distinctions, which will continue as well defined as they are now.

These observations, it is obvious, refer only to active hemorrhage. The distinction of hemorrhages into active and passive is founded on the same principle, as a similar division of the exhalations.* In active exhalation the life of a part is vigorous and it is full of blood. In passive, the vital power and the quantity of blood are both diminished. The same is the case with hemorrhages. Passive hemorrhage arises from an adynamic state of the vessels of the surface, whence it proceeds, and is not accompanied by that congestion, or those symptoms of fulness, which attend on active hemorrhage. The vessels seem to let the blood pass out of them, in consequence of their complete apathy, and want of power to retain it. Passive hemoptysis occurs in the lungs, in the advanced stages of chronic diseases of those organs; but I am not in the possession of experience or authorities on the subject, which would

* Bichat, *Anat. General*, vol. ii.

enable me to speak with decision or confidence of these cases.

This view of the proximate cause of hemorrhage applies to the disease in general ; but no particular remarks will be necessary to adapt it to the present subject. The phenomena of the disease are as distinctly and clearly marked in hemoptysis as in any hemorrhage, and like inflammation, the disease has the same general character wherever it is situated, though the structure and constitution of each particular organ may produce some slight varieties of symptom.

Having treated of the proximate, we proceed next to the remote causes of hemoptysis, which are in many respects the same as those of hemorrhage in general. It has been a common opinion that this disease was a sign of a plethoric state of the system. The effusion of blood was considered as a proof that there was too much of that fluid in the vessels, and that nature took this method to rid herself of the incumbrance. There can be little doubt, that the discharge is the natural means of relief for some difficulty ; but it does not follow of course that this difficulty consists in the presence of too much blood. The congestion and derangement is local, and the discharge relieves these ; and they may certainly be produced without the existence of a general plethora. Hemorrhage is doubtless sometimes occasioned by plethora, but not commonly ; and hemoptysis seldom. Individuals subject to hemorrhage have it generally in some particular part ; which circumstance indicates a predisposition in that part to the disease,

without implying any affection of the system at large. The part thus affected may perhaps be said to have a plethoric disposition of itself, which does not extend to other organs. It is thus that very slender women, who are far from a plethoric habit, have frequently profuse catamenia; a peculiar irritability of the vessels of the uterus drawing to them a disproportionate quantity of blood. An abundance of blood in the body will not be apt to produce hemorrhage, if it be equally distributed and properly balanced. It is only when the balance is destroyed that injury ensues, and although this is, perhaps, more easily done in a plethoric habit, yet it may take place under any circumstances and produce the same effects.

In hemoptysis the local tendency to the disease appears to be far more instrumental in producing it, than any circumstances relating to the general circulation. We cannot separate the predisposition to this disease, from the predisposition to phthisis pulmonalis. In fact we may generally consider it as the predisposition to phthisis, of which hemoptysis is one of the first effects. The existence of this predisposition may be often observed long before it is matured into disease. We can see it in thousands almost from their infancy; and we daily meet those who appear destined, by their very form and appearance, to become the victims of this destructive disease. Many, no doubt, go through a long life with this tendency, and are so fortunate as never to have it called into action; while others are cut off at the very threshold of existence. This predisposition of the lungs to pulmonary consumption consists probably in some peculiar modification of

the vital powers of those organs. It is, as it respects the lungs, what the temperament or constitution is as it regards the whole system, a peculiar mode of exercising the functions of life, which, though perfectly distinct and characteristic, cannot be accurately defined or described. We can arrive nearer the truth probably, if we defer an examination of the nature of this tendency in the lungs, till we have inquired a little into its origin and external signs; for it is usually accompanied by a certain habit and appearance in the rest of the body, and by visible peculiarities of the whole constitution as well as of the lungs. A general delicacy of habit—a fair and rosy complexion—the skin thin and transparent—a long neck, depressed shoulders, and flat and narrow chest—a flaccidity and softness of the muscular parts, are all marks of a predisposition to hemoptysis and consumption. Persons of this habit are apt to be peculiarly affected by any cause which produces an alteration in the state of the circulation. Hence any considerable degree of exercise renders their respiration laborious—digestion is accompanied with some sympathetic effect on the system, and there is a propensity to nocturnal sweats. A peculiar acuteness of intellect has also been ascribed to persons of this constitution. The predisposition, marked by these signs, is frequently accompanied, and rendered more alarming and inveterate, by a scrophulous taint of the constitution. Where this is the case, the evil is usually hereditary, and always where these peculiarities are present they are a part of the original constitution. But causes may operate after birth, so as to produce

a predisposition to consumption in those who were at first entirely free from it. Like other parts of the system, the lungs may be permanently affected by circumstances occurring in the early stages of life. Violent and long continued diseases, affecting the general system, sometimes produce consequences from which it never recovers. According to the common expression, the constitution is ruined or impaired; the individual is completely altered; his life and its functions have taken on themselves a new character. Similar to this may be the effect of disease on the constitution of the lungs. Accidental causes induce pulmonary disease in a child, which, though cured, leaves behind it a tendency, never to be eradicated, that finally brings on hemoptysis, consumption and death.

In the same way there are many causes, which, taken separately, are only capable of slightly affecting the lungs, yet long continued, produce a permanent change in their constitution. We may adduce the case of public speakers; of whose disproportionate liability to pulmonary consumption, we have so many and such melancholy examples. It is true, these instances may possibly be only the development of original tendencies; but it appears reasonable to conclude, that a cause, which applied in a certain degree is capable of developing a predisposition, may, if applied in a greater, produce the predisposition itself.

Having described the origin and signs of the predisposition in question, we return to the inquiry into its nature. Of this, I think we must judge rather

from phenomena which take place when phthisis already exists, than from any which occur previously. In this disease, processes are carried on similar to those, which in other organs are preparatory to the restoration of health—viz. inflammation and suppuration. The inference then is, that there is in the lungs an attempt to cure the disease, but not power sufficient to carry through all the processes which are necessary. Or if there be sufficient power, that it is not rightly directed, but expends itself in useless and excessive suppuration. The labour is rightly commenced, but not rightly finished. We may compare this state of things in the lungs to what occurs in irritable and phagedenic ulcers. The processes are formed and carried on by the same rules and on the same plan as in healthy ones, but there is a want of power to complete the plan, or else the power is misapplied. From these remarks we may derive some idea of the nature of that affection of the lungs, which constitutes a predisposition to phthisis pulmonalis. It appears to me to consist in a tendency to excessive action, without a proportionate power of supporting action; in a great degree of irritability, without corresponding strength. It is the result of such a disposition, that slight causes excite the vessels of the lungs to a degree of action, which their structure and organization are not capable of supporting; and the consequence is, that they are destroyed by the violence of their own efforts.

In those who are thus predisposed to the disease, hemoptysis is easily brought on by various exciting causes. These causes are generally such as produce

an increase in the rapidity of the circulation in general, or of that of the lungs in particular. Among the former, we may reckon exposure to great external heat, as in manufactories, glass houses, &c. all violent straining, or exercise of the muscles, as in running, jumping, and walking for a long time. Among the latter, public speaking or singing, shouting loudly, playing on wind instruments. In many of these cases, the extreme congestion of the vessels of the lungs is shown by the short and laborious breathing—a sense of oppression and suffocation—and the violent efforts of the chest to overcome this difficulty. In addition to these causes, we might mention some others which operate in a different way. Any circumstances, which, without increasing the rapidity in the circulation, destroy the balance between that of the lungs and the rest of the body, will often produce hemoptysis; and likewise causes, that do not affect the circulation immediately, but are applied to some other part of the system, produce disease in the lungs by sympathy; as cold applied to the surface of the body, and probably some states of the alimentary canal.

The suppression of accustomed discharges (such as the catamenia, piles, &c.) is often a cause of hemoptysis; from this it more frequently comes on without predisposition, than from any other, and is consequently attended with less danger, though still an important disease. These discharges were looked upon by the ancient physicians, as serving to evacuate morbid and injurious humors, which, when they were suppressed, sought some other outlet and thus fell

upon the lungs, the stomach, or the head. This explanation is hardly admissible in the present state of our knowledge;—can we discover any that is more satisfactory? There are some observations of Bichat, when speaking of the distribution of the vital powers, which appear to me to have a bearing not only on this question, but also on others relating both to healthy processes, and to those of disease. These observations with their illustrations and application, will be introduced here, not because the explanation of this circumstance is of very great importance, but because the principles quoted will be applicable not only here, but elsewhere in the course of our inquiry. The amount of the ideas he advances is as follows. “It is an invariable law of the vital powers, that if they are augmented in one direction, they are proportionally diminished in another. There is only a certain sum of these powers apportioned to the system at any one time. There may be much difference in the proportions in which this sum is distributed, but not a difference in the whole quantity. One part of the system then augments its actions only at the expense of some other.” Wherever there is an increase in the energy of action of any one organ, there is a corresponding decrease in some other organ, or in the system in general. These remarks do not imply that there is a certain quantity of vital power given to the system which is always to supply it. There is undoubtedly a constant development, as there is a constant consumption. But the supply is, at any particular period, in a definite quantity. If the circumstan-

ces of any particular part of the body call for an unusual proportion of vital power, this is furnished by depriving other parts of it, and not by an absolute production of the requisite quantity *de novo*, as is commonly supposed. We may infer from these principles, that many of the diseases to which we are liable, arise from an inequality and disproportion in the distribution of the vital powers; especially, as an unequal distribution of the blood usually accompanies, and is indeed a natural consequence of this occurrence. It is obvious, that if any cause attracts to a particular organ, a larger proportion of vital power than is sufficient to perform its ordinary functions, some derangement and the production of some unnatural function will be the consequence. For, since the structure and strength of the part is exactly adapted to the degree of life and action which it is destined to support, any increase in the latter, as it must destroy the proportion that ought to exist between these circumstances, necessarily produces a derangement. Morbid processes, or the functions of disease, are supported by the same means as those of health, but they require an increase in the powers, or at least in some of the powers of the part; or else a different proportion and relation among them. In the production of any discharge, whether sanguineous or suppurative, the part in which it exists draws on the rest of the system for an increase of its vital energy. If this discharge is habitual, the system is able by degrees to furnish an additional supply in order to compensate for this demand. But should any cause suddenly suppress the evacua-

tion, the powers which had been previously appropriated to its production are thrown loose upon the system. In constitutions universally vigorous, they are probably distributed equally among all the organs and not felt; but where there is some particular one weaker in its structure than others, and predisposed to take on itself diseased action, they concentrate there, and exhaust themselves in the production of some derangement.

Upon these principles, if they be well founded, we may, I think, account for the production of hemoptysis by the suppression of an accustomed discharge. And indeed, with proper adaptation to different cases, they will explain a great many other phenomena, both in health and disease.

In whatever manner hemoptysis is occasioned, it generally comes on with very nearly the same symptoms. The discharge of blood is preceded by a weariness and lassitude affecting the organs of motion, a shivering sensation and constriction of the skin—by a coldness of the extremities—a sense of weight or anxiety about the precordia—a slight degree of pain in some part of the chest—a sensation of heat or of burning under the sternum—and by a shortness and difficulty of breathing increased by moderate exercise. These symptoms may have existed for a longer or shorter time before the hemorrhage occurs, but sometimes it comes on suddenly without any such warning, the flow of the blood being the first symptom observed. This is said frequently to be immediately preceded by a saltish or brackish taste in the mouth, the cause of which, if it be any thing more than the fancy of the

patient, is probably owing to a sympathy of the organ of taste with the diseased part. A slight tickling is felt at the top of the windpipe, which excites a coughing to relieve it. This brings up the blood from the lungs, of a florid, arterial colour, and of a frothy appearance, at first in a small quantity, but the irritation continuing, more is brought up in the same way, with a rattling noise in the windpipe, as of air passing through a fluid. In some instances, only a few mouthfuls are thrown up, before the hemorrhage ceases; in others, a slight spitting continues for several days together, and sometimes, especially when it has repeatedly occurred, it is in great quantity, and the blood is thrown out so copiously, that the patient seems rather to be vomiting than coughing it up. It is seldom that the hemorrhage is so abundant as to cause death either by suffocation or exhaustion. It generally ceases spontaneously, when sufficient blood has been poured out to relieve the vessels of the lungs; or it is checked by the use of remedies.

Hemoptysis affects the system generally, and produces symptoms of the same kind, as those which accompany inflammations of internal organs. These are usually known by the name of the sympathetic fever, and are of two kinds, *Symptoms of General Inflammation*, and *Symptoms of Irritation*. The differences between them it is not necessary to describe, as it has been so frequently and so accurately done, as to be sufficiently familiar to physicians. The latter, *Symptoms of Irritation*, are most usually attendant on the disease under consideration; and accompany

especially those cases which result from predisposition, and are introductory to phthisis pulmonalis. The former, *Symptoms of General Inflammation*, occur oftener in those instances arising from the common exciting causes of disease, and which are therefore less likely to terminate in pulmonary consumption.

Having thus taken a general view of the characteristics of hemoptysis, as they ordinarily appear, we turn to consider the varieties to which it is liable. As it is produced by different causes, in different states of the system, and in a variety of constitutions, we ought to examine if there be any essential differences which require diversity of treatment.

Hemoptysis may be caused, in the first place, by some external violence. In such a case, the precursory symptoms, which have been above enumerated, of course do not occur, and if there be any constitutional effect, it follows the hemorrhage. It is easy to determine this kind of hemoptysis, because we can ascertain whether any cause capable of having produced it has preceded. The degree of danger to be apprehended depends more on the previous state of the lungs and of the system, than of the actual extent of injury done to the organ itself. If the health is good, and especially if the lungs be sound and without any predisposition to disease, a very serious injury is frequently recovered from. But even under the most favourable circumstances the danger is considerable. The lungs at best possess but feeble powers of restoring themselves after an injury has been inflicted.

In the second place, we rank those cases of hemoptysis, which are produced in consequence of some of the ordinary causes of inflammatory disease, are accompanied by the symptoms of General Inflammation, occur in healthy, perhaps plethoric habits, where there has been no predisposition to pulmonary disease, and are more easily relieved by remedies than any other kind, without leaving an unpleasant affection behind. It is impossible, in actual practice, to draw a line between this kind and that which will next be attended to ; but theoretically, at least, there appears to be a clear distinction between these cases and those in which signs of predisposition and disease precede the bleeding. The difference consists in this, that when phthisis follows this variety of hemorrhage, it is as clearly produced by it, as if the disease had been a common inflammation ending in suppuration ; but when, on the other hand, it follows a hemorrhage, which is manifestly the consequence of a predisposition, the hemoptysis is to be regarded as only a symptom of incipient phthisis, and this forms the third kind.

This kind, the third, is only one of a series of morbid phenomena, constituting pulmonary consumption, and may be either the first symptom, or it may occur after the disease has made considerable progress, and when ulceration has far advanced.

As the fourth kind of hemoptysis, we may reckon that which proceeds from a suppressed discharge. Of the nature and causes of this variety we have already spoken, and nothing need be added here. We can only observe that hemorrhages, produced in this

way, are often perfectly innocent. A spitting of blood, which is vicarious of suppressed menstruation will frequently go off with as little subsequent derangement, as if the discharge had been accomplished in the natural manner; and the accompanying symptoms are not more unpleasant than those which frequently accompany menstruation.

In the fifth place are passive hemorrhages of the lungs, which, as before remarked, occur in the advanced stages of chronic diseases of those organs. They are to be regarded merely in the light of symptoms of those diseases, as they are not of sufficient importance to require a separate treatment.

The degree of danger to be apprehended from hemoptysis depends on circumstances, which must suggest themselves to every one who has considered the disease attentively. Since scarcely any cases terminate fatally from the bleeding, the only thing to be regarded is the degree of probability that the case will terminate in phthisis. On this subject it is unnecessary to dwell. It will be sufficiently obvious from what has been already said, in what cases this termination is to be apprehended, and so far as we can ever decide, what the degree of danger is.

As in inflammation of the lungs, the first and most important remedy for hemoptysis is bleeding. The propriety of this practice has been generally acknowledged, though there have been those who have advanced many objections to its adoption. It will not be pretended that blood-letting is to be indiscriminately employed, wherever a spitting of blood exists; but in the greater number of cases it appears to be

a remedy of the first consequence. The objection which would be thought the greatest against its employment is, that it tends to increase and aggravate the debility which follows the disease, and thus lessen their chance of recovery, who are so unfortunate as not to have the symptoms of phthisis removed with the hemoptysis, where the bleeding proceeds from a predisposition to that disease. But, if it appears satisfactorily, from the experience of most physicians, that the adoption of seasonable and sufficient blood-letting affords the best prospect of preventing the hemoptysis from passing into phthisis, ought it not to be employed? For even if we admit, that it may hasten the fatal event in those, who, notwithstanding its use, do fall into consumptions; yet if it does actually preserve many from this issue to their disorder, it on the whole is of advantage.

Blood-letting is indicated by every view which we take of the nature, the symptoms and course of this disease. As a remedy for inflammation, it seems best calculated to remove the danger, that suppuration and ulceration will follow the hemorrhage. Writers in general have recommended to confine its use to strong and plethoric habits; but I do not see why this should be thought to make so much difference. Do we find that those of weak and slender habits are more debilitated by bleeding, than those who are stronger? At any rate, are the bad consequences of the operation so grave and dangerous, as those which ensue from hemoptysis? And does it not as often prevent these consequences from taking place in those who seem to have no blood to spare, as in

those who are full of it. If they are not able to bear the operation of the remedy; they are still less able to support the disease. It may be said that our opinions are derived from theoretical views with respect to the nature of hemorrhage; but is it not theory which restricts bleeding to those who are in vigorous health? We ought undoubtedly to have some regard to the power of the system to repair the loss of blood. There are certainly cases in which this remedy is improper; but in any subjects, with respect to whom it would be adopted were they attacked with inflammation of the lungs, there seems to be no danger in resorting to it in hemoptysis.

The degree and extent of the bleeding must be regulated in every case by the symptoms and the effects of the remedy. More copious depletion can generally be borne in the first, second, and fourth kinds of hemoptysis, than in the third, although the actual advantage to be derived from the operation may not be less. When hemoptysis occurs after phthisis has made considerable progress, it is evident, that, as we cannot promise ourselves a cure from it, many of the above arguments in favour of its employment do not apply, and the debility which it might produce would perhaps hasten the fatal event. Still, even in this situation, if the digestive powers continue in considerable vigour, small and frequent bleedings will often serve to remove some urgent symptoms, without much fear of any injurious consequences. Should this, however, not be the case, this treatment becomes of very hazardous application, and it is safer

to confide in some measures of a milder and perhaps as effectual nature.

We are however to be governed in our treatment of hemoptysis, rather by a regard to the state of the general health and the other indications of pulmonary affection, than to the simple occurrence of hemorrhage. If we consider this as merely one symptom out of many, which collectively indicate some disease of the lungs, there is no reason why we should direct our practice wholly by an attention to this particular. Does the spitting of blood ensue from a suppression of the catamenia? There is no more urgent call for vigorous practice, than if the hemorrhage were from the nose or the stomach; unless, at the same time, there are circumstances leading to the belief, that the disordered state of the catamenia has produced, not merely a vicarious discharge of blood from the lungs, but has likewise impressed upon them a tendency to disease. Does it arise in the course of pulmonary consumption, at an earlier or later stage? There seems to be no sufficient reason why we should bleed for this symptom, more than for any other of equal importance which may arise in the course of the disease. And we may perhaps fairly say, that where we should think it right to bleed for an increase of cough, a pain in the side, a difficulty of breathing and expectoration, when these are urgent, we should also be justified in bleeding for such spit-tings of blood as occur in the course of pulmonary consumption.

These remarks, it will be observed, are not intended to deter from venesection, when hemoptysis is the

leading symptom of phthisis, or when it arises from ordinary causes. In these cases, though not even in these without exception, it is eminently applicable; not simply because of the spitting of blood, but because there is generally a state of system and of local disorder, which would demand the remedy, were not blood effused.

The same principles are to guide us in the choice of other remedies. The state of the *primæ viæ*, generally claims our attention next to that of the circulating system. Emetics have been highly recommended, and sometimes to the exclusion of the remedy last spoken of. Of their great importance there is no doubt, and they seem to be called for in the majority of cases. They may be useful in two ways; first, when the stomach is deranged either from previous disorder or from the attack itself, by putting it in good order; for the system never acts to advantage under any difficulty, if this is not done; and secondly, by the sympathetic operation, which vomiting has upon the capillary circulation of every organ, particularly of the lungs and skin. The remedy is to be administered upon the same principle and operates in the same way, in this, as in other pulmonary complaints, especially those which affect the mucous membrane.

The emetics, which have been most highly recommended, are those of a metallic and astringent nature, such as the sulphates of copper and of zinc. It is somewhat questionable, when they are employed, whether part of their superior efficacy may not be ascribed to their astringency, and this probably is the

case, but the vomiting is itself of much service, since the exhibition of other articles is also attended with advantage.

The state of the bowels, as in every other disorder, demands special attention. In most instances, thorough purging in the first place, with the subsequent use of laxative medicines, is sufficient ; but there are some cases connected with a constipated state of the alimentary canal, and in some degree caused by it, which require a more continued use of purgatives. These cases are to be determined by a reference to their history. During the continuance of the bleeding and the immediate symptoms which follow it, those cathartics which operate with least irritation are to be preferred ; such are the neutral salts. But in individuals, where there is a combination of the pulmonary disease with some affection of the stomach, liver, or alimentary canal, other articles will often demand the preference. But this subject will be more particularly attended to hereafter.

The well known power of astringents in stopping hemorrhage, when applied to wounded vessels, naturally suggested the same application to the vessels supposed to be ruptured in internal hemorrhages. It is obviously impossible to do this in hemoptysis, unless the remedy be introduced in the form of vapour ; but it is probable that such evil would arise from the irritation excited in this way as would counterbalance any other benefit that might ensue. Astringents have therefore been introduced into the stomach, and operating sympathetically, they will frequently stop a hemorrhage in the lungs. But this is not

the same kind of operation, as that produced by their immediate application to bleeding vessels. If astringents were thrown into the stomach, when a wound is bleeding, we should not expect them to have any effect; and besides we suppose the state of the vessels in hemorrhage to be very different from that which exists in a wound. The effect of astringents is of the same kind as that which they produce in suppressing increased secretions; they probably remove that state of action in the part on which the disorder depends. Their use is indicated principally in those cases where bleeding and the other measures employed do not succeed; where any particular circumstance prevents their employment; or where the effusion of blood is so sudden and profuse as to threaten immediate loss of life from the hemorrhage.

It does not appear to be a matter of great importance what article of this kind we prefer. It is sometimes necessary to try several before we succeed. The mineral astringents, such as the acetate of lead, the sulphates of zinc and of copper, the super-sulphate of alumina and potash, and the sulphuric acid, are the most powerful, and the most commonly employed. The vegetable astringents, such as kino and catechu, though possessed of considerable power when intended to act on the alimentary canal, are less efficacious than the mineral, when their effect is to be produced in distant organs. Dr. Rush relates, that he has found a quantity of common salt effectual, when other means of arresting the bleeding had failed.

Counter irritation by means of blisters should be early adopted and patiently continued. It is one of

the most effectual means of preventing termination in phthisis pulmonalis. Where the hemorrhage is sudden, rapid, and of short continuance, we cannot expect by vesication to controul the flow of blood, unless, as he has been recommended in some other cases, we should produce it immediately by the application of boiling water. But in cases where the spitting of blood continues, at short intervals, for some time ; which are accompanied by a slight dry cough, pain in the side and across the chest, and shortness of breath ; counter-irritation, either by blisters, setons, or issues, becomes a remedy of great power, and is perhaps the most certain we can employ.

Digitalis is an article well worthy of a trial, in cases which do not yield to the measures already recommended. Though far from doing good in a majority of instances, it is in some, of such evident advantage, that one would hardly feel justified in omitting its employment, where the usual remedies had failed to check the hemorrhage, or where serious symptoms of pulmonary disease continued, after the violence of the first attack has been subdued. I know of no particular circumstances by which we are enabled to distinguish the cases in which this remedy will be of service, though such a power of discrimination would be of great value. On subjects, to all appearance affected in the same way, it produces entirely different effects, without affording any clue to the principle on which this difference is founded. It is possible, that it may have some connexion with the very marked and powerful influence possessed by Digitalis over the lymphatic system, in Dropsy.

When by these, or any other measures, or by the natural relief produced by the flow of blood, hemoptysis ceases, it becomes the principal object to prevent those changes from taking place in the lungs, to which there is a strong tendency, and which end in consumption. The measures, already recommended, if they have their due effect, are the most likely to prevent this unfortunate event. But it is not merely necessary to employ them while the spitting of blood is actually present; either the same or some other measures should be continued after it has ceased, and until its effects upon the lungs have been removed.

For this purpose frequent bleeding has been recommended. It should not, however, be regularly and periodically employed, as was done by some of the older physicians. It is sufficient, that it be practised whenever symptoms indicate that the lungs are disposed to hemorrhage. In this way, by seasonably arresting the processes of disease, it may be of important benefit; and when some marks of derangement remain, after a spitting of blood has ceased, the repetition of the bleeding is often necessary, and its propriety is to be determined by the nature and urgency of the symptoms, and the ability of the patient to bear depletion.

The production and continuance of an external discharge, by means of blisters, issues, or setons, is a most important measure in these cases. Some observations have been previously made, on the mode in which the suppression of an accustomed discharge operates to produce an effusion of blood

from the lungs. If we reverse the application of the same principle, we find the way in which the production of a discharge removes the effusion. So far as I have observed, this remedy has prevented more cases of diseased lungs, as well those proceeding from other causes, as from hemoptysis, from passing into confirmed consumptions, than any thing else.

But of equal, or even of greater efficacy, than any medical means, is a strict attention to the general health; and indeed, without this, little more than temporary benefit can be expected from medicine alone. If the general health be impaired, if the digestive system become disordered, a recurrence of the difficulty in the lungs is almost inevitable. To this subject I intend however more particularly to direct attention in considering the liability and tendency of a certain class of individuals to hemoptysis, and the best means of preventing so unfortunate an event.

I allude to public speakers, especially those of the clerical profession. The many and valuable lives, which have among us fallen apparently a sacrifice to the duties of this profession, have given to the subject a painful degree of interest. So little can be done with the hope of restoring those who have once suffered from hemoptysis with a tendency to phthisis, that it seems of the first consequence to ascertain what the exact circumstances are, in the life, habits, and duties of a clergyman, which render him peculiarly liable to such an attack and to the consequences it brings in its train.

The most obvious cause of this liability to pulmonary disease in clergymen, is the great and long continued exercise of the lungs, required in the performance of public worship. To this, as the peculiar duty of the profession, our attention is apt to be principally and almost exclusively devoted; we are too ready to consider it as a sufficient cause in itself, and to avoid examining the influence of other circumstances. It is not found that members of other professions, who are in the habit of exerting their lungs, are more liable than the average of mankind to pulmonary disease. We do not hear of any extraordinary proportion of deaths from consumption among lawyers, public actors, public singers, &c. We must therefore look to other circumstances in the mode of speaking, the life and habits of our clergy, for the causes of this tendency among them to affections of the lungs, and derive from our investigation the best methods of counteracting their operation, and of avoiding the fatal issue to which they lead.

It has usually been admitted by physiologists, that the exercise of any organ, if not carried to an extraordinary or unnatural degree, and if it be in a healthy state, contributes to increase its strength, and render it capable of sustaining an increased degree of labour without injury. This, under some circumstances, is true of the lungs, though not to the same extent that it is with regard to the external voluntary organs. Public singers, and performers upon wind instruments, acquire by habit the power of exercising their lungs in a pretty violent manner

for a length of time, to which at first they were totally inadequate. This partly depends, without doubt, upon the facility which they acquire of producing the same effect with a less exertion of strength ; but it cannot be entirely attributed to this circumstance. A few moments will exhaust a beginner upon wind instruments ; but almost any individual may gradually become able to play upon them for some hours without injury. Now why is the case different with regard to the public speaking of clergymen, which certainly requires a much less violent exertion on the part of the lungs, than either singing or playing on wind instruments ? The reason I believe to be this, that the duties of the profession are only occasional, and occur at too great intervals to allow of the formation of a habit ; whilst at the same time they are sufficiently difficult to over-exercise, fatigue, and exhaust the organ. They are from the first as long and as laborious as they will ever be, and there is no opportunity for that slow and gradual increase which enables one to acquire strength and facility of exertion. In order to strengthen the general habit, or any particular part, by exercise, it is not necessary to begin with any unusual or extraordinary efforts ; this is rather injurious, and defeats the object in view ; but it is necessary to keep up constantly some effect from the exercise ; to have the organ or the system under its regular and equable influence. It is only in this way that any benefit is to be derived from it in the treatment of disease. Occasional extraordinary exertion, carried to the point of fatigue, and then omitted until the fatigue is entirely removed,

can only have the most injurious effect; and it is exactly in this way that the lungs are exercised in preaching. They are wearied by the services of the Sabbath, and are then suffered to remain perfectly at rest, through the interval of the week.

But there are other circumstances which give force and certainty to the operation of this cause, and which act by rendering the system liable to become diseased in any organ to which the exciting causes may happen to be applied. They produce a general state of predisposition to disorder, which becomes developed in the lungs, in consequence of the unnatural exertions which they are occasionally obliged to make, and would, under similar circumstances, be developed in any other organ. I refer to the habits of studying and living among the greater part of our literary men.

They are, in the first place, accustomed to use but little exercise, and to devote a good deal of time to sedentary occupation. Their relaxation is too often of an inactive kind. Their exercise, if they are induced to attend to it at all, is seldom judiciously arranged; it is not regular and equal, but sometimes entirely omitted, and sometimes carried to excess. To the state of system produced by this inactivity, is added the effect of improper diet and improper quantity of food. In order to perfect health, it is necessary there should be a certain proportion between the demand for nourishment, and the supply provided. Other things being equal, the quantity of healthy exercise in the system determines the quantity of nourishment requisite for its necessities,

and the quantity which the stomach can perfectly digest. If the exercise increase, the food must also increase; and *vice versa*. He, therefore, who leads a sedentary, and as it respects the body, an indolent life, does not require so much food, as one engaged in active occupation, and it is not necessary that it should be of so nutritious a quality. But the opposite course is in fact pursued by students. Their appetites, at least till they are become the subjects of disease, are not affected; or if so, are excited by delicacies or stimulants, and are indulged to an improper extent. The consequence is, that digestion is impeded; is performed for a while with difficulty and labour, then imperfectly in a greater or less degree, and, at last, almost entirely destroyed. This of course is the case with only a part of the individuals to whom I refer; the constitutions of perhaps a majority, are sufficiently pliable to become accommodated to this manner of life sooner or later; but I apprehend I am correct in saying, that a great proportion of professional students in our vicinity, especially theological students, are affected, at one time or another, by some serious disorder of the digestive organs.

It is no part of my plan to describe these disorders, except so far as they are connected with affections of the lungs. Yet, so insidious are their approaches, so latent their symptoms, that hemoptysis may be produced as an indirect consequence, long before their existence is even suspected by the individual affected. I say an indirect consequence, because I believe the disordered digestion operates by impairing the gen-

eral powers of the whole system, thus lessening the vital energy of all the organs, and of course rendering them less able to resist the causes of disease. If then there be any predisposition to phthisis, or if the lungs be subjected to extraordinary irritation from excessive exercise or any other cause; they cannot resist, as in a state of health, but are excited to the actions of disease. The same is true of every other part. A disordered state of the digestive system, or as it has been denominated by a distinguished writer* on this subject, a constitutional disorder, influences local disease wherever it is situated. A scratch over the tibia, which, in a healthy individual, scabs and heals over in a few days; in another, the subject of such a disorder may spread into a large, foul, irritable ulcer, that will yield to no remedy except such as removes that disorder. Such ulcers will sometimes spontaneously arise; and they afford a true index of the state of the constitutional health, amending or growing worse as that improves or deteriorates. This is no bad illustration of what I believe takes place in the lungs, when hemoptysis is a consequence of constitutional disorder; the exciting cause, whatever it be, inflicts an injury, or produces a state of action in those organs, from which, on account of their deteriorated powers, they cannot restore themselves, and inflammation and ulceration become established.

It becomes of the highest importance then, to point out those circumstances which indicate the existence of such a digestive derangement, while it is yet latent,

* On the constitutional origin and treatment of local diseases, by John Abernethy, Esq. F. R. S.

and before it has produced irreparable disease. It is first sensibly felt, only whilst digestion is actually going on. There is a sensation of fulness, rather than oppression, in the epigastrium after a meal, even if it has been a sparing one. This fulness affects the respiration; it is difficult to draw a full breath, though there is a constant inclination to do it. Any change of posture, especially such as compresses or contracts the abdomen, as in stooping, or even in bending forward over a desk to write, renders the respiration short and hurried; there is an unusual lassitude, want of disposition to muscular exertion, and drowsiness, which continue while digestion is going on. For a while these symptoms only exist during the period the stomach is performing its function. This is actually as well, or nearly as well performed, as in health, but the symptoms, which have been described, show that the stomach labours in the performance of its office, and exercises an unnatural degree of power. Other consequences, however, soon become developed. The mouth in the morning has a filthy and nauseous taste; it is dryer than is natural and coated with a thick adhesive mucus; the tongue is furred at the root, and there is a sensation of faintness, emptiness, and sinking at the stomach; a sensation resembling that of hunger, so as at first to be mistaken for it. It is removed by eating, but occurs repeatedly during the day, and always seems to demand food for its relief. The food now really oppresses; it is felt sometimes like lead in the stomach, sometimes like a bar laying directly across it; the patient thinks

his clothes too tight and expects to be relieved by loosening them ; the relief is, however, only partial. Digestion is accompanied with much sympathetic irritation of the system, the pulse is quickened, there is head-ach, sometimes shivering, and burning of the palms of the hands and soles of the feet. Chemical changes take place in the stomach ; the food undergoes fermentation in part, instead of being digested ; and this is known by heart-burnings, and eructation of gas. The bowels become affected, they are costive or relaxed ; food passes in an undigested state, the stools are altered from their natural appearance and become dark and discoloured.

This is only a slight and superficial sketch of the incipient stages of this disordered state of the digestive system. A full detail of the symptoms is wholly out of my plan. It is at this early period, that the complaint is most apt to be overlooked. The appetite frequently remains good ; it is sometimes even greater than natural ; there is an almost insatiable longing for food ; and the patient is apt to imagine, that when this is the case, he must be in good health. Every physician, however, is aware, that this is the case in some of the last stages of disease, when the stomach is totally incapable of digestion, and the food passed off is but little changed by the bowels. The sensation of hunger in this case, is probably produced by the sympathy of the stomach with the state of the whole system. The nutritient vessels in the surface and extremities, retain their powers of action, and of course feel the want of their ordinary supply of materials, of

which the failure of digestion deprives them. This hunger then is in fact the hunger of the whole system, and in its nature is like that following a fever, which continues unsatiated, even when the stomach is distended with food.

This is a state of constitution, which renders us liable to local disease in any part already predisposed, or in any to which a sufficient exciting cause is applied. Even those, in whom phthisis pulmonalis is a hereditary disease, frequently perceive the first warnings of its approach, in an affection of the digestive organs, which develops and brings into action the predisposition, of which they are the subjects. When a public speaker becomes disordered in this way, he has reason to apprehend the production, sooner or later, of some disease in his lungs, and should at once take measures for the restoration of his general health, and removing any tendency to a pulmonary affection. If this be not done, the symptoms progress, there is some cough and pain in the side, and hemoptysis, if the disease takes this course, comes on, preceded by such symptoms and followed by such consequences, as I have described in the previous part of this dissertation. The treatment in this case, during its continuance, is to be conducted according to the rules already laid down; but a good deal may be done to prevent this unfortunate issue, by a strict and seasonable attention to the health of the constitution; and the measures to be adopted with this view I now proceed to describe.

It is sometimes sufficient, especially in the earlier stage, to counteract the operation of those causes which I have pointed out as producing this state of the health, by a strict attention to regular exercise, and the observance of rigid rules with regard to diet. In the more advanced periods of the disorder, particularly if it have produced and become combined with local disease of the lungs, the treatment becomes complicated, and requires the interference of medicine. It is not necessary, however, to discriminate particularly, in the consideration of the treatment, between these different stages.

“There are three things,” says Mr. Abernethy in a work to which I have previously referred, and to which the profession have to acknowledge much information on this subject; “there are three things which I consider as right and necessary to the cure of this disorder. *First.* That the stomach should thoroughly digest all the food that is put into it. *Secondly.* That the residue of the food should be daily discharged from the bowels. *Thirdly.* That the secretion of bile should be right both in quantity and quality.” These three heads include all the treatment which applies to the digestive organs themselves. The first embraces the quantity and quality of nourishment. We are most apt to err in the *quantity* of our food. This point must be particularly attended to where disorder exists. No more should be put into the stomach, than it can entirely and comfortably dispose of within the proper time. This organ should not be overworked. Nothing contributes more to strengthen it, than to give

it as little to perform as is consistent with a due supply of nourishment to the system, and let it have periods of entire rest. Where the appetite has failed, the patient is apt to imagine it to be absolutely necessary for him to eat something, even if he does not relish it. This is a mistake. He should not, till he has a strong inclination. Let him go without food till he becomes hungry; and this will unquestionably happen in a short time, if complete abstinence be adhered to. By constantly throwing in food against the inclination, the appetite is prevented from returning, as it would, if left entirely to itself. I have previously described a sensation of faintness &c. at the stomach, which is mistaken for hunger and relieved by food. This is a deceptive feeling; for it comes on immediately after a meal has been digested, and arises rather from the exhaustion of the stomach by the labour it has gone through. It is best relieved by some gentle stimulant, or light tonic, such as Infusion of Columbo, Cascarilla or Quassia. When the appetite remains good, it is equally necessary, though far more difficult, to enforce strict abstinence; the desire for food being frequently voracious, and seeming rather to be increased than diminished by the disorder.

It is extremely difficult to give any directions with regard to the *quality* of food, which shall be universally applicable, so different are the digestive powers in different individuals. Every one, with sufficient attention, may become the best judge of that which agrees best with himself; and this is to be done by a careful observation of the effects produced during

digestion by various articles of food, and the degree to which they are digested. If any thing which has been eaten is found to pass off unchanged, it is a proof that the stomach cannot digest it, and it should therefore be avoided. I am inclined to believe, that where there is danger that the digestive disorder will terminate in an affection of the lungs, a simple vegetable and milk diet is best, with very little variety. There is one kind of food, which I particularly mention to be avoided, because of its frequency, its delicacy, and the common impression that it is simple and not injurious. I refer to bread or pastry in which flour is baked or fried with butter or any other oil. This, whether in the shape of pie or cake, is always, to the invalid, an indigestible and pernicious species of nourishment.

Food should not be thrown in at too short intervals. The stomach ought not only entirely to finish digesting one meal before another is eaten, but have time to rest for a considerable period. Three meals each day are sufficient, and neither of them late in the evening. They had better be at least six hours apart, and nothing should be taken between them.

The second object to be attended to is, that there should be daily a sufficient discharge from the bowels. This is best effected by the formation of a habit of regular evacuation ; but in failure of this, resort is to be had to medicine. It makes no great difference what article is used, if the proper quantity is taken, i. e. enough to produce a discharge, but not enough to bring on purging. Two drams of a mixture of one ounce of the Tinct. of Aloes and Myrrh, with

half a dram of powdered Jalap or Rhubarb, is an easy and effectual medicine and does not interfere with the patient's nourishment; this quantity, two drams, is to be repeated once, twice, or thrice every day, according to circumstances. But I have been better satisfied with the effect of pills made according to the following formula, than any other preparation. *R.* Pulv. Aloes ʒj. Pulv. Jalap. et Ipecacuanhæ, aa ʒss. Tart. Antimonii gr. xv. M. This mass I have usually made into about an hundred and twenty pills, varying their size, however, according to the habits of the patient, and directing one or more to be taken with every meal. In a majority of cases, I have found this very minute quantity of medicine answer the intended purpose better than larger doses, and it seems, when thus taken with the food, to act by mingling with it, and imparting to the feces a gently stimulating power, which ensures their own evacuation. But the patient ought at the same time to endeavour to form a habit of daily evacuation, which may prevent the necessity of medicine.

The third object is to regulate the state of the liver and insure the secretion of bile, both in proper quantity and of a proper quality. The state of the liver is to be determined by that of the feces. Their natural, healthy colour is a dark, concentrated brown, or, as Mr. Abernethy describes it, a wet rhubarb colour; but a derangement of the the liver, which produces a diminution in quantity or an alteration in the quality of this secretion, renders them light coloured, black, green, clayey, &c. according to circumstances. The appropriate remedy in any

of these cases is mercury in small, alterative doses ; very seldom carried so as to affect the mouth ; and by far the best preparation of mercury for this purpose, is the *Pilula Hydrargyri*, or Blue pill. This preparation is very uncertain in quality, from the different modes of preparing it. The London pill has been extolled as far superior to that prepared in this country. I have carefully examined the imported and the domestic article, and have uniformly found the latter, if made by a careful apothecary, as good, and often better, than the foreign as we have it.

Mr. Abernethy recommends, that one pill, containing five grains of the mass, and one of mercury, should be taken every day or every other day, according to circumstances, and continued till the difficulty is removed. If this do not agree with the patient, a corresponding dose of some other mercurial is to be substituted.

But besides these organs, the immediate seats of disorder, the rest of the system demands strict attention. The tendency of the complaint is, to paralyze the nutritient actions of the body ; and our indication is, to counteract this tendency by exciting those actions ; and thus by creating a demand for nourishment, stimulate the digestive organs to furnish it. A medical gentleman once informed me, that while afflicted by *Dyspepsia*, he had occasion to lose blood for some local inflammation. The consequence was, for a few days, an increase of appetite, a restored power of digestion, and an apparent amendment. In this case the sudden loss of blood excited in the stomach an effort to repair the deficiency, and hence

the increased appetite &c. which ceased when this object was effected. It is in this way that travelling, exercise of all kinds, friction and abstinence appear to me to operate to amend this disorder; and by keeping up in this way a constant demand, the organs of digestion may be finally restored to their original powers.

Exercise should be so regulated as not to interfere with the process of digestion. It ought not immediately to precede a meal; there should always be time allowed, for the body to become rested and the increased rapidity of the circulation to subside before food is taken; and afterwards it should be delayed till digestion is accomplished. With these restrictions, it had better precede every meal, or at least two meals in the day. It ought not to be carried so far as to induce fatigue, nor should it be taken in the heat of the day during summer. There are some states of the complaint, when exercise will at best do no good; when the digestive organs require considerable preparation from medicine before they can be benefited by it.

It is impossible here to offer any thing more than this very general sketch. To enter into the numerous details of the subject would require a volume. I pass therefore to a few observations relative to the particular measures which may be taken to prevent or remove local disease in the lungs, whether produced simply by the exercise required by the duties of a clergyman, or by the operation of this cause, combined with and rendered more certain by such a disorder of the constitution, as has been

described. The object is to lessen the susceptibility of these organs to fatigue ; in other words, to give them strength.

I am convinced that the evil against which we wish to guard, arises rather from the infrequency and inequality of the exercise of the lungs, than from its essential bad tendency. I have previously stated some reasons for believing that these organs, like all others, are capable of being influenced by habit, and made able to bear by exercise more exertion ; and if clergymen could be induced to attend to the formation of such a habit, that they would be no more liable to a pulmonary affection than other men. It should be a first object with one who engages in the clerical profession—especially if he has any of the marks of weak lungs, if he is hereditarily or constitutionally liable to pulmonary complaints, if he is the subject of a disorder of the digestive organs or has a tendency to it—to accustom himself gradually to that kind of exertion which will be required by the duties of his future profession. This is to be attempted by the constant daily practice of loud speaking or reading. This need waste no time, and may be made to answer other good purposes. It will be best to begin gradually, to continue the exertion for a short time at first, to stop always before it becomes fatiguing, but to increase every day until it equal that required for public worship. If this kind of exercise be persevered in, it seems almost certain that all, except those whose lungs are radically infirm, may acquire the habit of going through their professional performances without injury ; and as for those who

fail, it is far better for them to know at once their incapacity, than to spend the best years of their youth in qualifying themselves for a profession which they must finally relinquish.

Bodily exercise of any kind, besides its general effect on the system, contributes in particular to strengthen the lungs, by increasing the circulation of blood through them and calling forth a more vigorous performance of their function. Exercise of a violent kind, in one unused to it, produces great efforts of respiration—if carried to excess, pain in the breast, shortness and difficulty of breathing—and it might sometimes possibly prove fatal. But habit soon enables one to bear the same degree of exertion without inconvenience; and this is to be attributed in some measure to an increased power on the part of the lungs, as well as in the muscular system.

Pain in the side is a common symptom among students whose health is in any way disordered, but is more particularly so in those inclined to pulmonary disorder or exercised in public speaking. Unaccompanied by other symptoms, it is not alarming, but when occurring with them, it becomes important. It is frequently the first symptom which leads to the suspicion that the lungs are in danger. The attention of patients is too apt to be confined to this symptom alone; they imagine if they can remove this, there is nothing to apprehend. It ought undoubtedly to receive attention, but not to the exclusion of other symptoms, for this may be removed, and yet others of more consequence, but less obvious, remain. The best remedy for the teasing habitual pain in the side

to which so many are subject, I believe to be a plaster spread from Burgundy Pitch, with the addition of from two to four grains to the ounce of the Tartrate of Antimony.

It is difficult to determine how far it is proper for the persons of whom I have been speaking, to take particular precautions against exposure to weather. I suspect the error has been on the side of too much caution. The question is, whether we shall always be obliged to guard against taking cold from the slightest alterations of temperature, or enable ourselves by habit to meet them without injury. When it is considered, that great care renders the system more susceptible, and that no care can prevent occasional accidental exposures, it seems most adviseable to adopt a course which shall render us able to resist those causes, to which we are all of us sometimes exposed, and which fall with their heaviest effects upon those who are accustomed to shield themselves from their influence. It is probably best to pay little regard to weather in the pursuit of occupation or exercise; to avoid the extreme of caution on the one hand and of foolhardiness on the other. If we keep within doors in a snow storm, whenever it is possible, we shall inevitably take cold if we ever happen to be exposed; and this must be sometimes the case with every man. If we always protect our lungs from the air by wearing some covering over the mouth, we shall suffer should this ever be omitted; and this must sometimes happen. The injury moreover in these cases will fall upon enervated organs, incapable of resisting the attack, and of

course more liable to be seriously and permanently affected. Unless then the precautionary habit have been long established, it is better to pay little regard to weather. Exercise should be taken as before described, without any reference to the state of the atmosphere, at all seasons and under all circumstances. The patient will not take cold more frequently than if he used all the precautions that prudence or timidity can suggest; and he will on the other hand suffer less from the complaint when it exists, and be far better able to struggle with it and throw it out of his system.

ON SUPPURATION.

SUPPURATION is so important a part of the process of Inflammation, and so intimately connected with its other stages, that we cannot enter upon the consideration of the former, without embracing a view of some of the general principles of the latter. These, it is to be remarked, do not refer to any particular stage of the process, but to inflammation as a whole, as consisting of a series of connected functions existing for some definite purpose ; which purpose is accomplished by different degrees, and a different exercise of the same powers, according to the nature of the purpose and the powers of the system and of the part.

If we would attain to a right understanding of suppuration, we ought to understand the object originally proposed by nature, in the establishment of such a function ; to what degree it is necessary, as a general principle that it should take place in those cases where there is an obvious tendency to produce it ; what is the state of the parts which precedes it ; and what the actions by which it is accomplished. These considerations embrace the fundamental principles of inflammation, and those laws which regulate

its progress from its mildest and simplest, to its most severe and complicated forms.

Supposing a human body in a state of the most perfect health of which it is capable; there seem to be only two ways by which we could imagine that disease should be ever produced. *First*, by a spontaneous imperfection in the actions of some of its organs, which deranges the natural relations its functions maintain with each other and the reciprocal influences they exert. *Second*, by the operation of external causes upon the different parts of the body; which operation is of two kinds, and will produce disease in two different ways. 1. By an immediate primary derangement, as is the case with all injuries, poisons, indigestible food, &c. or 2. by exciting trains of action in the system, not essentially morbid, which yet result, at a greater or less distance of time, in the establishment of disease.

Disease is probably never established in the first of these ways, since this necessarily implies an original tendency in the system to its existence. The gradual decay of the powers and organs, in old age, is the natural provision for the cessation of life, and seems to be the only one had in view in the construction of the system. But this is something very different from an original tendency to disease; this would amount to a direct provision for the existence of evil, of which I believe there is no example in the creation. Considered abstractly, it is believed that every thing in the human body is established in the best possible manner for its own well being, so far as its own organs and powers are concerned.

That if every natural appetite was naturally indulged, the functions might be performed in the same degree of perfection as at first, till exhausted by old age, were they not subject to the influence of external causes. It is to this influence, combined with the unnatural indulgence of our appetites, that we are to attribute our liability to disease; and, not merely to these circumstances operating upon individuals, but to the influence they have exerted for ages, upon generation after generation, till the constitution of the species has deteriorated from its original perfection, so that we are now born with a predisposition to disease. It is a consequence of this, that we daily see individuals who come into the world with such imperfections of constitution, or of particular parts, that even when in health, it is obvious that the regular series of their functions will finally end in the establishment of some fatal malady.

Considered merely in relation to our physical constitutions, our habits of life in society are artificial and pernicious. The temperature in which we live, our food, our clothing, our hours of rest, our exercise, are all unnatural. As we depart from civilized life, we find the quantity of disease becoming regularly less; the savage is free from a thousand ailments under which we labour, and the domestic animals we bring up around us are far more subject to disease, than those of the same species in a state of nature. Delicacy of constitution, susceptibility to disease, are the inheritance of civilized society; they are the price we pay for that refinement and

elevation of moral feeling, that enlargement and expansion of the mind, that intellectual grandeur which are only the results of social life.

All disease, then, I believe to be introduced in the second of the ways before mentioned, viz. by the influence of external circumstances. These, as has been observed, produce their effects, 1. directly; 2. indirectly; and under their indirect operation is included that deterioration from the original perfection of the constitution of the species, and that susceptibility to disease, of which I have just spoken.

The powers exercised in the processes of disease are the same as those which maintain the system in a state of health, diverted from their natural course and operation. Every phenomenon may be clearly attributed to the ordinary vital laws, and there is in fact considerable resemblance between the processes of disease and those of health, as to the general plan on which they proceed. The powers of life have an instinctive tendency to resist the operation, and remove the effects of the operation, of those external agents which are disposed to injure the organs, or derange the functions. This is a general principle of action, and I believe that all disease, except that which is produced by mechanical injury, is directly or indirectly the result of this principle.

To judge of the original objects for which the processes of disease are established, we are not always to look upon the effects which actually are, but those which there is a tendency to produce. It is a consequence of the deteriorated state of constitution of

which I have spoken, that those very efforts, whose original tendency is to restore the equilibrium of the system and amend any local derangement which may exist after the injurious operations of an external cause are turned aside from the purposes they were intended to accomplish and end in the production of injury instead of benefit.

I would start then with this principle, that all the actions of disease are, essentially and originally, actions instituted by the system with the intent of avoiding or repairing injuries, either from the direct or indirect operation of external causes. If we reflect on the effects produced by different agents, we find them to be such as serve to resist injury, or to repair it if it has taken place. Indigestible food excites vomiting and diarrhea for its expulsion. Poisons excite the same actions in a more violent degree; the secretion from the stomach and bowels is more copious, and inflammation is produced, which is an attempt, and often, where the poison is not of a powerful kind, a successful attempt, to resist the progress of the evil and check any farther operation on the system. To the same purpose, is the obvious tendency which the processes of inflammation, excited by a local injury, have to restore the part affected to its original integrity, or to such a degree of soundness as the nature of the injury allows. The degree of inflammation, also, is adapted to the degree of injury; and it stops at that stage in which its object has been properly accomplished. If adhesion alone is necessary, as in a recent wound, the adhesive inflammation alone

takes place. If suppuration be required, it ensues. If the part be too much injured to be restored in either of these ways, it is separated by mortification, and its place supplied in the best manner of which the system is capable.

Our reasonings with respect to inflammation, as a primary affection intended for the repair of injuries, must be principally drawn from what we see in external parts, where we know that it effects this purpose. Yet we have a fair reason from analogy to judge—since the processes in spontaneous and accidental inflammations are generally alike in symptom, in appearance, in the organic changes taking place, and in the stages through which they pass—that the objects for which they are instituted are also alike. “Suppuration being in cases of violence,” says Mr. Hunter, “a means of restoration, affords a presumption that it is a like instrument of nature in spontaneous cases;” “in these it is almost impossible to determine whether the inflammation itself be a real disease, viz. an original morbid affection; or whether it may not be (as is evidently the case from external violence) a salutary process of nature to restore parts, whose functions, and perhaps texture has been destroyed by some previous and almost imperceptible disease or cause. If it is the first, viz. a real disease, then two causes that are different in themselves, can produce one effect or one mode of action, for the result of both is the same; but if it be the last, then suppuration must be considered as depending on exactly the same stimulus being given as in the above mentioned case of violence.”

It is sufficiently evident that Mr. Hunter was of opinion that inflammation was *originally* a salutary process. Yet I should by no means contend, that it *actually is*, in all cases, a salutary process. The natural operations intended for good purposes have been modified and directed, by that infinite variety of external circumstances which have been influencing the human system ever since its creation. The consequence is, that a thousand processes take place without any object ; or which fail in attaining it, if they have one, from a defect or misdirection of the powers in operation, though we can still perceive, that even in these cases, the actions are conducted on the same general plan, as those which are really productive of benefit ; that their tendency is to good, though, from the circumstances of the case, good cannot result.

Having premised these remarks upon the general principles of action in the system from which disease takes its origin, I proceed to treat more particularly of inflammation and especially of that part which is connected with suppuration. It is no part of my plan to describe, except incidentally, the symptoms or causes of inflammation ; but, by an investigation of the general nature and objects of this process, and of the purposes for which it is varied in its different stages, to arrive at such views of the nature and objects of suppuration in particular, as will lead us to the most judicious and philosophical principles of treatment.

Where the suppurative inflammation follows the adhesive, as it does in the cellular and serous

membranes, the former cannot be well understood, without a thorough knowledge of the latter. Indeed the most common opinion among mere practical men has probably been, that the adhesive inflammation is only a measure of preparation for the suppurative, and not sufficient of itself for the accomplishment of any necessary purpose in the system. Inflammation without suppuration, they consider as only a half completed process, cut short in its progress by a defect of the exertions of nature or by the success of those of art. That many cases of inflammation have a tendency in the first instance to go on to suppuration cannot be doubted; and in such cases if art prevent this result, as it often does, the object of the inflammation, whatever it was, remains unaccomplished. Every practitioner must have seen cases, in which inflammation has begun in a part, has been checked and apparently subdued; has notwithstanding returned once or twice more, and been as often resolved; and nothing has seemed sufficient to relieve the morbid state of the part and restore it to a quiet state, till an abscess has formed and discharged. The reason of such a disposition we may imagine to be this; that a degree of imperfection exists in the seat of the disease, which can only be remedied by such a change in the part as is produced by the process of suppuration; and, that although art can combat the steps taken to effect this purpose, and prevent the vessels concerned from going through with their course of action, yet it cannot remove the original imperfection. This continues to act as a stimulus to inflammation, and finally brings on

a degree of it, which cannot be allayed. This appears to me particularly to be the case with the female breast.

Yet this necessity of suppuration in some instances does not invalidate the opinion, that adhesion alone is often fully sufficient for the purpose of repairing the imperfection for which the inflammation was produced. If this were not so, we ought in healthy subjects to have no spontaneous resolutions, and our artificial resolutions ought to be less perfect than they are. Adhesion is sufficient for the cure of wounds and many external injuries ; it seems to be so also in some internal inflammations, particularly of the pleura. I think we are justified in saying, that under different circumstances the vessels of any part take on themselves different degrees of the restorative efforts, proportioned to the necessity of the case, from the slightest blush produced by a gentle stimulus or by simple friction, to the most severe and aggravated degrees of inflammatory action. And it will be worth while briefly to trace out in order, those processes established by the system for the repair of injuries, arranged according to the degree in which they depart from the ordinary healthy functions of the same parts.

When any organ, especially one of a muscular structure, has been excited to extraordinary exertion, whether in its usual or in an unusual manner, we observe, after the exertion has ceased and the parts have been for some time in a state of rest, that they are affected by a degree of soreness, varying according to the violence of the preceding excitement.

This soreness, in some cases, shows itself only when an attempt is made to move the part, or when pressure is applied to it. In others, there is pain, or at least a sensation of uneasiness, even during a state of perfect rest. This soreness we do not call inflammation, and yet there seem to be good grounds for considering it as only a less degree of the same kind of action in the small vessels, as that which constitutes inflammation. Soreness, on pressure or motion, is one of the signs of inflammation; and, taking any particular organ as an example, which has been exposed to unusual action, we can trace out all grades of this symptom from the slightest tenderness, to the most exquisite sensibility caused by an acute inflammation. The consequences which follow an attack of colic, in different degrees of severity, illustrate extremely well the gradual blending of this simple sensation with that which is produced by inflammation. The slightest form of this disease, or even that action produced by the operation of a very powerful cathartic, usually leaves behind it a sensible tenderness; in the severer grades, this becomes more and more remarkable, till in its most violent and long continued attacks, it terminates in genuine peritonitis. The same is true of the uterus, after parturition, or when it acts spasmodically in dysmenorrhea, or from any other cause. Every practitioner, in the habit of observing the nice shades of difference in symptoms and in diseases, must have met with cases where the soreness, consequent on these affections, was so great, as to lead him to doubt whether peritoneal or uterine inflam-

mation was not coming on, and to hesitate whether he ought not to adopt the necessary measures for their removal. Now this approximation of cases appears to me to indicate a resemblance in the functions going on in the small vessels at these different times, or at least in the ultimate objects they are intended to attain; and to prove that the soreness is the consequence of an increased action in these vessels, by which they are making up for the wear of the part occasioned by the unusual exercise to which it has been subjected. Thus, after any extraordinary exertion in running, walking or jumping, or after epileptic convulsions or an attack of spasm, the muscles called into exercise are for a few days tender and sore, and the sensation is not very different from that produced in the same parts by a slight rheumatic affection, or some external injury; in which last cases we cannot doubt that a degree of inflammation exists.

Next to these, which I should consider as the most simple cases of the exercise of the functions of restoration, we may reckon the slighter injuries, which seem scarcely to excite the full adhesive inflammation, and yet are followed by an action approaching to it, before the parts concerned are restored to their former state. A higher degree of injury requires a higher degree of inflammation, the adhesive is established and apparently without any tendency to suppuration; a still higher degree requires and excites suppuration, and, one step farther, if the texture of the part be destroyed, or its vital connexions cut off, the proper action takes

place and it is separated from the system. We see in these cases of external injury particularly, because in them the processes are so entirely laid open to our view, the admirable economy with which nature husbands her resources; doing no more in any case, than is absolutely necessary, but always doing the most that is possible, where the health of the subject admits. We cannot, in internal inflammations, trace these things so distinctly, because the parts are hidden from our view, and because they are not probably so regularly, perfectly, and economically carried on, since in the latter cases the constitution is more oppressed by the disease and cannot exert its energies with the same effect.

According to this view of the nature and general objects of inflammation, we are to presume that these inflammations are intended to remedy an imperfection in the powers, or function of some part, or of the constitution, which has been produced by the remote or exciting cause of the disease. In many cases where these causes are known and their *modus operandi* is capable of investigation, we can trace the course which is taken, and attain to some notion of the state of imperfection, or defect in structure, power, or function, which precedes inflammation, and in fact affords the reason why inflammation takes place. Thus a severe blow upon the head produces an immediate and powerful effect upon the functions, if not upon the structure of the brain; this effect is not inflammation, it is the fore-runner of inflammation; it is a state of the organ which cannot remain consistently with the harmonious

operations of the whole system, and a process is set up to restore it from this state, and the principle on which it is done is the same, whether successful or not. The same is true of injuries in other parts; it is true of acrimonious gases taken into the lungs, and of poisons acting upon the stomach. Now we may reason from analogy, and apply the knowledge we acquire from these cases to the explanation of others, where the operations of nature are more inscrutable. We may conceive that the causes of disease produce an alteration in the vital state and vital relations of the organ affected, which is inconsistent with its health, and that inflammation removes or is intended to remove this state and restore the healthy relations.

It is obvious to inquire, if these remarks are well founded, whence it happens, that we daily see, even in the most healthy individuals, inflammations arising which can have no beneficial tendency, but must inevitably result in the injury or destruction of the part or of the system. In such cases, disease seems to exist for its own sake, and is situated in organs and carried on in a manner which precludes the possibility of a favourable termination. These cases may partly be accounted for upon the principle, that there is in the system an acquired tendency to disease in general, if not to any particular disease. This is applicable to those instances where the inflammation answers no good purpose, although there is no essential impossibility that it should. But there are others to which it will not apply. As examples, we may adduce the formation of pus in the brain, of which the result is almost necessarily

fatal, although it may be the regular consequence of healthy inflammation; the destruction of vision, which must inevitably follow a suppuration in the ball of the eye; the injury to the same organ occasioned by any degree of the adhesive inflammation, as in iritis, or of the effusion of coagulable lymph, as in a speck upon the cornea; and the impediment to the functions of the heart occasioned by the slightest depositions about that organ. To account for cases of this kind, we are to consider that the processes of inflammation are conducted throughout the system upon general laws, that they are essentially the same in all parts, are adapted by slight modifications to the varieties of structure, but not to the varieties of function, to the performance of which those structures, differently combined in the composition of different organs, are subservient. The tendency of these laws is upon the whole to produce good; yet their operation being universal, evil in particular instances will be sometimes their effect. We readily find among the phenomena of disease numerous instances directly illustrative of the operation of these general laws. The adhesive inflammation proceeds, on exactly the same principle in the iris and in the serous membrane of the testis, yet in the former case the consequence is a great imperfection or destruction of vision, whilst in the latter no sensible defect remains after the inflammation has subsided. Still the process itself is as perfect in the one case as in the other, and the difference of injury does not proceed from the difference of structure, but of function. The deposition of

coagulable lymph in the common cellular membrane, is a circumstance of trifling importance; let it take place between the laminæ of the cornea of the eye, or upon one of the valves of the heart, and it produces the most serious injury to the functions of either organ. The inflammation taking place around what we call the core of a bile is simply painful and inconvenient, but around a tubercle in the lungs, it gives rise to a most dangerous affection. It is needless to multiply illustrations of this kind. It is to be explained on the same general principle, that pain, which is intended to warn us of danger and direct us where that danger lies, is often a much greater evil than any which could result from the disease. The pain of a decayed tooth is frequently as severe and difficult to bear, as that of the most severe diseases, yet in this case, it is simply an evil, without any tendency to good.

Our first reflections, it appears to me, in entering upon the management of any case of inflammation, should be directed to determine from what cause and for what purpose, if any, it has taken place; how far it is necessary from the nature of the cause &c. that the inflammation should proceed, and what injury or benefit may arise from arresting its progress by the use of those remedies which exercise a controul over it.

From the operation of those general laws of action, of which we have taken notice, inflammation will take place in consequence of the imperfection of a part, wherever it exists, whatever be its cause, and whether it be possible that it should be remedied,

or not. Thus in the lungs, there is often a predisposition to inflammation, arising from a natural or acquired weakness, or from the presence and irritation of tubercles. A slight cause will bring this predisposition into action, and inflammation becomes established without the slightest prospect of ultimate advantage. In such cases, there can be no doubt, that we ought to check the inflammation, since it can do no good and may induce a fatal termination. The best we can hope is to render the organ quiet under its imperfection; and this we are to do by counteracting the causes which make the part sensible of its defect, if I may so speak, and by abstracting those powers which support it in a state of inflammation.

When any of the internal viscera become inflamed from taking cold, or without any determinate cause, it seems to me most probable, that this is a mode in which the constitution relieves itself of some disposition not consistent with its healthy functions. The remote cause appears, originally, to have its operation upon the vital machine as a whole, rather than upon any particular organ, and the system relieves itself by concentrating the affection in a particular part. Perhaps the reason why vigorous medical interference in these cases seems so entirely to remove the inflammation and its immediate cause is, that the remedies are capable of answering the same good purpose to the constitution with the local inflammation, and with much less danger of the lesion of an important organ. This suggests an important question in all cases of disease, which we believe to be

of constitutional origin, or to be produced for constitutional relief; whether we cannot substitute operations for those of nature, which shall answer equally well for the necessities of the system, and divert the diseased actions from an important organ.

Inflammation has frequently a tendency to proceed greater lengths than the part affected can bear without permanent injury; as in the eyes, brain, lungs, &c. The degree of this tendency is important to be taken into consideration, in making up our minds as to the general plan of treatment to be pursued in any particular case. We should adopt the most vigorous measures to prevent suppuration in a degree of inflammation of the lungs, which we should suffer to go unchecked in the external cellular membrane.

It seems doubtful whether we are in the habit of paying sufficient attention to considerations of this kind in the treatment of inflammation. We are apt, in every case, without much discrimination of causes, classes, or kinds, to push at once our most powerful remedies, with the view to cut it short as speedily and thoroughly as possible. Yet perhaps in many cases, parts would more perfectly recover from the effects of external injuries, if their operations were left a little more in the hands of nature; care being taken to check or regulate any excesses or irregularities of action. In severe inflammations of important organs, where the probable termination would be death or permanent injury, there can be no question about the propriety of our usual method of procedure, since the consequences of not permitting the inflammation to go through its intended processes, whatever they

may be, cannot be worse than those we have to fear from the inflammation itself.

But where no very important organ is concerned, it should be considered at the commencement of the disease, what processes it is necessary the part should go through before it is completely restored, or restored as far as is possible. In illustrating this point, we must take external injuries principally as our examples, since we are not sufficiently familiar with the causes and course of spontaneous inflammations. Many injuries require the adhesive inflammation alone in its most simple form; others run on to suppuration, and form either an abscess, or a suppurating surface, in order that some portion of the organ may be renewed, or new modelled by granulation. Wounds simple, or complicated with other injuries, may sometimes be healed by the first intention, sometimes by the adhesive inflammation, and sometimes suppuration, or even a degree of sloughing, is necessary. Now it is extremely desirable in the first instance to know, how far it will probably be necessary that the inflammation should extend, that we may be able to prevent any higher degree from coming on. This we can do in many cases; and this circumstance is always to be considered, that the state of health in most constitutions is such, as to produce a tendency to inflammation disproportioned to its cause. Could we examine the intimate operations of the system in the various cases of inflammation, we should, I believe, find in most of them, that a higher degree of this kind of action existed, than was necessary; and that there is a general propriety in the practice

of physicians, who are in the habit of endeavouring to alleviate inflammation, from whatever cause it has proceeded. So imperfect are we in our knowledge of what the system requires and purposes in the great efforts which it sometimes makes, that it is commonly, in important cases, safest to take the business out of the hands of nature at the risk of leaving her intentions unfulfilled, and a liability to the return of the inflammation as soon as the influence of our remedies has subsided.

It is true however in some constitutions, and in some parts, that we find a deficiency of power of action. An organ will remain a long time in a state of sub-acute inflammation, which cannot be resolved, but does not readily suppurate, or if it does, suppurates in an irregular and imperfect manner. There are in some individuals peculiar or specific dispositions with regard to inflammation. It is particularly exemplified in scrofulous subjects, in those afflicted with the fungus hematodes or the fungoid inflammation, and in the cancerous. The processes in all these cases are formed on the same general plan and carried on by the same powers with ordinary healthy inflammation. But the powers are either deficient or depraved. Thus a blow upon the female breast will produce a series of actions, terminating in scirrhus and cancer, which appear to me to be unsuccessful efforts at the adhesive and suppurative stages of inflammation.

It has been often and very justly observed by pathologists that there is considerable analogy between the functions of nutrition and of inflammation.

They are carried on by the same vessels supported by the same materials and the same powers. In those constitutions where nutrition is most vigorously performed, there also inflammation is established with more energy and its processes carried through with more rapidity and in greater perfection. At the commencement of inflammation, the capillaries of the part convey more blood than when exercised for nutrition; new vessels are formed, or blood passes into an immense number which did not previously transmit it. This indicates an increase of vital action in the part and an increased expenditure of vital power. To support this action, requires an increased quantity of blood, and the consequence is an increased diameter and capacity for transmission in the arteries going to the seat of disease, and this same effect, but more permanent in its nature, is observed whenever there is an unnatural growth of any organ of the body. This I conceive is the first and most simple state of the inflammatory process, before adhesion commences in the cellular and serous membranes, or suppuration in the mucous; it is the state of preparation, in which the vessels are rallying their powers and getting ready for more decisive operations. After this has continued a length of time, varying according to circumstances, the vessels take up a new function, they enter upon the adhesive stage, and pour out coagulable lymph. This is either sufficient in itself for the restoration of the part, supposing that to be the object in view, and relieves the vessels from their state of extreme action, or it paves the way for the next or the suppurative

stage. In this stage a new function is taken up ; pus, a secreted fluid, is poured out within the limits of the adhesive inflammation, an abscess is formed, the matter discharged, the cavity filled up by granulations, and healed.

If this slight sketch of what takes place in the successive stages of inflammation be correct, it is easy to attribute the whole to a progressive alteration in the mode of action of the same vessels which first commenced the process, supported by an increased expenditure of power. In the first place, they simply convey more blood than usual, or blood when they previously transmitted a colourless fluid ; in the second, their action is modified ; they extravasate not the whole of the blood, but one of its constituents ; and in the third they form, from the blood, a new and homogeneous fluid. What are the intimate actions of the vessels in granulation, the next step towards restoration is yet doubtful. A modern pathologist* has endeavoured to show that granulations are produced by coagulated pus, which becomes vascular by the rising of carbonic acid gas, formed at the moment of coagulation, through it, and producing tubuli into which the blood rises and from them forms circulating vessels. But so mechanical and, if I may so speak, *unphysiological* a mode of accounting for a process in the animal economy ought to have stronger proofs than can be derived from microscopic observations, before it can be allowed to pass current as philosophy.

* Vide the Croonian Lecture in the Phil. Trans. for 1819, by Sir Everard Home.

Suppuration would seem then to be only the result of a modified and in most cases an increased action also, of the same vessels which are concerned in the adhesive inflammation. It is certainly true in the majority of instances, that the more violent the first actions of inflammation, the more likely is suppuration to ensue, and we generally form our judgment of the probability of a resolution or termination in adhesion, by the less or greater violence of the symptoms. But on the other hand we frequently find the most violent inflammation existing without any apparent tendency to suppuration, and suppuration taking place unexpectedly when the mildness of the symptoms would have led us to predict resolution.

Taking it for granted that the adhesive and suppurative inflammations are only modified affections of the same vessels, the difference between them would amount to this; that in the former they pour out lymph, a fluid capable of coagulating spontaneously, and with a tendency to become organized after coagulation; and that in the latter they pour out pus, a fluid incapable of coagulating spontaneously or of becoming organized. This view of the subject suggests an explanation of those different phenomena of these two stages of inflammation, which might perhaps appear to indicate a greater difference in the actions of the vessels than I have attributed to them. It is to be considered, that when the lymph is poured out, it immediately coagulates, and becoming organized excites no irritation for its expulsion; whilst pus acts as a foreign body, so soon as it is

formed, and its quantity continuing to increase, it is necessary that room should be made ; this is effected by the absorbents and an abscess is thus formed. The adhesive and suppurative processes, appear to be sometimes mingled on the suppurating surface, and not merely to exist in different parts of the same organ, since we observe in the discharge of matter from abscesses, shreds of lymph which has coagulated, but could not, from the stage of the inflammation, become organized ; this would seem to imply that although the formation of pus had commenced, yet the change of function had not extended to all the vessels concerned in the disease, but that some continued to pour out lymph, whilst those in their neighbourhood had taken up the suppurative action. The rationale of these two processes of inflammation is perhaps this ; that being both intended in different ways to answer similar purposes, one strengthens the imperfect or injured organ, by pouring out coagulable lymph, as in the thickening of many parts which do not suppurate ; and the other removes the spot on which the imperfection exists, by means of an abscess ; for although I do not mean to imply the dissolution of the soft parts in the formation of pus, yet I believe them to be absorbed, so as to make way for the abscess, and then filled up with new matter by granulation.

Suppuration does not require a definite degree of action, nor a specific state of the powers of the part, to carry it on. It appears to be a relative process, and to be the result of a greater or less degree of inflammation, according to circumstances which we

do not generally understand. Mr. Hunter observes, that the inflammation preceding suppuration where it arises spontaneously, is often more violent than that which precedes it when arising from an injury, where, notwithstanding, the quantity of suppuration is equal. The injuries, however, to which Mr. Hunter refers in this remark, were probably those where an external opening or a breach of surface was produced, in which cases suppuration seems to go on in a manner similar to that which it pursues on a mucous membrane. Another reason why a spontaneous inflammation might call forth a greater relative quantity of inflammation before suppuration, may be, that where the former arises, there is some previous defect in the constitution or part which produces an imperfect degree of restorative power, and in consequence many imperfect and useless efforts when inflammation occurs.

Under circumstances apparently similar, there is a vast difference in the apparent degree of inflammation necessary for a part to suppurate in a healthy manner. We find in one case every symptom in its severest form; the heat, tension, and pain almost intolerable and so violent as even to threaten mortification; to all which an abscess affords speedy and complete relief. We find in another, when the symptoms have been unusually mild and indeed almost ambiguous, that suppuration will have taken place before we are aware of it. There are no certain rules by which we can judge of the probability of suppuration, since it does not depend on the violence of the inflammation. Personal experience will

undoubtedly do much to form a habit of accurate judgment, and a power of foreseeing the natural event of a case, yet this is a kind of *practical tact* which it is as difficult to describe as to acquire.

It has occurred to me that there was frequently more inflammation than the process of suppuration required; that is, from certain causes there was a superfluous exertion on the part of the vessels, which merely exhausted the powers of the system, without contributing to the process going forward. This opinion has been suggested by the result of a few cases, in which by the use of active measures with the view of producing resolution, such as leeches, blistering, and purging, the sensible symptoms of inflammation were very much reduced, and yet an abscess unexpectedly developed itself, full as early if not earlier than I should have looked for it, had the part been suffered to take its chance with the disease.

Although a violent and rapid inflammation is most likely to terminate in suppuration, yet this does not alone furnish us with a general rule for judging. It must depend on some relation between the action of the vessels, the previous cause of the inflammation, and the state of the part, which we do not entirely understand. Our principal object, then, in the treatment of an inflammation which we wish to have suppurate, should be to maintain this relation, so far as we do understand it. It may be sometimes necessary to do it by increasing, and sometimes by lessening the degree of inflammation according to our judgment of what the case requires, and so keeping it at the

suppurating point. These remarks are confirmed by the fact, that some of our best applications for promoting suppuration seem often to act as powerful resolvents. Thus we sometimes apply to an inflamed part substances, whose ordinary effect is to promote resolution, without any such effect, the inflammation continuing to advance. If *then* we apply poultices with the view of bringing on suppuration, the part begins soon to grow better, and finally gets well without forming pus.

Suppuration being the result of the natural actions of the vessels, it is obvious that we can only promote it by promoting those natural actions. There is no ground for interference, except to enable the vessels by our assistance to act to the best possible advantage, and to do this by removing every impediment which might prevent it, whether from within, or from without. It is an object, when parts suppurate, that they should do it in a healthy manner, so that the subsequent actions of restoration may have a good foundation. It is important that they should do it as speedily as is consistent with their doing it well; and in general the most rapid suppurations *are* the most healthy. It is also of consequence that it should take place with as little pain, irritation, and expense to the constitution as is possible.

Suppuration is sometimes prevented from taking place, where a tendency to it has appeared, and it would be a desirable circumstance, by an apparent indolence of the part which has advanced somewhat in the inflammation, but shows no disposition to go farther, and on the other hand has no tendency to

go back. There are other cases in which the part does not take the regular and direct path to supuration. In some, this appears to arise from the erisipelatous inflammation, uniting with the healthy and causing an irregularity and imperfection in its processes. The presence of a scrofulous diathesis has also a strong tendency to produce effects equally bad. In these cases the difficulty proceeds probably from a constitutional cause, and we perceive it not merely in instances where the inflammation is spontaneous, but in those the result of blows, wounds, &c. A wound, which is doing well and rapidly healing with healthy granulations and pus, may suddenly change its whole character and appearance; the granulations be absorbed or grow pale, the pus alter its qualities, &c. Now this, I conceive, must for the most part arise from a cause which affects the general powers of the constitution, and not this particular part, and the other irregularities before alluded to, are probably produced in the same way. The stomach, or rather the digestive system in general, is the most likely to lie at the root of any such imperfection. It is more closely connected in its functions and sympathies with the extreme nutritive vessels than any other. It would seem as if the stomach had the controul and direction of their functions by means of its vital influence and support; as if it not merely supported their actions with the necessary supply of materials, but as if it held the reins by which their motions were governed, and impressed upon them every change by which it was itself affected. The stomach cannot be deranged but every organ in the

body feels the want of that countenance and support it was wont to receive. The skin is affected by chills or by sweats, the muscles are relaxed and languid, the head dizzy and pained, or the respiration shorter and unequal; all these, which sometimes occur, are to be attributed to the sympathy of the extreme vessels with the stomach. This leads us to look to that organ for the cause of those irregularities of the same vessels, which have been alluded to, as taking place in inflammation; and we find in fact, that there is in these cases a derangement of the digestive system, either from oppression, exhaustion, or debility, and that a removal of this derangement restores the right method of action.

It is not my intention to enter into a detailed consideration of the method of treatment in these cases; our object ought to be to enable the part to pursue the natural bent of its own actions; and to do this it requires a supply of the same powers and materials necessary to health. It is therefore important to restore them both. To do this we must put the digestive system into good order and the part inflamed will then act to advantage. It is obvious, that in this way an attention to the state of the digestive organs may be the most efficacious means in our power to promote suppuration, as well as to bring about resolution; for where this termination is desirable and indeed almost necessary to the part, the derangement of the digestive system may be the cause which prevents its occurrence, and therefore the removal of this derangement will be the most effectual measure by which to promote it.

Suppuration, as I have before suggested, is sometimes prevented from taking place by an excess of inflammatory action; or rather perhaps by a strong disposition in the part to continue that stage of inflammation, that kind of action of the vessels, which precedes suppuration, and to change from it slowly and reluctantly. This may be either a local effect merely, or it may proceed from an excessive constitutional sympathy, which reacts on the local disease and aggravates its violence, but directs its exertions towards a wrong object. We are to be directed in this case, when we would wish to bring about suppuration, by the circumstances we observe. We are to attempt the alleviation of the inflammation, but not its removal. We must reduce it down to the suppurating point, but not below it, by the constitutional remedies of bleeding, purging, diaphoresis, and the production of nausea, as we find them necessary, and by the local applications of leeches, poultices, fomentations, &c.

There is probably no organ, whose inflammation, when once fixed, goes on with so much certainty to suppuration, as the female breast. It is rare, when any considerable portion of it has become affected, for resolution to be procured; and it often happens, when we have been flattered by an apparent success in our endeavours to effect it, that a sudden change takes place, and the part goes on inevitably to form an abscess. Yet it is extremely desirable in these cases, on every account, to cut short the inflammation; and if this cannot be done, at least to have the suppuration take place with as little suffering and

expense to the general health as is possible. It is too common, however, for a female breast to be exceedingly painful for some length of time before an abscess is formed, and to go on with the formation of matter in a very slow and tedious manner. This in part no doubt is to be attributed to the peculiar structure of the organ, its functions and relations; to the same causes indeed from which it derives its great susceptibility to the cancerous inflammation; but, in part also, it may be ascribed to something in the processes of the inflammation itself, which render it slow in passing from one stage to another, although the vessels themselves seem to act with a good deal of power. I state this opinion with diffidence, because I feel how liable I am, from the narrow range of my experience, to have formed a partial view of this subject. It has appeared to me, however, in a few cases, that suppuration was hastened and facilitated by the applications on which I depended for resolving the inflammation.

A female, about seven or eight weeks after delivery, was attacked with inflammation of the right breast, causing a good deal of pain. She permitted it to pass several days without assistance; leeches were then applied, purges administered, and discutient applications made to the part. The affection of the breast abated, the part became softer, the tension and pain left it, and the swelling subsided. She had then an affection within the abdomen, producing pain, soreness, a sense of fulness and tightness, accompanied by a constant and distressing nausea, and total loss of appetite; her pulse at one hundred and

twenty. These symptoms lasted with considerable severity for eight or ten days, and were removed by emetics, purging and blistering. Immediately upon their removal, or rather as soon as they were alleviated, the breast became again affected, not however as it had been at first, but simply with a degree of soreness and fulness; this continued, a little increasing, till it suddenly pointed and discharged a large quantity of matter exactly eighteen days from the first attack; half of which time there had been no mark of inflammation, and during the remainder only an inconvenient soreness without acute pain. In a week more the abscess had entirely closed and the breast remained well.

The same patient two years afterwards was confined with her second child. Within a few days after delivery she was attacked with inflammation in the same breast and the same part of it. It was bathed with a mixture consisting of Tinct. Mel. Ves. and Tinct. Saponis, in the proportion of one part of the former to two of the latter, till some slight vesications were produced; the inflammation seemed to abate, the part softened and became quiet. After a short time the difficulty returned and was again removed; till finally, at least six weeks after the first attack, the inflammation again made its appearance. It was thought in vain to oppose its progress, poultices were applied, a small abscess formed and discharged, and this without any very severe or long continued pain.

Another subject, about five weeks after delivery, was much exposed to cold and moisture and was in consequence seized with an inflammation of her right

breast. She took an emetic and purgatives, a mixture of equal parts of Tinct. Mel. Ves. and Tinct. Soponis was applied to the part, which lessened the pain and seemed to put back the inflammation, but did not carry it away. Upon a fresh exposure, inflammation came on afresh. A blister was applied over the whole hardened part of the breast. It gave immediate relief to the pain, and restored the flow of the milk, but the drawing of the breast by the child gave exquisite suffering, and consequently it was not completely evacuated. It continued however growing softer, though I had no suspicion that matter was forming. A few nights after the blister was drawn, the milk produced violent sickness, vomiting and diarrhea in the infant, and in an elder child who had nursed it, and no more attempts were made to draw the breast. It now became more painful, and more tense, and for a day and a half produced considerable suffering, when it most unexpectedly pointed, broke, discharged a large quantity of matter, and healed in a few days without the slightest difficulty.

Now so far as my observation has extended, inflamed breasts do not commonly go through the process of suppuration so easily or so speedily as happened in the above cases. It is true that one or two instances do not afford sufficient ground for the establishment of a general rule of practice; but they do afford a sufficient motive for farther investigation. It appears to me in these cases, as if the applications made to the system and to the parts removed all the inflammatory action, except so much as was absolutely

necessary to suppuration, and as if this process was performed more speedily, because every useless and superfluous effort of the vessels was checked; and for the same reason, the pain, instead of being excruciating, was comparatively so trifling in these cases, as scarcely to disturb the repose of a single night.

I would add to these remarks the relation of another case, which has some connexion with this subject. A female aged about fifty, of somewhat intemperate habits, applied to me on account of an affection of her arm. She had struck it some weeks before by a fall which had torn off a piece of skin and bruised the surrounding parts. In this spot there was a small, irritable, and painful ulcer; the rest of the arm from just above the elbow to the ends of the fingers was in a state of inflammation. It was much swelled, was œdematous and sore to the touch, but not very painful except in the ulcer. The fingers were useless and destitute of any feeling but that of soreness. By the application of blisters to the sound parts and of poultices, fomentations &c. to the seat of disease, and of such internal remedies as the constitution seemed to require, the inflammation, pain, &c. abated; there seemed to be no tendency to suppuration, and yet almost before I was aware of it, an abscess formed upon the side of the arm opposite to the injury, and discharged a large quantity of matter. She soon after complained of soreness and swelling in the arm-pit; on examination a collection of matter was found and another in the lower part of the right breast; these were opened and slowly got well. Another

er then formed just above the clavicle; another on the upper part of the arm, and another on the lower part just above the elbow. All of these and especially the three last, began with a soft red swelling, evidently containing matter from the first, with no sensation but that of tenderness and soreness, and appeared to be the consequence of the suppurative inflammation simply, with no more of the adhesive than was necessary to form a proper cavity for containing the pus.

Hence I would draw the conclusion, that the suppurative inflammation simply is not necessarily attended with much pain; that the sensation it produces is dull and rather that of soreness. This is certainly the case when it takes place on the mucous membranes, and we have no reason to conclude it to be different elsewhere; for as soon as an abscess in the cellular membrane is opened, it becomes comparatively easy, and the pain which accompanies its formation proceeds from the coexistence of the adhesive stage of inflammation with the suppurative and the consequent tension and pressure of parts. Does not this afford us some ground for doubting the universal truth of the principle stated by Mr. Hunter and other writers, that it is best to suffer an abscess to open itself? "Suppuration," says Mr. Hunter, "takes place on exposed surfaces, with a much less degree of inflammation and in much less time, than on those which are not exposed." Now when an abscess is opened, it is in fact converted into an exposed surface and suppuration continues to go on with as much rapidity and with greater

comfort to the part. Every surgeon does in fact disregard this principle, for the most part, in practice, and opens collections of pus whenever he can get at them, for his own reputation as well as for the ease of the patient.

Supposing a part to be healthy and the constitution in good order, it seems doubtful when the suppurative inflammation is taking place, whether we can do better than to leave nature to effect the object she has in view by her own means. But in the majority of cases, these circumstances do not both exist; the inflammation labours under some degree of disadvantage, and it becomes our duty to afford such assistance as lies in our power to promote suppuration. It has been doubted by some writers on surgery, and among others by Mr. Hunter, whether the local applications usually made are of any service in bringing forward suppuration. It was his opinion, that poultices and fomentations were only of use when the inflammation approached the surface, and acted by rendering the skin more easy and comfortable under the operation of the disease.

These applications however, in all their numberless varieties, have always been held in common opinion even among surgeons, to be peculiarly adapted to the promotion of suppuration; and it would be difficult to persuade people in general, that an inflammation could suppurate favourably without them; that their effects have been prodigiously overrated I am not inclined to deny. The vulgar are always disposed to attribute that which takes place while a remedy is operating, to the effect of the remedy.

We cannot doubt, that in the majority of rapid, acute inflammations terminating in abscess, poultices do little more than render the part easy, by keeping the skin warm, moist, and relaxed. But it certainly would appear, that where there is any thing like irregularity or inequality of the inflammation, where it is deficient from want of power, or excessive from too great irritability, that these applications are of considerable service in bringing about suppuration to the best possible advantage.

It is true, the immediate operation of these remedies is confined to the skin. Yet there is perhaps no system, except the digestive, through which so powerful an effect can be produced on the constitution, or on a diseased part, as the cutaneous. I conceive, in this case, that the influence is something more than physical; the application of warmth and moisture affects the vital state of the skin, with which the inflamed part sympathizes. There seems to be a peculiar power in the application of warmth and moisture combined, to promote a full, free, and at the same time, easy and natural circulation in the capillaries of a part. They appear to be peculiarly adapted to correct an irritable state to which the extreme vessels are sometimes liable, in which, if we may so speak, they act at random, act without effecting the object for which they act. Take for example an irritable ulcer, which has ceased to discharge pus and pours out instead, a thin, acrid, serous fluid; which has become painful, has an unhealthy, ragged aspect, in which there is manifestly a deterioration in the action of the extreme vessels forming its surface.

Apply a poultice to this ulcer for a few days, and in most cases, how completely will it alter the character of the sore. The discharge is again converted into pus, the edges become even and healthy, and fresh granulations cover the surface.

We certainly cannot expect so much where the application is not made to the part itself which is affected. Yet we know that any state of action, produced in the skin, has a commanding influence over that of the parts underneath. This is particularly remarkable in the case of blisters, of fomentations applied over the cavities, &c. We can conceive that a state of action in the vessels of a deep seated part, which is suppurating, might exist, similar to that of the vessels of an open suppurating sore just alluded to, and that the deep seated part might be remedied, though perhaps less speedily and less perfectly, by the same means which were successful upon the surface.

Suppuration may be prevented from coming on in a favourable manner, by a state of irritability in the vessels of the part, or by one of torpor, sluggishness and indisposition to action. These states, I conceive, arise in general from constitutional causes; but while the constitution in this manner affects the actions of the part, the latter in its turn by a reflected operation on the system, increases its derangement. In these cases, our treatment is to be directed both to the general and local affection. We are to regulate the system, in different ways, according to the manner in which it is affected. The stomach is to be put in good order, the bowels cleansed, the state of the liver amended if necessary, and then stimu-

lants, tonics, &c. administered according to the exigencies of the case. Of the local treatment, it must be confessed, there is little to be said. We probably effect much less than we are apt to imagine and our chief reliance should be upon the efforts of nature, with such assistance and guidance as we are able to afford.

Nothing is more important, in treating disorders where the constitution is at all implicated and where our treatment is to operate principally through the constitution, than to keep in view this principle;—that although life is the result of an assemblage of functions carried on by a variety of organs, it is still only *one in itself*. All these functions work together in different ways for one end, that end is the good of the system *as a whole*. However varied their individual objects, they are linked together by such indissoluble ties of mutual dependence, that no one can be affected without a proportionate effect upon every other. Life, like gravity in the physical world, seems to be dependant on every part of the system in proportion to the importance of the part. Throw but a stone, as philosophers have observed, and every planet, sun and star, to the extremity of the universe, feels the alteration which this motion has made in the relations of the different masses of matter in existence. So in the physiological system, any change in any organ affects the relations of the whole system, just in proportion to the extent of the change and the importance of the organ. Now this being true, we ought undoubtedly to give this principle great weight in the application of our remedies, especially

those whose influence is upon the system at large, and we ought always to investigate, before the remedy is applied, the state of the constitution and what the relations of the different organs and functions have before been.

Many practitioners have been apt to direct their exclusive attention to the phenomena of disease as affecting some particular function, or class of functions, and consequently to direct their remedies in the same way. Thus there are some who would cure every thing by the lancet, because they believe that the essence of disease is in the circulating system; others who would do it by emetics and cathartics, because they conceive the stomach and bowels to be at the root of all disorder; others who rely on opium and narcotics, because they think the nervous system principally implicated; and others on stimulants and tonics, from the opinion that every disease consists in debility. All must be partly wrong and partly right, for the causes and phenomena of disease exist by turns, or even at the same time, in each system and influence every function.

The treatment of constitutional disorder, in this point of view, and likewise the treatment of local disorder as affecting the constitution, becomes exceedingly delicate. We have to determine, at first setting out, the actual state of the system, its relation to the local disorder, and then to keep constantly in view the changes in these respects which our remedies or the progress of the disorder occasions. We ought to keep our eye fixed upon this, as the pole-star of our practice. It is only in this way that we can

know, what we have done, what we are to do, and what are the resources of nature on which we can depend.

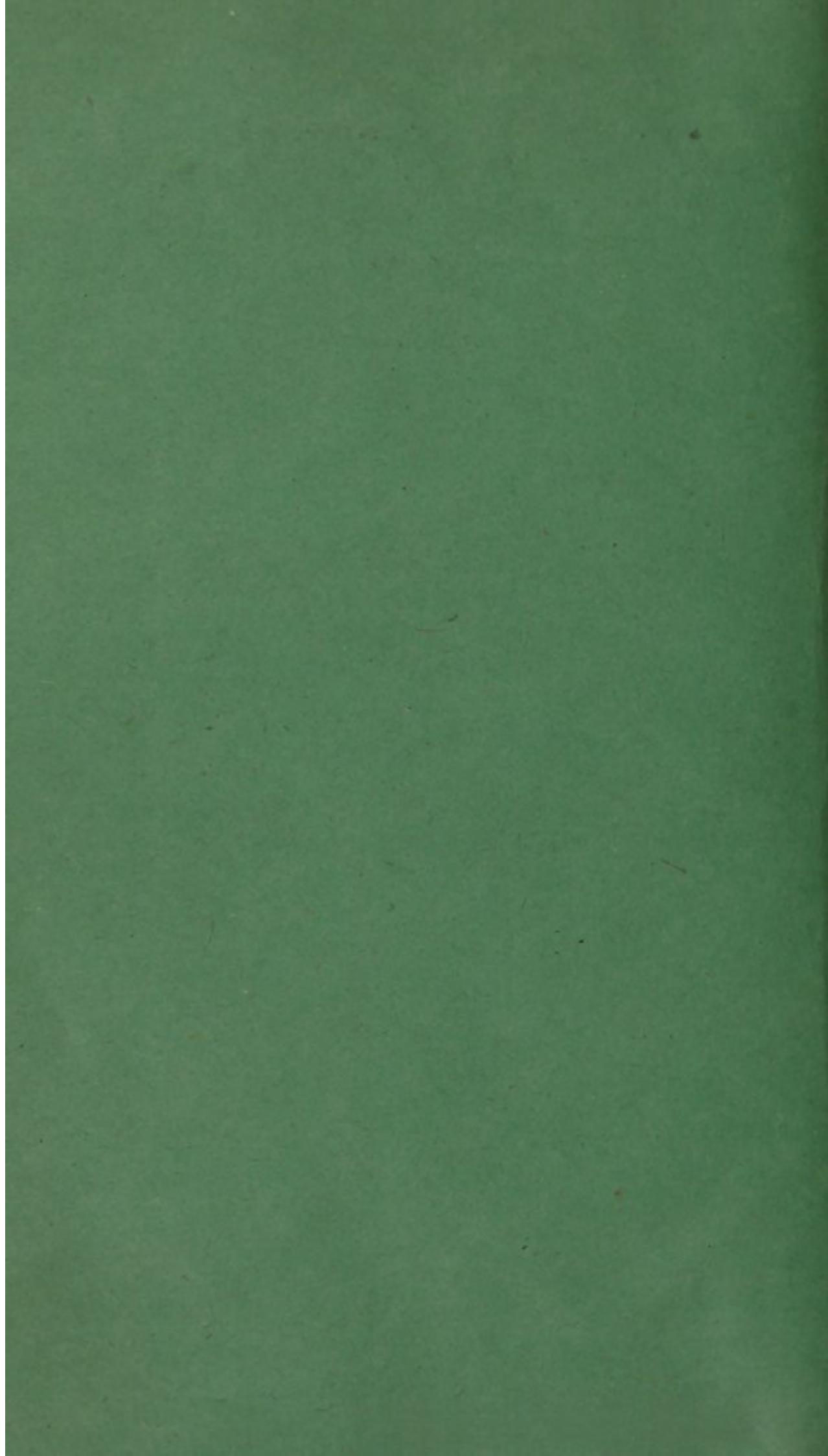
In general the character of any considerable local inflammation affords an index to the state of the constitution. It is an exhibition, a sample of the disposition and the powers of action of the system at large. Where there is vigorous, regular, and rapid inflammation, it is a good test of firm health, and every deviation from this kind of action is a mark of some deviation from firm health. Where the indication is merely to reduce *excessive healthy action*, our power is almost certain, and we can promise ourselves success, since we do it by the direct abstraction of strength. But every deviation is more or less complicated; we cannot be so certain what our objects ought to be, and have not so certain means of effecting them. We cannot directly *give* strength; the most we can do, is to call forth and regulate the expenditure of those powers the system already possesses, and to do this in such a way, as not only to produce a temporary capacity for exertion, but indirectly an accumulation of power. It is only in this way that we can look upon tonic and stimulating remedies as giving strength. By their use we primarily excite action, and of course expend the powers of life. If we can so regulate this action as by its means to have the natural functions properly performed, we accumulate as much or more power than is expended. But if this is not done, tonics and stimulants, whatever be their immediate effect, act only as causes ultimately debilitating; and a powerful

evacuant will often be the means of increasing the strength, when such remedies entirely fail, by removing those causes which oppressed the natural performance of the functions.

Where the deviation consists in irritability—by which I mean a tendency to action, without a corresponding power of supporting it, the consequence of which is, that the action is imperfect, as in the case of an irritable ulcer before mentioned—we must either increase the strength so as to be on a level with the action, or else reduce the action so as not to exceed the power of supporting it. The last is unquestionably most within the power of medicine, although the former, in chronic diseases where there is sufficient time, may be frequently brought about by the gradual operation of diet and exercise. Where action is exhausting the strength, without answering any good purpose, we virtually restore it by any means which will lessen this action. These means, so far as medicine is concerned, principally consist in putting the skin, stomach, and bowels into a natural state and in quieting the morbid actions by the use of opium or applications to the diseased part. The character of an irritable, ill-conditioned ulcer, will sometimes, where the stomach is previously put in order, be speedily amended by a few grains of opium, or the exhibition of bark.

It is difficult to write upon this subject with accuracy and clearness, and more difficult to practise than to write. The ideas of physicians differ so much with regard to it, that it is difficult for them mutually to comprehend their different views. It appears to

me particularly important in the treatment of internal suppurative or ulcerative diseases, to have in mind the considerations which have been suggested, and if we are ever to attain any controul over that hitherto untameable malady, phthisis pulmonalis, I conceive it will be brought about by a careful investigation of the subjects of which I have now briefly spoken.



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