

Observations on the general principles and on the particular nature and treatment of various species of inflammation / by J. H. James.

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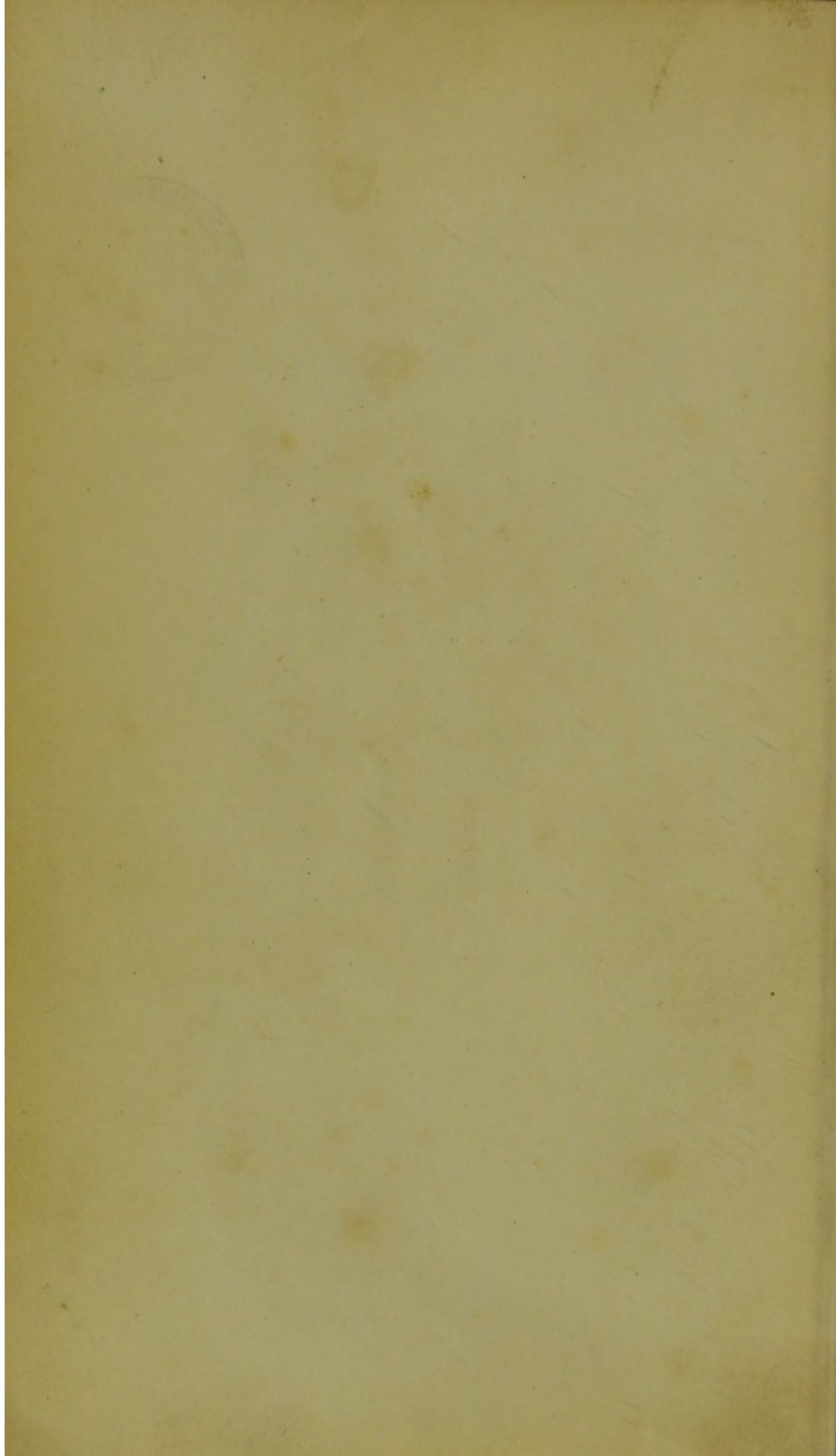
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Arnott's Physiology

OBSERVATIONS

ON THE

GENERAL PRINCIPLES

AND ON THE

PARTICULAR NATURE AND TREATMENT

OF VARIOUS SPECIES OF

INFLAMMATION.

BY J. H. JAMES,

SURGEON TO THE DEVON AND EXETER HOSPITAL, AND CONSULTING
SURGEON TO THE EXETER DISPENSARY.

"The knowledge of inflammation, in all its variety of causes, effects, terminations, and methods of treatment, may be truly said to constitute the basis of scientific surgery, entering, more or less, into the prevention or cure of every disease which comes under the surgeon's care."—WILSON'S *Lectures*, p. 243.

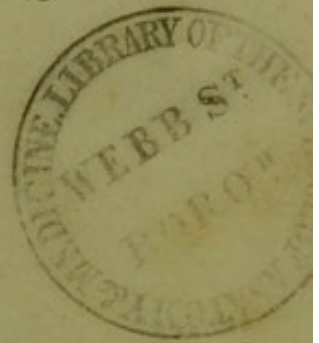
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RENSHAW AND RUSH, 356, STRAND,

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1832.



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PREFACE.

As there can be no doubt that inflammation and fever, which are commonly united, constitute in various forms and different degrees, by far the greater part of those affections which demand the assistance of medical art, so no endeavour to promote the knowledge of such important diseases can be deemed superfluous; and indeed, if we regard the labours of the most eminent men who have adorned our profession, we shall see ample reason to be convinced that no subject has more deeply engrossed their attention.

It is unnecessary for me to expatiate on the merits of that work which has immortalised the name of John Hunter: however deficient in some respects, it contains more original and important matter than any other in this department of medical science. Mr. Hunter investigated the principles of inflammation with peculiar industry and

success; but I may be allowed to say, that although subsequent observation has confirmed the truth and value of many of his opinions, yet there are not a few, which either have been disproved, or which are still so doubtful, that it would not be safe to adopt them.

It may also be stated, that while Mr. Hunter has contributed much to establish the fundamental principles of this branch of pathology, he has left comparatively little of value as regards their practical application to the different species of inflammation. It would, however, be ungrateful not to acknowledge that other distinguished pathologists, and I may particularly mention Dr. Thompson, Mr. Cooper, Mr. Guthrie, and Dr. Hennen, had done much to lessen this defect at the time I first offered any observations of mine to the public: my reason for then doing so, I ought briefly to state. The College of Surgeons proposed inflammation as the subject of the prize thesis for the year 1818, and the Essay I presented having been honoured by that distinguished body, I was induced to publish it, with some additions. It appeared to me that there was wanting a compre-

hensive and yet distinct account of the separate species of inflammation; that there was no scientific arrangement of them, and that the methods of treatment proposed were laid down too generally, in the works we possessed. It was my endeavour to supply these defects, and I wished also to submit some observations of my own. That the attempt has fallen very short of what could be desired, I am most ready to admit.

More than ten years have now elapsed since that appeared: in the interval, extensive and important contributions have been made, both in England and abroad, to the pathology of inflammation. Greater discrimination has been evinced in exploring the nature and determining the treatment of its varieties; still no exclusive work has appeared on this subject; nor has any edition of those formerly known been presented to the world. In France, it is true, M. Gendrin * has accomplished a systematic treatise of great value and extensive labour; but it rather illustrates the

* Hist. Anat. des Inflammations.

morbid changes of structure, than informs us how these are to be combated.

Among those who have of late years especially augmented our knowledge, I am bound to mention Dr. Duncan, Mr. Travers, Dr. M. Hall, Mr. Lawrence, Dr. Lee, Mr. Arnott, Dr. Davis, Andral, and to these many others might be added *; from their pens we have admirable essays on particular subjects. I am also bound to acknowledge the assistance I have received from the works since edited by one of the most distinguished surgeons this country has possessed, Sir A. Cooper; nor is it, I trust, superfluous to say, that to my lamented master, Mr. Abernethy, I am deeply indebted not only for much important information in general pathology, but, in a great degree, for the power of acquiring knowledge myself.

The scheme of this work will be explained hereafter; but it should be stated, that in handling so extensive a subject, one of the greatest difficulties I have had to encounter has been that of re-

* A great number of important cases and papers have been given in the various periodicals we now possess.

stricting its extent, by avoiding all details which could be spared. I fear, however, that in my endeavour to accomplish this object, I may sometimes have omitted points which ought to have been introduced; may have dealt too briefly with them to give their consideration the requisite weight, or, I fear, to render myself sufficiently perspicuous. Two points I have sedulously adhered to; the one, the introduction of as few cases as possible, and in them avoiding superfluous matter (for the unnecessary multiplication and prolixity of cases I look upon as a great evil in a work of this nature); the other, the exclusion, with few exceptions, of quotations from other authors, unless for the purpose of description.

With my best exertions, however, I perceive that the bulk of this volume has exceeded my wish, which was to convey as much useful information as I could in as small a space as possible. That I have so much exceeded the length of the former edition, may be attributed partly to my having added a description of several varieties of inflammation which were little discriminated at that time, and partly to my desire to render my de-

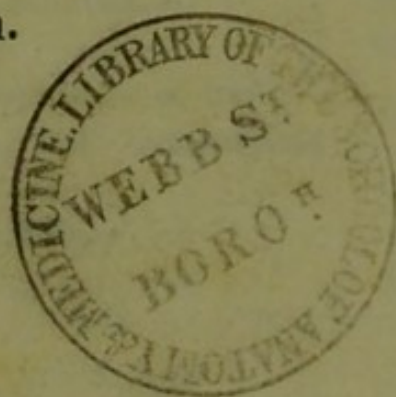
scription sufficiently complete to make it available to the student.

In the period which has passed since its first edition, I have availed myself, as far as lay in my power, of the opportunities which may have offered themselves of correcting or enlarging the views I then entertained—it would not become me to say more than that I have endeavoured faithfully to apply them. If I have come to different conclusions, on some subjects, from authors for whom I have the highest esteem, I hope my expressing them here, will not be imputed to any other cause, than that I felt I should not have acted honestly if I had suppressed my own conviction, although in opposition to theirs.

I may further remark, that when an author has to advert frequently to the opinions of others, and perhaps for the purpose of expressing his dissent from them, it carries an ungracious appearance; if, however, this matter is considered as it ought, it will on the contrary be found to be a proof of deference to which they are entitled; for, in any discussion, it is only incumbent on us to consider those works whose merits particularly demand our

regard ; and as it is unnecessary to produce our authority where all are agreed, so it is only for the purpose of expressing our doubts that this is to be done.

I must, in conclusion, beg that those who may take the trouble of perusing this work will make the most ample allowances for its numerous errors and defects, which a member of so harassing a profession as ours, may at all times fairly claim, but which will be especially called for, when he has had to embrace the consideration of such multifarious subjects as those which constitute the materials of this publication.



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ERRATA.

Page 12, line 17, *for on, read of.*

94, *in the note, for sty, read styce.*

168, line 12, *for coagulation, read coagulum; and insert the before blood, line 15.*

171, line 2, *insert in before which.*

207, line 12, *for occurs, read occur.*

290, *dele* Order II.

357, line 13, *for but, read best.*

358, line 6, *for buccæ, read bullæ.*

391, line 24, *for confines, read confirms.*

406, lines 12, 13, *insert commas after taken and given, and erase the semicolon after circumstances.*

line 14, *for answer, read answers.*

431, line 9, *for increasing, read unceasing.*

462, line 21, *for region, read regions.*

463, line 18, *for have, read has.*

469, line 8, *for having, read have.*

488, line 13, *for fingers, read finger.*

489, line 17, *full stop after incision.*

502, line 22, *semicolon after the first word, poison.*

503, line 14, *for phagedænas, read phagedæna.*

514, line 3 *of note, for with fever, read will allay fever.*

PART I.
ON THE
CAUSES, PHENOMENA, AND MODES
OF
INFLAMMATION.

PLATE

OF THE

CHURCH OF THE HOLY TRINITY

IN

THE CITY OF NEW YORK

CHAPTER I.

SCHEME OF THE WORK.

To embrace the consideration of all the circumstances connected with the subject of inflammation, and to do them the justice they deserve; to speak of every species which may occur, and detail its character, symptoms, and treatment, would be much beyond my power, and the proposed limits of this work. It is my intention, therefore, to restrict the *latter* branch of inquiry to those inflammations which are usually in the province of Surgery, according to the plan of the first edition, and of those, only to enter upon such as I have myself had sufficient experience of, to justify me in believing that I am enabled to judge of the matters proposed; and I have further reduced their number by avoiding details on those which have characters apart, depending upon the peculiarities of the organ in which they occur, as the eye.

Objects: first, to consider the fundamental principles; then the particular species of inflammation.

As regards the *former* branch, I cannot flatter myself that I have been enabled to treat it, even with the advantages which the labours of many eminent men in recent times have afforded, in such

a way as to satisfy the object proposed. It is, nevertheless, clear, that upon the proper elucidation of the fundamental principles of pathology in this as in every other branch, the right consideration of the subject must mainly depend.

An inquirer into this department labours under the disadvantage, that, however extensive the materials may be on which he has to work (a great advantage in itself), yet, from the deficiency of arrangement, they are apt to perplex, and are difficult of management. It is, therefore, a particular object to extricate them from the confusion in which they more or less are placed, and I have endeavoured to accomplish this,—with what success I cannot judge.

Arrangement
of the First
Part.

Subjects con-
sidered in
Chapter I.

In the first place, I have considered the questions connected with the ordinary powers and state of circulation, the state of the vessels under inflammation, and the symptoms which manifest themselves in the part.

In the second, I have entered into the subject of sympathy, as connected with the extension of inflammation to the adjoining parts, and the influence reciprocally exerted between the system at large and the part inflamed.

These constitute the materials of the first chapter. In the second, I have examined the principal causes which either predispose to the production of inflammation in a part, or influence its progress

Chapter II.

when produced, whatever may be the original cause.

These objects of inquiry may be divided into those more immediately depending upon the actual state of the system, as regards the condition of the nervous system; the digestive organs; the state of the circulating fluid, with reference either to its quality or quantity; the reciprocal influence of the solids and fluids; or circumstances connected with the condition of the part: and more remotely as regards the influence of temperament, diathesis, hereditary disposition, age, sex, habits, &c.: or extrinsic circumstances, as the influence of air, temperature, and climate.

A separate consideration is the examination of Chapter III. the processes and products of inflammation, and their apparent purposes in the economy; and this forms the subject of the third chapter.

In addition, although I must confess that the Chapter IV. matter can never be completely handled apart from the consideration of the particular species of inflammation, I have offered a *general* view of the objects of remedial means, the principles on which they are understood to act, and the circumstances which would guide us in adopting them; and this concludes the first part of this work. Second Part. The second has for its object the particular description of those various forms of inflammation which come within the view which I have above given.

SECTION I.—*Remarks on the Physiology of the Circulation.*

The methodical consideration of the subject of inflammation requires that it should be investigated with reference to its final causes, as well as those which predispose to it, or more immediately produce it. The first may be considered as particularly depending upon alterations in the nerves or vessels of the part. With respect to any alteration in the nerves, so little has hitherto been ascertained, that it is vain to say any thing in the present state of our knowledge.

State of
nerves—
knowledge
altogether im-
perfect.

Of the vessels.

That the vessels are materially implicated in producing it must be granted; and also that we are not very likely to arrive at any very precise notions of their state and functions in inflammation, unless we are acquainted with them in health, which is so far from being the case, that there is perhaps no point in physiology still involved in more doubt. This being so, it may be a question whether it would not be the most prudent plan to avoid the discussion altogether; and this opinion will receive further strength from the mortifying fact, that although men of the most exalted abilities and enduring patience have been engaged in the inquiry, it can hardly be considered as yet

Their physio-
logy but im-
perfectly un-
derstood in
health.

to have led to any definite conclusion. But being satisfied that doctrines maintained with great ability by many distinguished pathologists, and which must have a great practical influence upon our conduct, are based upon opinions which, to say the least, are very questionable, I think it is my duty to offer such considerations relative to these points as seem to me to be worthy of notice.

In the first place, let us consider the circulation ARTERIES. through the arteries: some assert that at each pulse of the heart they are dilated; while others maintain the reverse; but I must take leave to say, that the latter found their opinions exclusively Question as to their dilatation. on experiments, and these experiments, which cannot be doubted, may nevertheless be wrongly interpreted. It is true that an artery, if *exposed*, will not dilate under the systole of the heart, although, if pressed on, that impulse is felt: this is a phenomenon which every surgeon must have repeatedly witnessed, but then it may be demanded, is this the *natural* state of things? And I will further ask, whether it is or is not a fact, that in violent exercise we feel and hear the blood in the carotids striking at each systole against the sides of the bony canal? whether, at the same time, the blood in the digital arteries does not beat against the sides of a ring on our fingers? and how these facts can be otherwise explained than by the dilatation of these vessels under impulse.

Again, if we do not strip the arteries of their coverings, but look at the integuments above them, do we not see these rise and fall at the pulsations? And can we otherwise account for this but by supposing it is the lateral dilatation of the arteries which occasions it? I have seen a pool of matter over the femoral artery rising and falling in the same manner, and, in point of fact, excepting we actually expose or irritate the coats of an artery, I believe we shall always find dilatation take place.

Observations
derived from
experiments
more fallaci-
ous than those
from natural
phenomena.

And here I may ask, are we to consider experiments superior sources of induction? What are they, in reality, but the observations of phenomena under *unnatural circumstances*? which I conceive are of less authority than those which are made of the phenomena nature spontaneously presents.

Again, I may ask, for what purpose is the lateral elasticity of the arteries provided, if not for this? Can we suppose such a provision without an end, and if for any, for what but that beautiful purpose for which Mr. Hunter has explained its adaptation? With him, I must believe that at each systole the arteries are dilated, and that the blood does not flow in rigid tubes, in a continuous column; for if it did, is it not demonstrable that we must have it flowing in the smaller branches *by jets*, as well as in the larger? while, if, with him, we believe that the blood first moves by the

direct impulsion of the ventricle, and then by the elastic recoil of the dilated arteries, we shall immediately perceive how it happens that in proportion as the motion communicated by the latter impulse overtakes the former, the flow will be equalized in the smaller vessels till it becomes an uniform current.

But here it is necessary to examine another doctrine, which is, that the arteries themselves exercise a *direct power* of impulsion on the blood they contain by their muscular action. The muscular power of arteries is undeniable; but I believe it is given them for another purpose necessary to our existence, namely, *to regulate the calibre* of the vessels. Their elastic power would be inadequate to this; but we find that, as the case of exposure illustrates, they can hold themselves immovable against the impulse of the heart; they can close themselves to prevent hemorrhage; and they can, and do, enlarge or diminish their calibre to *regulate* the quantity of blood conducted through them to any part or the whole, *according to the demand* that may be made, under circumstances constantly varying.

Question as to the influence of the muscular powers of the arteries in propelling the blood.

Muscular power most probably given for another purpose; that of regulating the supply of blood.

That the muscular power of the arteries *cannot* be employed in propelling the blood, I should also infer from the following reason; namely, that it is clear either that the contraction must take place *simultaneously* with the heart, in which case they

would admit no blood, or *alternately* with it, when the effect would be to perpetuate the pulsation through the most minute vessels, which is contrary to fact, although the muscular power of the arteries is greatest in the smaller branches.

Capillaries possess a power of propelling blood, but it has not been ascertained to what extent this contributes to the venous circulation.

That the capillaries possess a power of moving and propelling the blood has been proved by facts innumerable, both in cold-blooded animals and in hot; but it is still a question to what extent they contribute to return the blood to the heart, or upon what that depends.

Many of the causes which have been assigned nugatory.

Numerous causes have been assigned for the return of the venous blood, independent of the action of the capillaries, and of the *vis a tergo* of the heart; such as the greater size of the veins, the existence of valves, the lateral pressure of arterial pulsation, the action of muscles, &c. With respect to such opinions, it is hardly worth while to attempt a laborious refutation: suffice it to say, that no *power* can arise from the two first; that the third is negative, acting equally in both directions; and the last is only occasional.

Theory of the power of suction exerted by the heart.

It remains to consider a cause which has been assigned, namely, a suction power, which was by some attributed to the thorax, but for manifest reasons has been given up, and by others to the heart itself, and has been maintained by experiments and arguments which entitle it to every

respect, particularly those of Dr. Barry: nevertheless I cannot say that I feel fully persuaded of the truth of the hypothesis, for which I shall state the following reasons:

If the return of the venous blood be owing to the suction power of the heart, then we might naturally expect that where the greatest force was required, the greatest power would be provided; and as the greatest force is necessary to return the blood to the right side, we might expect that these cavities would, at all events, not be weaker than the left; for, supposing it to be a part of the duty of each cavity to propel, and a part to suck the blood towards it, each duty of equal importance, we will say; then as much as the right cavities are exonerated on the score of impulse, from the shortness of the arterial circulation to the lungs, so much would be additionally required of them beyond the left cavities, on account of the much greater length and difficulty of the systemic venous circulation, through which, according to this hypothesis, they would have to suck it.

Rendered doubtful, from consideration of the structure of the heart.

Again, I do not see how we can, on this supposition, explain the due equilibrium which should be maintained between the respective cavities; for if the power of suction be in proportion to the strength provided—and why not? then we should have the left cavities sucking with enormous force, in comparison to the right, which would be little

able to provide for such a demand, and the pulmonary system would be prematurely emptied.

These arguments are grounded on the supposition that the sucking power is not considered as residing in the auricles only; for if that be the opinion, then I can only say, that the cause assigned must be considered a very inadequate one.

I am unwilling to load a work of this kind with detailed arguments on a subject which, though highly important, would lead me too far from the principal purpose; but I should wish to see these objections to the hypothesis answered before I can fully acquiesce in its truth.

SECTION II.—*On the State of Vessels in Inflammation.*

Examination
of the pheno-
mena which
are observed
in the vessels
of an in-
flamed part.

Admitting it then as probable, that the want of certain knowledge on the true nature of the functions of vessels would embarrass our inquiries into their relations in inflammation, we have next to consider what are the phenomena which do present themselves in inflammation. These phenomena have been observed repeatedly by many persons of high talent, who have for the purpose submitted animals to experiment, and have care-

fully watched the result. The parts selected have been chiefly the mesentery of hot-blooded animals, or the transparent web of the frog's foot, and the inflammation has been produced by various means, such as mechanical irritation, cauteries, strong stimuli, &c. It being premised that there is great reason to believe that the capillary circulation is withdrawn from the direct influence of the heart, and regulated by forces inherent in those vessels, it remains to state the facts observed, which are these:—

At first, the capillary vessels contracting, the circulation is accelerated towards the point irritated. They then become dilated; after a time the motion in them is lessened, becomes oscillatory, and in some cases is stopped altogether, the globules showing a disposition to coalesce*; but it is also stated, on good authority, that while in the centre there is cessation of motion, around this the blood moves more slowly than natural; but still further, *with more than ordinary speed*†.

* Hastings on Inf. p. 83 et alibi. Black, &c. &c. &c.

† Gendrin, Hist. Anat. des Inf. 1453-5-6-7.—The changes mentioned in these experiments, as far as they regard the dark colour of the part, &c., and the changes which then take place, it is unnecessary to mention, because they can only be taken as existing in certain states of inflammation, and not true as applying to inflammation generally, as the experience of every surgeon will prove, especially in many inflammations of the eye.

I shall take Dr. Hastings's exposition of these facts, as a concise and clear statement of his own opinion, which may be considered as agreeing with those previously expressed by Dr. Phillip, and from which none on the same side of the question, that I am aware of, remarkably differ.

Doctrine of
the debility of
the capillaries
being the
cause of in-
flammation.

“In the course of this inquiry it has been shown,” he says, “that the healthy circulation of the blood depends on a due degree of action in the vessels throughout the system. It has also appeared, that the ^{slight} application of stimuli, while it increases the action of the vessels, produces none of the symptoms of inflammation. When, however, the excessive application of these stimuli has impaired the excitability of the small vessels, the phenomena are fully manifested; and when their excitability is restored, the inflammation subsides. It may be logically inferred, therefore, that in-
erated, increased
includ ^{er}flammation consists in a weakened action of the capillaries, by which the equilibrium between the larger and smaller vessels is destroyed, and the latter become distended*.”

These are the facts, and the conclusions drawn from them; but I must take leave to compare them with other facts, to see if they will certainly bear the inference which has been drawn, and that in all cases.

* P. 99.

In the first place, then, we have a dilated state of the vessels, and a retardation of the motion of the blood, towards the centre, or even an entire stagnation of it; but, on the other hand, it appears that we have an accelerated circulation towards the circumference *. And how does the question stand with respect to the vessels still more remote? Is the circulation also retarded in the larger vessels, and are they debilitated? The answer is, that the larger arteries, leading to the inflamed part, are fuller; and insignificant arteries enlarge. Still, this does not prove, I allow, that they bring more blood; but, if they are divided, they bleed much more copiously and longer; on which fact I need not insist; and, what is more to the purpose, a larger column of blood returns also through the veins from the part affected, as Mr. Lawrence has proved †. From all these facts, I should draw the conclusion that, in such a case, *the circulation is often increased* in an inflamed part; and, not only so, but that the essential processes of inflammation depend upon its being increased. In proof of which, I shall mention a circumstance which cannot, I think, in any other way be explained—it is this: that, in strangulated hernia, although the intestine beneath the stricture cannot be deemed exempt

Considered, first, as to the actual state of the circulation in the inflamed part; secondly, as to the arteries bringing the blood, and the veins returning it.

* Gendrin, Hist. Anat. 1453, 1455, 1456, 1457.

† In his fourth Lecture.

from inflammation, and although there is so great a degree of that stagnation in the vessels which is stated to be the necessary condition, yet no effusion of lymph occurs (which I should call one of its most essential processes); while, as soon as the strangulation is relieved, it in many cases takes place immediately.

It should appear that there is an increase of the circulation.

The rapidity of the motion of the blood towards the centre, or any part of an inflammation, is a separate consideration from that of the *quantity* circulated; for, allowing that it may move more slowly, yet a greater quantity may be transmitted.

Pressure upon an inflamed part shows active circulation.

An experiment, which it is in the power of any person to make, proves, that the circulation generally through an inflamed part is not very tardy; at all events, that there is a great force exerted to promote it. I mean to say, that if an inflamed part be pressed upon by the finger, so that the blood shall be excluded from the vessels, on the pressure being removed it will return with great velocity; while it is very worthy of observation that, in parts reddened and turgid from cold (and, I might add, in a few inflammations), the contrary will be the case; in the latter, we can have no difficulty in supposing that the circulation is languid: is it not therefore a legitimate inference that in the former it is not?

There are some other direct phenomena which, to my mind, can be ill explained upon any other supposition than an increased force of circulation, namely, that bandages, applied after an injury, will become tight; that the cornea of an eye, inflamed internally, will be protruded and become hazy. It may be stated, that the weakened vessels do not resist the propulsive power of the heart; but my answer is, that even if a ligature be put upon the main artery of a limb, or the orifice of the aorta be greatly diminished by ossification, the phenomena will not the less take place, and therefore I conceive that the blood is *demande*d by the part, and *directed* to it; and that it is not as a mere result of a debility of vessels that they enlarge.

The distension produced by inflammation shows that there is active circulation.

I will follow this statement further, by saying, that if we divide the enlarged vessels going to an inflamed part, the cause of irritation still continuing, others immediately enlarge, and these even *remote* from the point where the division is made, nay *opposite* to it, as we may observe in cases of ulcer of the cornea; besides, we find the old ones uniting again, or new ones developed, for the same purpose of carrying blood, with a rapidity quite inconsistent with the supposition of weakness, as I should conceive.

The rapid union of divided vessels and development of new ones, in inflammation, hardly to be explained on the principle of debility.

The question, after all, to be determined then, is not whether the vessels are dilated, because that

The question is not whether the vessels are dilated, but

whether they
are dilated
from debility.

Arguments
deduced from
analogy, with
the dilatation
of other
canals, that
dilatation is
not necessa-
rily the result
of debility.

is admitted; but whether they are dilated from debility, which has only been assumed upon reasoning; but it may also be opposed upon reasoning, and reasoning deduced from some strong facts.

Now that we are not compelled to admit dilatation as a proof of weakness, I should contend from analogy, as well as from the fact last mentioned; for we find that the rectum is distended by the fæces, the bladder by the urine, the uterus by the foetus, or, in cases of obstruction, by the menstrual fluid; but in none of these cases are we warranted in believing that this has any thing to do with debility. No doubt, in all these cases, the cavities or canals permit themselves to be distended, or are so from the influence of a predominant force; but we have abundant evidence, that in these cases their powers are not diminished in common, but that they exert a counter-pressure on their contents, and ultimately expel them with force. This may be equally the case in inflammation, or in the less exceptionable instance of the branches enlarging when a trunk is tied. Mr. Hunter went so far as to consider this an *action* in itself, and called it the action of dilatation: to me it seems sufficient to explain the phenomena, that canals or hollow organs endued with contractile powers can accommodate their capacity within certain limits to the quantity of solid or fluid matters they are wanted to contain.

I will grant that if, in every case, inflammation were a disease, there would be nothing contrary to reason in the supposition that the dilatation resulted from debility; but if, in examining the question, it should appear, that precisely the same phenomena present themselves, where the action is one of *reparation*, it would, to my mind, be a sort of contradiction in terms to impute it to debility; and that such is the case, where its only object is to establish union, or repair a destruction of parts, is equally a fact. If, in these cases, I repeat, the phenomena were essentially different, it might alter the conclusion, but they are not; for we find that where the only result of the inflammation is to throw out lymph to repair an injury, there is the same dilatation of vessels and retarded motion of the blood*.

Also from the fact, that there is the same dilatation of vessels and retardation of the circulation, where the only result of the inflammation is to repair an injury by effusing lymph.

This leads me to another branch of the argument, and to consider how far this hypothesis can be reconciled with other phenomena, *exceedingly similar* to those of inflammation, as far as the enlargement of vessels is concerned, namely, the temporary enlargement of vessels in blushing, in the erectile tissues, in lactation. The advocates of debility should point out the essential differences between the dilatation of vessels in these conditions and in inflammation, or should prove

Analogous phenomena, where vessels are dilated, in which there is no ground to suppose debility.

* Gendrin, 1879.

that in these they are debilitated. Nor are more permanent states wanting in which we observe similar phenomena, as the state of pregnancy, or the formation of the horns of stags. If we observe what happens in the embryo chick, we see the transparent parts becoming vascular, and so they do under inflammation, and for the same purpose, to form new. In these processes of formation we see the vessels enlarge, and become distended with red globules; this is nowhere more manifest than in the ossification of bones, and the appearances there presented are precisely similar to inflammation; and the process, in fact, appears to be actually the same as that which occurs when the bone does inflame in fracture: does the natural process arise from debility? is there reason to suppose that the process of repairing does so?—It may be said that we have no *proof* of the identity of the processes mentioned above; and certainly the proof is no better than that of the experiments on animals, namely, the best observation which can be made.

Between those which occur in the formation and inflammation of bone in fracture, there is no apparent difference.

We have been accustomed to connect the idea of increased action with the processes of growth and new formation, and therefore have employed the term to designate those of repair, which appear to be similar; but of this more hereafter. I may next proceed to consider the arguments which have been advanced in support of the doctrine of de-

bility, from the means employed to cure inflammation.

The results produced by the application of remedies may very strictly be considered as *a series of experiments*, provided we know what the qualities of those substances are. Now, if we find, on the application of a known stimulant, that we increase an inflammation, it becomes probable that the actions are already too great, and *vice versâ*, and that very many inflammations *are* increased by known stimulants, I believe no one will deny. This may be carried further; for we find that the same application which would increase the inflammation in the beginning will lessen it after a time; if so, we cannot believe that the part is in the same state at both these times; if not, then—if it is contended that the vessels are weak at one time, we must suppose that they are in an opposite state at another, it matters not which; but it is sufficient for the argument that they cannot be considered as always weak, and, consequently, that inflammation *can* exist *without* weakness of vessels*.

Arguments which may be deduced from the effect of remedies which are a series of experiments.

I may be allowed here to say, that a great deal has been assumed with respect to the qualities of remedies: if it had been contended that cold was a stimulant, or that heat was a stimulant, and

* These arguments and these opinions, which I supported ten years since, I am happy to see confirmed by Andral, p. 55, et alibi.

acted by producing contraction of vessels, it might, perhaps, we will say, be conceded; but it may be difficult to admit both. It is too much to say, that sugar of lead, turpentine, spirit, vinegar, opium, argent. nitr. &c. all act by exciting contraction as well as linseed-meal poultices and tepid fomentations; and yet it is undeniable, that these and many other apparently opposite remedies are serviceable in inflammation. But are they all serviceable in *every* inflammation? the answer is, no. Are they all useful in *any one* inflammation? the answer is, no. Are those that are useful in any one inflammation, equally so in *every stage* of that inflammation? the answer is, no. The conclusion then appears to me to be this, that inflammation differs essentially in its nature, and that no one exclusive condition of vessels produces it; and, if we regard the differences in appearance, in product, in intensity, and in duration, which are so common and so undeniable, we shall have further reason for concluding, that it does not depend upon any one cause, such as the debility of vessels, or the want of equilibrium of power between the capillaries and the large arteries.

Not favourable to the opinion that inflammation depends on one uniform state, such as that of debility, or a want of equilibrium between the capillaries and large arteries.

If debility were the cause of inflammation by producing dilatation; as we have the means of producing contraction, we should require no other mode of cure.

It is said that we may either cure inflammation by diminishing the quantity of blood, by lessening the action of the heart, or by exciting the contraction of the vessels of the part; but where would be the occasion for the two former in any

external inflammation if the latter were true? We *have* the means of exciting contraction—why should not these, if efficiently exerted, succeed? but do they not often fail in the most judicious hands?

Again: there are inflammations in which the colour is arterial and the heat greatly augmented; and there are some in which the reverse is the case, even from the beginning. Is it reasonable to suppose that these opposite states are dependent upon the same cause, upon the same state of vessels? If in the one they are weak, in the other they must be strong; but as we find in a natural state of parts that the colour is venous and the temperature low when the circulation is tardy, and the reverse when it is vigorous, it is a fair inference that in inflammation the case is the same.

The opposite states of inflammation, as to heat and colour, imply a difference in the state of the vessels.

I am at a loss to know upon what principle the increased heat of an inflamed part is to be explained, excepting it is upon the general principle that it arises from the influence of the nervous energy, excited by an increased quantity of arterial blood. Now, although it by no means follows that an increased temperature in inflammation may not be the result of a morbid exertion of this energy leading to its consequent exhaustion; yet I should conclude, that it can hardly consist with an actual diminution of these exertions at the time.

The heat of inflamed parts cannot be explained on the principle of diminished circulation.

Phenomena
indicative of
increased
energy or ac-
tion in in-
flamed parts.

There are many facts which further tend to the idea, that there is often in inflammation an increased exertion of the vital powers; for independently of the phenomena of formation of new parts, to which I have alluded, and of increased secretion, to which I have not, but which, in the case of lactation, flow of saliva, &c. we have been apt to consider, and not without reason, an increased action, there are two or three other circumstances I would mention. One is the increased *growth* of hair on inflamed parts*; another is the result of an experiment made (for a different purpose) by Drs. Sillar and Hood of Liverpool. They introduced a piece of boiled flesh into a wound in the thigh of a dog and brought the edges together; it was found, after thirteen hours, to be partly decomposed and partly fibrous. Into the same wound they put another piece, which, after seven hours, was observed to be escaping in pulp through the lips of the wound, and on examining it, it was found that the whole was already decomposed into a soft mass, in which no trace of fibrous structure could be detected. This difference they ascribe, and I think justly, “to the vitality of the wound being increased by the subsequent inflammation†.”

* Hennen's Mil. Surg., p. 265, first edition.

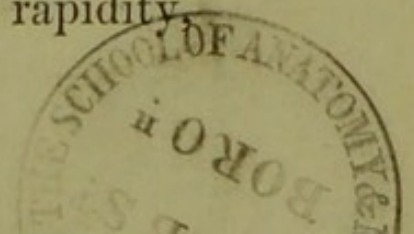
† Lond. Med. and Phys. Journ., March, 1822.

Mr. Hunter, when speaking of Boerhaave's theory, has made an observation which will apply more or less to every case, namely, that if there were but one final cause of inflammation, there would be but one kind; and I think if no other arguments were presented against the doctrine, the differences in the arrangement of the vessels, in the colour of the inflammation, and in its products, would induce the conclusion, that one simple principle cannot account for all.

Also the different arrangement of vessels and products of the inflammation.

Without thinking it necessary to accumulate further argument respecting the final cause of inflammation, I should be much disposed to believe that it is, in many, probably in most, an increased action or effort of some kind, although I would not be understood to say that it is a muscular action of the vessels on their contents. I believe that there is an increased effort of the part, even when its powers are weak; and in supposing this there is no absurdity, for convulsion is undeniably an instance of an increased action, existing as well when there is great weakness as when there is much strength. That there *is* increased action, we may judge from the results which we see in new growths, in increased secretions, &c.; but it may as yet be impossible to define in what it consists. We know that under the influence of a hot sun a vegetable will grow with rapidity.

Conclusion: that there is an increased effort or action in inflammation, commonly speaking, but that this does not necessarily suppose muscular action of the vessels;



and that the dilatation of vessels arises from the demand for blood in an inflamed part.

and we shall not, until we can find a better, use an objectionable phrase when we say that there is an increased action in it; yet it is not necessary to connect this with the muscular action of vessels on their contents. We also know that when an increase of natural secretions is to take place, as from the salivary or mammary glands, the vessels leading to them dilate—probably it would be incorrect to apply either the term increased action, or relaxation, to them. They enlarge in consequence of the demand made by these glands for a fuller supply of blood, through the influence of sympathy felt between the part where the actions are performed and the vascular centre; and I cannot myself see any difference in the principle on which they dilate in inflammation.

SECTION III.—*On the local Symptoms of Inflammation.*

There must be some cause for inflammation; in many instances this is cognizable: it is more immediately produced by some known agent, which, in technical language, is termed an irritant, and its action irritation.

This state of irritation may subside, or be pro-

longed; if prolonged, the state of inflammation occurs: the exact point when irritation becomes inflammation, it is hard to determine.

The obvious symptoms of inflammation are red-Symptoms of inflammation.ness, heat, swelling, and pain, varying much in degree and kind.

The *redness* is an universal symptom, and REDNESS.arises from a larger quantity of blood and of red globules being contained in the vessels of a part.

This state is termed *congestion*, and is con-CONGESTION.tinued while the inflammation lasts; but as there may be congestion of the vessels, as in blushing, &c., without any other symptom or result of inflammation, the state is often with great propriety distinguished from it. There are, however, I may observe, states of permanent *diseased* congestion, such I take to be the red noses of intemperate persons, &c.

The shade of colour varies according to the proportion of blood possessing arterial or venous properties, or the addition, perhaps, of other fluids, as bile, &c.

The *heat* may, by rational analogy, be ex-HEAT.plained, on the supposition that the actions of the part are increased, whether of its nervous or vascular system, or both; for it probably proceeds from an increased excitement of the former, supported by an increased circulation in the latter.

Observations
on the sen-
sation of heat
of inflamed
parts.

The sensation of heat is to be distinguished from its formation; it seems to be increased, whether the actual heat be so or not, and in no proportion to that, and is very remarkable in gangrene, in which the nerves are undergoing destruction. A burning sensation is not, I think, infrequent in some cases of gangrene, where the part is actually cold. In some degree it may be owing to the great increase of the sensibility, from which any given cause will produce an increased effect, and hence an ordinary temperature will give *pain*. It has been maintained, that parts which naturally do not perceive heat, do not when inflamed; that the mode of pain in disease is analogous to the mode of sensation in health; but that is not to be admitted without reserve, for the pleura gives the sensation when inflamed, and in enteritis it is excessive.

On the PAIN,
its varieties,
cause.

Pain can only be considered as *one* of the effects produced by the altered state of the nerves in inflammation; but we quite want facts at present to be able to discuss the important subject of their state in, and influence upon, the production of inflammation; but the mode of pain will vary according to the nature of the cause, the part, the kind of inflammation, and its stage.

It has been explained by the sudden tension of the nerves, from the swelling, or the pressure made upon them in unyielding parts; but then it should

be in proportion to this tension or pressure, which it is not. The pain in the inflamed pulp of a carious tooth which is not pressed upon is as great, or greater, than in the periosteum which is. The pain in the free mucous membranes of the intestines is often as great as in the pleura. There is often little pain in large soft nodes, thrown up in a day or two, and a great deal in small hard ones, which are long in forming. Besides, this will not explain the peculiarity of pain,—why it should be sharp in the pleura, burning in the skin, and aching in fibrous membranes.

Before we make up our minds on this point, it may not be amiss to inquire what is the object of pain being felt at all. We can hardly suppose the benevolent Author of our being would allow it, without some useful purpose; and without any disposition to question its necessity in a moral sense, I should also be inclined to affirm that, in a physical, it has its uses; nay, is indispensable. By it alone, in many instances, we are warned to avoid injurious impressions; and I would ask how the extreme sensibility of the sole of the human foot can possibly be accounted for, unless it were to guard the individual, particularly in the state of nature, from incautiously inflicting a wound, by placing it in a dangerous situation? And I would beg farther to suggest *how frequently* such mischief is incurred when paralysis has deprived

Uses of pain
in a physical
point of view.

the person of this necessary gift. Now, to apply this to the present purpose. In a state of health there would be no advantage in that important part of our system, which Bichat has termed the *vie organique*, communicating any impression to the sensorium, but the contrary. In disease, in inflammation, however, were this not the case, we should proceed, without any intimation of our danger, to do that which would prove inevitably destructive. The property of communicating pain, therefore, is beneficially imparted to all parts of the body; but it is hardly capable of being explained by any reference to the size of the nerves, or any mechanical affection of them. It should be remarked, that the degree of pain is not in any ratio to the size of the nerves going to the part, nor is the size of the nerves increased during inflammation, although that of the vessels is. Mr. Hunter refers it to the disturbance of the *materia vitæ* of the part; but it is difficult to separate this from the nerves themselves. Nor is pain only produced, but the sensibility of the part is greatly augmented to all impressions; so that those which were either pleasurable or negative before, become painful and exciting: to the propagation of this increased excitement to the system, the sympathetic affection may be much attributed, though not through the *nerves of sensation*, as the phenomena in paralysis prove.

I think it is probable that the first change which takes place is in the nerves, the second in the vessels; for when inflammation spreads, as in erysipelas, the surrounding parts which are to be attacked are very tender before they exhibit any apparent alteration of the vessels.

The first change in inflammation is probably in the nerves; that of the vessels follows.

The *swelling* is found to arise partly from the vessels being more distended with blood, and partly from the matters which are separated from it into the cells of the cellular membrane, namely, lymph, serum, or other substances. The *throbbing* has been accounted for on the supposition, that it arises from the inflammation being situated in the neighbourhood of arteries of a size sufficient to pulsate; for example, in the cellular membrane. This explanation, however, will not suffice; for there are frequent instances of abscesses forming in cellular membrane without any sensation of the kind. I have had reason to know this from my own personal experience, in an acute abscess, consequent on inflamed absorbents.

SWELLING.

THROBBING.

SECTION IV.—*On Sympathy, especially local.*

The body consists of an assemblage of organs, the functions of which are each more or less essential to the healthy and vigorous action of the

Nature of sympathy.

whole. They are so connected that the system at large can both feel the influence of any impression made on a part, or any process going on in it, and can communicate to it an influence resulting from its own state. Between several parts also, whose functions are especially connected, a particular communication of feeling and action exist. This connexion of all the parts with each other, and of several between themselves, is most probably effected by means of the nerves, at least there is every reason to believe so; it is denominated sympathy, and exerts a most material influence on the phenomena of disease.

With respect to the sympathetic affection of the *system*, I have partly discussed it under the section relating to the accordance of the local and general affection, partly under the head of Sympathetic Fever and Irritation.

Local sympathy in inflammation.

Inflammation could not take place without it.

Local Sympathy.—With respect to the *local* influence of sympathy, it may be stated, that the production of inflammatory action in any part depends upon it; because it is manifest, that whatever source of irritation might exist, there it would remain, and the parts, too, continue as they were, unless induced to some action, and this could not extend beyond the immediate limits of that source of irritation unless by sympathy; we

find, however, that it does so extend, and the processes may be observed.

If, for instance, a part is injured from any cause, there is an attempt made to repair it by the effusion of organizable lymph, and the conversion of this into animal structure: to effect this an increased flow of blood to the part seems to be required, which is accompanied with those phenomena of increased heat, sensibility, and, it may be presumed, vital energy, which have been elsewhere stated*. It appears to be from the influence of sympathy that the vessels leading to it consent to enlarge and transmit the requisite quantity of blood; and here I may remark, that in this more discrimination is displayed than those would suspect, who question the *design* of the various phenomena which occur in the animal system to repair injury. Thus, let an irritating particle lay upon the conjunctiva, or Schneiderian membrane, we do not find that there is merely an increased flow of blood to the part where that particle is situated, but there is instantly such a determination to the lachrymal gland as to produce a deluge of secretions to dislodge it.

Phenomena where an injury is to be repaired;

and proof that the laws by which they are governed are intelligently adapted to the purposes for which they are intended.

If the injury is considerable or important, the heart itself increases its efforts to send blood, while

Every part of the vascular and nervous system accommodate their actions to the necessity produced.

* Final causes.

in many other parts of the body the vessels and nerves diminish their action, in order that a greater supply of the nutritive fluid, and the chief exertion of vital energy, may be concentrated on that where the new process is going on. The phenomena which occur locally constitute inflammation, those in the system sympathetic fever. I say nothing of the affection of other organs here.

The sympathy may be in due degree, or excessive; if the latter, what are the results as regards the vessels?

When the sympathetic actions of the part and of the system do not exceed a due degree, they are not only not injurious, but useful and necessary; but supposing they do exceed that degree which is so, what will be the consequence? That much more blood will be brought to the part than it can dispose of, and with an undue degree of force; both which circumstances disturb the action of the minute vessels and prevent them from performing their task. But the efforts of the system will be in proportion to the necessity of repairing the mischief, and the difficulty of effecting it. The struggle, therefore, on the part of the system increases, as the mischief itself increases from the very efforts made to remedy it, and disorganization, as it is termed, ensues; *i. e.* the vessels are so overstrained by the influx of the blood, so disabled by over-exertion, compressed by surrounding effusion, or perhaps actually ruptured, that they are disqualified for their proper offices, while fresh efforts are made to obtain the object.

Many circumstances belonging both to the part and to the general system materially modify the extension of the sympathetic action, but in this place I shall confine myself to the *former*.

Circumstances which influence the extension of sympathetic action.

Continuity.—It is found, as might be expected, that inflammation spreads in the part, whatever it may be in which it originates, by continuity, as it has been termed, but not always equally in every direction.

CONTINUITY.

As the parts of which the body is composed generally consist of different tissues, the inflammation may be produced in one (or more) of these, and if in one, it will be found that the inflammation will have a *greater* tendency to spread in that particular tissue than any other; for as the different parts of that tissue have a greater disposition to sympathize with each other than any other parts in health, so they have in disease also.

When these tissues are arranged in surfaces, as membranes of any kind, we find this disposition to be particularly strong; nevertheless it is modified by particular circumstances. First, The degree to which the surface has been liable to impressions: thus the internal membranes have a much greater tendency to inflame throughout than the conjunctiva or the urethra, which are constantly exposed to irritating impressions; and if the internal have been accustomed to preternatural impressions,

Especially on surfaces.

Circumstances which tend to check it.

Their being accustomed to impressions, more or less.

Their vital properties being different in different parts.

The gradual exhaustion of the disposition.

The formation of a barrier of lymph.

In organs, disposition often terminated by their envelope.

I think they lose their extreme disposition to inflame, as is proved by the result of paracentesis, when the serous membrane of the abdomen has been long exposed to the pressure of a large bulk of fluid. Secondly, Different parts of the same surface, in some instances, possess different vital properties; thus different parts of the alimentary canal perform different functions; form different secretions; evolve different gases; are inhabited by different worms, and infested by different diseases; and this operates as a powerful cause in checking sympathetic action. Thirdly, The disposition to spread seems to be gradually lost on surfaces, becoming evanescent like a ripple on a pool. And lastly, If lymph is effused and becomes organized, it interrupts the continuity of the surface and becomes a barrier.

Organs, in contradistinction to surfaces, being likewise continuous in their texture, inflammation will more readily extend itself through them than invade another, which is defended, to use an expression of Bordeu and Bichat, by an atmosphere of cellular membrane; nevertheless its progress in solid organs is generally slower than on surfaces.

While some inflammations are confined to the surface, or the organ they attack, others extend to the neighbouring parts: this may be partly owing to the nature of the cellular membrane, which is

adjacent; for if it be of the nature of that dense structure which is exterior to mucous membranes, blood-vessels, &c. it opposes a strong barrier to the extension of disease*; while loose cellular membrane often serves to convey it, especially as M. Gendrin states, if it passes from a surface into the interior of an organ.

In what cases it chiefly passes reciprocally from envelope to organ.

Inflammation certainly affects parts by contiguity as well as by continuity, although contiguous parts often resist it; but when the cheek swells from an inflamed tooth, or the scrotum in strangulated hernia, more especially when, as I have seen, a spot of inflammation terminates in mortification, just opposite to that of the intestine (although the action had never been considerable in the scrotum), we have instances of inflammation from contiguity. The resistance, however, of disease by neighbouring parts is commonly so strong as to afford reason, in conjunction with other phenomena, for doubting how far the vital powers and properties of different organs and tissues are owing to the nerves; for it will be observed, that those parts which so strongly resist the progress of inflammation are supplied in many instances with both nerves and blood-vessels, not only from the same trunks, but from the same branches, and

CONTIGUITY.

How far the separate vital properties of organs resist the extension of disease;

* Bichat, Anat. Gen. v. i. p. 87.

and how far
their proper-
ties ARE pecu-
liar in each
organ.

even from the same twigs. It seems probable, as Bordeu maintained, that the vital power of particular organs is resident in them, a doctrine which, looking at the caducity of some organs, as those of generation, and the longevity of others, as the tongue, seems consonant with facts, while the nerves ought to be considered, as Mr. Hunter has stated, *chordæ internunciæ* in the truest sense of the word.

Sympathy of
function.

That inflammation should extend in the organ in which it originated, in preference to another, we might expect, as the same consent of feeling which influences the part in health (of which the breast affords a good example) would in disease also; but it is not only so with respect to every part of an organ, but it applies to similar organs where no connexion exists but by nerves; thus the stimulus of strong light falling on one eye affects the other: and it is well known that in disease they are disposed to sympathize, from the influence of a cause applied to one only. The same principle may, with great probability, be extended, as Bichat has insisted; and similar parts, such as membranes, participate in an inflammation excited in one. Sympathy of function has a powerful influence on the production of disease, but of it we know too little to offer any certain information, and it is a subject which demands large consideration, if any.

How far the particular *arrangement* of vessels in organs may determine the character of that organ, as regards its natural functions, is a problem not yet determined, and therefore it would not become me to express any positive opinion on the point; but undoubtedly if it were so, the character of inflammation, when it occurred, would be likely to be modified by it. I am, however, inclined to believe that the functions of the organ more depend upon its vital properties and intimate organization; and whether the peculiar elaboration of the secretions, or other functions, depend upon the latter or not, from the former, I believe, arises the peculiarity of influence which each organ is capable of producing on the system in health or disease, and which is so remarkable in relation to the testis.

How far there is reason to suppose the peculiar properties of organs depend upon the arrangement of vessels.

But besides the circumstances which are peculiar to each tissue or organ, tending in a greater or less degree to admit or to check the progress of inflammatory action; it also appears that there is a *general tendency to resist disease*, and especially inflammation, counterbalancing the disposition to extend; hence it is, that it is so often very limited in its effects. If it were not for this law of the economy, nothing could prevent the body from being overpowered by it on every occasion: the effusion of lymph is an instrument employed for this purpose,

There is also A GENERAL DISPOSITION TO RESIST DISEASE, counterbalancing that to spread, of which, in inflammation, THE EFFUSION OF LYMPH appears to be an instrument.

but the disposition alluded to is probably one great cause of that effusion.

It is much connected with strength and soundness of constitution.

This disposition to resist inflammation is certainly much connected with strength; I do not mean merely muscular strength, but soundness of constitution; and it is perfectly remarkable to what a degree it sometimes extends; thus, in the case of a healthy man, we often see the body covered with wounds and injuries, in none of which more inflammation shall take place than is just necessary to repair the injury.

It is deficient often, where there is weakness or unsoundness;

On the other hand, we find that the disposition to resist disease is often very small; and in the same proportion, that of the part to inflame, and the system to suffer, by sympathy, is proportionably increased: this may arise from a double cause,—simple weakness, or unsoundness of constitution, more particularly from both united; but they may exist more or less independently of each other.

* Weakness, simply as such, will increase the disposition to sympathize, and on this principle it is found that depletion will prove extremely injurious in particular cases; that weak persons fall victims

* I have been led here to anticipate remarks, which probably would have been more in place under the head of Influence of the Nervous System on Inflammation; but it appeared to me to be as well to insert them here, and refer back to them.

which others resist ; and that the nervous system is affected in a particular degree.

Weakness of the constitution, which results from various causes to be hereafter considered, is the main reason why the restorative processes in the system are imperfectly performed, and consequently becomes a cause of the system and parts suffering beyond their due degree. When weakness and unsoundness are combined, there the effects of disease will be most felt.

Irritability, which means no more than an undue tendency to sympathize, often results from weakness, whether naturally existing or artificially induced ; but it does appear that, independent of weakness, some individuals naturally have more irritability than others.

OR IRRITABILITY of constitution, which often results, but not necessarily so, from the former.

The circumstances above stated have a most important influence on disease ; the explanation of many points in pathology depends upon them.

Mr. Hunter lays down the position that health is lost by disease ill ; nay, more, upon this principle he has founded the practice, that it is better to wait some time after an injury requiring amputation, before an

Mr. Hunter's opinion on the subject of primary amputation erroneously deduced from his reasoning on this point.

operation is performed, until the patient has been brought to the actions of disease,—a practice sanctioned by many eminent surgeons, but disapproved by the result of the most extensive series of experiments which has ever been offered to the world. Perhaps, since history has commemorated

the events of which it has been the theatre—I mean those which have been afforded by the late wars in Europe. It is probably not the state of health and strength which are adverse to the due processes of restoration, but the plethora which so often accompanies them; and we do not, perhaps, sufficiently consider, that in performing operations we too often exert ourselves to prevent, almost entirely, the reduction of the circulating fluids by hemorrhage, which is one of the modes provided by nature to obviate the mischief occasioned by an undue quantity. We are bound not to hazard our patient's life, or full recovery; but I believe we often carry our interference much further than we ought, in preventing it.

Strength, then, if unaccompanied with plethora or unsoundness, is not to be feared, because we have it in our power to reduce it; but certainly if the constitution is bad, it is an advantage to correct the error, if possible, before an operation is performed. Weakness, on the other hand, is not to be apprehended, when it is merely the natural result of disease, when it is not connected with unsoundness of constitution; when there is no remarkable irritability, and when it is not excessive; and, under such circumstances, if we have to perform operations, we do not find it necessary or desirable to give our patient tonics or cordials to prepare him for it. The fatality which

Neither strength nor weakness are to be feared unconnected with other circumstances, unless the latter is excessive.

attends secondary amputations proceeds less, I should conceive, from weakness simply, than from the inflammatory diathesis which the processes consequent on the injury have produced on the constitution.

On this subject of strength and weakness, with reference to inflammation, Mr. Hunter has said much; but I cannot say that his opinions, if accurately examined in every part of his work, are on this point always consistent; and undoubtedly the conclusion he formed on the subject of amputation long proved a very fatal one.

SECTION V.—*On general Sympathy, the Accordance of the general and local Affection, and Sympathetic Fever.*

That the constitution sympathizes with any local disease, and certainly with inflammation, and that every local disease is more or less influenced by the state of the constitution, are points now perfectly established; but with reference to our present purpose, it is of consequence to ascertain to what extent this principle applies.

It appears probable, from considering the phenomena which present themselves, that the affection of the system accords with that of the in-

Reason to believe that the affection of the general system accords with that of the part in degree.

flamed part in kind, if not in degree, and commonly in both. It is a natural supposition that it should do so; but the principle has not, as far as I know, been distinctly recognized, excepting by two authors*. It is a matter of some consequence to settle the principle, with reference to the proper understanding of the nature of sympathetic fever.

With respect to the *degree* of the constitutional affection, it certainly varies, as has been explained, from the greater or less power of resistance, or the reverse; thus a given extent of injury shall produce a greater influence on one man than on another; but in the same man, the greater the local injury is, the greater is its influence on the constitution. Of course, the consideration of the degree of the injury includes the importance of the part.

It must also be understood, that the impression on the system does not always manifest itself in the same way; but this point, to avoid repetition, will be reserved for another place†.

But as regards the kind of constitutional affection, it may be observed, that there are many phe-

* Bichat, vol. ii. 502.—W. Phillip on Febrile Diseases, vol. iii. p. 108.—Mr. Hunter's opinions are not clear upon this point, vol. i. p. 460; vol. ii. p. 208 and 211; and Dr. Thompson does not seem to go this length, p. 90.

† Sympathetic Fever, &c.

nomena which support the opinion, that it varies in accordance to the nature of the local affection. Thus a clean cut, a lacerated wound, a contusion, a sprain, a limb suddenly removed, the bite of a venomous animal, shall all produce a peculiar effect at the time they happen, and the actions which ensue differ in each, general as well as local.

Again: we not only aggravate or lessen the *degree* of the general affection in proportion as we increase or diminish the local inflammation, but what is more to the present purpose, we change the *kind*, by laying open foul abscesses, exposing sinuses, amputating mortified limbs or compound fractures, by which we do not put an end to local disease, sometimes do not lessen its extent*, but we change its nature, *and the constitutional affection as invariably alters*; and I cannot help remarking in this place, that if after a severe injury or amputation there is no reaction of the constitution, it is always found that there is no action of the stump or part.

If mortification occur from injury to an individual previously healthy, in a few hours he shall be reduced to the same state as another in whom the affection originated from long error in health.

* I might cite the West Indian practice of cutting out carbuncles, when the negroes have contracted them by eating the flesh of diseased cattle: *v. Travers*, 371.

A man shall have a compound fracture, and in the advanced stages of that calamity bleeding would sink him: let a vital organ inflame from cold, or any other cause, and the same depletion which a few hours before would have destroyed him, now will save his life.

If the secretions cease in a part from its being inflamed, those of the whole system are arrested or checked. When they recommence in the part, they are restored throughout the body, whether it be pus now formed or the natural secretions; if, by treatment, the period when the secretions take place from the part should be protracted, as sometimes happens, the return of the general secretions is also delayed; while, if we can accelerate the one, we hasten the other likewise: if the local secretions are profuse and unhealthy, so generally are those of the system; and in this way, perhaps, the colliquative sweats and diarrhœa which occur under profuse discharges may be explained*.

And it should
appear in
kind also.

My conclusion from the foregoing and many other phenomena is, that there is such an accordance between the actions going on in the part and in the system, as if they extended over the whole body; and that any means which relieve the part

* In some inflammations, as in pleurisy, the blood is invariably buffed and cupped; in others, as bronchitis, it is not: whence does this arise but from the same accordance?

will relieve the whole, or those which will relieve the whole will relieve the part.

While on this subject, it may, perhaps, not be amiss to consider the question of sympathetic fevers, with relation to their resemblance to, and difference from, other fevers; but in the first place, I may observe that *fever* is not always the result of an injury or injurious impression, as more particularly explained under the head of injuries, nor is it the only result in many instances; and I may further observe, that the idea of fever is perhaps too much connected with that of vascular action, and the degree of the one measured by that of the other.

Fever considered in conformity with this principle.

Fever, like inflammation, should be regarded as a simple expression, signifying the existence of certain phenomena; but the varieties in fever depend upon other affections being grafted upon it, or upon those phenomena which it usually presents being variously modified. There is no one symptom taken separately which presumes its existence, and therefore no conclusion where it does exist can be drawn from the nature, nor can we measure its degree, or appreciate its kind, from any one symptom.

What may be implied by the term fever.

If it be true, then, that the constitutional affection varies in nature as the local, then as there are many and very different kinds of inflammation,

Differences between sympathetic and idiopathic fevers, and causes of that difference.

there will be numerous modifications of the systematic affection called fever. Many eminent pathologists * lean to the opinion that the fever which accompanies inflammation approaches nearly, or even entirely, to the characters of the idiopathic species. This to a certain degree is true, because all fevers, let their cause be what it may, whether idiopathic or sympathetic, are liable to be modified by the state of the nervous system, or by that of the hepatic, gastric, or intestinal systems; but although there is an unquestionable resemblance, resemblance is not identity, and in many essential particulars they differ.

Local affection equally influenced by the state of the constitution.

As the constitutional affection is influenced by local disease or injury, so is the latter by the former, and we may suppose *simili modo*; but here we have access to fewer facts. One of the most unexceptionable proofs, however, is to be found in the history of amputation; for if that be performed after injury (previous to the accession of fever), it generally does well; whereas if soon afterwards, the state of the constitution becomes the cause of the stump inflaming badly, and often doing otherwise.

The production of the secondary inflammations and suppurations which have of late attracted

* Particularly Pinel, Dr. Thompson, and Prof. Cooper.

much notice may probably be greatly influenced by the cause now stated.

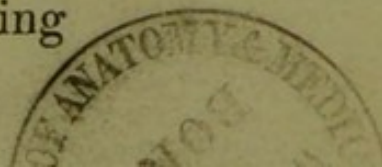
SECTION VI.—*On the Types of Sympathetic Fever.*

It is very certain that the type of sympathetic fever often approaches to that of idiopathic, and this may be, because the principal actions of disease or recovery proceed more or less in a given train; but if they are materially modified, it is necessary to attend to the modification. Thus, from the influence of marsh miasmata, and from the passing a bougie, very similar states of fever will be induced, so that an experienced practitioner might hardly distinguish them; but they differ, as appears from the effects of the same cause acting upon them, I mean as regards the effects of medicines; they also differ in this, that in the latter we have reason to expect many returns, in the former this is highly improbable. They differ in their cause, and however similar, differ in their nature.

Question of the identity or difference of idiopathic and sympathetic fevers considered.

Differences arising from the nature of the causes.

The congestive state of fever, in which reaction has not decidedly taken place, has been compared with the state immediately consequent on a severe injury; but in the former, the system is labouring



From the
state of the
blood and
nervous
system.

under a cause *which has vitiated the blood* and impaired the nervous energy; the system must work out its cure from this with such assistance as can be afforded; but in the state arising from injury, the whole frame may be healthy, excepting from this cause alone, and if we sever the injured part, or obviate the injury, the system promptly recovers itself. The man who has received an injury, as a severe gunshot wound, under the shock of which he sinks, will often possess his intellect as clearly and as strongly as ever he had it, to the last moment*; while the nervous system of the plague or fever patient is equally incapable of intellectual as of physical effort. This denotes important differences in the state of the *nervous* system; and who will say that the poisoned mass of blood in the plague patient does not also widely differ from the healthy fluids of a wounded soldier?

Differences
in the cha-
racter in
many im-
portant parti-
culars con-
nected with
the local
disease.

The state which exists when reaction has occurred in idiopathic fever (still attended with prostration of strength) has been compared with the state which after injuries also ensues when reaction has taken place; but in idiopathic fever we have probably, as before stated, a morbid condition of the blood; we have a cause acting which will endure a given time, and produce in a greater or less degree a given series of effects; in

* The deaths of many illustrious men prove this,

the other case it commonly happens that as we are able to remedy the local evil, or to remove it, so we may change the state of the constitutional affection, or entirely cut it short: the *apparent* character of the fever, for example, attendant on compound fracture, shall very much *resemble* the fever called typhus; but the surgeon amputates the limb in the former, and the next day it often happens that the dry tongue has become moist—the delirium is gone—the appetite is returned—the countenance is changed—the man hardly appears the same. All this arises from the effect produced by the injured part: in the one case the whole system is highly diseased, in the other it is often not so, and it is the part which produces all the effects. In strangulated hernia I have seen the influence of the stricture on the bowel hurry a man through the stages of sympathetic fever, if fever it might be termed, and render him a corpse in twenty-four hours; yet, could the stricture have been set free, those symptoms so formidable and destructive might have been at once put an end to.

Inflammation may supervene in idiopathic fevers, as occasionally happens in common continued fever, and invariably in small-pox; still it is not the pre-existing state upon which the fever depends; for in the latter the fever exists in all its violence before the inflammation appears on the surface;

No proof of inflammation being the cause of idiopathic fever, although it may subsequently arise.

and in the former we have no proof of inflammation at the commencement: the actions differ from those attendant on simple inflammation of an internal organ, and we have often strong evidence of a cause producing it, affecting either the blood, the nervous system, or both.

Idiopathic fevers have been distinguished into types, according as the nervous or alimentary systems are particularly wrong, or the vascular system excited, or the blood corrupted; but it may be observed, even of these, that there are a great many different kinds, although there may be only a few *leading* differences. With respect to sympathetic fever, it differs most materially in a far greater number of cases: it will be much influenced, no doubt, by the previous or accompanying disposition to disorder of the nervous or alimentary systems, be it temporary or be it permanent, as is often evinced by the effects of situation and air on wounded men; but sympathetic fever produced by local inflammation, whether that be spontaneous, or the result of accident, will also be influenced by many other circumstances which belong to that inflammation, such as the nature of the organ; the disposition of the inflammation to spread or be limited; the tendency to any particular mode of termination, or the existence of the adhesive, suppurative, ulcerative, or gangrenous processes; the confinement of matter or sloughs;

Circumstances which influence the character of sympathetic fevers more particularly stated.

the particular nature of the inflammation, as in gout, &c., as well as many other circumstances which cause it to vary more or less. It would be vain to attempt here a separate description of each shade of difference, but it is very important that the fact should be recognized.

SECTION VII.—*On Irritation and Irritability.*

It may not be amiss in this place to offer some remarks on the terms irritation and irritative fever which have been lately adopted by several English pathologists, among whom are names of the highest rank in the profession. It is a question of terms, but to me it seems that sympathetic affection will much more accurately include *every* alteration of the system induced by local derangement, and that the term sympathetic fever may be applied with more advantage to the *greater number* of those alterations in the constitution, induced either by local injury or disease. To the term irritation, as a substitute for inflammation or fever, many strong objections apply. What is irritation, used in the common and literal acceptation, but the effect of an irritant? it means neither more nor

The terms sympathetic affection, or sympathetic fever, seem preferable to the term irritation, as lately employed.

less. Is the idea conveyed by this word more correct than that which implies a consent in feeling (and virtually in state) between all the parts of the body, and especially as existing between all the parts, and that which is injured or peculiarly impressed in any way? It may be repeated, will this term irritation include every case; can we say with truth that a violent contusion, or that a mortified part, are irritants? If a depression of *power* and of *action* are the results, irritation can hardly be said to arise from their influence; but it is quite true to say that a sympathetic affection of the system may.

Again: the term irritability may be applied, with perfect precision, to denote a state of the system in which it is disposed to sympathize in a more than ordinary degree; and irritation might be understood well enough, as applied to the impression produced by many local injuries, as an inflamed bursa, or a splinter in the finger; but would badly serve to express that state which results from such injury as above stated, destructive actually of the irritability of a part, and often inducing the immediate or speedy death, not only of that, but of the whole body from this destruction; and it surely cannot be correct to apply that term to any less degree which is not applicable to the greater.

To the term irritation, as signifying the state of a part to which any injurious cause is applied, before the altered state of that part actually becomes an inflammation, there may in many instances be no objection; it seems also highly important to recognize the fact, that when the constitution is particularly irritable, or the cause, if I may so express myself, particularly irritating, either from its own nature or long continuance, the consequent fever will be attended by peculiar symptoms, and especially the actions will be greater in proportion than the power, and will be excited in a disproportionate degree by slight circumstances, and that this constitutes one of the most important modifications of sympathetic fever; but to include all the phenomena under one common term, irritation, is far from clearing our views respecting them; and to use the language of a very able Reviewer, as applied to Mr. Travers's explanation of the term, "we cannot persuade ourselves that we have received any more precise or clear notions from it; but this may be owing to our not comprehending the nature, or not understanding the effect, of irritation as contradistinguished from inflammation*." In point of fact, where are the limits to be found? if we take Mr. Travers's work as an exemplification, there will hardly be a case of inflammation which is not there included under the

Sense in which the term irritation may be advantageously employed.

* Ed. Rev. July, 1826.

denomination of irritation*. By many, I am persuaded, the distinction has been assumed, because the curative means, *usually* considered as anti-inflammatory, do not succeed; but, if so, is not this begging the question? Are there not many inflammations, and inflammatory conditions of the system, which are benefited by means opposed to those which our prejudices, perhaps, rather than our reason, consider as exclusively anti-inflammatory? For my own part, I believe that the explanation of the phenomena is this, namely, that in the state which has been lately so often termed irritation, there is commonly inflammation with an inordinate disposition to sympathize, generally arising from a want of healthy power in the system; and it is most important to understand, that, in this state, the depleting mode of reducing inflammation is frequently injurious, at all events alone, while opium, warmth, and light comfortable food, &c. by increasing the powers, and lessening the sympathy, reduce the inflammatory actions.

The more particular account of Sympathetic Fever will be found under subsequent heads, especially Inflammation from Mechanical Injury.

* It has been lately proposed by another distinguished pathologist, M. Andral, to discard the term inflammation and substitute *hyperæmia*: I must, however, profess my belief that the latter will be found very unmanageable, and I cannot think sufficient objections have been brought against the former to justify its abandonment.

CHAPTER II.

ON THE CAUSES AFFECTING THE SYSTEM GENERALLY, WHICH INFLUENCE THE PROGRESS OF, OR PREDISPOSE TO, INFLAMMATION.

SECTION I.—*Influence of the Nervous System as regards the State of the Mind, Pain, &c.*

The phenomena of sympathetic affection produced by the nervous system have already been considered; it remains to say a few words with reference to the influence of mind and of bodily pain.

Influence of the Mind.—With respect to the mind, there can be no doubt that its influence on the body is most powerful: apprehension, anxiety, despondency, excessive effort, natural want of mental energy, will in all cases of disease produce an effect which often overwhelms a patient, and not only turns the balance in cases that are doubtful, but weighs down the most favourable chances;

that such is the case, the history of all public calamities, retreats, sieges, times of general distress and apprehension, as well as the records of private history, where anxiety for relations, the disappointment of hope, the apprehension of death or mutilation, most abundantly show; and hence it is often one of our most important duties to supply that which Mr. Abernethy has emphatically termed the “best of all cordials,” hope, and to remove, as far as may be in our power, all that can tend to alarm and to depress.

The weakness of nervous energy which we often witness may be connected with weakness of mind; but it is by no means uncommon to meet with great fortitude in persons whose nervous systems shall physically betray them; to see cases where the performance of an operation shall be submitted to, and its preparations contemplated with perfect firmness, yet syncope shall ensue almost on the first touch of the knife; while, on the other hand, there are those, whose iron nerves will endure any torture they may have to endure without terror, and with scarcely apparent emotion. How much and how uncontrollably such opposite states of the system must influence the result of injuries and disease, it is hardly necessary to say.

Influence of Pain.—With respect to pain, it may be a question how far it depresses the nervous

energy of itself. It has been said by Mr. Hunter, that it rouses and excites, and certainly it appears to do so in many cases, of which many familiar instances might be adduced*; while in others it appears to subdue in no less a degree, as for instance, where blows are received on the testis; this, however, may not be merely as pain, for what can be more excruciating than that of *tic douloureux*, of toothache, &c., where there is little comparative effect on the system, neither being accompanied *with the disturbance of any important organ*: while from the passage of a bougie, producing but slight uneasiness, syncope not unfrequently occurs. In all these cases, it seems difficult to separate the influence of the injury of the part from that of the pain which it may occasion; nevertheless, in paralytic limbs we have often an opportunity of judging. A person so situated may place an extremity so near the fire as to burn it, or may accidentally throw boiling liquid upon it, or may suffer a serious wound or contusion; in such an event, the consequences, as far as I have had an opportunity of judging, are not less severe to the part or the constitution than when the connexion of the nerves was perfect; and it may be observed that in paralytic limbs a given impression will produce a greater effect than in others. We have, however, reason to believe

* The pains of parturition, for example.

that pain long continued and severe, independently of the injury of the part, does act prejudicially : the various modes of torture are generally contrived on the principle, that they are to produce great suffering, without much bodily injury ; still, under this suffering, their victims not unfrequently succumb from exhaustion*.

Preparation for Operations.—As connected with the matters now under consideration, though perhaps not exactly in place, it may not be amiss to add a few words on the subject of the preparation for operations ; and here I have briefly to say, that no general rules, as far as I can judge, can well be proposed : in every case, consideration must be had of all the various circumstances which may affect the particular individual ; and as many will produce a two-fold effect, injurious as well as beneficial, determine, as we best may, where the more favourable probabilities lay. Thus, by many we are instructed to prepare a patient by diet, by bleeding, by accustoming him to the habits of restraint and sickness ; while others contend, and in some cases not without reason, that we lose more by depressing our patient's mind, and often bodily health, than we profit him by such measures†.

* For some observations on the uses of pain in the animal economy, see chap. i., sect. ii.

† Ed. Journ. Syme.

If we regard the result of those operations which accidents render imperative, we may well draw a conclusion in favour of omitting preparation ; for we certainly find that they commonly do better with such care as we can subsequently give, than others which have had all the benefit of preparation ; the comparison, however, is not a fair one, for the former in general occur in persons whose organs are sound and healthy, which often is not the case in the latter.

Persons, then, who are to become the subjects of premeditated operations are in general prepared for them by such measures as are well known, and which have for their objects to remove plethora, to purify the blood, and to give healthy and correct actions to the digestive organs ; but if, in obtaining these objects, such an impression on the nervous system as often arises in anxious or timid minds, from the protracted contemplation of a dangerous operation, be produced, it may well happen that the benefit is purchased at too dear a rate, and the object itself, from the same cause, but imperfectly obtained.

Connected with the influence of the nervous system is the subject of strength or weakness ; for this see chap. i., sect. iv.

SECTION II.—*On the Influence of the State of the Digestive Organs.*

A disordered
state highly
injurious.

No part of the alimentary system can be disordered without the rest participating more or less; but it is well known either that one part of the canal is apt to take the lead, or that disordered action of the liver is predominant. It would be quite superfluous and presumptuous in me to enter into any details on this subject; it is my intention only to state, in a very general way, what I apprehend to be the leading principles with reference to inflammation.

Mr. Hunter's
opinion re-
specting the
stomach not
fully con-
firmed.

Mr. Hunter attributed a great share of influence to the stomach; he thought it the chief seat of vital energy, and of the production of animal heat. *All* the claims of importance which he awarded to it cannot be conceded; but it must, nevertheless, be allowed, that it is the principal centre from which good and evil proceed to our systems. Subsequent physiological researches have proved that his opinion, respecting its power of developing animal heat, was erroneous; yet its influence upon this process is remarkable. When the stomach is feeble, torpid, or oppressed, there is general want of power, and universal coldness; the extremities may even be below the temperature of the sur-

rounding medium, if I mistake not. While a cordial given during this state shall in a moment, like an electric shock (to which Dr. Heberden has well compared its effects), kindle heat, and communicate vigour through the whole frame. Such an organ cannot be disordered without imparting an important and injurious influence to every part of the body, and to every process going on in it. If there is inflammation in any part it continues to spread; the blood is propelled with increasing force, and increasing quantity to it; but no efforts of the heart and arteries can communicate that *disposition to the minute* vessels which will enable them to perform the necessary curative processes; they can only obey the demand to send more blood, which, as it cannot be rightly and usefully employed, increases the mischief. But if by appropriate means or medicines we can relieve this disordered state of the stomach, the disposition to healthy action in the minute vessels is imparted, the call for blood subsides, the action of the vascular system abates; in other words, the inflammation recedes, and the fever ceases.

But its influence most important.

The processes of inflammation are to be performed by the minute vessels, and their state depends greatly upon the stomach and bowels. The efforts of the heart do nothing towards repair but simply sending the blood.

There is no case of disorder in which the stomach is not affected; but these observations are, of course, intended to apply where that affection exerts a particular influence. Similar remarks will attach to the other parts of the digestive system; and the profession and the world are under the greatest

obligations to Mr. Abernethy, for disclosing to them, in the most convincing and impressive manner, the truth which so long received an inadequate degree of attention—that health and strength spring from a right performance of the chylo-poietic functions, and that weakness and disease depend upon their disorder and derangement. To his works I may refer with confidence for that accurate and important information respecting this subject, which will be the best guide to a surgeon in the practical part of his duty.

SECTION III.—*Impure State of the Blood.—Humoral Pathology.*

Arguments in
favour of the
humoral pa-
thology.

An impure state of the blood exists perhaps more frequently than we are aware of, but as it is invariably connected with disorder of the digestive organs, the effects which partly arise from both causes are often exclusively attributed to one; but when I see persons in whom every scratch festers into a sore, as in scurvy or scrofula; when I observe that the atmosphere alone will change the disposition of every action; that poisons introduced and acting upon the circulating fluid will induce the most powerful effects upon the

whole system, I must profess myself to be a humoralist, although quite ready to recognize the direct as well as the indirect influence of the digestive organs and nervous system on disease; a doctrine which Mr. Abernethy most perspicuously enforced with reference to many, for although he preferred the general explanation of the phenomena of disease by sympathy, yet he by no means excluded the influence of a depraved state of the blood.

If experimental research often instructs, I believe also it frequently deceives us, because we too hastily form deductions from what *we* deem *conclusive* experiments. Now the opposition to the humoral pathology has chiefly been grounded on the fact, that we cannot discover such an alteration in the circulating fluids as would seem to us to justify the suspicion that it exists. When, however, we see the efforts and the expedition with which the animal economy rids itself of some foreign matters introduced into the blood, which we can recognize by their specific effects, as ipecacuanha or jalap, or by their sensible qualities, as mercury, nitre, asparagus, garlic, &c. introduced any how, we must be strongly prejudiced not to believe that those matters have been contained in the blood, even although in the blood we cannot perceive them. But do not the vital powers quell

Experimental
researches
often de-
ceptive.

or suspend the chemical properties of most substances? Do they not convert the most dissimilar matters into an apparently similar one? May they not prevent these and others from manifesting their specific qualities, which, nevertheless, though modified, are not completely subdued, and may still excite great disturbance in the constitution? And if so, may not the vital powers, with reason, be supposed to prevent or modify the *sensible* alterations in the qualities of the blood in such diseases as scurvy, scrofula, gout, lues, mercurial disease? And if we are compelled to admit such alterations in these, may we not be called upon to allow that it possibly exists in a greater or less degree in many others? The abuse of the humoral pathology has led to great mischief; but if we are content to recognize the truth of the doctrine as far as facts seem to establish it, without, however, grounding any practice on that which we only imperfectly understand beyond what experience will bear out, we cannot err.

Ten years since I found it necessary to advance these arguments, in defence of a doctrine which had long been considered for ever exploded, and which at that time it almost appeared hazardous to defend; a considerable revolution however has since taken place in the opinions of the profession upon this point, and I may refer to the publications of

Mr. Coleman*, Dr. Stevens†, Dr. Clanny‡, and Dr. Prout§, in this country, and M. Dupuy, Bayle, Gendrin||, and Andral¶, in France, for many facts powerfully supporting the truth of the doctrine**; and as will be seen in the course of this work, its influence is in a great many cases kept in view.

SECTION IV.—*Plethora.*

The *quantity* of blood exerts a most material influence on the production and progress of in-

* Med. and Phys. Journ., Nov. 1826.

† Med. and Phys. Journ., June, 1830, and in a paper given to the College of Physicians, containing, as appears to me, facts of the highest importance.

‡ Clanny on Fever.

§ Gulstonian Lectures.

|| Hist. Anat. des Inflammations.

¶ Anat. Pathologique.

** Connected with this subject is another, which I mention because it deserves some attention, namely, how far the circulating fluid, passing through a diseased part, may become altered thereby. The blood passing through the lungs is very probably changed, independent of all absorption or separation of matters. There is some reason to suppose it so in the liver or spleen, and chyle and lymph are so in the lymphatic glands; and when we look at the peculiar alteration which occurs in people suffering under cancer or medullary sarcoma, or other malignant diseases in their advanced stages, the idea does not unnaturally suggest itself that these persons have had their circulating fluids corrupted, either by *transmission* through the diseased part, or absorption, or both. It is not unlikely that the former contributes materially. If true, this doctrine would equally apply to inflammations.

flammation as well as the quality; and as it happens that many are overfed and overfull, it must follow that this will much aggravate any inflammation which may occur. Upon this principle is founded the practice, often adopted, of bleeding to prevent the ill effects of injury. The simple and natural treatment of veterinary surgeons is also chiefly founded on this fact. Bleeding will prevent or cure many, perhaps most of the acute diseases which overfed and unnaturally fed animals are liable to; and pure air, and the food which the fields afford, will cure most of the other diseases which infest them in the stable.

In long continued plethora the reduction of the volume of blood will not replace the party in a healthy state.

In the human being, however, such a multitude of circumstances combine to render his diseases complicated, that it is no wonder we find both the cause and the cure less simple; and on this subject of plethora, I may observe, that where it has long been a permanent habit, the simple reduction of the circulating fluid does not suffice to place the party in a healthy state, although it may much assist in many cases. It often happens, that when we have lessened the excessive quantity, what remains is not pure; besides, the vessels and the organs of the body have been impaired by the long existence of this state; and in some instances such a disposition produced to inordinate fulness of particular parts, that no depletion will prevent their receiving more than a healthy proportion of blood.

Much, very much, has been said on the subject of plethora, but when we look on the condition of mankind in general, although we see every reason to admit the *propensity* to take too much food and stimulating beverage, yet the power of procuring it is denied to the larger proportion, and in a great many deficiency and poverty of means produce deficiency and poverty of blood; are then these unhappy individuals more exempt from inflammation? it were much to be wished they were so; but fever with its concomitant inflammations, ulceration and gangrene (modes of inflammation, it may be remembered), are their sad lot; and even in those who are not the subjects of want, but whose blood, from other causes, is deficient, numerous diseases, and those often inflammatory, are known to occur. I believe those err who think plethora is the main cause, and bleeding *the* remedy in inflammation, taken in an extended view.

Looking at the mass of mankind, the frequency of plethora has probably been over-rated.

Those in whom a deficiency rather than an excess of blood exists, are not more exempt from inflammation.

There are many facts to prove that the condition of plethora is long consistent with good health*, although this condition will certainly predispose to inflammation and will influence its effects.

Persons habitually plethoric may be in good health.

A local plethora often exists independently of general plethora; thus in deformed persons the

Local plethora common.

* In the employment of butchers, for example.—Thackrah on Trades, &c.

lungs or the liver may, from the contraction of the cavities in which they are placed, be pressed upon and narrowed, and in such cases the natural quantity of blood distributed to them becomes disproportionate, and plethora of that particular organ is induced, and often, in consequence, inflammation; or, on the other hand, from want of due resistance in the bones, as in rickety children, more blood may be received into the head than it should have, and in this case a plethora of the brain will result; these are marked and intelligible cases, but others might be mentioned where the cause is not so obvious.

SECTION V.—*On general inflammatory Disposition: and on the reciprocal Influence of the Solids and Fluids.*

A morbid state of the blood a frequent cause of a general inflammatory disposition, more especially if combined with plethora.

A deviation from the natural state of the circulating fluid, either as regards its quality or its quantity, becomes, as has been stated, a powerfully predisposing cause of inflammations of various kinds; indeed, it often happens that the former directly produces them, as we know to be the case in that numerous tribe of inflammations which arise from the introduction of a morbid poison. Hence it is that many individuals are liable to

attacks of inflammation upon every trivial occasion, and often manifest the disposition in different parts of the system, sometimes with very high febrile excitement. It is this state of the system which the common people have so long recognized, and which they characterize by such expressions as “inflammation in the blood;” such a one “has an inflammation all over him.”—The state of fulness is more disposed to produce this than the reverse; but it certainly occurs often in people of spare habits whose blood is impure.

All inflammations which have the character of attacking various parts of the body in succession, or at once, as gout, rheumatism, scrofula, lues, glanders, small-pox, may be ascribed to this state of the system, the blood being foul, its quantity in some cases excessive.

The secondary inflammations which have been lately so much noticed as occurring in the course of erysipelas, diffuse inflammation of cellular membrane, &c. may, in some degree, be accounted for on the same principle; but I think it will appear that we ought not to ascribe all such phenomena exclusively to the state of the blood in cases where we have no evidence of its being morbid, as in the last-mentioned diseases, for it is not improbable that a similarity of action may be induced in distant organs, of which some proofs are afforded by sympathy of function; and while we have strong

Many specific inflammations of this character.

Perhaps secondary inflammations occurring in erysipelas, &c. &c.

But these may partly arise from similar actions being excited in distant parts.

It must also be understood that the fluids can hardly be affected without the solids being influenced; and, on the other hand, that when the solids are affected, the fluids will feel the impression, probably through the influence of nerves.

reason for believing that hardly any case can occur in which the circulating fluids if disordered will not produce an impression on the solids; so, on the other hand, that when the solids are affected they will also influence the fluids. I shall not repeat the arguments which have been already adduced in favour of the humoral pathology, which might be multiplied if necessary, but it may not be amiss to produce an illustration of the immediate influence of the solids on the blood, and as it is a phenomenon familiar to every one, its authority is less liable to question: it is well known that if blood be taken in a series of cups at any time, but particularly during inflammation, that, without any difference in the cup or in the stream, the appearance of the blood varies as to its constituent parts; for this change I conceive no adequate reason can be assigned if we regard the blood alone, and consequently it must arise from an influence exerted on it by the solids; such an influence would probably arise from the alteration induced in the nervous system by the very loss of blood: this alteration seems essential; it effects a quick and strong coagulation necessary to arrest hemorrhage; but the rapidity with which it occurs can hardly be explained otherwise than has been now done. Again, a man receives a violent blow on the stomach and dies almost immediately; his blood shall not coagulate as

firmly as it ought, or as it would before the blow: what reason can be assigned for this change but the influence of the nervous system on it? There would be no lack of further evidence, if any were wanting; but one proof is as good as a multitude; and I shall only further express my own opinion as in favour of humoralism and solidism both, but of neither to the exclusion of the other.

SECTION VI.—*Circumstances connected with the State of the Part, influencing Inflammation.*

The circumstances hitherto mentioned as influencing the production and phenomena of inflammation have all been of general application; but it must be understood that there are many points highly deserving of attention, which are connected with the parts themselves, such are the nature of the organ or tissue concerned, and its situation and condition; to avoid repetition, I shall reserve for a subsequent section what need be said respecting the nature of the organ. As regards the situation, it may be stated generally, that the processes of inflammation are, *cæteris paribus*, most healthfully performed when the circulation is sufficient and the nervous energy strong; hence arises the advantage possessed by the

The processes of inflammation are much influenced by local circumstances, such as the nature of the organ, the situation of the part, and its condition as regards a due degree or deficiency of power, whether temporary or permanent.



superior parts of the body over the lower, and hence the use of a position not depending. With respect to the condition of the part, it may have been previously diseased, or weak, or may be affected by collateral circumstances which will influence it. Thus, in pregnant women fractures do not readily unite, because another organ abstracts a great proportion of the animal efforts; a case which occurred to me some years since also illustrates this point. A man had a severe simple fracture in the upper arm, another in the fore-arm; the same attention was paid to each: the first united in six weeks, the latter was not firm for as many months. The cause of the difference I take to be this: that the fore-arm was placed under circumstances of much greater disadvantage, inasmuch as the vessels and nerves which supply it were much injured and enfeebled, *not only* at the part fractured, but far above it, which was not the case with the other.

A permanent alteration in the powers of the vessels will unquestionably come under the same consideration: such a state exists in advanced life, and is frequently connected with ossification, or other obstruction of the arteries; in paralysed parts, too, there is deficiency of power in many cases; but these subjects will be again mentioned.

SECTION VII.—*Influence of Temperament, Diathesis, Hereditary Disposition, &c.*

Temperament.—Great indeed are the differences which result from the temperament of the individual, and no one can question that, with reference to inflammation, it must have a most powerful influence: thus the bilious temperament will be prone to erysipelas and other inflammations of that class; the sanguine to phlegmon, to quinsey, &c. To follow this subject fairly out would, however, lead me further than it would be wise for me to go, and I shall not enter upon it, as it is familiarly known.

Diathesis.—Almost akin with the temperament are the diatheses, which might, without impropriety, be called morbid temperaments; but although the consideration of those circumstances which produce the peculiar characters of gout, rheumatism, scrofula, &c. is well deserving of every attention, yet neither is our knowledge of these morbid states and dispositions sufficiently complete, nor, if it were, would it be desirable to extend the present work by entering fully into them. Their influence on the production and progress of inflammation is very great.

Hereditary Disposition.—Temperament and diathesis are most commonly inherited, sometimes acquired, and the hereditary disposition of the body to longevity or the reverse, to health or disease, and if to disease to affection of particular organs, is a point so well established, that there can be no difficulty in admitting it, although there may be in explaining it; but this remark I should make, that where the disposition to inflammation depends upon such a remote cause, as it will be impossible to remove that cause, it will be very difficult to prevent a recurrence of the inflammation, though much may often be done by avoiding the immediate causes.

SECTION VIII.—*Influence of Age, Sex, Habits, &c.*

Age.—Age, it has already been stated, produces a material difference with respect to inflammation: thus, in childhood and youth, its ordinary processes are rapid and healthful, partaking of the activity and vigour which then belong to the growth of the body, and seldom deteriorated by the diseased state of the internal organs, but at the same time, from the great susceptibility of

the nervous system, often producing, especially in infancy, a more than ordinary tendency to convulsions, and fatal disease of the sensorium.

From the termination of early youth to the decline of life, if the body is healthy, inflammation goes through its processes with vigour and success; but we may observe, that many species of internal inflammation incidental to early life, as mumps, quinsey, &c. cease to occur, while others which rarely affect childhood appear, and the same sort of inflammation will alter its type; and thus, instead of boil, we have carbuncle, and so on. The same may be observed of internal inflammation; and we see in childhood the brain, in youth the lungs, and, in more advanced age, the liver, more particularly prone to inflammation.

Again, in early and in advanced age, inflammation will produce too great an impression on the nervous system, which not only becomes irritable in the latter, but, moreover, weak; to which are added, the decay of vascular power and organization, and often, but not always, the existence of visceral disease of some kind or other.

Sex.—The difference of sex must also be estimated. In the male we have greater vigour and firmness, but they are often more than compensated by the injurious effects of irregular life; and, although in the female we have often to en-

counter both feeble frames and timid minds, yet it often happens that, under sickness, they exhibit a degree of fortitude, at least equal, and of patience much greater, than is commonly observable in man. From the consideration of their diseases, too, the functions of the uterus must never be excluded; for their influence on the system is of the greatest importance, and the secretions connected with these functions exert a powerful effect on the destruction or restoration of health.

Habits of Life.—The habit or condition of life no less deserve the attention of the pathologist: thus, whether a man has been sedentary or active, has confined his viscera by certain employments, or expanded his frame by others; whether exertion of mind, or activity of body, have predominated; whether he has preserved the tone of his health by moderation in food and liquor, or impaired it by excess; whether he has habitually controlled his passions, or given them unrestrained vent, are circumstances productive of the greatest difference, not only as regards the causation of disease, but its progress and results; their operation, however, is exerted on the three great systems of animal life. But, independently of causes acting so generally, there are others, as is well known, productive of peculiar diseases, as in particular trades, where the chimney-sweeper, the butcher,

the grocer, &c. are liable to peculiar inflammation, from the application of certain substances. In Mr. Thackrah's valuable work will be found the most ample illustration of the effects of habits of life.

Diet.—With respect to diet, great as may be the influence it exerts, still it is clear, that while it is not absolutely depraved—while it is sufficient, but not excessive—and while it is subjected to the action of sound digestive organs, the effects it produces on the system are not so great as might, *à priori*, be expected; and the animal feeder of this country, the fish-eater of northern climates, or the Hindoo who subsists on vegetables, differ much less in regard to disease than we should suppose; and although the use of animal food, during the actual existence of inflammation, is highly improper, yet European countrymen or soldiers, accustomed to it previously, do not, under inflammation, appear to be worse subjects than others, and it is very remarkable, that in our navy, where the diet both of food and drink is altogether unnatural, no remarkable difference is observable in the result of injuries or operations, as far as I am aware.

I regret that in the two last sections I have felt compelled to be exceedingly brief: to have enlarged on these subjects as they deserve would require me to go into a large field, but it is less necessary,

as they are fundamental points of the profession, applicable to all diseases, generally known, and little doubtful.

SECTION IX.—*Influence of Air, Temperature, and Climate.*

The Influence of Air seems to be immediately connected with the state of the circulating fluid on which its agency is primarily and principally exerted. This influence is recognized, but not, perhaps, generally attended to, in the full extent it requires. We know that the same disease goes on (independently of the circumstances mentioned under the head *Climate*) very differently, if the patient be situated in the open country, or in a populous town, in a spacious, clean, and well ventilated apartment, or in a small, close, and dirty room; nay, in the upper story or ground floor of the same building, or even if well elevated above the floor, or placed upon it. I believe there is no poison more injurious than foul, no restorative more effectual than pure air, and it runs no risk of disordering the digestive organs, as bark often does, or stimulating the vessels too much, like wine. It is always safe and always useful. There is no surgeon but is aware of its influence, but many do

Important
influence of
air.

not sufficiently advert to it, perhaps because it is such a common thing; but it is more indispensable than food, and upon its purity the proper changes of the blood must depend; and although the system can bear the influence of improper air, as well as improper food, with impunity, when in a state of health and vigour, this is far from being the case when labouring under disease; and it often happens that air exerts more influence than food; for the strictest attention to diet often fails, when a change of air restores the patient.

If it be demanded, upon what system the air chiefly acts? I should again say, on the blood; Exerted immediately upon the blood. for if we take a man in previous good health, and place him in an hospital, for an injury not very severe, at a time when the cases are doing badly there, and find that, without any cause which can particularly affect his alimentary or nervous system, a bad kind of inflammation is set up; is it an unreasonable conjecture that the blood, which in the lungs is particularly exposed to the contact of this air, should be thereby rendered impure? If we find that he does much worse when lying on the floor of the ward than if raised two or three feet above it, knowing that it is more deteriorated at the bottom than any where else, will not this opinion receive strength? and if, on sending him into a pure air, he does well, will not this add confirmation? It must be understood,

however, that although blood, rendered impure by this or any cause, is likely to afford but a bad material for the processes going on in an inflamed part, yet that its operation is not confined to this, but exerts a powerful influence on the nervous system generally, and through this on the alimentary.

As one proof of the influence of air on the vital properties of animals, I may mention the remarkable tendency to putrefaction which is observable in particular states of the air, commonly when warm and damp, but, as it appears to me, not purely in the direct ratio of either, but probably owing, in a considerable degree, to its electrical state. Now as the vital properties of animals will for a considerable time survive their vital functions, we may reasonably presume that this tendency to putrefaction arises greatly, if not entirely, from the destruction of the vital properties; and if so, is it not likely that while the functions of life are going on, the same state of air will lessen the vital properties, energies, or whatever they may be called; and, in point of fact, do we not find that, in the very state of air in which meat corrupts rapidly, the human health is much affected*?

* With reference to determining proper situations for the residence of invalids, and, indeed, for the ordinary purpose of establishing buildings, I have often thought that we greatly neglect

Temperature.—With regard to *temperature*, the history of the diseases of different climates very clearly shows that it exerts a most important influence, yet it may be much doubted whether this is owing to the *direct* agency of heat. It should seem rather to proceed from the changes it induces on the atmosphere by its action on vegetable and animal matter. Many mechanics, as anchor-smiths, glass-blowers, &c. almost live in a temperature far higher than the tropics; but, although they are but too apt to indulge in every species of excess, yet their diseases in no degree resemble those to which the inhabitants of tropical climates are prone. Under the same temperature, different districts are far more unhealthy than others, and their diseases are marked by peculiar characters. The diseases of spring and autumn, when the temperature is the same, are very different. This has been accounted for by supposing that the heat of summer has occasioned a certain alteration in the system, and to a degree this is the case, no doubt; but are persons coming to

Effects of temperature chiefly indirect, producing a material alteration in the qualities of the atmosphere.

many means for ascertaining the purity of the air; perhaps one of the most useful is the number of insects of particular kinds, which, as weeds point out the aptness or inaptness of the soil, will denote those of the air. Observation of those asthmatics, who are either relieved or injured by pure and dry, or loaded or damp air, is another; and with reference to certain properties of atmosphere, not to be detected by ordinary examination, there probably would be no better eudiometer than an asthmatic person.

this country, in the spring or summer, from warm climates, subject to autumnal diseases*? I believe not: and they should be if this were the only cause. Cold certainly occasions a strong disposition to acute and sthenic inflammatory diseases.

Temperature often acts as an immediate as well as a predisposing cause, for a draught of cold air, or a wetting, will very often excite inflammation sometimes in the part acted upon, more frequently remotely: it is probably by disturbing the balance of the circulation that this is effected.

CLIMATE.

Climate, as it is called, depends upon many circumstances; it may vary materially within a very short distance; in point of fact, it is merely an expression denoting the state of the air as it exists in a particular spot where it is influenced by the heat of the sun, by the prevalence of winds, by the contiguity or remoteness from water, either sea or fresh, by its neighbourhood to marshy land, estuaries, woods, jungles, or thickly inclosed grounds encumbered with trees; by the situation being a valley, hill, or a plain; by the soil being dry or wet, and by its neighbourhood to lofty grounds, determining a greater or less proportion of cloud; and also, and not without its share of importance, on the electrical state of the atmo-

* Certain it is that the observations of M. Larrey on the effects of temperature in Egypt, and of M. Dupuytren on the wounds resulting from the conflicts in Paris, in July, 1830, seem to confirm this view.

sphere being affected by either of these or other more remote causes.

Climate is a term which is generally applied to large surfaces; and it would *seem* absurd to say that the climate in which our ships lay at Walcheren differed from that in which our army was placed, perhaps not a hundred yards off; and we should therefore use a very questionable term if we attributed to a difference in the climate the fevers, commonly complicated with inflammation of the abdominal viscera, which occurred in the latter; so, too, the hepatitis endemic in Hindostan, and the dysenteric inflammation of many other regions, are justly ascribed to climate; but it must be understood that, with the exception of the degree of heat, the state of air may differ as much within a hundred yards, as in countries as many leagues apart: to follow out, however, this subject would obviously lead to more extended discussion than in this place might be desirable; but in the prevention or treatment of diseases, it is most important to keep the consideration of these matters in view, for we often can do more by removing the operation of such causes, when it is in our power, than by all other means.

CHAPTER III.

ON THE PROCESSES AND PRODUCTS OF INFLAMMATION.

Preliminary
remarks.

THE symptoms of inflammation have already been described, and, briefly, the state of the vessels and circulation in inflamed parts, as far as they have hitherto been ascertained by anatomical examination or experimental research; but it by no means follows that the facts observed exist in every species, or in a similar degree in each, or that no others exist which have not been yet observed; we can only, therefore, consider the present state of our knowledge as an approximation to the truth.

The results of the changes so taking place are next to be mentioned, and it may briefly be stated that they are as follows.

SECTION I.—*Adhesive Inflammation.*

Matters effused in adhesive inflammation.

At first, there is an increase of the natural exhalation of the parts, which is of a serous nature, containing albumen, the proportion of which is

increased. After a time fibrine is effused, and if violent, globules in the centre. A section of such a part exhibits, then, globules in the centre, around this a gelatinous infiltration, reddish, with a few striæ of blood; still further, the effusion is more serous and yellowish; lastly, at the limits it is free from colour*.

The globules are found detached from their colouring matter, which separates from them as soon as they quit the vessels†.

The result of this inflammatory action may be the organization of the deposited fibrine; this constitutes the process of adhesion or adhesive inflammation. In this case it is found that vessels pass into the fibrine or organizable lymph from the surrounding parts. The manner in which this takes place has been differently accounted for: Mr. Hunter thought the lymph organizes itself and forms the vessels; M. Gendrin thinks the lymph organizes itself, and the vessels are protruded into it by the *vis a tergo*‡. To me it appears that Mr. Hunter's doctrine has never been proved, and is exceedingly problematical; and even the modification proposed by M. Gendrin may be liable to doubt.

At all events, it cannot be unreasonable to suppose that a similar process to that which takes

* Gendrin, Hist. Anat. des Inflammations, 1438-39-40.

† Ibid. 1441.

‡ Ibid. 1303, 1380-83.

place in the original formation of a part would equally obtain in its repair or reproduction; but our information respecting the epigenesis of the body is still far from conclusive.

Interstitial
deposit.

When the object is attained, then all the superfluous lymph and serum are, or may be, absorbed, and the part return to its natural state; but this does not always happen, and the lymph which remains, together with some serous infiltration, constitutes those thickenings which long survive the original inflammation.

Process in
wounds.

A similar process occurs where there has been a solution of continuity, or wound, when that can be united by these means; and for this purpose the lymph is poured out in considerable quantity, and becomes organized in the manner stated. When the parts have thus been reunited, a great portion of the newly deposited lymph is absorbed, the remainder forming the cicatrix. To accomplish this, it commonly is only required that the processes should not be disturbed; for if they are, the lymph will perish, and another process be rendered necessary.

Absorption of
a portion of
the new
formed parts.

When the bond of union, or cicatrix, is completed, it likewise becomes to a certain extent the subject of absorption, and, in cases where there has been an actual loss of substance, is never fully equal to the repair, although it suffices to re-establish the contact of the divided parts. When,

however, there has been a simple division without loss of substance, it becomes an addition to the body, although a small one.

The bond of union is, in most tissues, of the nature of the parts divided, at least after a time it becomes so; thus, cellular membrane is united by cellular membrane (which, however, does not contain fat in any case), skin by skin, bone and tendon by similar substances, and the same may be said of vessels and nerves; but some structures are not united by the same, as muscles, which are joined by tendinous matter, and cartilages by ligament; in each case the vessels deposit in the lymph, as a matrix, those peculiar matters which belong to the tissue from which they spring.

Nature of the union when completed.

Again: when the inflammation does not take place in the substance of a part, or in wounds, but on some of the natural surfaces, as serous membranes, the processes are the same in nature, but the products disposed of differently; thus, we have an increased serous secretion, and often the deposition of lymph on the surface*, which in like manner becomes organized, and forms what is called a false membrane, or constitutes a bond of union between it and an opposite surface.

Process on surfaces.

I have thus given a brief outline of those pro-

* Dr. Babington states that there is reason to suppose, whenever serum is effused in inflammation, then fibrine is also separated somewhere.—Med. Chir. Trans. vol. xvi.

cesses which belong to adhesive inflammation, as it is commonly termed, and of which the meaning is sufficiently obvious, and shall now proceed to speak of the suppurative, which by some authors seems hardly to be considered a distinct kind *, while others, especially Mr. Hunter, think otherwise.

SECTION II.—*Suppurative Inflammation.*

Process of
formation of
pus.

It sometimes, nay often happens, that the processes already described under the head of adhesive inflammation, proceed further, and that in the centre of the inflamed part pus is found. It will naturally be asked, how is this formed? M. Gendrin states that the organizable lymph is converted into pus †. He also states that the globules of the blood, depriving themselves of the colouring matter, can change themselves into pus globules ‡. It may be so; but, I confess, that explanation which attributes the process to the action of the vessels, or it may be, the vital powers of the part, seems to me more to accord with probability; for if it depended upon a self-conversion of the

* M. Gendrin, &c.

† 1442-44-47; and, if I rightly understand, by spontaneous conversion.

‡ 1448-59.

fibrine or globules, it would be reasonable to suppose that it would take place nearly in a *given time* in each case, which is far from being true; and in a nearly *similar manner*, which is equally contrary to the fact.

Further, we find, that when once begun, the quantity increases in the part, and to such a degree, as to be inexplicable on any other supposition than that of its being deposited from the vessels. M. Gendrin states, that he has seen the blood globules approaching the centre lose their colour, and escape from the extremities of the vessels as pus*; but he further supposes that they so change themselves—how, he does not explain†, but compares it with the process mentioned above. Without calling in question the correctness of the observation, I should think it more reasonable to attribute the change to the influence of the vessels

Probably owing to the action of vessels, or the vital influence of the parts acting on the vessels.

* 1458-60-61.

† Excepting by some chemical change. “On ne peut guère voir dans le phénomène de la formation du pus, une action speciale des capillaires sur les molecules du sang; il parait probable, que cette formation n'est autre chose qu'une alteration en quelque sort chimique, effet rapid de la stase des principes coagulables du sang dans les tissus enflammes.” 1461. But if this were true, I would repeat, the chemical change ought to be similar in all cases as to time and mode; whereas in one inflammation it takes but a few hours to form pus, in another many days: in one inflammation we have the pus formed with laudable characters, in another, none can be more dissimilar; and, again, how will this account for the superaddition of specific qualities?

or parts themselves, which, if they are able to elaborate all the other secretions of the body, are surely competent to effect this.

Suppuration does not essentially depend upon the degree of inflammation.

By many, suppuration has been attributed to an increase merely of the degree of inflammation : this point deserves some consideration ; there can be little doubt that an increased degree will produce suppuration when a less would be attended with simple adhesion ; but, on the other hand, there are many cases of inflammation in which there is no tendency to adhesion, and where the disposition to suppurate is by no means the consequence of any *violence* of the disease, thus :

In *particular parts*, the natural disposition is to suppurate ; any other process is an exception to the rule, as in the urethra.

Particular inflammations are essentially suppurative ; this is the case in variola.

Suppuration occurs under *slight degrees* of inflammation, as in ecthyma ; while in the same texture it will not, when the inflammation is severe, as in herpes, &c.

Rather upon the nature of the inflammation and the objects to be accomplished.

Again, where there is a *general disposition* to suppurate, as in secondary suppurations, as they are called, this process occurs with scarcely any preceding perceptible inflammation. These, and other phenomena, would induce me to believe that suppuration is determined more by the nature of

the inflammation, and the ends to be accomplished, than by the degree.

It has also been stated that adhesive inflammation is a necessary precursor of suppuration. That it *generally* precedes or accompanies it is a position fully established; but it would, I think, be difficult to prove the proposition to its full extent; for inflammations of mucous membranes seem to afford a remarkable exception, and it is very worthy of remark, that while excessive violence of inflammation converts the adhesive process into the suppurative in most textures, excessive violence will also convert the suppurative into the adhesive in others, as mucous membranes; from which I should draw the conclusion, that these processes do not mutually depend upon each other in the way alluded to above, but that they are *different modes* of inflammation, depending upon circumstances for their existence.

Adhesive inflammation generally precedes or accompanies it; but in some cases they are the reverse of each other.

It may be right briefly to advert to suppuration, as it takes place under different circumstances.

When it occurs within the tissues of the body, either it is limited by the effusion of lymph, or it is not. In the former case it constitutes what is called an abscess; in this, pus is first found in the centre of the inflammation in small quantity, and this increases, until, by the intervention of the absorbents, it is again taken up, or the surrounding

Suppuration occurring within the substance of a part, accompanied with sufficient adhesive inflammation, constitutes an abscess.

Nature of the
process.

parts are, to give it vent. In these abscesses lymph is deposited around in sufficient quantity to form a barrier, preventing the escape of the pus into the surrounding cellular membrane, although the abscess may be continually enlarging; and it often forms a kind of cyst or false membrane, on the surface of which vessels are distributed secreting pus. Beyond the adhesive inflammation we have serous infiltration *. The subsequent processes will be hereafter mentioned.

IN WOUNDS.

In cases of wounds which do not unite by the adhesive process, we have suppuration as accessory to another, that of granulation (of which hereafter), and the suppuration continues until that end has been fulfilled. The process appears to be similar to that above described.

ON SURFACES.

Again: suppuration takes place, as before stated, from surfaces, as skin, mucous or serous membranes, &c.; here, at all events, the pus appears to be deposited from the vessels: in serous membranes, commonly as the result of severe or long-continued inflammatory action, and accompanied with considerable adhesive inflammation: on mucous membranes and skin, as the more immediate product of the inflammation. The varieties of character in inflammation, impressed by the pecu-

* I have seen repeated instances of this region becoming the seat of a subsequent diffused inflammation. It is often the case from the little abscess called a sty.

liarities of tissue, are well marked on surfaces; but, as I shall elsewhere state, this influence is perhaps exaggerated*.

Inflammation taking place in the substance of a part is generally limited by adhesions, but when it occurs on surfaces is more disposed to spread, for reasons which have been alleged.

But when the adhesive process fails in the interior of the body, we find that extensive, though irregular, surfaces are open to its invasion. I mean to say, the internal stratum of the skin, the subcutaneous cellular membrane, and eventually the fasciæ and intermuscular septa of cellular or fibrous membrane—along these the inflammation may spread indefinitely, and in these the processes will be found to be of a very imperfect and mixed character. Instead of a section of such an inflammation exhibiting the different processes arranged in concentric order, as stated p. 87, it will be found that they are indefinitely mixed, and that we have throughout deposits of pus larger or smaller, not limited; of lymph combined therewith, or in a gelatinous form, producing partial and imperfect adhesions; and a more than usual

Processes in
diffuse in-
flammations.

* To give a detailed statement of the observations made on inflammation, as occurring in the different tissues, apart from the general consideration of those inflammations, although an important object, would extend this work far beyond the limits proposed.

effusion of a serous nature; but of this, more under the head of Spreading Inflammation.

Adhesive inflammation, it has already been stated, not only exists as an original mode, but also as auxiliary to other modes of inflammation. The same may be said of the suppurative inflammation, which not only takes place, *ab origine*, under certain circumstances lately alluded to, but is a necessary concomitant of some other processes, as will presently appear; and I particularly allude to the formation of granulations, whether in abscesses or wounds, and it is my purpose next to speak of the phenomena of granulation, cicatrices, and scabbing; the uses of pus with reference to these, and the different varieties of pus. I shall then offer some observations on abscesses and their occasional consequences, fistulæ or sinuses.

Suppuration
as auxiliary to
granulation.

▪ *Granulations.*—With respect to suppuration, it must be understood that it often appears, as before stated, to be a necessary auxiliary to another important process—namely, granulation.

Process of
granulation
in wounds.

One process by which the union of wounds is effected has already been mentioned; but if the nature of the injury, or any extrinsic circumstance, should defeat the attempt to organize the first effused lymph, there is still a mode left by

which the injury may be repaired—namely, by granulation. In this case lymph is again thrown out from the surface of the wound in small quantities, and as it is effused, vessels shoot into it, and it is protected from the irritation of the external air *by the formation of pus on its surface*. More lymph is continually deposited, and organized as deposited, until the cavity is filled; and when filled, it is skinned over by a process to be mentioned hereafter.

The lymph so organized becomes a bond of union, similar to that produced by simple adhesive inflammation, and is also similarly converted into the nature of the tissues it unites*, and likewise as in that case a proportion of it is reabsorbed, but that proportion differs materially: *v. Cicatrices*.

This lymph assumes, as it is organized, the appearance of granules, which, when healthy, are small and red, being very vascular, their vessels radiated. ORGANIZATION.

These granulations are the product of inflam-

* This is one of the most curious phenomena of inflammation, and deserves further investigation; how far it depends upon any peculiar source of vessels or nerves, or upon any peculiarity of nervous influence, remains to be explained. I cannot help believing, that it is more dependent on the latter; and that there is the same principle of intelligent reconstruction pursued in this process, which certainly seems to prevail in the original formation, and which is, to my mind, remarkably evinced in those deviations from the ordinary structure which are found in monsters—deviations adapted to the peculiar circumstances of those individuals and not of the species.

mation: how can we reconcile the phenomena now described with the debility which is supposed to be essential to inflammations?

ABSORBENTS.

Granulations no doubt possess absorbents: it has been thought worth while to make experiments to prove this, but every one knows that medicines are absorbed from their surface; it is also established that they are themselves absorbed.

Nervous properties.

Granulations produced from sensible parts are sensible, but I believe it would not be easy to demonstrate nerves in them. Nerves are produced with difficulty, blood-vessels easily; but it may be a false notion of ours, that there is in *no* case sensation without nerves: certainly, with respect to granulations, it is clear that while some possess no feeling, others are acutely sensible.

How far exposure is necessary for the production of granulations.

It has been supposed that exposure was necessary to the production of granulations; but there cannot be a more beautiful instance of their formation than in the *interior* of bone, whose surface has perished (where there is no exposure); in this case absorption precedes their formation to soften the bone in which they are produced.

Union of granulating surfaces.

If two granulating surfaces are kept in close but easy contact, they will unite by adhesion, and the suppuration, for which there is no further use, ceases.

Mr. Hunter states, that "granulations are always

of the same disposition as the parts on which they are formed, and take on the same mode of action ; Disposition of granulations to health or disease. if it is a diseased part, they are diseased *.” Certain it is that they often are unhealthy, and in this case the breach will rarely heal. This may be from simple weakness or defect, as in the case of those exuberant and large granulations termed proud flesh ; or may proceed from diseased action, as in what is called fungus of different kinds : the former state is easily remedied, the latter with difficulty.

Granulations are very easily affected, either by Easily affected by local or constitutional causes. local impressions or constitutional influence ; and by a change in their appearance, in the nature of the pus they secrete, by its entire cessation, or by the absorption or death of the granulations, we are often and early apprized of any change which has occurred in the constitution.

During the continuance of the granulating process, pus is constantly poured out from the vessels, for the reasons stated : it may probably be, that of those ramifying on the surfaces, some are engaged in the first, others in the second task ; but of this more hereafter.

Cicatrices.—The new-formed part which re-establishes a breach of continuity is termed a cicatrix.

* P. 348.

trix, and there are certain circumstances which belong to its constitution which are well deserving of attention.

Absorption of a large proportion of the new part, on what principle explained.

It has been stated, that when the union is effected a considerable part of the cicatrix is re-absorbed: now this takes place on a principle the use of which is sufficiently obvious; for, in the first place, if there has been a simple division, this cicatrix is an addition to the body, and so far more than is wanted; and secondly, it is less perfect in its organization than the original parts, and consequently the less of it there is the better. When, therefore, there has been no actual loss of substance, the reduction of the extent of the cicatrix is a very beneficial provision.

Only is a cause of defect where there has been a loss of substance, but partly remedied by the extension or growth of surrounding parts.

When there has been a loss of substance, the absorption also takes place, so that the volume lost is only imperfectly repaired, and the integrity of the part is established with some deformity. We observe, however, that by a very useful process the adjoining tissues allow themselves to be extended, so as to supply that part of the deficiency which the cicatrix itself does not*; and nowhere is this more remarkable than where there has been loss of substance in the face, in which all the parts are moveable, while on the head, shins, &c., being fixed, this advantage cannot be obtained.

* Mr. Hunter asks, p. 360, "Does the surrounding skin lengthen by growth, or only by stretching?"

It remains to be considered whether, in every case, this process now mentioned is advantageous. I should certainly say it is not; for, although it will be found that much time is saved by it (for the absorbent process begins to close the opening before the breach is healed), yet in some instances great evils arise from the contraction of parts which is induced, as in burns; and as nature is competent to the cure, where the parts are naturally fixed, as on the head, &c., so it may be when artificially fixed by us, as becomes our duty in some cases.

Nevertheless this very advantage compensated by disadvantages.

A very curious case, which I have elsewhere mentioned, illustrates the degree to which the absorption of a cicatrix and extension of the surrounding parts may be carried, in a maximum degree, if I may be allowed the expression.

Illustration of the extent to which these corresponding processes of absorption and extension may be carried.

The globe of the eye and its appendages were removed, with the exception of the lids, for a disease in it. Long afterwards the patient was admitted into the hospital on another account; on examining the orbit, I saw at its *very bottom* the commissure of the eyelids like a line; the orbit elsewhere was lined by an extension of the integuments, and that these were so borrowed, I think is proved by the fact, that a muscular movement beneath them was evident whenever the other eye was closed, of course by consent of the orbicularis; but as muscular fibres cannot be reproduced,

I must conclude that they were *extended* to this extreme degree, while the new-formed parts were reduced to a size many hundred times less than they originally occupied.

Puckering of
the neigh-
bouring in-
teguments.

Very often these processes are accompanied with a puckering of the adjacent skin; and in some cases the contraction of the cicatrix begets a power which not only pulls it violently, but squeezes up the interior granulations, as Mr. Hunter has remarked, on the surface of stumps; and he explains the process on the supposition that the contraction takes place at the circumference of the sore as the healing is completed.

New skin is
organized
from the old.

Much remains yet to be ascertained with respect to the constitution of cicatrices; but before making any further remark on this point, it should be stated, that when the chasm is filled up, we find that new skin is organized from the cut edges of the old, so of the cellular membrane, &c.; and it has been affirmed, that new skin will not be formed unless it is from the old. Be this as it may, nothing can well differ more than the new-formed skin of cicatrices; certainly, as it should seem to me, differing more by reason of the constitution of the cicatrix of which it forms a part, than of the skin from which it is supposed to be organized; and this leads me to observe, that the essential differences of cicatrices deserve more attention than they have received: wherefore, I

Great differ-
ences in the
nature of
cicatrices.

may ask, is the cicatrix produced by a burn so dense, I might almost say cartilaginous in its structure, and its contraction so strong and permanent, as to overcome completely the action of our muscles in those examples we so often see in the limbs and neck; while other cicatrices, as for instance those after caustic issues, are soft and pliable, and have hardly any contraction, whereas the destruction of skin and other parts has been equal in both? I shall not, however, here enter into any further discussion of this subject. Cica- Their general character. trices, at first very red and vascular, after a time become of the natural colour of the body, unless they remain unhealthy; but at all times may be deemed less perfect in their organization and power of resistance to disease than originally formed parts; hence they become the seat of ulcers in scurvy and other maladies.

I have stated that the secretion of pus appears to be a necessary auxiliary to that of granulation; for it will be understood that the newly-formed parts have no protection to defend them from the injurious impressions of external agents, while all other surfaces, such as skin and mucous membranes, are either defended by a cuticle or some defensive secretion: this appears to be the legitimate use of pus, in the present instance; and I can hardly believe that it is capable of organizing Reasons why pus is a necessary auxiliary to granulation.

itself, as has been thought. Certainly the quantity of pus need not be large, and in truth no better sign can exist of a healthy disposition in a wound than the small quantity of discharge, if that is good; and the converse is so true, that we cannot help thinking, when this is so, that the efforts which ought principally to be bestowed on elaborating the bond of union are, for some reason, expended on that which is only an auxiliary process; and what further appears to prove this, is, that those applications which tend most *to restrain the discharge*, as sulph. cup., &c., will soonest produce vigorous and healthy granulations.

It can be legitimately deduced from this reasoning, that supposing such is the real use of pus, if we can sufficiently protect the wound from the irritation of external agents, it will heal without it; upon this principle, I conceive, may be explained the process of scabbing.

Scabbing.

Its principle.

Scabbing.—Nature often points to this; for although it is notorious that the contact of air is often very painful, yet no one can have failed to observe, that when it has dried the surface of a sore, and formed a scab, very often the sore will heal beneath, and the scab drop off, leaving it sound*: it is no objection to this, that when the

* Upon this principle it is common to heal the wounds made in scarification.

sore is unhealthy, or the process is disturbed, that matter will form beneath. In brute animals, it is of necessity the usual mode of healing.

We apply the same principle in every case where we endeavour to heal by covering a sore surface with dry lint, goldbeater's skin, any varnish, such as tr. benzoës, where we dust it with flour or any powder, or coat it over with the eschar produced by arg. nitr. Mr. Hunter has strongly enforced the propriety of attempting to heal wounds by scabbing, but no one has carried it so far as Mr. Higginbotham; nevertheless, it will seldom succeed in deep sores, because nature has much to perform to fill them up, which this process would defeat; nor in diseased sores, because, although it may assist in giving a healthier disposition, it will often fail, till by other means this disposition is corrected.

Different kinds of Pus.—The formation of pus has been briefly spoken of; its chemical properties, if considered at all, would occupy a good deal of space; but of the different qualities of pus it seems necessary to say a few words, as they are very striking, and indicate a material difference in the nature of the inflammations which produce them. We have, then,

The qualities
and kinds of
pus.

1st, Good, or *laudable pus*, as it is called, a thick white opaque fluid, free from offensive odour, not unlike cream, the product of healthy

inflammation; it is of a greater specific gravity than water, contains globules, but is chiefly composed of a fluid similar in many respects to serum.

2d. The same kind, with lumps of lymph, which may, perhaps, have been imperfectly organized, and thus detached.

3d. Offensive, darker, often green; this also may be mixed with lymph.

4th. *Sero-purulent*, where the thin character denotes a much larger proportion of the serous constituents.

5th. Slimy or glairy pus.

6th. A thin, serous, reddish, or even bloody discharge, mixed with shreds or flocculi of lymph, often the result of violent inflammation of serous membranes.

7th. A thicker discharge, more turbid, but red, offensive: secreted from sores of a bad character, or under destructive inflammation. *Sanies*.

8th. A thin, watery, and highly acrid discharge; offensive, from ulcers rapidly spreading, or having no disposition to heal. *Ichor*.

It may be observed that, at the commencement of all suppuration, an effusion of serum and lymph precedes the formation of pus.

It may be further observed, that the nature of the tissue from which it is produced, as well as the character of the inflammation, will occasion considerable shades of difference.

Abscesses.—Hitherto we have only considered the terminations of inflammation in the formation of adhesions, and in that of granulations and pus (as accessory to the formation of granulations); but it is necessary to return a little to say a few words with respect to the formation of pus without granulations, technically called abscesses: the former is altogether a reparative process; the latter may have its uses, but direct reparation hardly appears to be one, unless we suppose that the inflammation has produced such a state of the centre as can neither resolve or be absorbed: be this as it may, here we find that the vessels, having once begun to form pus, continue so to do in the centre, and in proportion as this proceeds, so in general does the violence of the inflammation abate a little, for any secretion will give relief to inflamed vessels; these now are found disposed on a surface circumscribed by adhesions, and called a cyst, and they continue to form more, until either the disposition of the parts is so entirely changed as to put an end to the further secretion, and cause the absorption of that already deposited, or until the continued accumulation works its own cure, by producing an external opening.

As soon as an external opening takes place, the pus is of course discharged, and there is then a cavity, a breach of continuity, which is to be re-

Suppuration
considered as
regards AB-
SCESES.

Process of
granulation
here subse-
quent to the
formation of
pus.

paired; and it will be found, that if no particular circumstance of the part prevents it, that this cavity will be filled up in the way already described under the head of wounds; but here we have the vessels *already* forming the pus, which is *one* of the requisites, and, in general, sufficiently disposed to throw out the granulations which are to fill it up.

But little loss
of substance
to be repaired.

This object can often be facilitated by approximating the sides, which will (in part at least) commonly accept of union; and as there has been little actual loss of substance, there is little to be supplied.

Circum-
stances which
may defeat
the healing of
an abscess.

There are many circumstances, however, which may defeat the healing of an abscess.

1st. There may be a want of disposition, when the abscess will continue to form pus as before, without producing granulations.

2d. There may be a constant natural disturbance of its sides, as occurs within the chest, near the anus, &c., defeating this disposition, if it does exist.

3d. There may be an inability in a part of its parietes to form a bond of union, as happens with respect to the skin in some instances (especially in venereal abscesses), in which case it must be removed by ulceration, or by art, before the cavity can be healed.

4th. The nature of the opening may not be sufficiently depending, when the matter is never entirely evacuated, and the abscess cannot close.

5th. The abscess may have been improperly interfered with, and an opening made, before the processes were complete, in which case the suppurative action will go on, or perhaps be excited *de novo*, as is evinced by the altered character and great quantity of the pus produced; while the granulating disposition is either altogether, or for a time, suspended.

6th. After an opening has been made, either by nature or art, pressure may have been so applied as to obliterate a portion of the upper part of its cavity, without, at the same time, closing it throughout, in which case matter will continue to form and be discharged, or the abscess forms anew.

7th. The existence of foreign matters may interfere with the healing process.

When from any of these causes the abscess does not proceed progressively to heal, the efforts to form granulations are in a great degree abandoned, the pus continues to be formed, probably altered in character, and a sinus or fistula remain.

Fistula.—The term *fistula* may be with more propriety applied when the cavity is kept open by some permanent and notorious cause, as by the presence of diseased bone, or other foreign matter,

The consequences are sinus or fistula.

by the discharge of urine or fæces through it, or by continual disturbance of its sides, and the cure cannot be accomplished till the cause is remedied, when it often heals spontaneously, as the history of urinary fistulæ sufficiently evinces.

Sinus.—A *sinus* does not imply any condition which should prevent of necessity the process of healing, and very often it is sufficient to excite that degree of action which is requisite for the formation of granulations, and by the judicious application of pressure, to maintain the parts in apposition, either or both, to effect the cure.

The parietes of these fistulæ and sinuses are constituted by the cysts before mentioned, which have greatly the appearance and character of secreting membranes, while on the outer side the adhesive inflammation often occasions great induration—callus, as it is called.

The treatment of these is a separate consideration.

On the processes by which matter is conducted to the surface, and prevented from extending itself laterally or towards the centre.

Processes which protect surrounding Parts from the Invasion of Pus, and produce its Expulsion.—When pus has been formed as the result of acute inflammation, there is a constant irritation of the part (and of the system) until that is discharged, while in chronic inflammation it exists in a very slight degree; this accounts

for the processes which are established in the former to get rid of the matter; but connected with this subject there is a circumstance which has, in all ages, excited great attention, namely, the constant disposition of abscesses to discharge the matter they contain through *the external surface, and to prevent its spreading, either towards the centre or laterally*; to understand which it may be useful to attend to the following circumstances.

A foreign matter, either on or under the surface, will occasion one or both of the following effects: *i. e.* it will either excite the absorbents to remove the part, or it will excite the nutrient vessels to protect it further by the effusion of lymph, and that process will be established which will best answer the purpose, provided it be attainable*. The final cause of this process it may be difficult to assign, as of many others we observe in the animal economy; but the object and the *modus operandi* may be explained, and are sufficient for us to know.

Now, supposing the foreign body is beneath the surface, as in the case of pus, the most useful purpose to be effected towards the centre or the sides is to effuse lymph, which is generally done; and the most useful purpose towards the surface

* This does not apply to dropsical effusion.

is to remove the parts, which is also generally done.

How far pressure is the IMMEDIATE cause of these processes.

The *pressure* of the foreign matter has been assigned as the *immediate* cause of these phenomena, and may be the true one, for we constantly see that parts cannot endure a certain degree of pressure if continued, and they are either protected by thickening or callus, separated by pus, removed by ulceration, or killed by mortification.

And what makes it more probable that, in the case of pus, it is the pressure which acts, is this: that if we, disregarding the processes of nature, make an opening at the upper part, it will not prevent the ulcerative process from occurring below also, the pressure continuing; still if matter does *press*, it can only be because the surrounding parts are excited by it to contract upon it.

Processes when there is want of power.

When the adhesive process is sufficiently established at the sides and towards the centre, it rarely fails to occur that the ulcerative process takes place towards the surface*; but when, as sometimes happens, perhaps from want of power or deficiency in sympathetic action, the neighbouring parts do not duly set up the adhesive process, then the matter makes its way through the parts which least resist, as the cellular membrane; or

* It is probable that the process of thinning is effected by a two-fold cause, *i. e.* that the action of the nutrient vessels is suspended, while that of the absorbents is increased.

cause ulceration towards the centre as well as towards the surface, and effects a passage into some cavity or canal.

It sometimes happens, on the contrary, that from the excess of sympathetic action the adhesive process takes place on every side*, which we find to be the case when the pus is particularly foul and irritating, as in carbunculous abscesses, when it would appear that nature makes particular exertions to wall in matters so irritating and injurious. Hence it is that we have the thickened, brawny state of the surface in these diseases, preventing the egress of the matter, which may, perhaps, also be partly attributed to the powers of the skin preponderating over those of the cellular membrane when set upon the same work. In the end, between the efforts to give the matter vent and to confine it†, partial ulcerations take place in the midst of great thickening, and the object is at last, though imperfectly, accomplished, provided the patient lives.

Processes
where the
matter is
particularly
irritating.

Pointing.—Such appears to me to be the rationale of the processes observable in most ab-

* That the adhesive disposition exists towards the surface in a certain degree is proved by the readiness with which incisions heal, when made prematurely into an abscess; after a time this gives way to the ulcerative.

† Analogous processes take place in aneurism, &c.



scesses ; but on the subject of *pointing*, I must mention the remarks made by Mr. Hunter. This seems to consist, as he has stated, in remarkable relaxation of the integuments over the abscess, owing probably to a sympathy felt by them, and by him compared with that process of relaxation in the external organs of generation which precedes the process of parturition. Owing to this the abscess is enabled to assume a somewhat conical form before it breaks (or rather an ovoid with the smaller segment inward), by which the free evacuation and subsequent obliteration of the abscess are promoted. I may add, that from sympathy also, inflammation takes place on the surface of the skin long before the matter has reached it, which inflammation acquires a true ulcerative disposition, and ends in the formation of a breach of continuity through which the matter is eventually discharged.

Suppuration on Surfaces.—Suppuration on surfaces also requires our attention. In the case of the skin and mucous membrane, it appears to be the immediate and natural result of the inflammation; in the latter, for a reason alleged by Mr. Hunter, and a very probable one, namely, that adhesions here would be fatal to the functions of the organs, and certainly they or false membranes are hardly ever formed, excepting under a very severe degree of inflammation.

It should appear that the vessels which exist on these surfaces, and I allude to mucous membranes especially, are capable of secreting pus after the excitement of a *very short inflammation*, particularly where they have been in the habit of forming pus before; usually, however, either an arrest of the natural secretion followed by an increase of it, but of an altered quality; or that increase, without any previous arrest, precedes the actual appearance of pus, and when the matter is secreted it is commonly combined, more or less, with these altered secretions.

On MUCOUS
MEMBRANES
remarkable
disposition to
form pus.

Increased vascularity is not less remarkable in these cases than in any other inflammations, as the state of the conjunctiva in purulent ophthalmia will abundantly evince. Granulations are rarely the result of inflammation of mucous membranes, but, as the last-mentioned disease shows, sometimes are. Adhesions and false membranes do occur, as we find in croup, but rarely, excepting in the windpipe or under violent inflammation; and indurations, as we observe in the urethra.

Inflammation of skin sometimes produces a se- SKIN.
rous effusion, which separates the cuticle in blisters and phlyctenæ; sometimes a layer of lymph on the surface resembling a false membrane; sometimes a gelatinous lymph effusion: a formation of pus often follows; it may be to protect the granulations which the foregoing processes have rendered

necessary ; it may be as the natural disposition of the inflammation, though when this is the case, it is commonly effused under the cuticle in the shape of pustules.

SEROUS MEM-
BRANES.

In serous membranes, the converse of what is observed of mucous membranes is true, for here the effusion of serum is accompanied with the effusion of lymph, which is commonly organized, and forms adhesions, or false membranes. Suppuration only results from *peculiar* inflammations, or *an excessive degree* of common inflammation.

Vessels prob-
ably in a re-
laxed state in
suppuration.

On the process of suppuration I have only one further remark to make, namely, that there is reason to believe that the state of vessels in suppuration is a relaxed one ; because we observe, that it coincides with a state of general relaxation of the body and its vessels, and that if by the application of a fresh excitement the general relaxation is put an end to, the secretion of pus is also stopped.

SECTION III.—*Ulcerative Inflammation.*

Facility in
observing the
processes of
ulcerative in-
flammation.

The next form of inflammation, the ulcerative, naturally differs from the preceding kinds, both in its nature, and in our power of observing its progress, for they are situated too deep for our in-

spection in many cases, and either we must be content to mark after death what has happened, or are obliged to make cruel experiments on animals to ascertain this, at the risk of disturbing those processes which we desire to see. It is true, that in the eye we may look, as through a glass bee-hive, to see the labourers, as Mr. Hunter called them, busily employed on their work; but even here, though we observe the transparent fluid of the cornea becoming turbid, the lymph deposited on the iris, or pus poured into the anterior chamber; though we may see the cornea distended by the force of the inflammation (which has been ascribed to weakness!) and perish or be absorbed, yet we cannot watch the phenomena on so large a scale, nor in that tangible form which we may in ulcers of the surface of the body, where no experiments are required to be made by us; but nature herself presents them, and only calls upon us to observe.

The nature of ulcerative inflammation is the reverse of the adhesive; the latter builds up, this pulls down; but it is a great mistake to suppose that they are not often combined.

The reverse
of the adhe-
sive.

To describe ulcerative inflammation fully would be to enter into an account of a great variety of forms, but it may suffice to state the general principles.

The usual external phenomena of redness, heat

The inflammation has the general character varied in each species.

pain, and, indeed, swelling, present themselves; yet it is most certain either that the vessels assume a peculiar distribution, or that effusion gives in each a peculiar character; for it is notorious that there is a difference recognized, not only by the form and appearance of the ulcer itself, but of the inflammation around it in each of its many species.

The process consists in the removal of a part.

Essentially it consists in the removal of a part. If this is a surface, we can watch the formation of the breach, which is generally preceded by the detachment of the cuticle in the form of a vesicle or phlyctena; this breach of surface is, no doubt, effected by the absorbents, and having began, it extends in a greater or less degree. If the ulcerative disposition exists alone, the ulcer extends in every direction.

Counteracted more or less at the edges by the adhesive process.

Most inflammations affording a combination of the different modes more or less.

But it will be found that *every inflammation consists of a combination of the different modes*, and that it is the predominance of the one or the other which gives the prevailing character. Here we find that the adhesive inflammation is combined generally, thickening the edges, and contending against its extension; and it is no uncommon phenomenon to see this prevail on one side which heals, while the ulcerative enlarges the other.

Pus formed to defend the breach of surface, but it is imperfect, and often peculiar.

Again, we observe pus form on the surface of the ulcer, and no doubt for the same purpose as formerly mentioned, to protect the surface of the

sore, but this may differ more or less in its quality from healthy pus; it may be sanies, ichor, or bad pus; as soon as it becomes healthy, we may be sure that the ulcerative process is subdued by the healing. It is remarkable, too, that the pus (of which the immediate object, it may be presumed, is to defend the surface), in some cases, is so irritating as to excite fresh and destructive inflammation in the neighbourhood where it is produced; and if retained on the surface of the ulcer will prove injurious to that. It is further remarkable, that it is often imbued with qualities giving it the power of producing similar inflammation in a healthy individual.

Moreover, granulations are observable at the bottom of an ulcer; for as the adhesive process combats the ulceration at the edges, so does the granulating (which is only a modification of the other) at the bottom, where the surface is exposed; but while the ulcerative disposition predominates, these granulations are either unequal to fill the breach, or at all events do not possess that disposition to heal over which is necessary to complete the process; when they become healthy, and the pus too, the ulcer heals.

And granulations to counteract the destruction, or repair it.

From many ulcers the granulations are an abortive attempt, thus from the cysts of tumors, &c. they are formed, but are denominated fungus.

These granulations themselves diseased and abortive.

It is not essential to ulcers that there should be

Neither pus nor granulations essential to an ulcer.

either granulations or pus; the latter is the consequence of exposure, the former an attempt to heal; and when ulcers have not this disposition, and are not exposed, we find neither the one nor the other, as is often evinced in ulceration of bone or cartilage.

Causes producing or predisposing to ulcerative inflammation.

Pressure; foreign bodies, or dead parts.

Tumors or matter.

Use in the animal economy.

There are many causes which will produce ulceration, and many which will predispose to it; for instance, it will be produced in a healthy person by the presence of any foreign body, by pressure, &c. and appear to be a process to loosen and get rid of that foreign body, or to avoid that pressure; but in these cases, the cause being removed, the part has all the disposition to heal. If a part of the body dies, or is killed, the soft parts will be removed around to allow of the dead part being detached. If a tumor, or matter, form beneath the surface, it will open a vent for the exit of the one or the other; such is the extent of its operations in this way, that it was denominated by Mr. Hunter the natural surgeon. There are indeed some natural processes which cannot be effected without absorption—I would hardly venture to call it inflammation; thus it is required to make way for the teeth to the surface of the gums; to remove the fangs of the old teeth, and to take away the alveolæ of those which have been removed, and are now therefore useless; though, in all such cases, I imagine, that the suspension of nutrition might account for the phenomena; for as all parts of the

body are naturally absorbed in turn, so, if the nutrition of a part be simply suspended, it would be removed by this ordinary process.

Ulcerative inflammation will often take place from some internal cause; thus many poisons will produce it, and none more surely than mercury, whose effect in causing ulceration of the gums is most notorious. Again: scurvy, venereal disease, or various other cachexies, produce this action in different parts of the body, owing, as I believe, to an alteration of the blood; they first excite inflammation, and ulceration is the result.

Produced by internal causes, as various cachexies, &c.

Ulcers will take place from a defect in the circulation, most commonly in the venous, and hence they occur so often in the legs, especially from varicose veins; but here, I believe, an inflammatory state of those veins contributes to this state.

Defect of circulation, especially venous.

The causes now mentioned may be considered as more immediate; there are others which may be regarded chiefly as predisposing; thus:

PREDIS-
POSING
CAUSES.

Ulcers are often the *result* of weakness of parts; at all events, when parts are weak slight causes will produce ulceration; thus pressure, acting on a weak part, readily occasions it, and any other irritation producing inflammation of a weak part (as for example, of a cicatrix) will occasion ulcerative action.

Weakness a great predisposing cause.

Diseased deposits, as in scrofulous bones.

Akin to this, we may remark, where disease has deposited extraneous matter as in scrofulous affection of bones, that the ulcerative action is established if any cause of irritation be applied, hence caries; and doubtless the same cause will operate similarly in other cases not so well recognized.

Also the peculiar nature of some tissues.

Again: ulcerative action is more prone to take place in some tissues than in others, as on the conjunctiva of the eye; on the mucous membrane of the mouth or intestines it is very common, and also on the skin it is a very frequent occurrence.

The healing of ulcers mainly depends on the removal of the cause.

With respect to the healing of ulcers, I have few observations to make here. It will not be effected, or but rarely, while the cause, whether extrinsic or intrinsic, continues to operate, and therefore no general rule can be laid down: hence the removal of a cause of irritation, support given to weak parts, the destruction of a morbid disposition in the part, or in the constitution, or both, will often give ulcers a tendency to heal; but these ends are to be accomplished by various means. One remark, however, I have here to make, that we very often pay attention to the ulcer, to the exclusion of the inflammation which surrounds it, while both the one and the other require it. A judicious application to an ulcer will often put an end to the surrounding inflammation which is excited by it, while,

on the other hand, leeches applied to the neighbouring inflammation often heal it, when applications to the sore itself are of little avail.

I may further remark, that when ulcers do heal, they by no means invariably go through the process of filling up, to form a cicatrix ; but on the contrary, the parts are often never repaired, but deep indentations remain (as is familiarly known with respect to chancres, scrofulous sores, &c.), consequently, as the pits have not been filled up with new matter, that, not having existed, cannot be absorbed, and hence, in these cases, we have the deformity of a deep scar, but no puckering round it.

The cicatrix differs from those when there has been no ulcerative action, as the breach is often not filled up.

SECTION IV.—*Mortification.*

The observations I have to make on this subject will be arranged, with reference, 1st, To the changes anatomically observed in the part ; 2d, To the state of the circulation and nervous system during the preceding stage of gangrene ; 3d, To the difference between moist and dry mortification ; 4th, To the relation of mortification to inflammation ; 5th, To the processes to limit its extension and remove the mortified part ; 6th, To the in-

fluence created by it on the surrounding parts;
 7th, To the influence produced on the system;
 8th, To the various causes which produce mortification.

Anatomical
 changes in
 the part.

Mortification (or sphacelus, its equivalent term) is applied to a peculiar alteration induced in the body, in which the fluids are found coagulated more or less powerfully, the solids changed in their texture, and the functions of the nerves and blood-vessels completely abolished; in short, a part so circumstanced is dead; but this is not simple death, or the cessation of all the functions of life, from which the body, or a part, may, under some circumstances, be recovered; but it is an irreparable destruction of the organization and powers, and with respect to the blood-vessels, the abolition of their functions extends far along the trunks, whose contents are coagulated*.

In this mode of death, the colour of the surface is changed, generally becoming dark, probably from stagnant blood, and in some cases black; but there are considerable differences, partly depending upon the mode of death, partly on the circumstances of

* Andral seems to regard mortification as a mere stagnation of the blood (p. 41, 52, et seq., translation); but although it is true that a part will die when its circulation is interrupted, yet stagnation merely does not account for the conversion of tissues in the part mortified, or the changes which the adjoining vessels undergo.

exposure, and partly on the tissue in which it occurs.

The skin commonly becomes dark or black, and as that is most frequently seen, we are apt to connect the idea of mortification too much with this blackness; for even the skin sometimes mortifies without being so, but assumes a dark fawn colour: the difference, also, observed in the colour may perhaps partly be attributed to the length of time which has elapsed since the mortification took place, as a dark slough of the skin will become fawn, from the maceration of poultices in which it has been kept. Phlyctenæ form on the surface of the skin.

Cellular membrane generally becomes of a dirty grey, or of the colour of shamoy leather; so do granulations when they perish on the surface of a sore.

The muscles also are converted into a substance very similar in appearance, sometimes brown, and lose their fibrous character*; in fact, it is difficult to distinguish any tissue in the midst of sphacelus. The cornea becomes brown, mucous membrane ash-coloured.

If the parts are exposed to air during the process, they become dirty brown. If the blood has been greatly obstructed in the part, they are

* Gendrin, 1131.

consequently darker. The parts become dense, but not more resisting, and lose their elasticity. In most cases there is a considerable quantity of dirty, dark interstitial fluid: often air is disengaged.

Such are the appearances which disclose themselves after death, or the severing of the part; but another and more important subject of inquiry is, the condition of the vessels and nerves before sphacelus actually occurs.

State of the
vessels and
nerves.

It appears that the circulation is slower or more oppressed than natural, even in those cases which result from high inflammation; but that effusion takes place from the vessels with considerable force, I should infer, not from direct experiment, but from the observation of the following fact, namely, that the skin, even though tense and resisting, becomes still more distended from day to day, which of course implies a force to effect it; but that the circulation is slower requires often no experiment to prove beyond the simple one of pressing on the surface, and observing the slow return of the expressed blood. In further confirmation of the difference in this respect between the state of the vessels in approaching sphacelus and in more active inflammation, I shall mention the following cases.

A young man received a severe injury which lacerated the lower part of his arm, and fractured the

external condyle of the os brachii into the joint; very high inflammation followed, with great tension above the elbow. To relieve this, I made a long incision, which bled profusely in every part, from a multitude of vessels, bright scarlet blood; it was difficult to stop this, but it proved of great service to him.

I mention this as contrasting well with the following:—

A few weeks afterwards a little boy also had his arm severely lacerated about the elbow, and the olecranon was fractured. Inflammation followed, which early had a tendency to sphacelus; circumstances prevented me from making an incision as soon as I probably ought; but the increasing tumefaction and tension, the dusky red colour, and an evident emphysema below the integuments, led me to do so; it was long and deep. *Hardly any blood flowed, and this of a dark colour.* Whether the cellular membrane was then dead or not, the skin certainly was not. Much dark serous fluid oozed out. The boy died four days afterwards.

In the former instance the pain of the incision was acute, in the latter it was hardly felt, and it seems probable that, in such cases, there is a great loss of nervous energy, as well as a stasis of the blood.

When the part during the process of mortifica-

Effusion of
interstitial
fluids and air.

tion, or rather of gangrenous inflammation, which precedes it, becomes pervaded with interstitial fluids, which are not susceptible of coagulation, it assumes that form to which the term moist gangrene has been applied, and in this, such fluids rapidly putrefy, and, when putrid, disengage gas (at least, this is probably the course), hence the part becomes emphysematous, and the gangrene has been termed *emphysematous*, as if it were really distinct in its nature. In such cases it spreads with uncommon rapidity; but the cause of this is the nature of the inflammation, the emphysema is the effect. The seat is commonly the cellular membrane, for the denser tissues hardly admit of any copious interstitial effusion, even in gangrene.

Differences
between dry
and moist
gangrenes.

On the other hand, when parts die suddenly, as from caustic, they are comparatively dry, which may, perhaps, be explained in this way, *i. e.* that the destruction is so sudden that there is no opportunity for the preceding inflammation to cause interstitial effusion, while those fluids which are in the vessels are coagulated as far as may be. In addition to this, such parts are often exposed to the same process of desiccation, which is observed in corpses denuded of cuticle, under a high temperature.

Many spontaneous mortifications take place without any inflammation, of such a character as produces interstitial effusion: in these, also, the part will become dry.

It will be obvious if this explanation be true, why moist gangrenes generally spread rapidly, why dry do not; beyond this observation I do not think it of advantage to push the point as a good ground of distinction.

With respect to the term gangrene, it should GANGRENE. be well understood, that it only implies that state which precedes and commonly terminates in mortification, but does not inevitably, and therefore, although often used as synonymous with it, cannot correctly be so; but as there are few mortifications, if any, not accompanied with gangrene, and as it will hereafter be stated, that it is the gangrene more than the mortification which we are to regard, we shall seldom err in speaking of the gangrene. In point of fact, gangrene is no other than that Its relation to mortification. mode or state of inflammation which produces mortification; and it may not be an erroneous view of the matter to consider mortification as standing in the same relation to inflammation as adhesion, suppuration, or ulceration. They may all be preceded by a high degree of inflammation, or it may be scarcely sensible; and it is not improbable that they *may* all be original actions in some cases, and that parts may adhere, suppurate, ulcerate, or mortify, without preceding increased heat, swelling or turgescence of vessels, without

those symptoms which we denominate inflammation.

But whether mortification is the invariable product of inflammation or not, is not always material in a practical point of view, for it often ensues so speedily on the application of the cause, that no available interval intervenes before its occurrence for the adoption of any treatment. In the majority of cases, however, it is the result of inflammation as much as any of the other modes above specified, sometimes inevitably, sometimes not; and this being the case, the best mode of considering the subject, with reference to practice, is to ascertain in what cases mortification is immediately consequent on the cause, and in what it is the product of inflammation; and when so, in what cases it can be prevented, and by what means; which can only be understood by knowing the nature of the inflammation which threatens it, or the particular causes which are apt to induce it, and these will be hereafter considered.

Processes
which nature
employs to
limit its ex-
tension.

It is necessary, also, to understand what processes nature employs to prevent the extension of the mischief: now here, I may state, that it appears to consist in simply converting gangrenous inflammation, or that which has a disposition to mortification, into adhesive inflammation, or that which has a disposition to limit the

disease ; it does not follow that this should be throughout, it is sufficient that it should prevail at the margin, and as the gangrenous disposition is not so strong, nor indeed the inflammatory action so violent, at the margin, here it generally takes place, and is known by the inflammation assuming those appearances which are characteristic of adhesive inflammation, and the product is shortly obtained, becoming generally a barrier to the farther progress of the disease ; this, however, often gives way ; for if either the violence of the inflammation be again increased, or the powers weakened, this consequence may result. It is the nature of the disease, in many instances, to *pause*, and a barrier is formed ; and again to renew its violence when it is destroyed.

The establishment of adhesive inflammation.

The formation of the barrier, or line of separation, is usually the result either of the degree of inflammation being lessened, or the powers of resistance increased ; and if either the latter can be sustained, or the former still kept down, the barrier stands, and the part and the general system subside into a quiet state.

Depends on the degree of inflammation being lessened, or the powers of resistance increased.

When this is so, the next object to be accomplished is the separation of the mortified part, now not only useless but injurious ; this is accomplished by the absorption of the living parts around, which are thus detached from the slough, and then by the processes of granulation and sup-

Removal of the mortified part.

puration the cavity is healed: these processes, however, occupy very different times, according to the activity of the disease, and the nature of the tissues.

What influence does a mortified part produce on those surrounding it.

It is a question of some interest how far the surrounding parts are influenced by the existence of a part already dead; now we cannot help observing, that in some cases, as where a part is destroyed by caustic or cautery, there is no disposition communicated to the surrounding parts, causing them likewise to slough; indeed the fact is so much the reverse, *that we avail ourselves, and often successfully, of the disposition* these produce, to limit other gangrenes; and, actually, if we convert a gangrenous part into a slough by such means as cautery, nitric acid, &c., we often change at once the nature of the actions going on; for in the last case the actions established are merely those requisite to throw off a foreign body, and are now substituted for the gangrenous disposition. It may, then, be much doubted whether the existence of a mortified part *per se* produces any mischief, with the following important exceptions:—

1st. When the slough is situated beneath the surface and is confined, in which case it not only irritates as a foreign body; but in addition, when it becomes putrid, and no barrier is formed,

the influence of this putridity is communicated to the surrounding fluids, which may be, probably are, absorbed, at all events are in contact with the living parts; hence, from both causes, the impression in carbunculous inflammation, E. Phlegmonodes, &c. &c.

2d. Where it is not situated beneath the surface, if there is no barrier, especially if there is a large quantity of confined interstitial fluid, for this in like manner becomes putrid, may be absorbed, and at all events acts injuriously on the living parts in contact with it, disposing the inflammation going on in them to the same gangrenous tendency: hence it appears that the interstitial fluids contained in gangrenous parts may produce mischief, and hence the advantage of giving them vent.

But I must observe that this, although one cause of the destructive tendency of the disease, is very far from accounting for all the phenomena, it is only an additional cause, we must look to the *original disposition* of the inflammation as the indispensable one; for as we often see spots of gangrene appearing in several places at once, we can hardly ascribe these to the continuous propagation of the disease from an influence spreading from one point, but is the consequence of that original disposition.

The influence produced by the interstitial fluids is by no means the only cause of the peculiar impression produced by gangrene, which is rather owing to the peculiar character of the gangrenous inflammation.

There is another subject of inquiry of consider-

Nor does it account for the remarkable effect produced on the system, which must rather be ascribed to sympathy with the gangrenous inflammation.

able interest, which will also tend to throw light on this point, namely, how it is that the constitution *as well as the* neighbouring parts suffer such a singular impression. By many it has been ascribed to the absorption of a deleterious principle; but this opinion is sufficiently refuted, as Mr. Burn argues, by the fact, that the impression is in no degree commensurate with the *size* of the slough, and consequently with the quantity of putrid matter, as the effects produced by a small slough of intestine or of the cornea will exemplify. This absorption will have its effect; but it is far from being the only or principal cause, which is no doubt, in such cases, attributable to sympathy. And it may likewise be observed, with respect to the sympathy, both constitutional and local—and the fact, although it does not oppose Mr. Burn's opinion, renders further explanation necessary—that it is by no means in proportion to the size of the slough, *when situated in the same part*. Thus a slough from pressure or burn will produce a very different effect from one caused by erysipelas, although the situation be the same: it is, therefore, still further probable, that it is from the *inflammation surrounding the slough* such influence is communicated: if this is merely calculated to throw off the slough, little disturbance will be produced if the powers are adequate, as generally happens in the two first cases; whereas if the

slough exists in the midst of an inflammation whose disposition is already unfriendly, then it will tend to augment this, and the constitution, as it were, conscious of its danger, perhaps overpowered by it, will yield to its influence.

Upon the whole, then, I should conceive that the singular impression communicated to the constitution and to the neighbouring parts depends upon the peculiar character of the inflammation which produces and surrounds the slough; but that the putrid, offensive, and irritating fluids contained in it are eminently calculated to give this additional force, if a line of separation has not excluded their influence from the system, more especially if such fluids are confined. The practice of scarifying mortified parts is now considered as useless or injurious; if the view here taken is correct, it may appear useful by giving vent to such fluids. The point now discussed is not merely speculative. The practice of the older surgeons, at all events, was founded upon the doctrines which they held on the state of the parts in mortification; and we cannot properly appreciate its propriety or impropriety in various instances without bearing in mind the objects they had in view*.

* In this place I should, perhaps, state that some pathologists, I may mention M. Gendrin (*Hist. Anat.* 1688), ascribes the production of gangrenous inflammation to the introduction of a septic

The sympathetic affection is in accordance with that of the part, and the constitution will be overpowered by it if this is sufficiently great.

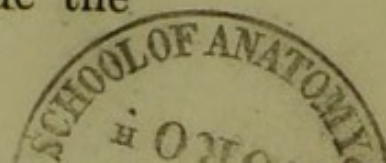
The ultimate state being nearly the same in all cases, whatever may have been the original cause.

With respect to the influence produced on the system by gangrene, in short the sympathetic affection, what I have already said has anticipated many points; and in truth, the view I should take of the case is easily summed up. The presumption is, that as in other cases it is in accordance with the local one; if the part is in the act of dying, if its vital powers are extinguishing, it is not to be wondered at that this should be the case also in the system at large, supposing the local disease is sufficiently important from its size, or from the organ it affects. Failing strength, cold sweats, hiccough, anxiety, suppression of pulse, indicate the approaching death of the whole body; and when it has gained this mastery, whatever may have been the cause, the state is the same, whether the mortification has, after a short interval, befallen a robust man from accident, or has been the result of disease in a long disordered frame.

If this accordance between the local and general principle in the blood, which is deposited on some organ or other; and he states that his own observation and the experiments of M. Dupuy confirm this fact, which I by no means question in particular instances; but there are so many facts which militate against it as a general principle, that I think it an unsafe one. Why, for instance, if this is the case, should an incision in a carbuncle put a stop to the further extension of the disease, if there is a given quantity of septic matter to be got rid of? The foul blood of a carbunculous person will dispose them to carbuncle, but this does not necessarily imply the existence of septic principles in their blood.

symptoms be true, with respect to the last stages of mortification, it is no less so in the earlier ; and as that affection may and does result from various causes, and the preceding inflammation is of various kinds, so it appears that the sympathetic fever attending it will be variously modified ; and although we may recognize those characters which are known to belong to the type of nervous or bilious fevers, in a greater or less degree, yet they are combined with others. The fact would be of little consequence if it were not connected with treatment ; but say that bilious symptoms appeared in a case of carbunculous inflammation, and in a case of erysipelas, would it be wise to administer the same constitutional remedies in both ? should we do well to bleed or give large quantities of tartrate of antimony in the former, or administer cordials and support with little reserve to the latter ? although such cases might occur, certainly the general principle would be to observe a different treatment. It may be said that the typhoid character is more compounded with the bilious, as in the case of carbuncle, and that this leads to difference of treatment. Be it so, but let the difference be recognized : green is compounded of yellow and blue, but it is neither yellow nor blue. It is difficult to disturb ideas once established, and to multiply fevers by the number of different inflammations would probably never be tolerated ; but let us for a moment set aside the

With respect to the sympathetic fever in the earlier stages, it will be modified by the nature of the inflammation.



term fever, and state the fact in plain words, and it may perhaps be admitted, that the constitutional sympathy varies as the local affection.

The production of mortification may generally be ascribed to certain causes, which are

With respect to the causes which either produce or influence the progress of mortification, they are numerous; but it may simplify our views of this matter to arrange them under certain heads, not with reference to treatment, for very dissimilar forms of the disease would be found thus classed together, but merely to form determinate ideas as to the causes capable of inducing this state.

want of power longer to support life in any part, from defective supply of blood.

1st. It will be found that mortification takes place because the vital powers are incapable of longer supporting the part. Thus, when the circulation is much reduced by the interruption of a main trunk, or when the heart is diseased, or when the vessels are diseased, *the supply of blood being inadequate*, the part will mortify.

From obstructed return of blood.

Or when the blood cannot freely return from the part, it is equally deprived of that supply of arterial blood which is requisite; still more, it is overloaded with venous blood, which is injurious, and it will also perish.

If these causes, existing in a certain degree, are capable of producing mortification, so they are of assisting in producing it on the application of other causes; thus when an artery has been tied, there may be still enough of support to maintain life;

but if the part be over stimulated, or exposed to cold, it will mortify under this impression.

2d. If an injurious cause has been applied, which the part has not powers to resist, it may also mortify, although that cause *does not* possess an extraordinary energy; and this may be considered,

From the application of injurious causes to weak parts,

First, With reference to the *part*, as where tendons or fasciæ, tissues of naturally feeble powers, or the integuments of the scrotum or eyelids are concerned, or as regards the *whole* of the frame, when that has been much debilitated.

Secondly, When the *cause* itself is of a powerful nature, and this may be so from its possessing the quality of *stimulating* the part beyond what it can bear, as excessive heat, ammonia, &c., or of *depressing* its powers of resistance, as excessive cold; or still more, from any cause operating *with a combined influence*, as in the case of poisons, which at once singularly depress the powers and excite actions; and though very dissimilar in the character of the disease they produce, yet acting locally on the same principles, we may recognize the influence of great mechanical violence. The poison, however, enters the blood, the mechanical violence does not so operate, nevertheless the irritating and putrescent fluids, effused in mechanical injuries, may probably contribute to the production of the symptoms; and hence, possibly in part, the difference between contusions, in which they do

or from powerfully injurious causes to any parts, either by stimulating too much, or excessive depression of the powers, or by both.

not become putrescent, and lacerations, in which they do.

Or from a
vitiating state
of the blood,
of which
there are
many kinds.

3rd. The state of the system being disposed to produce it, not so much from simple debility as from some internal defect which often can be recognized, as when

The blood is rendered impure in scurvy, or from bad living, or from such food as ergot of rye.

From common fever, measles, scarlatina, plague, or pestilential fevers.

From the influence of other morbid poisons, as in hospital gangrene, venereal phagedena, pustule maligne.

From some unknown defect, probably both in the blood and digestive system, as in

The limited inflammations of the carbuncle kind.

The spreading inflammations of the erysipelatous kind.

It is often imputed to the violence of inflammation, but this I must remark is the *statement of a fact, not the explanation* of it; there must be *some reason* for inflammation being violent.

This summary of the causes which produce mortification will partly illustrate the principles on which it should be treated; but as mortification, in point of fact, only constitutes one of the phenomena of inflammation, it is consistent with the plan of this work, and, I believe, with right

principles, to consider it in this relation, as will hereafter appear. I shall only briefly state here, that as it is generally more immediately the result of deficient power and increased action, the object generally is to lessen the latter, and increase the former; simple, however, as these objects appear, it unfortunately happens that they are very difficult to effect, for the means which we possess of increasing power, often, at the same time, increase action, and, *vice versâ*, those which diminish action lessen power.

To prefer the one or the other, or to combine them, distinguishing rightly the case, or the opportunity which demands the preference or the combination, together with the removal of the influence of the immediate and remote causes, constitutes one of the greatest difficulties of our art.

SECTION V.—*On the Purposes and Uses of these different Modes of Inflammation.*

The animal body is perpetually undergoing a process of wasting from its own actions; and the loss is repaired by organs which assimilate other matters, either actually possessing, or which have possessed, the principle of life, and are termed

Nutrition
provides for
the ordinary
repair of the
body.

food; and by vessels which replace the original matter of our bodies by the new thus obtained, and in this way its growth and maintenance are provided for.

Inflammation
in case of in-
jury or dis-
ease.

But it is liable to injury from without or from within, by which parts are destroyed, removed, divided, or rendered imperfect in their powers or actions, and the usual processes of nutrition are not sufficient for the repair of the mischief; under these circumstances *they are gifted with the extraordinary power of inflaming*, which must so far be deemed salutary.

Object to re-
pair injury or
protect.

It is the object of inflammation in external injuries to repair the mischief done, or to protect the body from the further operation of the cause.

To repair
when parts
are removed.

When parts are *removed*, there is a disposition to reproduce or restore them, which, however, is only perfectly accomplished in the lower orders of animals; for in the higher, although certain tissues, such as bone, artery, tendon, skin, cellular membrane, &c. can be so, parts or organs of complicated structures never are*.

* The cause of this difference between the two classes may, perhaps, be thus accounted for: a state of repose continued for a considerable time is probably necessary for parts of complicated organization to be formed anew. The lower orders of animals are capable of obtaining this, from their nature and constitution, which enable them to dispense with the necessity of taking food for a considerable time, and consequently with the exertions required to procure it; whereas the reverse of this is the case in hot-blooded

When parts are *divided*, a *similar disposition* is produced as when they are removed, and new are formed to fill the chasm and connect the separated surfaces.

Similar disposition when divided.

Inflammation may arise from external injury, although *no division* has been produced: as for instance, from any mode of mechanical irritation, as pressure or friction, and from chemical injury of every kind. Under these circumstances it should seem that its object is either to get rid of the noxious cause by an increase of the secretions, or to protect the neighbouring parts from its influence by adhesions; or, if these purposes cannot be effected, to remove the parts themselves by ulceration or mortification. It is also not improbable, that it is sometimes produced for neither of these purposes, but merely to restore to their healthy functions parts whose organization has rather been disturbed than destroyed; at least we may suppose this to be the case in some contusions or concussions (occurring without disorganization), and in scalds.

To get rid of a noxious cause, or resist an injurious impression.

The disposition to the one or other of the modes of inflammation will therefore much depend on the nature of the object to be effected, partly on the structure of the part.

animals, and therefore, perhaps, Providence has not formed them with powers for performing a process they could never have brought to perfection; and although, with the aid of his fellow-creatures, man enjoys, in this respect, advantages no other animal does, yet the general principles of his constitution being the same, he with them suffers under this disability.

The mode of inflammation will partly depend upon the object to be effected, partly on the structure of the part.

upon the object which is to be obtained, and the nature of the structure concerned : thus, if a chasm is to be filled, the adhesive mode is attempted in every case ; if an irritation is to be resisted, either the inflammation will tend to effuse lymph, or to pour out other secretions, according to the functions and structure of the part.

In every organ capable of effusing lymph and requiring protection, the adhesive process takes place, unless prevented by a faulty state of the constitution, and thus it resists, or attempts to resist, the progress of disease from within as well as from without ; thus it attempts to resist the spreading of the suppurative and ulcerative actions, or sphacelus.

Suppurative inflammation is established where it can better accomplish the object than the adhesive, as in cases of injury so severe that adhesion is impossible ; where it is necessary to rid the body of foreign substances, situated both above and under the surface ; where adhesive inflammation would be more injurious, as in canals and hollow organs, which have an outlet ; as an inevitable result of the state of the constitution, or to clear it from some noxious cause, as in small-pox ; or as a resource where adhesive inflammation fails from excessive violence : suppuration, therefore, cannot be justly regarded as an unfortunate termination of inflammation, excepting in particular cases ;

when begun, its action will be continued until the object for which it was established be accomplished, or until the state of the constitution on which it depends is altered.

Resolution, adhesion, and suppuration, are desirable processes or terminations, according to the purpose to be effected; on the other hand, they are in certain cases of injurious consequence; thus, resolution may take place when we wish to procure adhesion, as in hydrocele; adhesion when we wish to resolve the inflammation, as in iritis; suppuration much more frequently is injurious.

These processes of inflammation sometimes injurious.

Ulceration and mortification, though essentially destructive, have also their use; for it often happens that a part *should* be sacrificed for the sake of the whole; thus, when parts cannot escape from pressure, they must be removed by the former, or rendered insensible by the latter and so interposed between the injurious cause and sound parts. Ulceration separates and removes parts which do harm by remaining, and makes way for the expulsion of foreign matters.

Ulceration and mortification often necessary.

The danger and mischief which arise from these processes either proceed from their being misapplied (if I may use such a term), or from their extending beyond the part; which, when the sympathetic actions excited are not of a nature to stop the progress and repair the mischief, but the contrary, seems chiefly to depend upon the state of the

Are injurious when excessive or misapplied.

constitution, though it is much influenced by the nature of the cause, and the structure of the part.

Spontaneous inflammations resemble those from external causes; but we cannot so readily prove them of advantage, though there is little reason for doubting it.

Inflammation occurs from certain states of the general system, imitating in its processes those which arise from external causes. In some cases a useful purpose for the system is evidently answered, although at the expense of the part; in other cases it seems to be an unequivocal evil, still it probably may be the least evil of two.

A *vis medicatrix* must be conceded, and the only object of medical treatment is to regulate or assist its efforts.

Whatever has been said in ridicule of the *vis medicatrix*, I cannot help believing that many, very many of the actions established in the economy are efforts made by the constitution to remove or prevent the consequences of injury and disease; and further, that all medical assistance has for its object to check those actions if excessive; to alter the disposition which renders them so, or perverts their character; or to excite them when deficient or altogether wanting.

These simple objects, however, are to be obtained by very complicated means.

SECTION VI.—*Resolving Inflammations.*

Inflammation, then, has been described as the adhesive, suppurative, ulcerative, and gangrenous;

and I have endeavoured to give a brief view of these inflammations, or, to speak more correctly, modes of inflammation. Their treatment can only be understood when their various relations to each other, to the constitution, to the organ in which they occur, or to the cause which produces them, are also taken into consideration; but, before proceeding further, there are other important subjects requiring attention.

Inflammation may go on to occasion, if such be its disposition, the phenomena of either or all the modes above mentioned; and we occasionally see, at the same time, adhesions, pus, sloughs, and the effects of ulceration; there may be more, or fewer, or *none* may take place; but instead thereof, the inflammation may disappear after a time, when it is said to be resolved. But here I have to observe, that there are many inflammations which, *ab origine*, have no disposition to produce any of these results; and which, although they may be severe and endure for a considerable time, are alone disposed to this termination, namely, resolution, which, in my belief, is as much their character as any other result is of the preceding. They probably arise exclusively from a constitutional cause.

Original disposition of many inflammations is not to produce adhesion, suppuration, ulceration, or sphacelus, but to resolve.

They often produce some secretion.

It may, however, be stated, that commonly these inflammations, which are disposed to resolve, have more or less a disposition to produce some effusion,

either of the natural secretions or of a peculiar kind; thus, rheumatism will occasion a large secretion of a serous nature; gout but little, that little, however, peculiar; mumps, again, seem to produce little or none; and it is the disposition of this, as, indeed, it is more or less of the others, *to be rapidly translated* to other organs, which in mumps, singularly enough, occurs in the glands of the genitals of either sex; but it will often be found that little trace of disease will remain in the part first affected, or eventually in the last.

Are very
liable to me-
tastasis.

Among these, I should certainly be disposed to assign a place to that species of inflammation which Sir A. Cooper has described under the denomination of the irritable, and the term seems, indeed, very appropriate; it is one of its characteristics to persist an indefinite length of time without producing any disorganization in most instances.

Resolution, then, deserves to be considered, not only as the disposition more or less of all inflammations, but as the particular tendency of a particular class.—What then do we understand by the resolution of inflammation? simply the return of the inflamed part to its natural state; the vessels cease to be distended with blood; the circulation is restored to its natural mode; and the interstitial fluids which have been poured out are reabsorbed: the parts, however, are more ready to resume the inflammatory action than they were before.

In what does
the resolution
of inflamma-
tion consist.

SECTION VII.—*Metastasis, Counter-irritation, Derivation, Revulsion, Hæmorrhage.*

Metastasis.—At times, resolution takes place with unusual speed, every trace of inflammation may disappear in a few minutes; in this case it seldom happens that the disease is cured; it ceases in the part, but it will generally happen that it fixes on another; whether it there assumes the form of inflammation, or whether it merely disturbs its functions, this phenomenon constitutes metastasis; and, it may be observed, that those inflammations which have the least tendency to produce fibrinous effusion commonly have the greatest disposition to quit the part and attack another; thus it is with rubeola, erysipelas superficiale, &c. &c.; but this is not invariably the case, for nothing is less probable than the metastasis of scarlatina, as we know by the modes of treatment commonly employed.

METASTASIS.
Its pheno-
mena.

Although metastasis *most* readily occurs in inflammations which have not advanced to any fixed product, yet it is not uncommon where they have; thus we sometimes see the pustules of variola suddenly sink and empty themselves, and other abscesses disappear; in this case we have the absorption of pus added to the other process.

It may be inquired what becomes of this pus

when it is so absorbed ; and that question will be considered hereafter.

The subject of metastasis has excited great interest, and it has often been remarked as extraordinary ; I cannot, however, conceive that this phenomenon is so ; the original production of an external inflammation as a relief for an internal disease is, indeed, a very remarkable occurrence, and we must be content at present to admit the fact, without attempting to explain it ; but when this is granted, is it any wonder, should the inflammatory actions established in a part for the relief of that disease be checked, that there should be an effort to renew them elsewhere ? Metastasis, however, does not solely arise from an external check ; it often happens, there is reason to believe, from an internal cause, and this, perhaps, want of power. We often see a person labouring under great disorder take a stimulus, which shall be followed by the appearance of an inflammation on the surface ; we may presume that the stimulus enabled the system to establish that inflammation ; and seeing the disordered state of the constitution relieved, we may further presume that in some way the inflammation effected that change : while, on the other hand, if, on the employment of a powerful purge or bleeding, we find that inflammation suddenly disappear, with a renewal of the former disorder, it is not an irrational conclusion

that it renewed its attack on the internal organs for want of power to maintain the struggle on the surface.

The subject of metastasis naturally leads to the consideration of another point, namely, the power of artificially substituting one disease for another; for we practically find, that one of the most potent means we possess, consists in establishing a new disease, whereby the other is lessened or removed, by diverting, in fact, the morbid action to the new part.

The practice of counter-irritation grounded on the principle.

Two principles seem deserving attention with respect to this point; one is, that the new disease be established at such a distance as not to extend its sphere of irritation to the old one, which will then be augmented by it; the other is, to establish a new disease, approaching as far as may be to the probable nature of the old one; thus, when we wish to remove inflammation which has not proceeded to the effusion of lymph or pus, we should excite simple inflammation, as by a mustard poultice or blister; if it has advanced to secretion from a surface, as in an inflamed joint, a blister will be the appropriate remedy; but if we have to contend with a suppuration or ulcer, then a seton or issue, being of the same kind, will be more likely to cause such a disease as will divert the other.

Principles on which it is conducted attempted to be explained.

Nature points out, as has been stated, this mode of proceeding, and I may add, that besides simple

Natural phenomena which have led to the practice of DERIVATION and REVULSION.

inflammation, there are many other morbid phenomena, curative of disease, attributable to the same source; thus, we have hæmorrhoids as well as abscess prope anum; we have hæmorrhages from the nose and premature discharges of the catamenia occurring for the relief of other diseases; and hence we also proceed upon the principle of drawing blood or secretions from a distant part, and this is called revulsion or derivation.

Spontaneous HÆMORRHAGE considered as one mode of cure of inflammation.

On the subject of hæmorrhage, it remains to say a few words; and I may here add, that it is *one* of the means by which inflammation often terminates. When inflammation occurs in the substance of a part, it has been stated, that antecedent to the formation of pus, red globules are often deposited in the centre; but the circumstances of such an inflammation are a bar to any extension of this process—*not so, when surfaces are affected*; and hence, hæmorrhage from membranes, especially mucous membranes, or even from the skin (petechiæ, purpura, &c.) are sufficiently common, and very often completely relieve the inflammation; hence, hæmorrhages attended with fever, or active hæmorrhages, are truly considered as inflammatory, and their product as an useful termination.

But even where it is not a surface, but an *organ possessing a mucous surface*, which is the subject

of inflammation, it is not uncommon for hæmorrhage or discharge of blood to occur from the communication of that inflammation to the surface; and hence we have in pneumonia the appearance of blood in the sputa hailed as a satisfactory occurrence; and hence, if I mistake not, many floodings occur as the natural relief of inflammatory action of the uterus, and cannot be stopped with impunity. Perhaps the relief of the head or eyes from epistaxis are of the same nature.

SECTION VIII.—*Injury of Function. Disorganization.*

It is necessary to speak briefly on one or two other points connected with inflammation.

Injury of Function.—First, when inflammation occurs in any part, its functions are more or less impaired: an inflamed eye cannot see as it ought; an inflamed lung cannot respire perfectly; an inflamed muscle acts not at all or irregularly, but is generally impaired in its power of action: the heart and some other involuntary muscles may be exceptions.

If it is a secreting organ, the secretions are either suspended or increased, but in all cases

disturbed and morbid; and I may observe, that the return of secretions, if suspended, and their approach to the natural character, are among the best symptoms in inflammation; and I may further add, that nothing appears more to reduce inflammation than the occurrence of secretions, for which reason we promote this, as a principal object of treatment.

If the part be a vital organ, the imperfection may prove an immediate cause of death; but more frequently this arises from the sympathetic effect produced on the system.

The function of an organ may be rendered imperfect *for a time* only, still if that organ is essential to life and is seriously impaired, death may be the result (without any great degree of disorganization); but commonly, when inflammation produces death speedily, it is rather from the *sympathy* produced in the system and its consequences, than from the mere imperfection of the organ; for we undoubtedly see, in the examination of those who have died of chronic diseases, examples of infinitely greater disorganization (long compatible with life) than we observe in acute cases, where death often occurs before any such lesion has taken place as would abolish the function.

Disorganization.—The function of organs may also be *more permanently* lessened or abolished, and this happens when inflammation has produced effusion of lymph in a great degree which is not again absorbed, constituting indurations, and de-

stroying the mobility of its parts; also, when pus has been effused, or when ulceration or sphacelus have destroyed parts, and in all these cases they are strictly said to be more or less disorganized.

There is another change induced by inflammation, which is the reverse of induration, but not less destructive in its effects, I mean softening, which in the bony structure is a frequent result of inflammation, and should appear to arise from the disease occasioning a diminished deposit of those materials which are necessary to the due consistency of the parts: how far this may be the case in the brain, and in other instances, when we know it takes place, can only be conjectured.

SECTION IX.—*Inflammation considered as Acute, Subacute or Chronic, Sthenic or Asthenic, Active or Passive.*

Terms Acute, Subacute, and Chronic.—Inflammations have been regarded by pathologists (and divided by some) as acute, subacute, and chronic. As employed to distinguish different kinds of inflammations, these terms seem, as hereafter stated, incapable of fulfilling the object with accuracy, but, as expressive of degrees of inflammation, are very useful.

Inflam-
mations con-
sidered as acute,
subacute, and
chronic.

The term *acute* is used when the processes of disease are active, and have a *tendency* to terminate speedily; but I think it is a mistake in the definition to say that acute inflammation does terminate in a few days; for surely the processes maintained in compound fracture are often very acute, though they may continue long: and even in spontaneous inflammation this is also often the case, of which the eye affords frequent examples. The *tendency* to terminate may remain the same, but it is prevented by the continued operation of the causes which originally produced it.

The term *subacute* is adopted when the processes are in a much less degree active, and it often, but not invariably, has a tendency to a more protracted continuance than the former; but this is by no means constantly the case, as the phenomena of many catarrhal inflammations prove, which are both slight in their symptoms and brief in their duration.

Inflammations are said to be *chronic*, whose *disposition* it is to continue long; it also is understood to imply the absence of acuteness or activity in the character of the inflammation. If it be admitted that chronic inflammation often becomes acute in its phenomena, no objection need be made to the definition; but it is of consequence to understand that such is the case; and, indeed, in many instances this appears to be its natural and almost

irresistible tendency, producing eventually the loss of the part, or the patient's life. It is also of consequence to understand, that while, on the one hand, this and subacute inflammations are often exalted into the acute, that on the other has generally a tendency to subside into the subacute or chronic *degree*.

It is the natural progress of acute inflammations to commence with less, to increase with more, and to decline into less severity ; but though the degree of severity may be nearly the same in the rise and in the decline ; the other circumstances are materially different, influenced by the exhaustion of the powers of the part, and by the organization having been impaired ; and for these reasons I cannot think that it is right to consider, as has been advanced, the first and the third stage as equally demanding the same mode of treatment.

It is an undoubted fact that inflammation, which might have been completely terminated, is often prolonged in a chronic form, by too early a recurrence of exertion or improper food, or by the operation of the same causes may again be excited into the acute form ; but on the other hand it is no less true, that it often persists in a chronic form, merely because the use of stimuli and exertion are too long withheld. Many cases of in-

flamed* joints prove the latter, of the eye the former.

Inflam-
mations con-
sidered as
sthenic or
asthenic.

Terms Sthenic and Asthenic.—I have still to notice the terms sthenic and asthenic, active and passive, which have been applied to different inflammations, or to different stages of inflammation. It is clear, if the hypothesis of debility as a general cause of inflammation be admitted, that it would be idle to trouble ourselves about these terms; for on that supposition all inflammations would be asthenic.

I must, however, say, that as far as I can judge, Mr. Hunter has well laid down the position, that some inflammations have action with power, which have been denominated sthenic; that others have action without power (to which as yet no appropriate term has been affixed, unless we were to adopt that of irritation); and that others, again, have neither action nor power; and to both of these the term asthenic is in common applied, whereas it would be more properly restricted to the latter.

* Acute and chronic diseases, or inflammations, owe their origin to similar errors, and similar objects are to be pursued in their treatment in many instances; but the activity of treatment must be proportioned to the activity of the disease: that which is to be done must, in the former, be done speedily.

Active and Passive.—With regard to the terms Active and passive. active and passive, they are, I think, less definite than the former, and, indeed, not applicable in precisely the same sense; for an active inflammation is by no means necessarily attended with power, or sthenic, and although in a passive inflammation the action may not be considerable, yet it may not be deficient in power.

CHAPTER IV.

ON REMEDIAL MEANS.

SECTION I.—*Objects of Treatment.*

GENERAL observations on the foregoing points with reference to treatment.

As I have now briefly stated those circumstances which commonly influence the production and progress of inflammation, it may not be amiss also, to make a few general remarks on the subject of their avoidance or removal, which of course will involve the most important points of treatment ; but I must carefully guard myself against the supposition, that the observations I have now to offer apply to each and every kind of inflammation ; for as inflammations differ in their cause and in their nature ; so they will, in my belief, differ in their treatment, both as regards the kind of remedy, and what is not less material, the degree to which it should be used ; but before I commence on this point, I may mention, that we have certain objects in view which have been very clearly stated by

Mr. Lawrence in his lectures*, and which may be briefly summed up as follows :—

1st. The prevention of a temporary *cessation of function*, especially when that function is essential to life.

2d. The prevention of *permanent injury* or *destruction* of an organ.

3d. The prevention of the continuance of the inflammation which increases *the disposition to a recurrence*.

4th. To relieve the patient's suffering.

To this I might add an object of paramount importance, namely,

5th. To put an end to that *sympathetic action of the system* which often proves destructive; for, I believe, I am justified in saying, that many more inflammations destroy life by sympathetic affection of the system, than by their immediate effects on the organ or part inflamed.

I shall only add, further, that our object must be in all cases, when inflammation is a disease, to restrain or put an end to its actions; but in injury, to assist the processes of restoration, and not, in checking the actions established, go so far as to destroy the power of effecting it.

* Lecture 8th.

SECTION II.—*On Bleeding.*

Eminently
useful, but
with very
many ex-
ceptions.

As there is no circumstance which produces so direct an influence on most inflammations as the determination of blood to the part, so there is no remedy of equal efficacy as bleeding; and we might almost persuade ourselves, while consulting the opinion of many eminent men on this point, that scarcely any other was required; such opinions must be admitted with great reserve; they are true only as regards some inflammations: we might also from the same sources almost be tempted to believe that it is hardly capable of doing harm, except it be carried exceedingly far. Now, although I most willingly concur in the opinion, that it is *the* remedy for many inflammations, especially in the beginning; it should, likewise, at the same time, be stated that it is not by any means adapted for *all* inflammations, or for all *stages* of the same; that it ought not to be employed in many to a *considerable extent*, or that, in many others again, it is applicable at all*.

* I may repeat here what I have stated elsewhere, that blood is not too largely determined to a part in inflammation, unless from a *particular disposition*; and our object is to remedy this disposition, which is not always best effected by bleeding.

A few examples will illustrate these points. We bleed in inflammation of joints, and in many of those of the eye, with almost a certainty that, if employed in time, and sufficiently, it will cure them, and with the confidence that we shall not endanger the lives of our patients; but we are not equally certain that we shall do the same good by this means in the advanced *stage* of these very inflammations.

As in the advanced stage of many inflammations.

Again: we bleed, even to a greater extent, in inflammations of vital organs; and we do so in the beginning, because we know that, in the beginning, it will succeed, and we may find this the sole means to be depended upon for saving the patient's life; but we cannot always employ it, even in *these* cases, without great risk of harm, as well as great chance of good. *We may accelerate the progress of effusion*, often fatally; we may carry it so far as *to prevent restorative actions*, in which way many persons have died after injuries of the head from its abuse. We may adopt it in cases of inflammation of vital organs, in *which it is unsuitable*, as in those which occur in the advanced stages of fever; in some kinds of uterine inflammation, &c.; and, again, where its sparing employment may be advantageous, its free use may be fatal.

Even in inflammation of vital organs it often increases the disposition to effusion.

It may prevent restorative action.

It may be unsuitable from the nature of the inflammation.

Again: in inflammation of vital organs we find that its employment, or its extent, *must depend*

Or the nature of the tissue inflamed.

mainly on the tissue inflamed; thus, as regards the lungs, the most ample depletion is called for in inflammation of their serous membranes; but it is otherwise when the mucous membrane is concerned.

In many injuries we may exhaust, so as to render the patient incapable of carrying on the necessary processes to their close.

Again: in many cases of injury, such as lacerated or contused wounds, we *may* be obliged to bleed, and largely; but we bleed without any confidence that we shall surely serve our patient by it; for if we fail in subduing the inflammation, we only render him *less capable of contending with the stages of suppuration or sphacelus which follow*.

In many, useless.

In many inflammations we need not bleed at all; *it would be useless, if not injurious*, in many cases of boils, common phlegmon, mumps, &c.

In many, injurious.

In many cases we should do *positive injury* by it, although the inflammation is sudden and intense, as in cases of viper bites, &c., carbuncle, &c.

In many, doubtful.

In many other inflammations, it is a remedy *most doubtful, yet most important*, as in erysipelas, or diffuse cellular inflammation.

In many, fruitless.

In many cases *it must prove fruitless*, as in some, where the inflammation is maintained by the presence of a foreign body which cannot be removed. In others, the state of the constitution renders it so; it relieves for a short time, but the symptoms infallibly recur. We might drain every drop from the body, and yet not cure the inflamma-

tion; this is the case in some inflammations about the heart, &c., and frequently in rheumatism*.

If we regard these, and many other instances which might be cited, we should be disposed to think that the justly deserved commendations which this remedy has received ought to be much qualified; and that, when its advantages are set forth, the limitations should be strongly enforced. It may be right to add, that as there can be no doubt that repeated bleedings establish a state of the blood in which the inflammatory appearances manifest themselves, we may be commencing a habit which will, at a more remote period, reproduce the evil we now wish to avert; this is no objection, however, to its use when really required.

The tendency to establish an inflammatory habit an objection.

I have not mentioned asthenia or debility as objections to bleeding; in many cases they are, but often they are not, as when a vital organ is affected in asthenic fever; in cholera, &c.; and here I may remark, that although the advantage derived from it in the latter has been attributed to the relief it affords to the loaded circulation; the explanation is hardly complete, because it is capable of affording great relief, as it should appear, before the asphyxia prevails.

Asthenia in itself no objection to bleeding.

* When the digestive organs are very wrong, as in erysipelas, &c. that will prevent the curative effects of bleeding, however far we may carry it in many cases.

When employed, principles which should govern its use.

When it is deemed right to employ bleeding, there can be little doubt that, in serious cases, it is desirable to take blood largely, at once, as it affords a much better chance of putting a speedy end to the inflammation, and thereby preventing its consequences; and in addition, it eventually saves the patient's blood; for not only do small bleedings produce a very much less proportional effect on the system; but if they fail in arresting the inflammation, every hour it persists in an unabated course, the greater is the difficulty of subduing it, even by the same means, whether this arises from the processes which are taking place in the part, the state induced in the system, or any other cause.

Syncope.

It is well known that the production of a state of syncope most materially influences the inflammatory action in the system and part; it is also well known that the flow of blood from a large orifice in the vessel, and in the upright posture, tends much to accelerate this state; two ounces more taken will often induce it, and the loss of these two ounces shall do more good than ten times the quantity previously removed. There can be no doubt that, in many instances, it is rather the state of *syncope* that is required, than the abstraction of a considerable volume of blood. I have repeatedly seen (although it is contrary to the opinion of valuable

authors*) that the loss of merely half a teacupful, producing this effect, has been of the greatest use, and has put an end to an inflammation†.

By some eminent authors the utility of bleeding in inflammation has been ascribed to the reduction of the quantity of blood. Again: others, and I may particularly mention Sir A. Cooper, ascribe it also to its diminishing the nervous power; but as it is very serviceable in some cases, where that is already too low, and the quantity of blood does not too much abound‡, it must have a further use than either of these; and as its benefit is greatest when syncope is induced, it is not, I conceive, improbable that one important effect is to serve, by *inducing a relaxation throughout the body*. Without encumbering myself with any arguments, bearing on a spasmodic state of the part, I may say that immediate relief is afforded to the constriction of the vessels generally; the free perspiration, and the discharges from the bowels, which ensue are sufficient proofs of this; and it must not be omitted, that one great use of bleeding *is* to dispose to these

One great use, the relaxation it induces.

And consequent restoration of the secretions, locally and generally.

• Dr. M. Hall.

† At the same time, I admit most freely, that, generally speaking, the position he has laid down is true.

‡ Bleeding is useful in some of the inflammatory attacks of those who are much reduced in *condition*; also when the nervous power is low, as in fever.

secretions, which very often cannot be obtained by any other measures; and while this change in the *general* system serves, the vessels of the inflamed *part* may themselves be disposed to *their* natural secretions, which gives great relief.

There is no question either, that the state of the blood undergoes some change when bleeding is carried to syncope. M. Gendrin states (1413), that if a bleeding, which affords a buffy blood, is interrupted by syncope, and more is afterwards allowed to flow, that will not be buffed, but the coagulation, loose in its texture, occupies the middle of the serum, which allows it to precipitate colouring matter plentifully. He observes however on this point, that the original disposition of blood soon returns if the inflammation continues.

Syncope
sometimes
alarming.

The syncope is often alarming: there is no surgeon but must have sometimes felt serious apprehension lest a patient should not recover, especially when a child: in these cases, if the pulse does not speedily return, we must exhibit stimuli, but cautiously. Nor do I think they do much harm in this state, as regards the inflammation; for when the syncope is so extreme, it is seldom the inflammation is not stopped, whether cordials be given or not; generally, however, the recumbent posture, free air, cold water dashed on the face, ammonia to the nostrils and pit of the stomach, or vinegar, will recover the patient.

Treatment.

When vomiting occurs on such occasions, it is a good sign, and the patient recovering feels much benefited. Continued yawning shows that more blood has been taken than the patient can well bear; when *this* is so, the utmost care should be taken that no more is lost from inattention, and that the patient is supplied frequently with food, as may be necessary, to prevent sinking: opium in such a state is generally very useful.

Unless the symptoms of syncope are alarming, and have been induced by the loss of a very large quantity of blood, it is generally serviceable to allow the faintness to continue for some time.

I shall briefly state the circumstances which indicate benefit, as derived from bleeding, and warrant its repetition.

Circumstances which warrant a repetition of bleeding, and in what way.

When there is a palpable improvement in all the symptoms, the pulse being quieter, there can be no doubt that the remedy has done good. If after a time the symptoms return, we have a warrant for repeating the bleeding; and if benefit is again derived, we are often encouraged to recur to it: but it should be observed, that as the good effects of bleeding are generally in proportion as it is adopted early, and employed decisively; so with respect to repeated bleedings, when necessary, their effects are also in proportion as they are followed up, as to frequency and quantity, until the inflam-



mation is got under. It must not, however, be understood that I should recommend this energetic practice, excepting in cases of emergency; for nothing can be more certain than that although the practitioner should never hesitate at taking any quantity of blood which may be requisite *to preserve life, or the functions of any important organ*, yet in less extreme cases, where the assistance of other means will either altogether, or in part, supersede the necessity of taking large quantities of blood, it is better to have recourse to them.

Indications
of bleeding
proving in-
jurious.

Hitherto we have considered the subject in one point of view, and have supposed that the remedy does good; but if the reverse, what are the indications? In some instances they are clear: the relief, if any (and it is common there should be *some*), is *very* temporary; after a very short interval the symptoms not only return, but increase; there is great restlessness and anxiety; the respiration is hurried; the pulse more rapid, often jerking; the patient, perhaps, bathed in profuse perspiration, and says the bleeding does not relieve: when these symptoms are well marked, it rarely profits to repeat the measure. But it *may* be doubted whether the symptoms do not go on, because the bleeding has *not* been carried far enough. There are in truth many *doubtful* cases; the bleeding is repeated; if with the same result, it may be presumed that it should no longer be per-

sisted in ; but to distinguish always those cases in which it is and which it is not required, is one of the strongest characteristics of professional ability, and always has been so.

What information can we derive from particular sources to guide us ? from the blood, pulse, skin, tongue, urine, &c. &c. ?

With respect to the blood, its crassamentum may be dense, and in sufficient quantity *, an indication that bleeding may be borne if other symptoms demand it ; or it may be loose, denoting commonly an opposite state.

Indications for its employment derived from the appearances of the blood.

This crassamentum may be cupped and buffed, both indications of inflammatory action, but no proofs that bleeding is required, or will be borne ; though when the crassamentum is strong, and the buffy coat thick and opaque, it will have much weight on our determination, coupled with other symptoms † ; while, if the edge is thin and irregular, it will not very often be proper : so much, however, with respect to the appearances, depends

Is there in action also a frequent The blood is buffed at time

* When I say in sufficient quantity, I am aware that a dense coagulum is small, *cæt. par.*, *i. e.* if two portions of blood be taken from the same person, in such a way as that one may form a firmer clot than the other, the latter will be much larger than the former ; but if the same person be bled repeatedly, the last remaining equally firm as when first bled, will be much smaller from the exhaustion of fibrine.

† When there is much buff, the crassamentum is always strong.
—Gendrin, 1406.

upon the manner in which blood is taken, that this of itself renders it a most uncertain criterion*.

The blood taken is sometimes pitchy, or dark, or grumous, or very thin; in these states it indicates great want of crisis; nevertheless, we find, from experience, in some cases of fever, purpura, cholera, &c. that bleeding is serviceable, when such is the character of the blood†.

If the loss of a small quantity induces syncope *without relief*, the system will neither bear farther depletion, nor be benefited by this; but where a small quantity gives relief, although it induces syncope, this opinion is hardly just.

* It being first understood that the inflammatory appearances of the blood are in themselves not sufficient to determine the propriety of bleeding, because, granting the criterion to be true, as regards the disease, it may not be true as regards the remedy; it may be stated in few words, that in proportion as the buffy coat is thicker, the coagulum more dense and contracted, and swimming more on the surface, the serum occupying a larger space (the result of the last phenomenon), and more viscous and free from colouring matter, the greater is the inflammatory disposition, and *vice versâ*; but where much inflammation exists, still these characters *may* not appear. With respect to the alterations in the *constituents* of the blood, on which these in part depend, I may briefly observe, that as far as the experiments of Dowler, Gendrin, and others go, the physical changes chiefly consist in the greater quantity of fibrine contained in the buffy coat, and of albumen in the serum; but there is also little reason to doubt, as the observations of Hunter prove, that the *vital principle* is also very much affected.

† M. Gendrin states that, in inflammations which have advanced to suppuration, the buffy coat is of a more obscure white, and less transparent: 1429, 1529.

No appearance of the blood, as far as I am aware, *taken singly*, will either warrant its employment or forbid its use.

The pulse is a better criterion than the appearance of the blood; if a pulse too frequent is rendered less so, too full is reduced, too hard becomes soft, too small becomes freer, too slow or oppressed regains more its natural standard, rises under bleeding, as the term is; either of these changes marks a beneficial effect; but if the pulse becomes more hurried, easily compressible, soft, weak, vibratory, uncertain, without relief, further bleeding will rarely serve.

It is hard to say what character of pulse will, in all cases, *taken singly*, forbid a *first* bleeding; perhaps, if any, a very frequent and compressible pulse,—if any will demand it, it is a hard and strong pulse, whether full or otherwise.

The skin offers an important indication, if dry and hot, bleeding is often proper; it may be so, if dry and shrunk, if the heat is not deficient; but when cold, clammy, and shrunk, is rarely borne; and when a hot perspiration largely covers it (especially if clammy), it is *not often* useful. The relaxation, which it is one great object of bleeding to produce, already exists.

The tongue is a much less certain guide; for there is hardly any state of tongue that can be

mentioned, excepting when covered with a dark sordes, in which bleeding may not be proper, and I do not deny that cases may occur when even that state ought not to forbid it. It has been stated, that a tongue white from its own colour, rather than from coating, is a pretty sure indication for it*.

From the
urine.

The urine is, in many cases, a good guide; it is rarely proper to bleed when the urine is pale and *copious*; it may, or may not be, when it is high-coloured and scanty, very often is so; but when a deposit takes place, there is reason to believe it less necessary.

The countenance offers many indications in disease; but how shall any one so portray them *with the pen* as to convey an adequate idea of their distinguishing characters?

From the
habit.

When the habit is plethoric, more especially *when known to bear bleeding*, we have a strong indication; but I must decidedly state, that the converse is not exactly true; many thin and meagre persons bear bleeding well, and with great advantage.

Experimental
bleeding.

I shall only mention, in addition, that in doubtful cases it is very often proper to institute bleeding, *as an experimental measure* to determine the question, where other evidence is not conclusive;

* Lawrence, Lecture 9th.

I need not say that, where this is done, its effects should be most carefully observed.

Mr. Hunter* has laid down certain indications for bleeding, which may be called general; with great deference, I should venture to deviate from them, and say, they should be according to, 1st, the organ, whether vital or not; 2d, according to the nature of the inflammation, whether spreading or otherwise, for these two circumstances will chiefly determine the violence; also, 3d, according to the quantity of blood in the system, and its power of bearing depletion; 4th, the tendency of the inflammation to one or other mode of termination; 5th, the stage of the disease; and, 6th, the effect produced.

Local bleeding may be employed either as a Local bleed-
ing. substitute for, or auxiliary to, general bleeding.

Its effects on the general system are much less, and therefore it is inadequate, when much impression on that is desirable; and this is easily explained by reference to the effects of general bleeding, which, as has been stated, do not so much As a substi-
tute for ge-
neral. depend upon the quantity of the blood taken, as upon the alteration effected in the system (perhaps by its relaxing effects); now it is possible that we might abstract, in some cases, an infinitely larger

* Vol. ii. p. 108.

proportion of blood by local means without inducing this state, than would be required, if a vein or artery were opened. Local bleeding is proper, either when it is not necessary to influence the system powerfully, or where it might be injurious to do so.

Its effects on the part are often, but by no means always, greater in proportion to the quantity taken than those produced by general bleeding, and in this way it saves the system in cases to which it is adapted.

As an auxiliary.

In many in which local bleeding will not alone make an adequate impression on the disease, it often becomes most useful as an *auxiliary*, after a general bleeding has been practised.

Cautions respecting the ill adapted employment of local bleeding.

The mode, whether by leeches or cupping, and the quantity, are also to be considered, and will depend upon the circumstances of each particular case; but with reference to quantity, I may observe, that there is not a greater error than consuming the strength and exhausting the blood of a patient by local bleeding, whose case requires general; therefore great discrimination is likewise demanded on this head.

It is quite necessary to say, that very often leeches applied directly to the part inflamed do more harm than good, by producing an additional afflux of blood to it, by the irritation of the bites, and by the stiffness they produce in the skin; it is

difficult, in all cases, to say, *à priori*, when this will be so. It is often advisable to do as with blisters, employ them at a distance greater or less: in France this derivative plan is much adopted. It is also a fact, that in many cases a small number will *do harm*, where a large will do good.

There are many other remedial means in inflammation which require some general observations; they may be considered, 1st, In their direct tendency to reduce inflammatory action; 2d, As lessening the sympathy which so materially influences the progress of inflammation; 3dly, As restoring the proper functions and the secretions; and, 4thly, With reference to the withholding the supply of those means which might excite it.

Other remedial means.

SECTION III.—*Medicines having a direct Anti-inflammatory * Tendency.*

Amongst the first may be placed *antimony*, especially its tartrate: there can be no question that in many kinds of inflammation, especially pulmonic,

Possessing an anti-inflammatory power.

Tartrate of antimony.

* This term may be objected to, on the ground that all remedies which relieve inflammation are anti-inflammatory, and this is not to be denied; but the medicines in question appear to reduce inflammation by some peculiar property they possess, independent of their cognizable action on the system; whereas the effect of other means

it will itself suffice to put an end to the inflammatory action, rendering bleeding, and other medical agents, unnecessary : we may inquire on what principle this proceeds.

The beneficial effects may be partly explained on the same principles as bleeding.

It has already been advanced, that the utility of general bleeding does not depend so much on the removal of a quantity of blood as on certain effects which that removal induces, especially faintness, relaxation, and consequent increase of the secretions ; and if we examine into the agency of tartre of antimony, I think we shall find that its effects on the system are very similar in their nature ; whether it has any specific quality beyond these effects, it may be difficult to say. It powerfully relaxes, reduces action, restores the secretions, and tends to maintain the proper evacuations of every kind from the body ; moreover, it has much influence on the liver.

Much, certainly, appears to depend upon the quantity which can be introduced without occasioning vomiting, and it is found that plentiful dilution assists this intention ; so, likewise, does a combination with opium, and grateful but not stimulating aromatics. It is a remedy much better calculated for some species of inflammation than others ; it is often advantageously combined.

may be explained by some known action. Antiphlogistic is a term in itself loose, and, as long received, applicable to a much more extended range of remedial means.

Mercury is another remedy which has a great, Mercury. perhaps a superior anti-inflammatory tendency, especially where the inflammation affects glandular structure, serous membranes, or the eye: we cannot explain this on general principles by any known effects on the system; it appears to produce an action subversive of the inflammatory action in many cases, while in other and different cases, it rather increases them. There is much reason to believe that it lessens adhesive inflammation, and increases often the ulcerative*, and probably the suppurative; it restores or increases many of the secretions with great effect. Much, assuredly, depends upon the form used; for while calomel, or blue pill, particularly the former, are extremely efficient, large doses of many other preparations exert little influence. Even as an external agent, it has an anti-inflammatory tendency, as should appear from the use of mercurial ointment in erysipelas.

The combination of mercury with opium or with antimony, or both, adds much to its effects.

When inflammation has subsided into a chronic stage, mercury often possesses an admirable efficacy in removing that thickened and indurated structure which is left, and which not only impairs the function of the organs, but maintains the

* The ulceration of the gums and the alveolæ show this.

tendency to a recurrence, or, the actual actions of inflammation.

If I were to draw a comparison between the merits of mercury and antimony as anti-inflammatory remedies, I should be disposed to say, that the latter is the most powerful in appropriate cases, when it can be largely introduced ; but that it is not so generally applicable as mercury, and often cannot be borne on the stomach in any requisite quantity.

Colchicum.—Mercury and colchicum are justly regarded as medicines possessing specific qualities with reference to specific inflammatory diseases, but it is not less true that they possess general anti-inflammatory qualities in a high degree ; and this may be truly said of the latter as well as the former, although in external inflammations it does not appear to be so often an applicable remedy.

Bark, &c.—It may appear a novel proceeding to speak of bark and ammonia, and other tonic or stimulating medicines, as *anti-inflammatory* ; nevertheless, if these directly tend to put an end to inflammatory action (and there are not many who will deny that there are some kinds or stages of inflammation in which they have this quality), it will be strictly correct to consider them in this

point of view; and I have little hesitation in saying that the converse is also true, and that bleeding will increase inflammation in some cases as decidedly as bark will in others, though by no means so often.

SECTION IV.—*Medicines lessening Sympathy.*

Opium is often of the utmost service in inflammation; one of its effects is to increase the secretions, and to this most pathologists have attributed its chief utility; it also lessens the pain, which is a great aggravation of the disease, but its *modus operandi* must be explained, partly by the effects above mentioned, *but more especially by its lessening the irritability, and, consequently, the sympathy of the constitution*, which is the main cause of the disturbance in inflammation; and hence it is so particularly useful in those inflammatory states which have been lately designated under the term *Irritation*.

Opium and narcotics, their principal use explained on the supposition that they diminish the disposition to sympathize.

There is no remedy so uncertain: it may arrest the secretions instead of increasing them; this depends much on the combination, or the time of exhibition; it may disturb the digestive organs, or it may excite and irritate, instead of tranquillizing, the nervous system; the latter effect depending much on the peculiar constitution of the patient,

Their uncertainty.

the form or dose in which it is given, the medicines with which it is combined, and, lastly, the stage and kind of inflammation for which it may be employed.

Other narcotics act on the same principle as opium, with more or less activity and modified effect; it would occupy too much time to specify them at length.

SECTION V.—*Medicines which act by restoring the proper Functions and the Secretions.*

Medicines which remedy error in the digestive system, and by increasing the secretions purify the blood.

Under this head come all those medicines which are calculated to remedy an unhealthy state of the system; for it will readily be understood, that if inflammation is produced by an unhealthy state of the constitution, or should arise accidentally during such a state, its progress must be materially influenced by it. To enter into all the measures calculated to do this, would carry me beyond my limits. I shall only, therefore, consider generally the state of the digestive organs and of the secreting system.

Purgatives: three objects.

Purgatives, it is well known, rank among the most important remedies in many kinds of inflammation: it is necessary to consider what their

proper objects are; first, then, it may be stated that the alimentary canal should always be unloaded of accumulated contents: the injurious influence produced by their presence is most materially felt as long as it continues, and it prevents the second object from being completely obtained, namely, a flow of the secretions from the bowels. When, therefore, there is reason to believe that such accumulations exist, the first purgative given should be of a quality calculated freely to unload, and it may be necessary to repeat it. Purgatives possessing this power, however, are commonly of an irritating quality, and their continued use would be very injurious: they are best adapted to spontaneous inflammations, where error of the digestive organs has materially contributed to the disease; in accidental inflammation in healthy persons they are often not called for: a saline purgative suffices.

First, to unload the bowels.

The second indication, namely, the obtaining a flow of the secretions, is generally best accomplished by the saline purgatives; by none better than Epsom salts (where it is *particularly* desirable to avoid irritation, these should be given in copious solution, perhaps in gruel). The combination with senna answers both indications, and the addition of tart. antim. increases its efficiency. The object being known, it is not difficult to find the means; we have many at our disposal.

Secondly, to produce a discharge of the secretions.

Super-purgation injurious.

Leaving the bowels unloaded is a great error; super-purgation is not less: the soliciting evacuations and procuring a discharge of the secretions is the main object.

Thirdly, by their sympathetic influence.

Moreover, in regarding the use of purgative medicines, it would be a capital error not to understand that, as sympathy with a disordered state of the digestive organs is a frequent cause of and always influences diseased actions, the restoration of their healthy condition is of the utmost importance.

Medicines which promote other secretions, and change the qualities of the blood.

Under the head of promoting secretions, those of the liver are not less to be considered than those of the rest of the apparatus; and, in truth, they are among the most essential: the tartrite of antimony and mercury will both assist in effecting this purpose. The common saline draughts, also, are contributory, and promote the other secretions from the body. I am sufficiently a humoralist to believe, that through this channel the matter of many diseases is discharged, and from the kidneys also; nor is the influence of such medicines confined to this, for there is great reason to believe that many fevers, and, probably, inflammations, are much connected with a state of blood in which the salts are deficient, and, consequently, that their long known utility may in part be explained by their fulfilling the intention now alluded to, of supplying saline materials to the blood.

In cases where the stomach is loaded, emetics are often advantageously used.

In some inflammations we have pretty strong evidence of the existence of morbid matter, as I have elsewhere stated; and I may mention gout and rheumatism as examples; and it is not improbable that some acid may, in these cases, be the morbid cause, at least we know that those things which encourage the development of acids induce these diseases; those which counteract it, prevent them. We further know, that if a disordered state of the fluids materially influences the production of such inflammations, there are other substances which have greatly the power of controlling them, as, for instance, colchicum; this we learn from experience; and from their remarkable influence on these diseases, but unknown mode of acting, we call them specifics; but of specific diseases or specific remedies, it will not suit my purpose to speak.

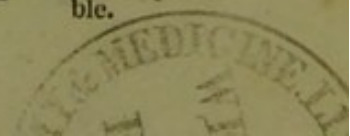
Reasons for believing that in inflammations, especially spontaneous, the circulating fluid is in an impure state, deduced from analogy.

SPECIFIC REMEDIES.

SECTION VI.—*The Removal of all Causes of Irritation.*

In all inflammations, if the cause is known and can be removed or lessened, that must be espe-

Removal of cause of inflammation where possible.



cially taken care of; but independently of the direct removal of *the* cause, the removal of other causes which may excite or disturb is of the greatest consequence; and, as excitement of the nervous and vascular systems exists in all cases, it must be a principal measure of cure to exclude, as far as possible, every circumstance which might increase either; hence should be avoided

Avoidance of nervous excitement.

All excitement or exertion of mind.

Much light, or disturbing sounds.

Too great warmth, or, on the other hand, undue cold.

Muscular exertion.

Muscular fatigue should be avoided; the position should be in general horizontal, it should also favour the due circulation of the blood. The inflamed part should be perfectly quiet, if possible.

Stimulus of food.

Furthermore, the diet should never disturb the stomach, or excite the vascular system; hence its portions should be small, being no more than the stomach will take without loading, and its quality, in most inflammations, such as will not, in the slightest degree, stimulate; such are the rules to be observed in all cases where the inflammation is active without depression, and where the plan commonly called the antiphlogistic is to be pursued. There is a further use obtained by this, in my belief, and that a very important one; it allows of the mass of the circulating fluids being rendered pure.

But as there are stages of inflammation in which we must change, *locally*, our cold applications for warm, so there are those in which the continued negation of all stimulus to the system will prove most injurious, and where “*cibum opportunè datum*” is equivalent to all other remedies.

The negation of food has its limits.

Again: as there are inflammations which require the use of external stimuli, so there are some which demand their internal employment; this, however, will rarely apply to the very commencement of any inflammation; but when effusion, secretion, or suppuration, have occurred, proper support and tonics will either, or both, prove more *anti-inflammatory*, when judiciously managed, than any continuance of the depleting plan in many cases. One remedy remains to be spoken of, it is air; over this, unfortunately, we have less control than the others, the varying state of the atmosphere often destroys or saves the patient; no human means being able to avert the former, or, without it, accomplish the latter. Still there are many important objects regarding it which we can obtain, and which never should be lost sight of; but all important as these are, I cannot here allow myself room to enter upon them.

Stimulating food in some cases proper.

Influence of air and atmospheric changes.

In this brief sketch of the general modes of treatment of inflammation, it has been my particular object to set forth the principles which are to guide us, and have not thought it advisable to

Conclusion

dwell on them at greater length; first, because *most* are fully, largely, and ably, enforced in works very commonly possessed; and, secondly, because I must again express my opinion, that greater advantage is derived from considering them in their application to the *different kinds* of inflammation, of which it is next proposed to treat; and from a careful consideration of those inflammations, it will appear that there is not one of these agents universally applicable, excepting one, and that is pure air: hence will appear the palpable defect of describing these remedies generally with reference to the management of inflammations, without more particularly specifying what are the principles of resemblance and difference of its various kinds, and what diversity of treatment these may require.

SECTION VII.—*General Remarks on Local Remedial Means.*

Local remedies considered under the head of inflammations, for which they are adapted.

It may next be expected that something should be said on the subject of local applications; but I feel so strongly the propriety of reserving the consideration of this matter until they can be discussed with reference to particular cases of inflammation, that I shall content myself with a very few remarks here, and these will rather bear upon

the *mode of employing* them, than on their applicability to certain cases.

Poultices, it is well known, are of two descriptions, the one made with watery fluids, and their purpose more particularly to resolve inflammation; the other made with greasy fluid, and meant rather to promote suppuration. With the modes of making either, it may be presumed that every one is well acquainted; but this I may say, that if they are not perfectly well made, they will fail in answering the intention. On another point, a few words are necessary: bread and water poultices when first applied, and the same poultices after the lapse of a few hours, are no longer the same application; when fresh made, moist, soft, pulpy, and not tenacious, are agreeable to the feelings, acting as a fomentation, and encouraging perspiration; but they soon become close, tenacious, stiff, dry at the edges; and, as the rag which envelopes them evinces being also dry, incapable of promoting evaporation. I have no doubt that we very often fail in our object from their being made negligently, applied too small, and renewed not sufficiently often, in urgent cases; in such, I have been much in the habit of applying them fresh every hour or two.

Observations
on the mode
of using
poultices,

Again, they may become cold: we do not want to chill a part, but simply to reduce its temperature: a frequent renewal is one guarantee

against this; but warm light envelopes may be employed for the purpose if necessary, and, even though it checks evaporation, oiled silk, which is so often used outside greasy poultices.

and fomentations.

If we employ fomentations again, much depends upon the proper conduct of these. They should always be hot, often *very* hot, and it is steam, not fluid, that should come in contact with the part: it is always necessary likewise to apply an external envelope to prevent that steam from escaping too rapidly. They should be continued long, often for an hour, and renewed frequently, perhaps every two or three hours. They should be applied extensively, and when so, they often induce a perspiration generally, as well as in the part.

It is often useful to employ fomentations without poultices, the moist warmth and weight of the latter being disagreeable to the feelings of the patient, while the warmth of the steam is most grateful; in these cases, after the fomentation, the part should be sufficiently covered to prevent it from feeling any chill.

Effect of medicines applied externally.

It is, as I believe, extremely useful to medicate fomentations, poultices, and lotions; and I think there are facts without number which prove this. The arguments, however, which have been adduced against them have been grounded on the assumption, that *all* the benefit derived has resulted from the simple quality of fomentation,

poultice, or lotion, without reference to any medicinal property they possess; and it has been asserted that such medicines can produce no effect when the cuticle is entire, unless they be powerfully rubbed in. I could hardly have supposed it necessary to adduce facts to contradict such opinions, if they were not urged by what I must deem the highest authority; but if this be so, we must be deceived when we fancy that vinegar or ammonia rubbed on the temples, palms, or pit of the stomach, rouse a patient from syncope sooner than cold water rubbed on the same places; or that a solution of tobacco applied to the pit of the stomach has no more effect in producing faintness or sickness than so much milk. I cannot, in illustration of this point, avoid mentioning a case which places it in a striking point of view*.

Late experience however has, I think, amply

* A girl, *ætat.* 15, was admitted a patient of this hospital, with strongly marked symptoms of inflammation of the spinal chord; one of the effects was the production of spasmodic contractions of the lower extremities, more severe than I ever saw. Various means of relieving these spasms were tried, but none succeeded excepting fomenting the back with a strong solution of belladonna; after this was continued some time, it invariably relieved her, but it never did so till her sight became affected, or lost (which shortly returned), and as soon as this was perceived, the process was stopped. I am not aware of any possibility of deception in this case, or of any quality of warm water which would produce such an effect, of which, however, the well-known result of this remedy applied to the eyebrow is a very familiar, though less striking example.

Argentum ni-
tratum.

shown that there are medicines which possess a great power in controlling the actions of inflammation, independently of any property attached to heat or cold, fluidity, or any other circumstance with which they are combined, and as a striking example of this fact, I should, in a particular manner, mention the argentum nitratum, whether employed as recommended by Mr. Higginbotham, or Mr. Guthrie.

PART II.

ON THE

PARTICULAR NATURE AND TREATMENT
OF VARIOUS SPECIES

OF

INFLAMMATION.

CHAPTER I

PART II

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FIRST DIVISION.

INFLAMMATIONS PRODUCED BY EXTERNAL INJURIES.

CHAPTER I.

INFLAMMATIONS FROM MECHANICAL INJURY.

THIS form of inflammation being less complicated in its nature, its causes assignable, and its progress easily watched, may be more suitably described in the first place than any other.

Why first described.

Its invariable object is to repair the harm that may have been inflicted, although the endeavour often fails of success: it must therefore be considered a *natural* process, but it does not always follow that it should be a *healthy* one. In this respect, however, it differs from spontaneous inflammation, for that of necessity implies disease, while this may occur in perfect health. It differs also in another important respect, namely, that it always has a disposition to a speedy termination, *i. e.* adhesion, suppuration, or sphacelus; it also has a disposition to recovery; and it is no objection to this statement, that its termination is

Its object restoration.

Its disposition to speedy termination.

often prolonged by the presence of foreign matters, or its object frustrated by its excessive violence, or by the extreme disorganization of the parts.

When the constitution is sound, the inflammation is of the best kind, with the exceptions stated, and generally succeeds in re-establishing the integrity of the part by the effusion of lymph, or the formation of granulations.

Adhesion
often effected
without sym-
pathetic fever.

When the process of adhesion takes place without any interruption, and perfect tranquillity is preserved, there is scarcely any sympathetic affection: when, however, this is not the case, that will occur, varying according to circumstances, which are chiefly determined by the *nature or mode of the injury, the nature of the part*, and of the constitution.

Modes of me-
chanical in-
jury divided
into four.

The *modes* of mechanical injury may be divided into four—incision, puncture, contusion, and laceration.

SECTION I.—*Incised Wounds.*

INCISION.

In these the parts are divided in such a way that the disorganization of the vessels and nerves *is confined to the smallest possible limits*, and they are ready at once to execute those processes

by which union is effected; and so little difficulty is experienced in this, that there is scarcely any sympathetic action. If the disposition to adhesion is frustrated, still the parts have their perfect powers; the granulations and pus which are formed are healthy, and the termination commonly favourable, unless the injury implicates some important cavity or viscus, in which case high inflammation and constitutional disorder may ensue; as, for example, if we take an incised wound of a joint, this may excite inflammation only affecting the edges, or it may extend over the whole; in the latter case severe constitutional affection ensues, and may now be considered under the denomination of sympathetic fever: great and extensive inflammation occurring in the limb as well as the joint.

State of the parts.

State of the system.

The immediate impression on the constitution from the injury is so slight, that the patient is often little aware of any hurt having occurred; when, however, inflammation spreads, the pulse becomes hard, frequent, full; the skin dry and hot; the secretions from the kidneys scanty and high;—from the liver, either arrested or depraved; from the intestines checked, producing costiveness. There is thirst, often intense, and disinclination to food; the tongue, white at first, then thinly coated with brown, becomes dry throughout, or in the

SYMPATHETIC FEVER.

middle. There is great pain in the head and spinal chord, and often in the calves of the legs. The respiration is accelerated.

Change in the symptoms, if the inflammation does not subside.

If the inflammation is subdued, all these symptoms gradually subside; if not, and suppuration (or gangrene, which is rare) occur extensively in the limb, we have the sympathetic fever altering its character in the following ways:

If the local disease, from any cause, is protracted, if the demands on the constitution have been great, and the disease remains unconquered, then we have the fever assuming either that form which by Mr. Abernethy was denominated irritative, or hectic: hectic, if the suppuration is profuse, with a free exit to the discharge; irritative, if the suppuration is not copious, or the matter is at all pent up, or cannot discharge itself with perfect freedom.

IRRITATIVE
FORM OF
FEVER.

If it becomes irritative, the pulse increases in frequency and quickness, but diminishes in strength and hardness, and often becomes intermitting; the secretions still remain scanty, and those from the liver and intestines depraved; the thirst continues, and the stomach loathes food; the epigastrium is tender; the tongue remains dry and horny; the muscular system shows great debility, and its actions are rapid and unsteady and attended with instant fatigue; the tongue is projected with rapidity, and quivers while we look at it; the hands

tremble and the tendons start ; the patient's efforts are sudden and exhaustive ; the eyes are dull and red. In the mean time the nights get restless and delirious, and the delirium soon continues throughout the day ; the tongue then darkens ; the dryness of the skin is followed by profuse and clammy perspiration ; the respiration, always quick, becomes more and more anxious and oppressed : hiccough comes on ; the pulse becomes innumerable, and the patient sinks, unless the local disease is timely removed or relieved. It should seem that the character of irritative fever depends upon the continuance of a local disease, exciting the system to restorative actions, which cannot be at all, or only imperfectly, accomplished.

If the violence of the inflammation has been relieved by the occurrence of *profuse* suppuration, and still the disease persists without any effectual curative process, hectic ensues. In this form of fever the tongue is moist, and the secretions copious, an over-relaxation existing ; and the patient is either bathed in profuse perspirations, or weakened by colliquative diarrhœa. The stomach is often eager for food ; the thirst generally continues. The debility is great, but there is not the same irritable state of the nervous system ; on the contrary, the mind and body are often perfectly calm during this destructive process. The pulse continues through the day rapid and weak ; the heat

HECTIC
FORM OF
FEVER.

Differences
between the
state of the
parts and ge-
neral system
in these two
modes of
fever.

is often irregularly distributed, but generally much increased ; the palms of the hands and soles of the feet burning, and the cheeks flushed with a circumscribed determination of blood to them.

This form of fever has its daily remissions and exacerbations ; but if the local disease is not removed or relieved, like the former, it proves destructive, but not till after a long interval, for the patient does not die till he has consumed both the materials and powers of life ; while in the irritative form, the system is conquered by it, and there is much reason to believe that the mischief produced in the *brain and nervous system* speedily destroys ; in hectic, however, enteritic inflammation often supervenes and becomes a cause of speedy death.

During both the irritative and hectic form of fever, there is a great tendency to secondary inflammation.

Gangrene
rarely results
from incised
wounds.

Gangrene, it has been stated, rarely results from incised wounds ; when it does, the sympathetic affection so nearly approaches, in its phenomena, to those produced by lacerations, that it may be the best plan to consider it under that head.

SECTION II.—*Lacerated or Contused Wounds.*

If, instead of a simple division of parts, we have this produced by a degree of violence, which has

powerfully torn or bruised them, whether this may have proceeded from within or without, the nature of the injury is the same; it is a contusion or sprain, with breach of surface.

In this case, not only are the respective tissues more or less comminuted or disorganized; but the vessels which are to repair the injury, and the nerves which are to sustain their energy, are equally affected, and thereby more or less incapacitated from performing their functions; under these circumstances, considering the difficulty of restoring the injured tissues, and the imperfection of the powers employed in the task, we cannot wonder at its frequent failure. Adhesion to a certain extent takes place around, but often gives way again. The next best process, suppuration, is established *more or less* perfectly, and we regard it as the best result of the inflammation to which we can look. Sphacelus must frequently take place; in fact, the parts are often actually killed by the violence, and must separate, or will perish under the circumstances of exposure and high inflammation.

State of the parts, and influence of this on the restorative processes.

Hence, we have in the injured part the processes of a bad or imperfect suppuration, and in many cases sphacelus; and the inflammation which has produced them may spread widely, very often to the parts beyond the actual wound, because they have been so impaired by the bruise, and weakened

by serous effusion, that they have not the powers to limit inflammation.

And when such an inflammation has commenced, it exerts a prejudicial influence still further upon *the contiguous parts hitherto sound*, and the constitution itself feeling, and being perverted by the disposition established, the local disease continues to spread to the destruction of the patient.

Influence of
the particular
tissues on the
inflammation.

It will be stated in its place that the effect will be much increased, when parts are involved whose vital powers are low, as bones, or whose surfaces are extensive, as fasciæ, &c.; indeed when soft parts alone are concerned, the powers of nature commonly suffice to repair the injury; but when bones, still more when joints are implicated, the processes which take place are defeated under circumstances of exposure by external wound; the necessity and the difficulty of repair are rendered greater in proportion, and hence the severity of the symptoms in the first place, and their long continuance in the second.

X
Description
of the local
symptoms.

In this way I should view the phenomena which occur, but it is necessary that they should be stated. At first there is little pain felt; the part is stunned; there is also but little hæmorrhage; after a few hours there is much heat; serous oozing takes place from the wounded surfaces, and an effusion, chiefly serous, takes place abundantly

in the vicinity, the part becoming extensively swoln and tense; after a time a kind of sanies, then pus, both generally fetid, are secreted, or a yellowish gleet; the effusion in the neighbourhood, meanwhile, becomes more gelatinous. The skin reddens, but the changes in that tissue are often subsequent to those deeper seated. Some parts have, perhaps, been killed outright, others perish from their weak powers, as tendons, fasciæ, &c.; and others, again, from the result of the inflammatory action.

This brief statement of the peculiar characters of the local inflammation will lead to an explanation of the sympathetic affection of the constitution, which may be considered under the following heads:

SYMPATHE-
TIC AFFEC-
TION.

1st. The immediate impression on the nervous system. On the receipt of the injury, the person is incapable of supporting himself by his muscular power, and falls to the ground; the action of the heart fails, and syncope is induced; and when he recovers, the pulse is small and feeble, the extremities cold, and the stomach often rejects its contents; this is the state of collapse, by Mr. Travers called prostration without reaction: similar phenomena ensue from concussion of the brain; they seem to be of the same nature, and, probably, all originate from the nervous system, which will occasion such symptoms, whether the injury has

1st. Phenomena immediately consequent on the injury resulting from the state of the nervous system.

COLLAPSE.

been received more immediately by the brain, or more remotely in less essential parts of that system.

When, from the immediate effects of injuries (and operations which are a mode of injury) such symptoms are induced, the use of stimuli given in a guarded way, but according to the emergency, is required; it being necessary to prevent the powers from sinking on the one hand, and, on the other, to guide the patient through this alarming stage in such a cautious manner, as not to induce too violent a degree of reaction.

It may happen that the injury from its own quality, or from the state of the patient, is so irreparable, that no stimuli we can employ will contravene its effects; or it may happen that insufficient means being used, death will ensue; sometimes the fatal result is speedy; in others the patient vibrates for days between life and death, no reaction taking place either in the part (a very fatal symptom) or in the constitution, notwithstanding the most sedulous endeavours.

Treatment.

Brandy caudle, mulled wine, ammonia, &c. in the worst cases; warm tea or white wine whey, negus, &c. in the milder, are appropriate remedies; effervescing draughts with brandy and opium if there is vomiting. Pills with cayenne pepper and ammonia I have found very useful, if there has been hiccough: in this state warm fomentations

must be applied to the part; stimulating applications to the stomach externally, and warmth to the body generally, but all with caution.

Besides the immediate collapse, we may, setting aside the question of fever, have delirium, coma, convulsions, or tetanus.

The following is a remarkable example of the DELIRIUM. delirium consequent on such injuries.

A stout middle-aged man, addicted to drinking, entangled his hand in the machinery of a powerful engine; it was extremely lacerated, and he was immediately brought to the hospital; on examination it appeared necessary to remove a part of his hand. On desiring him to go into the operation-room, he arose with alacrity, but in an instant became violently delirious, throwing about the mangled limb with frightful violence, *his face remaining pale*, and it required several strong men to lay him again in a recumbent posture, when he soon became rational.

This affection of the cerebrum I take to be somewhat analogous to that which exists in delirium tremens, and best allayed by opiates, affording a striking proof that delirium may be the result of pure nervous sympathy. The following case, where it was equally sudden, however shows that this may be sometimes combined with congestion.

A lady of a firm mind, but very irritable nervous system, had a schirrous breast, which I removed; a few days afterwards, on going down stairs, she was *suddenly* seized with complete delirium, the face being flushed. Her feet were immersed in warm water, and cold applied to the head, and the delirium shortly subsided.

CONVULSIONS.

Convulsions sometimes ensue very soon after a severe injury; if so, they will rarely be benefited by depletion, more commonly by opiates or ammonia. In a remarkable case which supervened a considerable time after a laceration, which had much the character of tetanic chorea, if I may be allowed the expression, I was recommended by a friend, now no more, to try the liquor arsenicalis, and it was attended with remarkable success.

TETANUS.

Tetanus is another, and in hot climates very frequent, form of nervous affection, consequent more or less remotely on injuries of this kind, but its consideration would hardly consist with the plan of this work.

Phenomena consequent on reaction, constituting SYMPATHETIC FEVER. Rationale of the symptoms.

We are next to examine the nature of the sympathetic fever which is established in these cases, and here we can clearly recognize the accordance of the general and local affection; for instead of its possessing that bold and healthy character which results from simple division and inflammation, we may here trace throughout the influence of the nervous disorganization and consequent depression,

and the peculiar impression which the tendency to spread and to sphacelate invariably induce*: hence we often have from the beginning a hurried and uncertain pulse, agitation, anxiety, and oppression; hurried respiration and sighing; symptoms, in short, of great nervous lesion and irritation: in this form of injury we may also observe a particular disturbance of the digestive organs. Vomiting will often continue, with a dry, dark, or red tongue. Hiccough (mainly a nervous affection, I grant) and jaundice, a very fatal symptom, often occurs; to this I may add, that the expression of countenance, haggard, contracted, with a dull red eye and anxious look, denote the formidable and doubtful struggle for life. Here let me observe, that of all the means which present themselves to us of looking into the fate of our patients, none possess greater authority, when faithfully interpreted, than those which constitute the physiognomy of disease. When cold† and clammy extremities, with a dull red colour of

* I believe it will be found that when a large mass of bruised and lacerated flesh remains connected with the body, the depressing influence on the sensorium will be maintained very much longer than when it has been removed speedily by the knife, or at once by the cannon-ball.

† Mr. Hunter, I believe, truly states, p. 43 et seq., that the animal body has the power of producing cold as well as heat, and that it is a strong indication of weakness and depression.

the hands, ears, and nose are also present, it may be considered an indication of the worst kind.

The foregoing picture has been drawn from the most severe cases, but will apply more or less to all.

Treatment of
mechanical
injuries.

The treatment of inflammation from mechanical injuries is next to be considered, but it is necessary for me first to state that it has not been my purpose to enter into the detail of many of the circumstances which belong to the consideration of them, although highly important, such as hæmorrhage, &c. &c., because it would have enlarged too much a treatise which has only for its object to set forth the phenomena of inflammation as they arise from various causes; as far as may be, the rationale of their occurrence, and the treatment adapted to them. To other works I must refer for information on the points alluded to, nor do I know where a better epitome is to be found than in the first lines of Professor Cooper. In the more copious works of Guthrie, Hennen, Hutchison, and Larrey, however, fuller illustrations are contained.

Of incised
wounds,
locally.

In the treatment of mechanical injuries, incised wounds may be first considered, and of this nothing more need here be said, than that the well-known practice of placing and keeping the divided parts in strict apposition and perfect quietude is of all things most necessary, and often will suffice with

the avoidance of every cause calculated to excite vascular action, to enable nature to restore the union with little disturbance of the part or the constitution.

Should the injury affect parts of consequence, Generally. or should the constitution be a doubtful one, it will be requisite to employ depletion, *in anticipation* of inflammation.

And if severe inflammation and sympathetic fever do occur, as in wounds of joints, &c., then it becomes necessary to bleed locally, to apply *cold* with energy, and to employ active antiphlogistic measures generally, at the head of which energetic blood-letting and entire negation of stimuli are to be placed. The more complicated questions of treatment may be best reserved for the next head.

In *lacerated wounds* we have to consider the Of lacerated wounds locally. local and general treatment.

In these, as in contusions*, we may recognize three stages:—in the first, the parts are stunned by the blow; in the second, reaction takes place, with its consequences; thirdly, after this the parts are left enfeebled. It is of importance to make a Principles of treatment. discrimination between them, for I cannot conceive it can be right to adopt a sedative practice in the first stage, while the tone of the part is impaired, and reaction has not commenced.

* *Vide* p. 223.

In the second, the object is to moderate the actions which must take place to their due degree; and here we should not lose sight of the important fact that these parts have greatly lost their natural power.

Principal objects to promote moderate suppuration, to prevent mortification, and to support adhesion.

Suppuration, being in general the result of this injury, will, as explained*, extend through the whole or greater part of the wound, and reparation be effected by the granulating process. Adhesion, however, *is* set up, and ought to be established *around*. Sphacelus may occur, either of inevitable necessity, as from a gun-shot, when the part dies with such rapidity that there is little or no struggle to prevent it in the neighbouring parts, nor in the general system; it dies as from caustic: or it may occur as the result of the high inflammation which often ensues on laceration of any kind; and when so, after it has once commenced, may spread to the neighbouring parts, which (though not injured) participate in the inflammation; or to those beyond.

Mortification may occur in two different modes.

If *mortification* takes place, and spreads, it appears to me that it may do so in two different modes; on the one hand, it may be the result of excessive reaction, when the heat and tension in the neighbourhood of the sphacelated part and the force of the circulation will be manifest; in the other it spreads *proprio impetu*, if I may so express

* Compound Fracture.

myself; it prevails with little struggle to prevent it. The treatment in cases of lacerated wounds will be much influenced by a consideration of these different objects.

The objects then are, to favour the development of a *moderate* suppuration in the wound, and to maintain the adhesive action in the neighbourhood, which is best done by preventing such a degree of inflammation as would destroy the adhesive disposition, and induce excessive suppuration or sphacelus; for if from excessive inflammation taking place to repair injury in parts so weakened (greater, to use Mr. Hunter's language, than they will bear), the adhesive action fails in the neighbourhood, and excessive suppuration or mortification are substituted for it, the inflammation in either case spreads more or less, and those phenomena take place which have been already described. If in this case we regard the *suppuration*; we find matter making its way under the fascia, in the interstices of muscles, &c., ruining the limb, or part, and often producing its necessary sacrifice; not so frequently the death of the patient.

After the wound has been carefully cleaned and foreign matters removed, and the parts laid and lightly supported in a state of easy approximation to allow the different portions of the wound to adhere if so disposed, the best application to the wound itself is, I believe, in the first place, a *tepid*

The mode of treatment of lacerated wounds.

LOCAL.
Poultices
considered.

and soft bread and water poultice, inasmuch as its temperature neither acts as a stimulant or sedative, both which impressions are liable to prove injurious to a part whose powers are much reduced: from the softness of its texture it is easier than any thing else, and disposes to that suppuration which is the natural and best termination. There are many cases, however, in which the poultices may be advantageously applied *cold* when the powers of the part are not excessively reduced, or cold water itself may be employed with advantage, as hereafter stated.

With respect to poultices I may observe, that they avoid an inconvenience which attaches to every other mode of dressing, namely, that of hardening on the surface and preventing that exudation from the vessels prior to suppuration, which very much lessens and relieves inflammation. I do not think the same end is as well answered even by cold water applied on lint or rag; but for another object it may be advisable to dispense with poultices, namely, where they would loosen straps which may be necessary to approximate the divided parts; when they are employed without straps, it is sometimes useful to apply an easy tailed bandage externally to the poultices, to support those adhesions which are disposed to form at the sides or bottom of the injury, and which, when poultices are used, sometimes do not obtain that sup-

port which is desirable. But while there is this inconvenience attaching to them, there is also the objection to lint, that it becomes stiff, and so en- DRY LINT. tangled with the lymph and granulations that it is long before it will separate, and it thus confines not only the first serous effusion, but matter which ought to have early vent; hence Mr. Hunter advised, that if applied it should be plentifully smeared with grease.

When the parts are exceedingly disorganized, or FOMENTATIONS. where gangrene is setting in, in lacerated wounds, I believe the use of fomentations, properly employed, is far preferable to the use of cold, or poultices alone. The powers here are greatly reduced; the constitution sympathises with the part; under the employment of cold we shall find the person anxious, oppressed, and sunk; when hot fomentations are used, from the same cause, sympathy, the system rallies and restorative actions are renewed.

When the parts are not excessively and exten- Cold applications. sively contused, and when we have rather to regard inflammation set up in the neighbourhood, cold is often employed, and extensively, to moderate the actions and keep them within due bounds. To cold water, spirit or vinegar may often be added with advantage, tending to give power to the nerves, which is here wanted; but if any be used, the proportion must be governed by circumstances and regulated by the effect; the addition of super-

acetate of lead is often very serviceable, whatever the principle may be.

But it must be understood that while in many cases it is advantageous to apply cold only (as in wounded joints), or poultices and fomentations exclusively, there are a great many cases in which it is highly useful to apply poultices to the injury, cold to the parts above, if a limb.

LEECHES.

Leeches are often of the greatest service, their number should be adequate to the occasion; and in serious cases I have often endeavoured to keep up by their means an unceasing hæmorrhage until the inflammatory action abates, hæmorrhage being one of the terminations of inflammation. I think more good is often done in this way than by applying them in larger numbers at a time, and allowing the inflammation to light up in the intervals.

Position.

The position must be carefully attended to, in order to prevent any obstruction to the return of venous blood, which, by its accumulation, would prove most powerfully destructive of the vital powers.

PRESSURE.

Undue pressure must be carefully avoided: moderate pressure is often salutary, as it tends to support adhesions and encourage their formation. By supporting the vessels when relaxed or weakened, it assists and invigorates the circulation; but if it at all exceeds a certain degree, it excites increased efforts in the vascular system to over-

come the obstruction it occasions, and also gives a disposition to remove the parts by the processes of ulceration or mortification; in these several ways tending to produce an increase of the inflammation on the one hand, and to give that inflammation an unfriendly disposition on the other*.

Tension is a mode of pressure occasioned by TENSION. causes acting from within, and will be infallibly produced where there is much swelling beneath skin or fascia, and the effect is precisely the same for the parts underneath, which are *pressed*, as in the former case, while the parts actually *stretched* are themselves undergoing a process not less injurious.

Incisions (I will not call them scarifications, as INCISIONS. that term may give an inadequate notion of the object proposed) are capable of giving great relief under such circumstances; nor do I see any reason why they should not be as fully employed as in cases of E. Phlegmonodes.

I may here mention that where parts have been COUNTER-OPENINGS. extensively and deeply torn, it sometimes happens that a collection of blood and sanies of the most irritating description will be found at its lowest part, producing highly pernicious consequences,

* *Vide* Compound Fracture, for bandages.

and this at a very early period*. A counter-opening or incision here is most essential.

GENERAL
TREATMENT.

The general treatment must vary much, according to circumstances; in the commencement, when the collapse has passed away, the antiphlogistic regimen is commonly proper, the digestive organs should be cleared, and the antimonial mixture given, probably with some opium. Where a joint has been wounded (and in some cases of fracture), general blood-letting is proper; but it may here be observed, that while this measure must often be pushed in wounds of joints to an extreme degree, in other lacerations, where the tendency to mortification always exists, caution is necessary: and I must also remark, that when the stage of secretion or suppuration has taken place,

* The following case will show *how soon* the necessity may arise for evacuating such matters:—

“Dec. 18, 1830. Mr. P., whilst riding at a rapid rate, in the dark, came in contact with the shaft of a carriage, also travelling very fast; it transfixed his left thigh, at the upper part, or nearly so, entering a little below the groin, passing behind the bone, and nearly escaping at the buttock; but at that part the skin did not give way.

“Dec. 19. *Twenty-four* hours afterwards he felt extreme pain at the part of the buttock above indicated, and being satisfied there was fluid, I made a free incision, and evacuated a large quantity of grumous blood, some of which spirted out with much violence, mixed with bubbles of air, and having a most offensive odour. It afforded great relief. He recovered.”

it will be found that a continuance of active depletion only augments the ravages of the disease, which increases, because there is not power to resist; and, if I may be allowed the paradox, the best antiphlogistic, is support adequate to the occasion.

If by these means the inflammation is not subdued, extensive suppuration or mortification, or both, will ensue. If the former, the part may be undermined with matter, and the chief object now is to give this free vent by ample incisions, if necessary, and to support the parts by the pressure of bandages carefully applied, by which we endeavour to obtain the following objects; 1st, The support of adhesions already formed, or forming; and, 2d, The prevention of matter from insinuating itself into the interstices of muscles, or the expulsion of any already there; the other purposes are subordinate. Poultices and fomentations must be abandoned, and spirituous lotions employed.

Treatment in the advanced stages.

Local.

If extensive, suppuration ensues, by

INCISIONS.

BANDAGES.

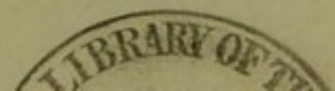
SPIRITUOUS LOTIONS.

GENERAL.

It is no longer right in this stage to persist in the employment of antiphlogistic plans; moderate support should be given, and if the discharge becomes excessive, the patient will also require wine or ale, and quinine.

If mortification ensue instead of suppuration, we have to consider whether the attending inflam-

If MORTIFICATION ensues.



mation possesses the character of excessive reaction or not; if it does, it may be right to pursue the antiphlogistic plan, perhaps with increased energy, while there is a prospect of subduing it by such means; but if this fails, or if the mortification be of the second kind *, spreading with a rapidity which bids defiance to the former practice, and speedily depressing both the powers of the neighbouring parts, and of the system to such a degree, as to put all lowering plans out of the question; it must be met with prompt and decided measures of an opposite character, and quinine, ammonia, opium, wine, or spirits, &c. may be resorted to, and persevered in, according to their effects, or the occasion; but on these heads I shall not now dwell, but make one remark however, namely, that great care should be taken to prevent the patient from being sunk by diarrhœa, which is apt to supervene.

GENERAL.

LOCAL.

The local applications here are of importance; but the choice, in each case, is attended with difficulty; when there is much struggle, tepid poultices, often changed, appear to answer, but when there is little, stimuli, such as warm port-wine, brandy, camphorated spirit, or eau de luce diluted, &c., may serve, but should not be persevered in, if they increase the pain. The hot fomentations may often be continued with advantage.

* *Vide* p. 210.

The important question of amputation remains to be considered. In ordinary cases of mortification proceeding from the state of the system, we justly conclude, that until a line of separation has taken place, *i. e.* until the adhesive action has been successfully established, it is of no use to amputate, because the state of the system remaining unchanged, it will recur; but in the cases now under consideration, the constitution, prior to the accident, may have been perfectly healthy, and, therefore, if mortification follows an amputation, it must arise either from the altered state of the constitution, or the part, or both.

Question of
consumption
after mortifi-
cation has
commenced.

amputation

Now, although it is most certain that when mortification occurs as the consequence of inflammation with a disposition to spread, the whole system is influenced by it, and it therefore happens, that when amputation is performed, mortification of the stump will very often ensue; on the other hand, it has been ascertained by M. Larrey, and subsequently by other eminent surgeons, that in many instances where injury has been the cause, mortification will not take place after amputation, but the patient be saved: the question, then, is, whether we can distinguish that case in which there is, from that in which there is not, a sufficient probability to justify the operation?

The state of the part must be taken for something; thus, if the inflammation and swelling have

extended so high in a limb as to make it necessary to cut through parts in this condition, there must be a greater probability of mortification ensuing: and hence we have a better, or I should say, a longer chance, when the injury has been of the ankle, or wrist, than of the knee or elbow.

But it is the state of the system which chiefly produces the danger; for even if the parts are sound which we cut through, mortification may ensue; and hence it is, that the less the time has been, during which the constitution has been influenced by the mortification, the greater is the probability of success; for whatever the cause may have been, the state of the system is ultimately so changed by the existence of mortification in a spreading state, that it will in nowise sustain the operation, or the sanatory processes which should follow.

Should it
ever be per-
formed in an-
ticipation of
mortification
when that is
imminent.

While on this subject, I cannot forbear from speculating on a point which has not hitherto been considered, namely, how far it may be right to amputate in cases of injury threatening mortification (where the first period for operation has passed) prior to the existence of that state, which has usually been considered, the fit period for *secondary* amputations.

If it be right to amputate because mortification *has* commenced and is spreading, it should seem probable that amputation would be attended with more success at the first moment of *its* occurrence,

may more, before it had actually begun, while gangrenous inflammation alone existed. The question is, are there any facts which will bear upon the point? to this I should answer, that there are certainly facts which do bear upon it, they are contained in Mr. Guthrie's work; but it should be added, that they are not mentioned by him with reference to this point: he states*, that after the battle of Salamanca, 150 French soldiers who had received compound fractures, under circumstances greatly aggravating the severity of the injury, were committed to his care on the third or fourth day after the wounds had been received, and of course after high inflammation had set in: "forty-six of the *worst* of these wounds were amputated in the course of the next fourteen days, nearly all at the thigh; of this number I saved but six, and these six may truly be said to have been saved, for of their comrades, *who were not so severely wounded*, and who were not operated on, as few in proportion survived."

Punctured Wounds are in some measure to be considered as contused wounds, as they are commonly inflicted with more or less of bruise, hence much of their character; as the consequences re-

* On Gunshot Wounds, p. 58. Since the above was written, I observe that the point is mooted by this excellent surgeon in a lecture published in the Lond. Med. and Surg. Journ. for Feb. 1832.

sulting from them, however, are often connected with wounds of fasciæ, to avoid repetition I have considered them in a subsequent part.

SECTION III.—*Contusions and Sprains.*

Nature of the injury.

A contusion or sprain consists in an injury of the soft parts, whereby these are disturbed and generally divided or torn more or less, their vessels being lacerated and pouring forth blood or serous fluid, the nerves also being torn or injured, the tone of both impaired, the tissues, in fact, are commonly disorganized to a greater or less degree. A contusion does not necessarily imply a separation of parts, although this generally exists in some portion of the injury; but the integuments are left undivided in all cases.

Processes of reparation.

The processes of reparation consist in the absorption of the effused blood or serum; in the reunion of any parts which may have been divided, and in the restoration of the whole to due power and healthy action.

Differences of inflammation from that in lacerated wounds.

These processes may be effected without any necessity for suppuration and granulation, as there is no external wound, and they are generally carried on uninterruptedly and with success; this con-

stitutes the difference between the inflammation now considered, and that in lacerated wounds; but should the skin subsequently give way, either from ulceration or sphacelus, or any other cause, all the consequences to which a lacerated wound are liable may ensue.

Three stages, I think, may be recognized, in Three stages. which the state of the parts differs materially, and on the due consideration of these differences, the appropriate treatment will materially depend.

In the first, the parts are in a great measure deprived of their tone and power by the blow: they are stunned.

2d. To this succeeds increased action and inflammation to repair the mischief.

3d. To the inflammatory stage a state of atony.

In the first stage the treatment is sufficiently Treatment of first stage. simple; the objects we then have in view are, the giving a necessary degree of tone and power to the parts which have suffered; and the prevention of that effusion which will much protract the cure, because if we can check that effusion and infiltration which now takes place, we shall prevent the operation of a cause injurious in various ways; for,

First, This effusion, by still more separating To check effusion and give tone. the parts, weakens them additionally; secondly, when it collects in large quantities under, and insulates the skin, it mechanically cuts off a considerable portion of vascular supply; and thirdly,

the fluid so thrown out, if it loses its vital principle, often becomes in a high degree injurious to the surrounding parts.

Now, the treatment best calculated to prevent this effusion and restore the tone is the application of spirit, or vinegar, alone or mixed, or diluted with water. Nothing appears to me to answer better than brandy, and it generally should be applied cold, because while the stimulating quality restores the tone, the cold checks the effusion. The pressure of a bandage carefully applied will, in some cases, promote the same intention. In very threatening injuries the temperature of the first applications should be raised.

Of second
stage.

In the second stage we have to consider both the degree of reaction and the effusion.

Leeches will now often prove extremely serviceable. Sometimes cold lotions, sometimes hot fomentations are preferable, but either should contain, in general, a considerable quantity of spirit. The feelings of the patient will often determine whether the application should be used cold or warm; but on this head I have to observe, that when the parts *beneath* the integuments have suffered most, and the inflammation is active, cold stimulating lotions will prove most serviceable; when, on the other hand, the skin has been materially injured, and there is risk of its sloughing, cold is rarely proper; indeed in such cases especial

care should be taken not to use either strong stimulants or sedatives.

Poultices, either simple, or medicated as below, are sometimes preferable, particularly in the case of sprains.

The lotio mur. ammoniæ is often a valuable remedy, especially in sprains, so is the liq. ammon. acet. with spt. more or less diluted.

When the bruises are very general, and not particularly severe in any one part, the warm bath is often very serviceable. The well known case of Marshal Lannes, whom M. Larrey caused to be wrapped in the skin of a sheep newly slain, is analogous in principle.

Strict rest should be enjoined, especially where muscles, tendons, or fasciæ are torn.

Under this treatment it generally happens that the parts are by degrees restored; but, on the other hand, the skin may die from the violence, or improper treatment; or may ulcerate to discharge effused blood; or lastly, an ill-conditioned supuration may take place and require vent.

If the skin dies and separates, the injury is converted into a lacerated wound, but not always with consequences so bad as ensue in originally lacerated wounds; for in the interval which occurs before this takes place, the parts below have in a considerable measure recovered their powers,

Consequences
if the skin
sloughs.

and the adhesions in the neighbourhood are often firm.

Or the ecchymosis produces ulceration.

The injury equally becomes a lacerated wound if the ecchymosis produces ulceration; on this head I must observe, that if the blood is not absorbed in the spot, nor dispersed in the cellular tissue extensively and thus absorbed, as often happens, but on the contrary remains, and loses its vitality, nature gets rid of it by producing ulceration of the skin; it is often advantageous to accelerate this process, when the redness of the integuments shows that it is going on, by making a puncture and allowing it to find its way out quietly, when no disturbance ensues in many cases; whereas by remaining, its irritation may induce mischief; when it is merely extravasated blood so contained, the opening we make should only suffice to let it escape; a large one might excite a prejudicial disturbance; but the recommendation made by many excellent authors, to make only small openings, must have its limits; for it may here be stated, that if the inflammation has produced a partial suppuration, then a small opening will not suffice; as soon as a communication has been formed between such a collection and such a cavity, and the surface, those symptoms generally come on which will be more fully described under the head of Opening the Cysts of large Abscesses;

Treatment of ecchymosis.

Of suppuration if it occurs.

and as far as my experience has gone, nothing will here suffice but the complete exposure of the cavity by an ample aperture.

The third stage of contusions follows the sub-^{Third stage.}sidence of the inflammation, and then the parts are left weakened both by the injury itself and the increased actions which follow; if those actions ^{Treatment.}are kept within due bounds there is scarcely any third stage; but if they have been violent, a languid state of the part, with œdema of the integuments, succeeds, in which, warm fomentations and frictions with stimulating liniments, are, in the generality of cases, of the most essential service; in some, cold pumping and friction.

The appearance of discoloration on the surface is familiarly known to be a frequent indication of this stage. This often ensues immediately on the receipt of the injury, or very shortly after; but in others, it does not appear for a considerable time; this is not very easy to explain, but it may possibly arise from blood extravasated beneath the corion not making its way to the surface, when that is thick, till the subsidence of the inflammation leaves the apertures therein open for its passage; while, when it is thin, as in the eyelids, scrotum, &c. it always appears at once.

SECTION IV.—*On the Differences arising from the Nature of the Organ or Tissue injured.*

Having considered the characters of the inflammation as far as they may fairly be attributed to the mode of injury, it remains to offer a few observations on the differences arising from the nature of the organ or part concerned.

When inflammation originates spontaneously, it can hardly be ascertained how far a vice in the particular tissue or organ may have contributed to the causation of that inflammation; but of course, when injury is the cause, this point can admit of no question; it therefore only remains to examine what consequences may result from the nature of the part. The principal differences depend upon its being one of vital or primary importance, or one of secondary consequence; it may be better to reserve for a future part the remarks on the first; the secondary are, the integuments and muscles; fasciæ, tendons and ligaments, and bones; besides some external membranes, the vessels and nerves.

Integuments or Muscles.—An injury of these will be generally attended with healthy inflammation and vigorous action; its tendency to adhesion

or reparation by granulation, excepting in cases of great severity or in unsound constitutions; they have great power of reparation. It must be observed, however, that injuries of these parts occurring on the head, thorax, or abdomen, are more serious than elsewhere.

Fibrous Membranes. — Whether tendons or ligaments, fasciæ, or such structures as the cornea or sclerotica, they are all parts endued with few vessels or nerves; their dense structure will with difficulty admit of an increase of vascularity, and is the cause of an injurious pressure being excited when their vessels enlarge under inflammation. From these causes, inflammation, when it occurs in them, is prone to mortification under injury with wound, unless that is a simple division, when they readily unite; but although they are incapable of bearing severity of inflammation, *with exposure*, it is remarkable that under other circumstances they will, as in gout or rheumatism, or when injured by sprains or contusions.

Under the heads of Fascial Inflammation and Paronychia, the peculiar phenomena of these inflammations will be considered.

Bones. — There is seldom a breach of continuity of bones without great violence has been inflicted; notwithstanding, if the injury is not connected

On the inflammation consequent on wounds of bones.

with a wound of the surface, reparation is, after a time, effected; if it is, a portion often perishes; for the same remarks which apply to fibrous membranes, do so here, with this difference, that of the two, bones are much more highly organized; their dense and unyielding structure, however, renders the processes of inflammation in them very tardy, and with circumstances of exposure unfavourable; nevertheless, when there is no external wound, they rarely perish in case of fracture, although (and it is not a little remarkable) necrosis often occurs from blow where there is no fracture.

Necrosis is rarely the result of blow, when there has been simple fracture.

The remarkable difference which occurs from the circumstance of an external wound deserves every attention: why should the addition of a trifling wound to an injury of great severity cause such a difference in the symptoms? It has been attributed to the admission of air; but to what extent *is* the air admitted? not beyond the mere surface*; it is not here as in a case of abscess, where a *cavity* is emptied of fluid, and air may find access if the sides are not compressed; but if

* It is said that the union does not take place as in simple fracture, because, from the exposure, the first bond of union, *i. e.* coagulable lymph, is removed or destroyed before it can become vascular. This undoubtedly is the case; but why is it so? We may with reason suppose that such parts of this lymph as the air has touched will perish; but in many instances the proportion so circumstanced is very trivial; and pretty surely, if we can prevent the skin from suppuration, the uniting process does not fail beneath it.

air does come in contact with the parts, it does not prevent ready union. How many wounds unite after being long exposed, nay, after a part has been separated from the rest and been surrounded with air? Air does not prevent the wounds of brute animals from healing. Still the cause of the phenomena must be ascribed ultimately to the influence of the air, though indirectly: the facts are the same, but they admit of a different explanation.

As a lacerated wound of the *skin* will seldom heal by adhesion, the granulating process is necessary, and for this, suppuration. Now, in the case of compound fracture, *this* forms a part of the general surface of the wound, and the suppurative action having *commenced* in it, is communicated *throughout*, which would not otherwise have been the case, as is evinced by the difference when adhesion in the skin can be procured*.

The peculiar consequences which arise in compound fracture may be ascribed to the extension of the suppurating process from the wound in the skin,

When bone is implicated in a lacerated wound, the consequences are much more severe than in other cases; because, in the first place, there is considerable disposition in it to perish under the

and to the peculiar circumstances of a suppurating wound, of which bone forms a part.

* The argument in the text, in its chief bearing, was maintained by Sir C. Bell, in his work on Operative Surgery, in the year 1807. In 1809 I advanced it in a paper given to the Medical Society of St. Bartholomew's, being unaware at the time that if the remarks possessed any merit, that was due to the distinguished surgeon I have now mentioned.

high inflammation which ensues, arising from its structure. 2d. This disposition having commenced in a part, is, like any other disposition, capable of being extended to, or influencing, the whole surface of the wound, and adds to the tendency already existing in its sides to sloughing and unhealthy suppuration. 3d. The high inflammation and profuse suppuration which occur prevent, in a considerable degree, the restorative process of depositing matter to form new bone. 4th. The matter tends to prevent that contact of the ends of the bones which is calculated to excite this process. 5th. All processes performed in and by bone are slow; and when any portion is exposed without periosteum, a very considerable interval, under the most favourable circumstances, elapses before granulations are formed, and until they are so, the object nature has in view is not accomplished. 6th. It is very difficult to avoid all motion, and every movement in fracture, when the limb has lost the support of its bone, is a fresh injury: and 7th. The repair being so difficult, the sympathetic fever is high in proportion, and tends itself still further to aggravate the mischief.

Principles of
treatment.

The principles of treatment seem to be, 1st. To procure adhesion of the external wound, if possible, for which purpose any thing like tight strapping (which it is to be feared is often em-

ployed) must be injurious in a wound of this nature*. Sir Astley Cooper recommends, as the best application for the purpose, a bit of lint wetted with the blood. 2d. To procure reparation of the bone, always effected readily enough, if supuration be prevented by the success of the former intention; but if not, perfect quietude is of all things the most essential. For this reason it has long been my plan to lay the limb in that position in which the wound may be dressed without displacing the apparatus, whatever that may be, and have in most cases of compound fracture abandoned the use of bandages in the beginning, for these require the splints to be moved, even when separate heads are employed. In the position on the side this is of less consequence; but when the patient is on his back, which perhaps will be found the preferable posture in the majority of cases, the splints and bandages cannot be moved without disturbing the ends of the bone, and inflicting a new injury. There is another objection to bandages, which is the putrid, filthy state into which they get, and this is only imperfectly obviated when separate heads are used. Such matters, in the neighbourhood of the sore, or inflamed skin,

Disadvantages of bandages.

* This does not apply to Mr. Guthrie's plan of bringing the edges of the skin together by sutures (which he proposes in wounds of the knee joint), provided the state of that integument affords any presumption that adhesion will take place in it.

are of a nature diametrically opposite to those we should wish to have.

Use of band-
ages.

The use of bandages seems to me to be this: 1st. By a gentle pressure to give support to the muscles, and counteract spasm; but this may be equally well effected by the judicious use of splints and pads. 2d. To give a gentle support to the vessels of the part, which has a tendency to check effusion and restrain inflammatory action; but to effect these purposes the greatest care is required that the pressure should not exceed a certain point. 3d. To support adhesions, whether in the commencement, as soon as they are formed, or after the suppurative stage has taken place, to prevent it from spreading in the interstices of muscles; in the latter case it is always useful, if duly applied, and may likewise be so employed as to obliterate sinuses already existing; but with reference to the *former*, the utility depends upon the pressure being of a *due* degree, and if from the action in the part, tumefaction takes place, it too often happens that the pressure becomes excessive, and the most mischievous consequences ensue: with a view to obviate this I have tried elastic bandages, but as yet with very imperfect success. I may conclude by saying, that there is no purpose of *steadying* the limb which may not be equally well accomplished by good pads, splints, and fillets; and since I have adopted this mode of

treatment, I have found the management of these cases less painful to the patient, less troublesome to myself, and far more successful.

It has been observed by many surgeons, and I believe is a fact, that where the external wound is large the case often does better than where it is small, provided that small wound does not unite by adhesion. For this many reasons may be assigned. 1st. The greater loss of blood at the time, in many instances. 2d. The freer exit for blood and other matters effused, both at the time and subsequently. 3d. The relief which is obtained from the suppuration of a large external wound. 4th. This suppuration being effected more speedily; for the difference in this respect is, in some measure, the same as between the *formation of an abscess* from inflammation, and the suppuration of an *open* lacerated wound: and 5th. Such a wound obviates the tension which, perhaps, is more mischievous than any thing; and I can take upon myself to say, that the practice of enlarging a small wound, founded upon these principles, is to be recommended in every case where there is little hope of adhesion. The additional *pain* inflicted at the moment is not to be compared with that which arises from the high inflammation and the openings we are subsequently obliged to make to evacuate matter, to say nothing of the increased risk to life and limb.

Compound fractures often do better when there is an extensive external wound than in other cases. Why?

CHAPTER II.

ON CHEMICAL INJURIES.

THESE may be divided into two classes ; 1st, Those from the effects of temperature ; 2d, Those produced by poisons—animal, vegetable, or mineral.

These agents differ materially in their mode of action from mechanical injuries : they impress a *peculiar* disposition in every instance on the part they affect.

SECTION I.—*Inflammation from Excess of Temperature.*

Burns and Scalds.—If heat be applied to any part of the body, it causes the vessels to be distended ; it also occasions a feeling of uneasiness often amounting to pain, sometimes intense. If, however, heat be applied by the intervention of dry air, a great degree will be borne without perma-

ment inconvenience ; but if any solid or fluid substance be the medium, injury is experienced.

Within a certain point, the derangement which occurs from its application is only temporary ; beyond this inflammation takes place, and if it be very great, disorganization, from the vital powers being unable to prevent the coagulation of the fluids, or the crisping of the vessels.

May produce temporary inconvenience only. Inflammation, or the death of the part.

We may then have, 1st, a state of disturbance of brief duration ; 2d, A state of inflammation produced by fluids approaching to, or of the boiling temperature ; 3d, A state of inflammation produced by fire or a very high temperature, inducing a degree of disorganization, which may or may not be retrieved ; when there is a struggle for recovery, and when the part is *capable* of recovery under good management ; or, 4thly and lastly, where the disorganization leads to the immediate death of the part, as in the severe applications of fire, or where boiling water has long been applied.

The inflammation may terminate in sphacelus or not, according to the degree.

Whether the part returns to its natural state or not, for a time it remains red, and a painful sensation of heat continues, although the heat itself is withdrawn ; and it is very different from that which is perceived when the skin is rendered red and turgid from any other cause. It is a perpetuation of the sensation of the body, producing an impression very analogous in its nature to what

The nature of the impression on the nerves of the part.

is observed in some other cases ; as, for instance, when the taste of any particular substance is retained in the mouth, or a predominant colour appears after the eye is closed.

If the part is immediately plunged into cold water, this pain is relieved ; if again taken out, or exposed to heat, it returns, or is increased : are then the nerves in the latter case rendered more sensible to the impression ? or does the immersion, in the former, check actions on which the pain depends ?

Similar effects produced by the application of heat and cold as remedies in these cases.

If the part be exposed to cold sufficiently long, it is often found that the restorative actions have taken place without any, or with very little pain, and that it has returned to a healthy state ; but is it not a little remarkable, that nearly the same phenomena will occur under an opposite plan, *i. e.* under warmth and stimuli ?

Cold inapplicable in burns.

In burns, cold has an injurious effect ; but in burns there is a great degree of disorganization, and whenever the powers are impaired by this cause, whether the vessels are bruised by violence or scorched by fire, they are not likely to act healthily or vigorously.

In scalds there seems no reason for supposing such want of power ; for if, as I conceive, the quantity of heat developed by a part may be, in some measure, taken as a criterion of the actions

it is performing; this in scalds is great, and as these rarely terminate in sphacelus, we may also conclude that there is no want of power.

I must here observe, that the information afforded by the thermometer is very delusive with respect to this matter; it will not at all ascertain the quantity of heat a part is giving off, or capable of giving off, for the thermometrical temperature of two parts shall be the same, the one being inflamed, the other near the centre of circulation; but the quantity of fluid which the first will evaporate shall be two, three, or four times greater than the other.

The thermometer delusive as a measure of animal heat.

Whatever may be the nature of the inflammation in scalds, it is certain that it is not the only kind in which heat and stimuli on the one hand, and cold and sedatives on the others, *are* of service (though not in an equal degree): thus, vinum opii and saturnine lotion will benefit the same inflammation of the eye; plunging a whitlow in hot water or alkaline ley, are sometimes good remedies, so are ice and Goulard. M. Dupuytren blisters an erythema—we apply a cooling lotion. That these opposite remedies do good is matter of fact; that they act upon opposite principles we must infer from what we know of their usual effects on the healthy body; but what these are remains yet to be explained*.

In many other inflammations, remedies of a directly opposite nature useful: on what principle not known.

* It may be said by some that they all produce contraction of the vessels.

SCALDS.

To return, however, to the subject more immediately under consideration. When heat is applied of the temperature of boiling water or oil, or of an inferior degree, it is said to occasion a scald ; and the effect of this is an inflammation producing a separation of the cuticle, often in a few hours, in the form of large vesications, but there is very little affection of the subcutaneous parts : but if the heat has been long applied, as in the case of a person falling into boiling fluids, and a part remaining there, such disorganization is produced as leads to its inevitable death.

Great pain accompanies a scald, which, however, subsides often in a few hours, rarely exceeds a day or two, and it is probable that the effusion of serum from the surface of the skin relieves.

There is a great tendency in the skin to suppurate when these vesications take place, especially if they are prematurely deprived of cuticle ; and if suppuration occurs, a formidable-looking sore is formed, which, however, with proper care heals in about three weeks.

The constitutional sympathy is found, *cæt par.*, to be in just proportion to the extent of the mischief, and if that is considerable, the nervous and respiratory systems are dangerously affected ; but of this I shall say more under the head of burns.

Local treatment.

With respect to local applications, it may be stated, that if the scald is not very extensive,

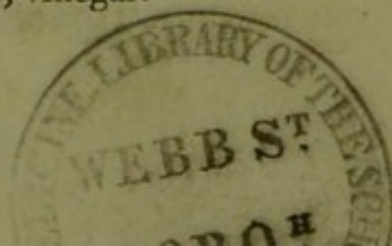
especially if it be in the limbs, the efficient use of cold applications will generally give great relief*, and prove most serviceable, if no circumstance forbids their employment; but if used at all, they should be sedulously. When cold is not admissible, carded cotton, or flour, or linseed oil and lime water, are probably the best applications; and this must at all events be the case where the scald is very extensive, where the constitution has received a great shock, and cold would be dangerous. A horizontal position is of consequence when the extremities are affected.

If vesications form, it is best to prick them, to lessen the chance of the skin being exposed by their being incautiously torn off. Should this happen, or sores be produced, they should be dressed simply, either with lead ointment, calamine cerate, chalk sprinkled over them, or with poultice. A liniment, made by melting equal parts of diachylon and oil, is also an excellent application, used on fine rag. In every case especial care should be taken not to expose the surface to cold air, which has a very prejudicial effect.

It has been stated that fire, or the long continued application of boiling fluids, may produce

Burns and
scalds with
disorganiza-
tion.

* Spirit much diluted, with or without superacet. plumb., vinegar. Potatoe poultice and simple water come under this head.



either such disorganization of the parts as destroys them on the instant, or inevitably leads to their destruction; or the injury may be such, that without good care such destruction will ensue, while *with* good care a complete or partial recovery may be effected.

When the part dies, it may happen that the whole thickness of the skin perishes; nay, in terribly severe cases this extends to the deeper seated parts; but it is worthy of remark that this sphacelus, whether it be the immediate result, or whether it may ensue after a struggle to preserve the life of a part, never appears to have any disposition to spread, in which it remarkably differs from that consequent on lacerated wounds, and many other kinds of sphacelus.

When the skin perishes deeply, it is separated in large sloughs; when slightly, or when it is preserved from perishing, suppuration to a greater or less degree takes place. In either case, the sores produced, unlike those occasioned by scalds, are often long in healing; when the whole cutis is destroyed, it requires many months or even years.

The cicatrices which form when such sores heal, are frequently of a peculiarly dense, almost cartilaginous structure, and contract so much as very frequently to produce deformities; but on this subject I shall not in this place enlarge.

The constitutional sympathy must now be considered :—first, in the stage of collapse ; secondly, of consequent fever.

That great collapse should follow such injuries, especially when extensive, cannot be wondered at, nor do the symptoms greatly differ from those which occur after severe contusions, excepting that there is a greater disposition to shiver. With this symptom the face is pale, the extremities cold, the pulse small, little comparative pain expressed, but the patient is anxious, and his respiration oppressed, vomiting or hiccough may occur. If he does not rally from this state, he becomes convulsed or comatose, and sinks, often very soon. The degree of the symptoms coincides with the extent and severity of the injury.

Constitutional symptoms in burns and severe scalds.

If he survives, fever comes on, and continues till the processes of suppuration and separation of the sloughs take place : this fever is often attended with severe affection of the head and chest, often fatal.

When suppuration is established, the fever greatly subsides and alters, but if the discharge is large and long continued, hectic may ensue.

In every stage of burn and scald there is great irritation, probably arising from the nerves of sensation being so largely disturbed, and severe affection of the respiratory organs, which may be ascribed to the connexion of function between the dermoid and pulmonary systems.

Local treatment of burns.

The local treatment of these injuries is a matter of great consequence. Cold may be generally discarded, it would be contrary to all reason to suppose that it would benefit where the disorganization is so great. On the other hand, stimuli are often very advantageous: the part injured may be bathed with warm laudanum, and Dr. Kentish's liniment of turpentine and ung. resinæ applied, which it is probable not only acts by its stimulating, but also by its *defensive* quality: it is on the same principle, probably, that oil and lime water act; indeed it will be found that all the remedies which deserve confidence in burns, either possess certain stimulating qualities, as the lin. saponis, or combine them with the property of excluding the influence of air and temperature, as is the case with those above mentioned, and this leads me to speak of applications which simply possess the latter quality.

Flour and carded wool constitute the remedies to which I now allude. We can hardly attribute to either of these any specific efficacy; it is more rational to believe that they rather act by excluding injurious impressions, and allowing nature to perform her curative operations without that disturbance which arises from the influence of external air or temperature on our bodies when injured and unprotected; of the extent of which influence we may judge from the processes which

take place in lacerated as compared with contused wounds, and also from the speed with which sores will often heal when we can succeed in forming a scab over them. This coating performs the same office of protection for the skin, which *the skin usually does* for the subjacent parts.

Under their use, when the surface is as yet free from vesications or destruction, the parts often gradually return to health; when otherwise, we still find that the separation of the sloughs and the healing of the suppurating surface take place much more readily than under other modes of treatment—indeed the difference is remarkable. I may also add that the cicatrices formed are of a less hard and unmanageable character than in other cases, at least so it appears to me.

I will not say that these remedies will always succeed; in some, from causes which are not very apparent, they augment the heat and pain, and must therefore be abandoned; in others, they answer well till the suppurative stage, but then the part, instead of healing, becomes irritated by the retained discharge.

If flour is used, it must be heaped on the part, and whenever it falls off should be plentifully dusted on again with the dredger: where the nature of the part renders it difficult to keep it on, pledgets of simple dressing may be applied over it, and retained by a slight bandage. If suppuration occurs, notwithstanding the pus is seen to ooze

through the flour, and form with it a crust, this should not be removed, but an additional quantity dusted on, and after a comparatively short time it will commonly be found that the part has healed, and the crust comes off dry. If, however, there should be a considerable degree of uneasiness, it must be taken as a symptom that this mode of treatment does not agree, and we must have recourse to mild and emollient poultices or other dressings.

The principle and the plan in the case of carded cotton is probably precisely the same as where flour is employed, but my own experience has been much greater in the use of the latter; and in burns, at all events, I am apt to believe it preferable.

With respect to general treatment, it may be chiefly considered in the first and second stages.

General treatment of
scalds and
burns.

The first stage of scalds is not so decidedly one of collapse as of great nervous irritation, and the pain is often terrible; here large doses of laudanum are commonly required. The first stage of burns is attended with less irritation, but a great deal more depression, and the use of stimuli, combined with some proportion of opium, is necessary; the former repeated frequently, according to the occasion, the latter used with more reserve.

It often happens, that although the patient may recover from the coldness and collapse, he does not from the nervous impression; he will take no food,

but has thirst; is convulsed, or comatose: he sinks and dies, the injury is too much for him; in this case all endeavours often prove fruitless.

If, however, he gains upon the first shock, it may well be supposed that so much injury must still produce fever; if this runs high, it may prove fatal from affecting the head or lungs*, and it is often necessary to bleed to obviate the effects produced on these organs. The bowels require careful attention, and saline neutrals, with antimony, are often of service.

Even when suppuration has been freely established, such a febrile disposition has been excited in the constitution, that vital organs, or other parts, may, from slight causes, fall into inflammation, and this requires prompt depletion.

On the other hand, the immense drain which such extensive suppurating surfaces produce, often demand ample support to prevent the patient from sinking.

SECTION II.—*Inflammation from the Application of Cold.*

Perhaps the principle on which inflammation is produced, by the application of cold, is not so

Analogy between injuries produced by extreme heat and extreme cold.

* I might add, bowels; and since this was printed, I have had a case terminate fatally from melæna occurring a few days after an extensive burn.

entirely different from that occasioned by the direct influence of heat as might be at first supposed; and it is not a little remarkable that the same sensation arises from a great degree of cold*, as of heat, so that a similar effect appears to be produced on the nervous system in each, and is called *burning*, because it most commonly and familiarly is known to result from the action of heat.

Relative nature of the terms heat and cold.

Cold, *per se*, is rarely the cause of inflammation, it is a sudden change of temperature which produces it after parts have been exposed to severe cold.

Cold does not seem to produce inflammation *per se*†; a person, or a part, may be kept in a great degree of cold and no inflammation will occur; but inflammation takes place when heat is applied to a cold part, and that is heat to all intents and purposes, to a part which has been exposed to a temperature many degrees below the freezing point, which to others is temperate or even cool‡; and while, on the one hand, such a part is liable to be very injuriously affected by a slight degree of warmth, so, its powers being much diminished, it is less capable of resisting an injurious impression of any kind, from the same reason that a slight degree of heat will produce vesications in a limb whose powers have been reduced by paralysis.

Observing, then, that parts exposed to violent

* *Vide* Parry's Voyages, p. 112.

† Larrey, Mem. de Chir. Mil. vol. iii. pp. 60, 61.

‡ Pearson, p. 163.

heat inflame, if afterwards subjected to a mean temperature, but often do *not* if gradually cooled; observing also, that those which have suffered extreme cold also run into inflammation, if subsequently exposed to a mean temperature, but do not if gradually warmed; we may infer that the inflammation, in either case, is less the consequence of the immediate application of heat or cold, than of the sudden change which takes place, whether that be satisfactorily explained on the doctrine of excitability or not. It is not, however, meant to deny that *extreme* cold, as well as heat, will render inflammation inevitable, by the immediate disorganization they produce.

The preceding discussion is not without its practical import, for whatever difference of opinion there may be on Dr. Kentish's theory, as regards the treatment of injuries by fire, no doubt can exist that the best mode of managing frost-bitten parts is by friction with *snow* or *iced water*, so as gradually to raise their temperature; and it is well known that sudden heat applied, produces their death inevitably.

Cold in an extreme degree drives the blood from the vessels, the textures are rendered rigid, frozen, and the part resembles a portion of a corpse; it is said to be frost-bitten: the treatment just alluded to should be employed to restore the circulation and thaw it, and as its vitality is

Cold expels the blood from the vessels, if intense, in a less degree causes it to stagnate.
Treatment.

not actually destroyed, but suspended, this will often succeed ; the powers, however, are so much reduced, that if it be exposed to any excitement, it will perish as soon as reaction takes place ; and it is, indeed, often difficult to prevent the inflammation from terminating in sphacelus. I believe in this state of inflammation strong spirituous lotions applied cold or tepid are the best applications. If sphacelus follows, it is not apt to spread. We frequently see examples of the extremities perishing, especially the feet, ears, and nose, when the cold has been long continued, although its degree is *not* excessive. The colour of the part induced by the cold is a dull red in these cases, the blood becoming rather stagnant in the vessels than driven from it.

In persons whose systems are exhausted by poverty, cold in a very inferior degree will produce sphacelus ; this will be spoken of hereafter.

Chilblains.

A less severe, but much more common effect of cold, or rather of alternating temperature, is chilblain, which often becomes a serious evil from the great suffering it occasions, and from its disabling the hands and feet when it exists to a great degree. A description of a form of inflammation so commonly known would be idle.

Although varying temperature is the immediate cause, yet no doubt the disposition belongs to peculiar constitutions and ages, and these not the

most vigorous; and it is not clear that in some instances they may not tend to prevent other forms of disease: they are popularly said to be healthy.

When the blood is nearly stagnant in them from cold, they are without sensation; when heat accelerates the circulation, they become distressing from a sensation of itching and burning; after a while this subsides, and if a moderate temperature be long preserved, they get well; if, as is commonly the case, they are again repeatedly exposed to cold, they ultimately *ulcerate* on the surface, become broken, as it is called, and such a sore is very crude and indisposed to heal.

The remedies employed are all of a stimulating nature: friction with cold water or snow, camphorated spirit, ammonia, turpentine, vinegar, or a liniment much recommended by Mr. Wardrop, composed of soap liniment and tr. lyttæ*, are among the best remedies, and so are all articles of covering which shall prevent the influence of cold.

When ulceration has taken place, the sore is particularly foul and indolent, and requires stimulating applications and warmth. An ointment composed of the ung. res. flav. with the bals. Peruv. about a dram to the ounce, with the addition of a small proportion of the hyd. nitr. oxyd.

Treatment in the first stage.

Treatment when ulceration has occurred.

* M. C. T., vol. v.—Lin. sapon. p. vj., tr. lyttæ, p. i.

I have found the best application, poultices or stimulating lotions being applied externally. The arg. nitr. is also useful in these cases.

It should appear that inflammation produced by cold has no disposition to suppurate; its tendency is to ulcerate or to slough.

SECTION III.—*Inflammations from Poisons**.

Certain matters applied to the surface of the body, or inserted into it, produce inflammation, the phenomena of which vary according to the peculiar nature of each. They may be considered under the head of animal, vegetable, and mineral.

Two kinds; one act immediately and violently, and do not remain in the system, as the poison of reptiles, &c.

Animal Poisons are exceedingly numerous and various in their effects. Some act violently and immediately on the part to which they are applied, exciting severe inflammation, but having nothing in common with the living properties of the re-

* It may admit of a question, how far the term should be applied in a sense so general as I should understand it; but it is on the principle that every thing capable of exciting an injurious impression on the human body is so far poisonous. The difference between a deleterious application or poison, and a useful remedy, only consists in the quantity and the manner of exhibition.

recipient, which, therefore, throws them off if it is able to survive the first injurious impression ; such are the poisons of reptiles, insects, &c. Their *modus operandi* would appear to be in great measure by the direct destruction of the vital principle of the part or animal on which they operate, when in a degree sufficiently intense, so that the beings which possess them, effect by this means what others accomplish by their mechanical powers and offensive weapons.

Others excite little or no local disturbance, have a certain relation with the vital properties of the recipient, in whose constitution they produce a peculiar alteration, but are, for the most part, sooner or later eliminated from it, if they do not previously destroy life ; such are the poisons produced by other mammalia, particularly by man himself.

The others have a certain relation with the recipient, in whose system they appear to remain for a considerable time.

The former class exist for the defence of the beings to which they belong ; the second for the offence of others, for reasons which we can only conjecture, but the wisdom of which we cannot for a moment permit ourselves to doubt.

Of the latter, some poisons present themselves in a fluid form, as in lues ; others of an aeriform nature, as in typhus ; others again in both, as variola.

Extreme diversity of the phenomena incident to morbid poisons.

Some produce only slight local inflammation, as vaccinia, hydrophobia ; others very severe at

times, at others slight, as lues, the matter of dead bodies, &c.

Some produce regular secondary symptoms, as variola; others very irregular, as lues: the interval which elapses may be certain as in the former case, or very uncertain as in the latter; they may be highly acute as in the former, or may be either so, or chronic, as in the latter; the constitution may be freed from them after a given interval as in the former, or sometimes never get rid of them as in the latter; it may be rendered altogether, or almost, insusceptible of a renewed attack as in the former, or it may remain as liable as ever it was.

Peculiar
change in the
economy of
the part,

With reference to the part: when morbid matter has produced an inflammation, it may be observed, that its actions are altogether peculiar; not only the secretions are so, as is proved in a great number of instances by their power of inoculating others, but the state of the surrounding vessels is also *sui generis* in each, as is evident to the eye, which can at once recognize the kind of inflammation by the form and distribution of the increased vascularity*.

and of the
system at
large.

With reference to the system at large, its nature, like the part itself, seems to be modified by that of the poison, at least in those cases where a violent effort does not take place at once to elimi-

* Can all these variations be explained by simple debility?

nate it; it seems to create a particular diathesis, if I may so express myself, although this change may be long before it shows itself; and when it does so, the phenomena may occur at once and violently, as in hydrophobia and many other cases. This conversion of the constitution, whether it depends upon an alteration wrought in the blood or in the solids, or in both, as is most probable, has a material influence on the processes of inflammation which ensue.

It is not my purpose to go into the consideration of that numerous class of inflammations which arise from the introduction of morbid poisons of whatever kind, save in so far as their primary effects may be severe; but some of the most formidable we have to treat are of this kind. I allude to the phagedæna, which arises from hospital gangrene, lues, &c. &c., to the diffuse inflammation arising from the poison of dead animals, &c., which will be considered under their appropriate heads; in this place it will be sufficient to mention the effects produced by the poison of reptiles, and the introduction of acrid substances into the cellular membrane.

The effect of the introduction of a portion of the poison of a venomous reptile, as for instance a viper, is as follows.

Sudden and great swelling takes place in the part (probably a hand or foot), in the limb, and

Poison of venomous animals.

Symptoms local.

very speedily in the adjacent part of the trunk. The inflammation appears to affect all the tissues, and very notably the cellular membrane; the skin also is much implicated, the cuticle separates in phlyctenæ, and a remarkable tendency to ecchymosis exists, even to a great distance, in that portion of the body which is affected continuously by the poison, probably from the tone of the vessels being much broken down. Nothing can be more formidable in appearance, and sometimes in reality, than this inflammation, although when produced by the viper it does not often prove fatal*. Not unfrequently, however, some portions of the integuments fall into gangrene, especially in the neighbourhood of the bitten part; but in all cases, resolution takes place through a great portion, if the person survives.

General
symptoms.

The affection of the general system so speedily follows the bite as to give great reason for the belief that it does not proceed so much from sympathy with the local disease as from the absorption of the poison. Great depression, tendency to syncope, vertigo, sickness and vomiting of bilious matter, cold sweats, small pulse, and occasionally pain about the navel, are the result, and may increase to a fatal termination, which often occurs in a very short time from the bites of the more

* The danger will depend, *cæt. par.*, upon the vigour of the poisonous animal, and the relative feebleness of the recipient.

venomous serpents; but from that of the viper recovery commonly takes place, and the symptoms begin to subside sooner than might be expected from their severity and the extent of the local disease: they often cease to be formidable within two or three days.

The treatment in these cases consists, 1st. In Treatment. preventing the communication of the poison to the system. 2d. in moderating its local effects by local applications. 3d. In general remedies.

The first object may be attempted either by 1st. By removing or destroying the virus, the immediate excision of the bitten part, by sucking out the virus by the mouth or cupping-glasses, or by its destruction in the wound by caustic; for which purpose M. Boyer, in his *Traité des Maladies Chirurgicales*, has recommended the introduction of some liquid caustic into the orifices so as to convert them into sloughs. He employs the muriate of antimony, sulphuric or nitric acid, inserted into the wounds, on wood properly shaped.

This object may be further attempted by or by arresting its progress. arresting the progress of the virus after it has been absorbed, by the application of bandage or ligature, and it is not deemed necessary for this purpose to intercept the circulation altogether. In cases where ligature is used, a portion only of the virus seems to operate on the nervous system, and its effects may then be successfully combated. Of this mode of treatment, we have an interesting

account by Dr. Butter, in the second volume of the Calcutta Transactions*. The only objection which suggests itself is the increased chance of mortification in the part: it however appears probable, that nature has the power of conquering those poisons which do not destroy the individual too soon, and that, perhaps, in the part as well as in the system.

2d. By moderating its effects by local remedies.

The second object, that of overcoming the local effects by local remedies, is attempted by a practice which has resulted from observation. Certain medicines, especially ammonia combined with olive oil, and employed with friction, appear highly serviceable: the ung. hydrarg. is also an application of considerable efficacy. Indigo and many other applications are recommended.

3d. By supporting the system.

The third purpose is accomplished by supporting the powers and stimulating the nervous system; for this end, ammonia, eau de luce, brandy, mulled wine, laudanum, warmth, frictions, &c. should be employed. Dr. Butter also walks his patients about, as in cases where an overdose of laudanum has been taken, until the patient rallies, and then removes the ligature.

And by specific remedies.

Another plan consists in giving medicines which have some specific quality. The serpentaria has been used with this view; but it probably deserves

to be regarded only in the light of a useful stimulus; the guaco is much spoken of, and arsenic has also been freely exhibited, and, it should appear, with much success: from the accounts we have received it is well deserving a trial.

The stings of hornets, bees, and wasps, never Stings of insects. prove mortal, excepting they are inflicted in a considerable number, in which case I apprehend the general treatment should be of a similar description to that above mentioned, making allowance for the greater degree of pain and irritation, and less depression of the nervous power; laudanum, therefore, is especially necessary. The local treatment is also of the same kind, excepting that we never find persons attempting to destroy the virus in the part; but why this should be omitted I know not, as the consequences are often troublesome, although not serious. Particular individuals are more than others prone to suffer from stings, and in these, even a gnat-bite will occasion extreme inconvenience. I have seen great relief afforded in cases from stings by gently rubbing the part with ung. hydrarg., and applying extensively a lotion with liq. subcarb. ammon. ʒij . aq. ʒvj . to the surrounding parts.

Vegetable Poisons, applied to the surface, rarely From vegetable poisons. produce any thing deserving the name of inflammation, unless they are long kept in contact, as

mustard, horse-radish, garlic, &c.; but this inflammation only affects the surface of the skin, and is, in truth, altogether under our control, so that it may be regarded as a remedial measure alone.

From wine, urine, or other irritating fluids, injected into the cellular membrane.

Both vegetable and animal matters, however, when they come in contact with the skin denuded of cuticle, and more especially with cellular membrane, are capable of bringing on a very destructive inflammation: the most frequent examples which we see of this kind are those urinous abscesses occasioned by a breach in the urethra. I may add those cases which occur of sloughing of the scrotum, from the incautious injection of wine into the cellular membrane during the operation for hydrocele.

Great tendency to produce sphacelus.

The effect of such effusions is to produce inflammation of the cellular membrane, under which it speedily perishes, and then inflammation of the skin, and suppuration of the surrounding cellular membrane are established to give these sloughs vent. I very lately had a case of this kind in the hospital, of a young man, who was brought in with the whole of the scrotum and integuments of the perinæum in a state of sphacelus; they were thrown off, leaving the testes in the tunicae vag., the corpora spong. and cavernosa of the penis, and the extremity of the rectum, exposed as completely as if they had been dissected, these tissues preserving their vitality.

Practically there is no difference in the treatment of these cases, and the carbunculous abscesses which occur in the same situation; in both there are irritating matters, and sloughs beneath the skin, and in both it is the object to give these free and early vent; and I may here observe, that I conceive it to be very possible, that in many of the inflammations of the cellular membrane I now allude to, which terminate in sloughing, that result may partly arise from the excessively *irritating nature of the secretions* poured forth in these particular inflammations, and that *one* use of making early incisions may be to give these secretions vent; and I may adduce in support of this conjecture, the fact, that certainly, in cases of phagedæna, where we can observe the process, the secretions are often so irritating as to produce the death or extended ulceration of the skin.

Treatment analogous to that of carbunculous abscesses.

It does not appear that urine or wine will always produce sphacelus, if they do not remain long in contact with the cellular membrane; and, therefore, it is always an object, when we have reason to believe that they have been effused, to evacuate them as soon as possible.

Mineral Poisons.—The inflammation they produce has little disposition to spread, often the contrary, as is particularly evinced by the effect of nitrate of silver; and, indeed, we often avail our-

selves of this property to *prevent*, by its application, the spreading of other inflammations, and to excite the adhesive inflammation. Many of them produce the death of the part they are applied to, as arsenic, potass, mineral acids, &c., the time required for the process varying, being very short in the latter, longer in the first. The part perishes from the contact of a highly injurious and irritating substance, not merely from the chemical action of that substance, at least so it appears to me. When not very intense, they merely produce inflammation, and in some instances the secretion of pus, as, for example, the tartrite of antimony; in the greater number of cases, however, the tendency of the inflammation is to slough, if the action of the substance is violent.

It is not often that we are called upon to treat cases of this kind, excepting those we have ourselves produced by the application of pure potass, or accidents produced by the concentrated acids, the latter often extensive and formidable; the integuments perish, as they do in cases of burn, sometimes at once, when the chemical agency of the poison *may* have produced the disorganization; at others consecutively, but in the same manner as excessive heat. I believe the treatment adapted to burns is the most suitable for these cases.

SECOND DIVISION.

INFLAMMATION ARISING FROM INTERNAL CAUSES.

HAVING considered the inflammations which owe their origin to causes whose operation we are well able to observe and to appreciate, we are in the next place to proceed to those which arise either from some defect inherent in the part, or some error in the constitution, be that what it may.

Some parts are in particular individuals prone to disease, and the disposition is often inherited from parents; or having once suffered from external causes, they are liable to a recurrence without a repetition of this agency, but simply from an error in health; for in such cases a disordered state of constitution generally brings the disease into action.

Modes in which diseases originate from internal defects.

Spontaneous inflammation, then, may, with much probability, be considered as the result of disordered constitution acting upon parts predisposed towards

Spontaneous inflammation the result of disordered health.

it, from causes of which we are often ignorant, although frequently they are very intelligible.

If this is permanent it constitutes a diathesis.

The state of the constitution may be permanently wrong and peculiar, so as to constitute a diathesis, in which case any inflammation arising spontaneously will be impressed with particular characters, constituting peculiar kinds: in other inflammations, the disordered state of constitution also, as I believe, differs more or less in each species; if otherwise, we should have only one form, as phlegmon, or carbuncle, or erysipelas, &c.; but though peculiar, they are not, as in the former case, permanently so, and the person who now has erysipelas may in a short time have phlegmon.

There appears to be a peculiarity in the state of derangement in each kind of inflammation.

These disordered states of constitution are often owing to specific causes, either of speedy operation, and short duration, as small-pox or measles; or of more protracted duration, as the venereal poison.

It is the object of this work to add, if possible, to the knowledge, and to methodize the application, of the principles of treatment to those of the disease; but first, to consider knowledge derived from experience as paramount; and, in investigating the principles, rather to infer the nature from the result of treatment, than to ground the treatment on the supposed principles of the disease.

But before proceeding to the description of the individual species of inflammations, it may not be amiss to inquire how far it is practicable to *arrange* them in such a manner as to facilitate our endeavours in studying their nature.

Advantages of arrangement in every science. Is it applicable to the present subject?

Principles of Arrangement.

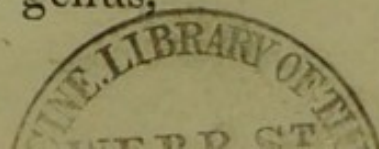
There can be no doubt that where arrangement is possible in any science, it greatly contributes to promote this object, and to enlarge and correct our views respecting it; the question is, how far it is applicable to diseases. I fully concur in the opinion entertained by many eminent pathologists of the present day, that no system of nosology, which ever has been propounded, has in the slightest degree aided the cause of science; on the contrary, diseases of the most opposite character have been, in the best of them, grouped together in a very preposterous manner; it may be, because the subject *never* will admit of classification; it may be, because the attempts have *hitherto* proved abortive.

Nosologies defective.

Nosologists have borrowed from natural history the titles by which they have distinguished their divisions; this of itself is, perhaps, a matter of regret; for the strict adaptation of these to diseases may prove impracticable.

It is, I apprehend, deemed requisite for systematic accuracy that each class, each order, each genus,

Principles of classification.



and each species, should possess certain exclusive characters; while each species possesses those common to its genus, as well as those which are common to all the other genera of its order, and that the orders themselves should possess the peculiarities which distinguish their class from any other: how far it may ever be possible to submit diseases to so strict a test must be still a matter of doubt.

In works treating of inflammation, we find them considered under the heads of Acute, Subacute, and Chronic—as the Adhesive, Suppurative, Ulcerative, and Gangrenous. On these subjects I have already expressed myself. I hardly suppose it necessary to dwell upon the inadequacy of any arrangement founded on these phenomena, more or less common to all.

But there is another, adhered to by pathologists of high talent and reputation, and as it involves important practical considerations, it is necessary to consider it—I mean that first suggested by Dr. Carmichael Smith. It proposes that the essential differences of inflammations depend on the tissue in which they occur, and that their proper arrangement should proceed accordingly.

Without doubt, every tissue in which inflammation takes place has properties which influence its progress; without doubt, also, some tissues are prone to particular modes of inflammation and

exempt from others ; these are important facts, but beyond this it appears to me we cannot safely go, for I think there is not the smallest question that *different kinds* of inflammation are liable to occur in the *same* tissue* ; that the *same* kind of inflammation is met with in *different* tissues† ; nay, more, that the *same* inflammation shall be transferred *from one tissue to another*‡. If the doctrine alluded to were true, then it would be sufficient that any given tissue were inflamed for the nature of the inflammation to be determined ; a position so irreconcilable with facts, that its advocates admit that the cause may modify it ; if it does so, this modification may be so material as to throw the influence of the texture into the back ground, and for this I contend.

Although, however, the principle cannot be conceded, that it is the tissue which determines the nature of the inflammation, still it may be argued that it is better to describe inflammations after some arrangement than wholly without one. For

* In skin we have erysipelas, exanthemata, ecthyma, &c. &c. ; in cellular membrane, phlegmon, boil, carbuncle, erysipelas, &c. ; in mucous membranes, catarrh, croup, aphthæ ; in serous and fibrous membranes there is also a considerable variety, and no part of the body exhibits a greater than the eye in each of its tissues.

† The skin, mucous membranes, periosteum, bone, glands, &c. in syphilis ; almost every structure in scrofula ; in measles, variola, erysipelas, &c. the inflammation often attacks the serous or mucous membranes as well as the skin.

‡ In mumps, &c.

the sake of reference this may be so, and the same observation applies to that method which describes diseases in sections according to the region of the body in which they occur; but by neither are the principles of science advanced, in my belief, in the slightest degree: it remains to be seen whether any other mode is attended with advantage.

Now, although I fully allow that in the present state of our knowledge it were vain to attempt a classification of the whole catalogue of diseases, it is nevertheless true that there are particular departments in which considerable benefit has been derived from rational arrangement, as for instance in those of the skin and eye. In the extensive subject of inflammation generally it may be more difficult, but I was induced to attempt it in the first edition of this work from the persuasion that it might be accomplished on safe and rational principles; these it must now be my business to explain*.

Principles on which this classification is proposed.

It will be found that in all spontaneous inflammations there is an original disposition either to be limited or to spread, and I should therefore divide them into two great *classes* accordingly.

First, the disposition to limit or to spread.

The cause of this phenomena probably depends

* I am happy to see that one of these appears to be admitted, *i. e.* the propriety of dividing inflammations into those which are limited and those which are spreading or diffuse.

upon the power or disposition to effuse organizable lymph, which appears to be the mode by which nature repairs any injury and arrests the progress of inflammation. If this exist in a sufficient degree, the inflammation will be limited; if the contrary, it will spread.

And the danger of the disease being in proportion to the disposition to spread, *cæt. par.*, more constitutional sympathy will be produced; and sympathetic fever so excited will, from exceeding certain bounds, tend to augment rather than lessen the mischief.

This disposition to spread, as I have stated above, is original in spontaneous inflammations; but it is often much connected with the nature of the part, as in membranous surfaces, and *in this case* is by no means invariably connected with a defective power of effusing lymph. In accidental inflammations it is often owing to the nature of the cause, as from poison. It commonly, however, proceeds from the peculiar unhealthy state of constitution, and therefore it will be found has, or ought to have, a material influence on the principles on which we treat them*.

* If it be said that it would be as well to designate inflammations by the old titles sthenic or asthenic, or by the terms phlegmonous and erysipelatous, it would not be difficult to show that either of these are objectionable. The terms sthenic and asthenic might probably be employed with reference to internal inflammations without any obvious disadvantage, but a system to be tolerably perfect should

Secondly, the disposition to particular terminations.

There is another circumstance, which to me appears to constitute an important feature in most, perhaps in all, inflammations, namely, the disposition to a particular mode of termination: thus in mumps it is to resolution, in croup and iritis to adhesion, in boil and whitlow to suppuration, in carbuncle, &c. to sphacelus; and this disposition is so strong, that it is difficult to procure any other termination. There are some in which the disposition is to a *two-fold* mode, as in erysipelas

apply generally. Now if we were to apply these designations to external inflammations, we should often find ourselves involved in difficulties, which in their consequences amount to more than technical errors; for example, in classing erysipelas, can it be considered as an inflammation of the sthenic type? is it not often the reverse? can we class it as asthenic? would it not lead to a very erroneous consideration of the purer kinds of E. phlegmonodes? Many other examples might be cited; but by taking the disposition to limit or to spread, as the leading features of distinction, we do not imply the necessity of treating them sthenically or asthenically, we merely recognize a prominent character which ought to have a material influence on our conduct. The objections to employ the terms phlegmonous and erysipelalous are not less weighty; as phlegmon and erysipelas are names now given to definite forms of disease, we naturally connect the idea communicated by the adjective phlegmonous with the disease entitled phlegmon, and so of erysipelalous; now if we were to include all the inflammations whose disposition it is to be limited under the former designation, we should ally with phlegmon those which are exceedingly dissimilar in nature; as for instance, mumps and carbuncle; and, in the same way, if we called all those inflammations erysipelalous whose disposition it is to spread, we should confound together many species equally dissimilar; while by adopting the division mentioned, we do not involve ourselves in any false analogy with particular inflammations.

phlegmonodes both to suppurate and to slough ; or to *either of two modes*, as in phlegmon to suppurate or to resolve. According to their characters in this respect, I should subdivide inflammations, and for want of another term should adopt that of genera, as applied to these.

Again, there is a point which deserves attention : it is the degree of sympathy which is produced by the quality of the organ or part attacked, which, *cæt. par.*, is much greater and more formidable when they are *vital*, or when their functions, without being so, are of *great importance* to the individual, as for instance, the eye, joints, &c. Perhaps the divisions so constituted would be more arbitrary than the two former ; nevertheless, I should think it might not be either inconvenient or objectionable to form the orders on this principle.

Thirdly, the nature of the organ or part affected.

According to this plan, I shall in the first place proceed to speak of the class of Limited Inflammations, and the Inflammation of Vital Organs will constitute the first order of this class. But as these rather belong to that department which I do not profess to treat on particularly, I shall confine myself to a few general observations, which relate either to the nature of the organ affected, or the cause which has produced the inflammation.

CLASS I.

LIMITED INFLAMMATIONS.

ORDER I.—*Inflammation of Vital Organs.*

First division
of vital
organs.

Nature of the Organs.—Vital organs are the viscera of the head, thorax, and abdomen. The functions of some of these are more immediately connected with the support of life than of others; and when the former are concerned, the sympathy of the whole system will be more remarkable; such are the stomach, small intestines, brain, and the heart. This sympathy is often attended with singular depression of the nervous powers, and weakness or irregularity of vascular action; so much so, indeed, as to lead to very erroneous ideas respecting the nature of the malady, unless this matter be well understood.

Second and
third divi-
sions.

The lungs*, liver, and kidneys, perform offices on which life also depends; but although the interruption of these will, sooner or later, be followed

* From the lungs being double, there is a provision which renders life compatible with very severe affection of a portion of them.

by death, this consequence is not so immediate, nor are the attendant symptoms so urgent. This is still more the case with the pancreas, spleen, bladder, and uterus*.

Inflammation affecting *serous membranes*, however it may originate, is highly dangerous, because it surrounds all the viscera, and there is always more or less disposition to communicate it to them, and hence it produces a great alarm in the constitution; because also it has, from its affecting a surface, and more particularly from the nature of that surface, a strong disposition to spread; and because all the results of inflammation, except resolution, must be productive of consequences injurious to the functions of the organs they envelop, even in the most favourable case, that of adhesion; and destructive generally in the others, *i. e.* where they occasion sphacelus, or even suppuration.

Why inflammation is so apt to spread on serous membranes, and why it is so serious in its consequences.

Mucous membranes are not, in themselves, vital organs, but frequently become so from their relations. Some are situated externally, as on the eye, glans penis, &c.; many others may, without any great violence, be considered as external, as the membrane which lines the fauces, nares, œsophagus, and even the bronchiæ, being constantly exposed to the external air.

How far mucous membranes situated in the interior of the body may be regarded as external surfaces.

Where the mucous membranes are covered with

* The latter, however, most commonly inflames under circumstances which give peculiar effect to that inflammation.

an epidermis, or simply secrete mucus to guard themselves and the organs they cover from any irritating impression, their properties bear a near resemblance to those of parts which apparently, but perhaps not more strictly, form a portion of the surface; but, when they become organs for the purpose of producing peculiar secretions, the case is altered, and in the stomach and intestines they may be considered vital.

Important consequences arising from their disposition to secrete when inflamed.

But the nature of their functions, even in this case, produces a wide difference in the progress, character, and treatment of the inflammations which affect them, for they are all naturally disposed to secrete, and when the secreting process is established, inflammation is peculiarly relieved by it.

When the inflammation is carried to excess, they may throw out lymph, or slough; it may also be their peculiar disposition to ulcerate or slough.

Differences where they effuse lymph, or when the subjacent tissues are affected.

Where it is their original disposition to effuse lymph, as in the eustachian tube, larynx, or trachea, there will be found a remarkable similarity between the character of the constitutional affection, and that which obtains where lymph is effused under any other circumstances; it may also be observed, that when the inflammatory action is extended from a mucous surface to the subjacent tissues, a similar difference in the affection of the system may be observed; as in bronchitis, and en-

teritis, when compared with catarrhal inflammations of these respective parts.

The practical inferences to be deduced from the knowledge of the disposition of inflammations are exceedingly important: for example, in such structures as these we have now been considering, if we have reason to believe that they will terminate by secretion, and that secretion will not, from its situation, confinement, or irritation, prove particularly injurious, we are less anxious to arrest its progress by bleeding, which, indeed, might defeat the curative processes of nature, in some cases, and protract the disease; or might cause the secretions to become too copious from want of tone. But where the tendency is to destroy the organization of a part of importance, we cannot use too active endeavours to check it; and as if conscious of the difference, the constitution is tranquillized, and its state improved, in the latter instance, by the same means which would have rendered it more unfavourable in the former.

Practical inferences.

CAUSES WHICH PRODUCE INFLAMMATION IN VITAL ORGANS.

They may be arranged under the following heads: 1st. External injury; 2d. Changes of temperature; 3d. The suppression of some disease or

Causes of inflammation of vital organs divided under five heads.

wonted discharge; the repulsion of eruptions, or some specific diathesis, as gout, rheumatism, &c.; 4th. The introduction of some morbid poison, as of typhus, measles, &c.; 5th. The mechanical irritation of some other disease, as of tubercles, calculus, &c.

The consequences which arise from a wound not directly referable to the admission of air.

1st. When vital organs inflame from *external injury*, it is generally implied that the cavity which contains them has been opened; and, whether the viscera have been wounded or not, inflammation will probably take place in the serous membrane. This, and the very mischievous consequences which often follow, have been ascribed to the admission of air; but the opinion is rendered doubtful by the same arguments which have been already stated in speaking of compound fracture, and there is one accident which particularly seems to disprove it: the lungs and pleura are often wounded by a broken rib, and air expelled in large quantities into the thorax, and this under circumstances of great irritation; yet there is no comparison between the danger of a wound, thus inflicted, and of one *from without*, although all circumstances are the same as far as the *air* is concerned.

Mr. Hunter's opinion doubtful.

Mr. Hunter explained the rapid, severe, and general inflammation which occurs from a wound of a cavity, by referring it to the stimulus of imperfection, on the supposition that the general dis-

position to inflame arises from the cavity being rendered imperfect in a part. To this the following objections may be made :

1st. If the cavity is rendered imperfect by a cause, acting from within, as from the point of a broken rib, an equal disposition is not excited, as from a wound through the skin, although the imperfection is of the same kind ; 2d. In the case of paracentesis, the peritonæum rarely inflames, although it is rendered imperfect ; 3d. Although it is not rendered imperfect by strangulated intestine, yet inflammation is greatly disposed to spread over this membrane ; 4th. If the state of contact between the viscera and peritonæum be considered, it is not easy to conceive how any *cavity* exists to be rendered imperfect by a wound in any part of that membrane*.

But whether a membrane inflames from the contact of air, the stimulus of imperfection, or the extension of the disposition from the wound in the skin, over a surface which readily and rapidly participates in an affection of any part of it, and with such rapidity, indeed, that it may easily be supposed that before adhesions form in one part, the disposition has been propagated further when it is

The usual effects of the adhesive process defeated by the remarkable rapidity with which inflammation spreads over serous membranes, and the constitutional sympathy is great in proportion.

* It might, 5thly, be added, that when a synovial membrane is wounded, as in dislocation, without an external wound, although the cavity, as it is termed, of the joint is rendered very imperfect, the consequences are seldom important.

active (and hence the benefit generally obtained from the adhesive process is lost): whether this be so or not, the consequence is, that the system sympathizes intensely, and the effect of this sympathy is to increase the mischief.

Great difference in the severity of inflammations of vital organs from wounds, and from other causes.

There is a remarkable difference between the severity of inflammation in vital organs as produced by wounds, or from other causes, even although the constitution in the former case shall be more healthy than in the latter. This may, perhaps, be accounted for in the following way:

Attempt to explain this.

In spontaneous inflammations it is not *necessary* that effusion of any kind should take place; and, therefore, it often happens that the inflammation resolves without any: at all events this takes place reluctantly, and *gives time* for the interference of medical assistance to prevent it. But when a wound has been inflicted, the injury *cannot* be repaired without effusion; and if that disposition once extends beyond the edges of the wound, it will, perhaps, pass over the whole surface; the consequence will be, that the general sympathy will be great in proportion, as even lymph effused will tend to impair the functions of the part; and from the intensity of the sympathy, the inflammation in its turn will be increased, and lead to the fatal consequences we often witness.

Treatment.

With regard to the treatment of these cases, there is a better chance of preventing the mischief

than of curing it; and there is a better chance of curing it before much sympathy of the system has been excited than afterwards.

Where nature is herself capable of curing disease, we should do well to observe her processes, and to imitate them, for she is not to be thwarted but obeyed*. If a man receives a wound in a vital part, we observe that he drops in general, and there he would lie, perhaps, in a state of inaction, and under the influence of privation, if he were not removed. The wounded soldier does often remain in such a predicament, without help, but without the stimulus of warmth, or of food, and the processes which are immediately consequent on the wound are not defeated by these causes and by being moved prematurely: while his comrades carried to a crowded house or hospital, very

Remarks on
the principle
of treatment.

* Those who utterly deride the *vis medicatrix* will view such reason with contempt; but I confess, when I observe that the whole structure and economy of every animal is most admirably calculated to contribute to the perfect enjoyment of health, I cannot but believe that as accident and disease must be unavoidable, that they are also so constituted as to repair the one and resist the other; neither do any of the phenomena of disease I have yet seen give me any reason to doubt this. It does not follow, that the attempt is not made because it does not succeed; such an inference would not for a moment be admitted in any human affairs, and as man and other animals are constituted for a certain period of existence, they are endowed with such powers as will preserve them through the average share of injuries, to which from any cause they are exposed; a fact not to be denied, however the cause may be doubted.

frequently die. As syncope from hæmorrhage, though alarming as a symptom, is beneficial as a process; so the sudden and entire loss of power which often follows a wound in a vital part may contribute greatly to prevent mischief by *the contraction of vessels it occasions*, and its incapacitating the individual from moving or procuring food.

The mode of treatment of these cases enforced by medical officers of the first ability accords entirely with these principles, and there can be no further inference deduced from them, than that it is of particular consequence, *if possible*, to insist upon an entire negation of stimulus and motion for a considerable period after the injury, for the first forty-eight hours especially*.

* When vital organs are wounded, the plan is to *prevent* inflammation by entire rest, the avoidance of all stimuli, and taking blood largely.

If inflammation does come on, the treatment is by bleeding largely and repeatedly until it is reduced, assisted by entire rest, the avoidance of all stimuli, and the use of gentle and continued laxatives of neutral salts with subacid drinks, often by the use of tart. antim. in doses not likely to vomit.

When the excitability of the system is great, opium cautiously used and suitably guarded may, in the progress of the disease, be advisable. There are circumstances belonging to each vital organ which demand some peculiarity of treatment, and, therefore, I would rather refer to the works of Guthrie, Hennen, Thompson, Cooper, and other authors, than enter into a particular disquisition at length here.

2d. Sudden *change of temperature* very frequently proves a cause of inflammation of vital organs. This species of inflammation resembles that from external violence in one respect, *i.e.* in not depending of necessity on any preceding error in the constitution; a fact of some importance with reference to treatment.

Inflammation arising from sudden changes of temperature does not of necessity presuppose any disorder of the constitution. Inference with regard to treatment.

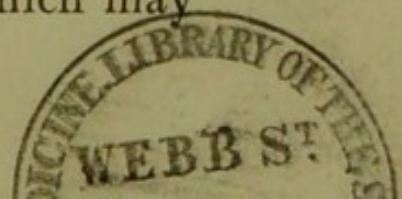
3d. Various degrees and kinds of disorder of internal organs are frequently relieved by the occurrence of external inflammation in the shape of gout, rheumatism, erysipelas, eruptions, or by a discharge from some surface, which being repelled or suddenly stopped, the original disease recurs, or internal inflammation ensues.

From the repulsion of external inflammation or the cessation of disease.

When inflammation arises *from any such cause*, it presupposes a disordered state of constitution: it is never of so pure a kind as it may be from injury or sudden change of temperature, and this requires consideration in the treatment, as an unsound condition of the vital, particularly of the digestive organs will often render a considerable difference in the plan necessary. The reproduction of the original disease, if possible, or the substitution of another by blisters, sinapisms, &c. is also a principal indication.

4th. Inflammation is also frequently produced by the *introduction of morbid poisons*, which may

From morbid poisons.



either attack external parts or vital organs; may vary from acute to chronic. In these cases there is invariably a considerable degree of disorder superadded to the common effects of inflammatory action; in some, this may be sufficient to give that type to the fever and inflammation which is denominated asthenic, which may either arise from the previous state of the system or condition of the patient, and, perhaps, causes the difference between distinct and confluent small-pox, measles of a good or bad kind, scarlatina simplex or maligna, and so on; or of the poison itself, as of plague, typhus, &c. Those inflammations of vital organs, whose type is commonly called sthenic, I should venture to class with this division; while the asthenic I should refer to the second, as more analogous with those of external parts whose disposition it is to spread. But for reasons before assigned, I do not propose to enter into any particular descriptions of inflammations of vital organs.

From the
mechanical
irritation of
other diseases.

5th. The mechanical irritation of calculus in the alimentary or urinary tubes, or of tubercles in the viscera, give rise often to inflammation, frequently incurable from the nature of the cause; and possessing peculiar character from the obstructions they produce, or the diseased state of constitution which accompanies them.

ORDER II.—*Inflammation of Parts of great but not vital Importance.*

Although the safety of the whole may not be immediately affected, indeed, if not at all compromised by the seat of the inflammation; yet if it be in an organ whose integrity is of great consequence to the perfect possession of all the faculties and functions of the individual, we shall find that it is connected with the vital organs by a very close sympathy: that great precautions are employed to guard it from injurious impressions, and great efforts are made to repair it when injured. Inflammations of the joints, the eyes, and the testicles, afford the most striking proofs of these facts. From this circumstance we find it necessary in the treatment, to proceed with a degree of energy not much inferior to that which would have been required if the organ had been vital; perhaps the inflammation in either case may require equal means to control it, and, in the case of joints, it may, and often does, endanger life; in the others we are contending for a less stake, but always one of great consequence.

Inflammation of Joints.—This may proceed either from wounds or from constitutional dis-

Intermediate
between those
in vital
organs and
common
parts.

From wounds
particularly
severe. Why?

order, excited probably by some external violence or cold. That which arises from *wound* is infinitely the most severe.

The great severity of inflammation from wounds may, perhaps, be accounted for, not only from the importance of these parts, but from circumstances belonging to their structure and functions, which render the processes of cure particularly difficult.

The repair of ordinary wounds is effected by the effusion and organization of lymph; but if this were the usual consequence of inflammation in joints, ankylosis would be the result by which their function would be destroyed, and for this reason, probably, they are little prone to effuse it, certainly in common inflammation. Again, if they do so when wounded, the copious secretion of synovia will tend to wash it away, and not only so, but by distending the capsule, when the opening is not so large as to allow its escape, prevent that contact which is also very essential to union. By all these causes the attempts to repair are rendered in a considerable degree fruitless; but the efforts of the system are increased in proportion to the difficulty of repair and the necessity of the case, and hence the intense character of inflammation after wounds of articulations. The cure is commonly at length accomplished by granulation, but much, if not entirely, at the expense of the functions of the joint. Joints, too, are, *par excellence*,

movable ; but motion in inflamed parts is highly injurious, hence we have a similar cause acting to defeat the end of inflammatory actions, as in the lungs, larynx, &c. * ; and it is very difficult to control this altogether, for an apparatus, without the greatest care, may be displaced, and a momentary error lead to permanent mischief. It is from this cause, perhaps, that joints with flat surfaces suffer so much less than others when inflamed.

The most exquisite cases of inflammation of joints occur from wounds, partly perhaps from the causes now stated, but always aggravated when laceration exists ; also by the presence of foreign bodies ; a rough surface presented to the irritable synovial membrane ; and by an unsound state of the constitution. The picture of these cases, drawn by Mr. Guthrie and Dr. Hennen, is not overcharged ; and to their pages I should refer for the most valuable information on this subject generally. In civil life, wounds of the joints are however but too common : on this subject Sir A. Cooper has, under the head of compound fracture, and dislocation of the ankle joint, collected a great mass

* I cannot help offering a conjecture, that the same cause accounts for a phenomenon often observed, namely, that in inflammation of the pericardium, adhesion is often defeated, though constant endeavours may be made to procure it, evinced by the enormous quantities of lymph often thrown out.

of valuable information, and has, perhaps, as far as may be practicable, laid down, with reference to this accident, the rules of conduct with respect to amputation; in this particular, however, surgeons in the metropolis, and in the country, will find it necessary to make considerable allowances for the different results which might be expected in similar cases, and which differ to a degree scarcely to be imagined. The work to which I have referred contains copious reports from both.

Usual terminations of inflammations also denied in spontaneous inflammations.

When joints are not opened, the *usual* terminations of inflammation are denied to them; for, as it has been stated by Mr. Hunter, canals and open cavities are disposed to pour out secretions, but shut cavities to effuse lymph; in the present instance, however, it is the natural disposition to pour forth secretions, *i. e.* synovia; and it is only under a very severe or long continued inflammation that an unopened joint throws out lymph, and when it does, from the causes above assigned, the objects of this process cannot be attained until an opening has taken place in consequence of the disease, or by art.

Illustration of the principle that the sympathetic effect on the constitution is in proportion to the importance of the disease, derived from

From these various circumstances arise the peculiar characters of inflammations of joints, which principally consist in their disposition to continue for a length of time, and if severe, in inducing great constitutional sympathy. I may observe, in

this place, that they afford an excellent illustration of the principle, that the degree of this sympathy is in proportion to the importance of the part. Thus the effect produced on the constitution by disease of the hip is far greater than that of the ankle, although the extent of surface in these several joints does not greatly differ, and although the distance from the centre would give an unfavourable disposition to the latter; but then the whole lower extremity is dependent upon the hip-joint, the foot only on the ankle. In fact, it cannot be too strongly enforced, that the sympathy of the system is by no means in proportion to the size of the part affected.

the phenomena of these inflammations.

On the management of joint diseases little remains to be said, the profession are now so well informed on the subject, greatly owing to the labours of Mr. Brodie; for it is by discriminating the particular nature of each case only that we can arrive at any certain principles of conduct; and for the power of establishing such discrimination, and of determining the nature of the remedies appropriate to each, we are chiefly indebted to him.

General remarks on treatment.

In inflammation of *joints, from wounds*, the principles of treatment appear to be briefly these: perfect quietude; cool air; ample depletion, local and general; the energetic application of cold;

In cases of wound.

the lowest possible diet; gentle saline laxatives with antimonials; and opium, if necessary. Poultices and fomentations should be carefully avoided in the beginning, and, indeed, in a great number of cases throughout.

In other cases.

In *spontaneous inflammation of joints*, perfect quietude; local depletion; evaporating poultices; mild, unirritating, but nutritive diet; attention to restore the healthy action of the digestive organs, and the secretions from the skin; colchicum, calomel and opium, to relieve pain; and counter-irritation by blisters, first at a distance, then in the neighbourhood of the joint, followed up with great activity as soon as the symptoms cease to be acute.

Inflammations of the Eye.

Speaking generally, we are warranted, I think, in separating inflammations of these organs from those of common parts; but in its slighter forms such a distinction is hardly necessary.

The eye consists of a number of distinct structures, each of which has its peculiar properties and functions, and when implicated in inflammation, gives rise to a peculiarity of symptoms. It is also liable to the influence of causes proper to itself, and to suffer from constitutional disorder of

various kinds; from these circumstances a great variety occurs in the nature of the inflammations which affect it, which have received their full share of consideration in the writings and practice of modern surgeons.

The general principles of inflammation, which it has been my endeavour to support, will, I think, find strong confirmation in the phenomena which the inflammations of these organs exhibit. In the first place, it is perfectly well known, that when ulceration, abscess, or sphacelus, are spreading on the cornea, still more in the globe, the constitutional sympathy is far greater than when the mischief is arrested by the effusion of organizable lymph, and that if this can be procured by the use of arg. nitrat. remarkable relief is obtained with respect to the general symptoms, while, on the other hand, those remedies which will correct, subdue, or change the state of the system will influence the progress of the disease in a manner no less remarkable; and as these are processes which we can actually observe and watch, as much as if they were experiments contrived in the most delicate manner, they possess particular value. In the second place, this sympathy is much less when the conjunctiva or integument of the eye is alone concerned, than when the more essential parts are so, and there is risk of disorganization. And in the third place, it may be noticed that each

Particularly
capable of
illustrating
the general
principles of
inflammation.

Limited inflammations.

kind of inflammation of the eye has its own peculiar disposition to terminate in one mode or another; in some this is effusion of puriform mucus; in others, in vesicle and ulceration; in others, in adhesion or abscess; in others, in sphaecelus; and in others again, to persist *merely* as inflammation.

ORDER II.—*Inflammation of the Testis.*

Inflammation of this gland may be highly acute, subacute, or chronic.

CAUSES.

Acute Inflammation.—The acute inflammation may arise from gonorrhœa, blow, the translation of mumps; from rheumatism, gout, or scrofula.

LOCAL SYMPTOMS.

The gland generally enlarges rapidly, distends its tunics, often to the utmost extent they will allow, and becomes excessively large, heavy, and tender, with heat and redness of the scrotum; there is great dragging of the chord, which also enlarges; pain in the loins; nausea, or vomiting, from nervous connexion, and colicky pains of the bowels, simulating inflammation. The severity of the symptoms partly arises from the great sensibility of the gland, its nervous connexions, and numerous sympathies, partly from the pressure of its dense coats, partly from its depending position.

It has less disposition to terminate in suppuration, commonly speaking, than any other gland in the body, except perhaps the salivary. Its disposition is to resolve, but in many instances the lymph is not completely absorbed, and indurations remain, especially of the epididymis. The exception to the remark above made applies to the scrofulous inflammation, in which suppuration is a frequent result, and when a venereal taint is added to a scrofulous diathesis this is more particularly the case.

Limited inflammations.
TERMINATIONS.

The constitutional symptoms in the more acute cases are often intense, and I have seen the fever as high, and the affection of the system as severe, from inflammation of this gland, as from any species of inflammation I ever witnessed; the depression, faintness, and sickness completely subduing the individual; the pain in the head intense; and had not the cause been known, the patient's life must have been concluded in imminent danger. I have seen it, like other very intense inflammations, induce a complete jaundice in a very short time.

Constitutional symptoms.

With respect to the treatment, it must depend upon the cause and the degree of the inflammation.

TREATMENT.

In every case local bleeding is highly useful, by leeches, or from the veins of the scrotum, and repeated according to the occasion; in every case, also, the gland should be completely and easily supported in the horizontal position, but the pro-

LOCAL.

Limited in-
flammations.

priety of the other applications depends upon circumstances. In cases arising from gonorrhœa, bread and water poultices, either alone or to which the superacetate of lead has been added, perhaps with a little vinegar or spirit, are often very serviceable; but they sometimes are most benefited by cold applications, at others, on the contrary, by warm fomentations. In inflammation from blows (often very severe) the same treatment may be required, and it is hard to say, *a priori*, whether the hot or cold applications will succeed best, but in most, I am apt to believe that fomentations are preferable*. Acute inflammation of the testis, however, arising from mumps, rheumatism, gout, or scrofula, require a treatment varying according to the cause; in the three former I cannot conceive it to be right ever to use cold applications; in the latter I believe they are preferable, because in this, as in all scrofulous inflammations, there is a great tendency to suppurate, and if that event occurs it often spoils the gland.

GENERAL.

In the acute stage of inflamed testis, from gonorrhœa or blow, the general treatment is most

* I may here observe that when we know the disposition of any inflammation to be resolution, we can have no reason for avoiding the use of hot fomentations and poultices; on the contrary, they are often peculiarly proper, and *vice versa*; hence the great importance of studying the disposition of particular inflammations to particular terminations.

essential; venesection is often imperatively called for, and the patient obtains no relief until it has been freely performed. Calomel is also to be given, combined with opium, and it is useful to affect the mouth; the nausea and vomiting may forbid the use of antimony, if not, the tartrite will be very serviceable.

Limited inflammation.

Inflammation of this gland from scrofula is rarely so severe as to require general blood-letting, but calomel is in many cases useful. That form which occurs in mumps, as far as I have known, subsides with little trouble; those from gout or rheumatism, which occur but seldom, may be benefited by colchicum, and these are not apt to leave indurations.

It is an object to pursue the measures employed so as to obtain a perfect resolution of the inflammation, otherwise it may long persist in a subacute state; it may suppurate where there is a scrofulous diathesis; or indurations may remain, which commonly affect the epididymis, and which are seldom of bad consequence when gonorrhœa has been the cause, but I believe not unfrequently prove the foundation of more serious disease when blows have been.

Consequences if not completely subdued.

Subacute Inflammation.—When the inflammation is found to persist in the subacute degree, or when subacute inflammation of the testis arises

Limited inflammation.

from any cause, some modification of the treatment is required.

Inflammation of the testis may be originally produced in the subacute state by irritation of the urethra, scrofula, or venereal disease, perhaps from other causes, as a disordered state of health, which, at all events, it has the effect of deranging.

If acute inflammation of the urethra will occasion exquisitely acute inflammation of the testis, subacute inflammation of the same canal is often the cause of subacute or chronic inflammation of this gland. However it be produced, it has some tendency to suppuration, but rarely till after a considerable time. When disease of the urethra has produced it, the removal of the cause very often will cure, and the prudent use of the bougie is found very serviceable.

In the greater number of cases of subacute inflammation of this gland, be the cause what it may, the employment of mercury, and a horizontal position, with leeches and other remedies, as enforced by Sir A. Cooper, are exceedingly beneficial; and scrofulous cases, in many instances, are found to be no exception to this observation, although where the health is very irritable, and other scrofulous affections prevail, it may be prudent to avoid it, or employ it with great caution*.

* The patient is to be kept in a strictly horizontal position, and the part carefully suspended; leeches should be applied twice a week,

The testicle is rarely diseased from the effects of venereal poison in a healthy constitution; but this more frequently arises from the irregular forms of the disease occurring in scrofulous constitutions, or where mercury has been injuriously employed: there are generally other symptoms present, but very irregular in their character. If there is strength of constitution, a judicious employment of mercury combined with sarsaparilla and proper diet will generally succeed; if it has been much shattered, probably it will not be safe to carry the use of that medicine beyond simple friction on the part*.

Limited inflammations.
Cases arising from venereal taint.

the part fomented thrice daily, and a lotion used with liq. ammon. acet. \mathfrak{z} v., sp. vin. \mathfrak{z} i., or equal parts of mist. camphor. and vinegar.

Calomel and opium, in the proportion of three parts of the former to one of the latter, should be given night and morning to affect the mouth, which should be kept sore for a considerable time (Sir A. Cooper says a month), and the cathartic mixture given every fourth morning.

Such in brief are the directions given by Sir A. Cooper, and with such allowances as circumstances may demand, I believe they will be found admirably calculated to obtain the object proposed. I may, however, mention that it accords with the experience of many surgeons, that the application of the ung. hydrarg. on the part is often highly beneficial; and in obstinate cases of a more chronic character, blistering the scrotum and applying a mixture of the mercurial and iodine ointment has frequently the best effect; and as an internal remedy, I believe that conium also will often be serviceable.

* There is a mode of subacute inflammation of the testis, for the discrimination of which we are indebted to Sir A. Cooper; it is the irritative. It seems to depend chiefly upon an inordinate degree of sensibility of the nerves, and occasions extreme distress and pain,

Irritative inflammation.

Limited inflammation.

Of the sequelæ of inflammation of the testis it may be right to say a few words: there are induration, suppuration and its consequences, and wasting.

Treatment of induration.

The treatment of induration, when it exists to any extent, is that of subacute inflammation: when it is slight, its dispersion may be attempted by mercurial or iodine friction, or the application of a mercurial plaster, and the part should be carefully suspended. It often continues indefinitely without any harm.

Of suppuration.

When the testis suppurates, it is advisable to let out the matter early, so as to save the gland as much as possible from being spoiled; and not to make a very large opening, to prevent the risk of fungus.

Of fungus.

* Fungus often follows the suppurative process, it also, according to Mr. Lawrence, frequently ori-

while the vascular actions are by no means considerably excited, and there is no disposition to suppuration; it appears much to depend upon the state of the health, and to be more amenable to general than to local remedies. Sir A. Cooper recommends alteratives, namely, the oxymuriate of mercury, in small doses, with sarsaparilla; tonics, such as quinine, steel, or arsenic, and locally a belladonna plaster, the groin being blistered, or leeches, and cold. Attention to regimen and change of air are often beneficial.

It is easily distinguished by the extreme tenderness as contrasted with ordinary subacute or chronic inflammation, while the small degree of vascular excitement establishes the difference between it and the more acute species.

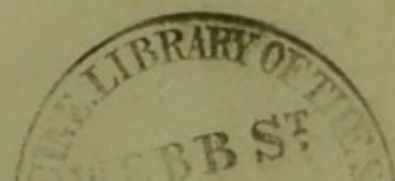
* The granular swelling of Sir A. Cooper.

ginates in a chronic disease of the body of the gland; but however it may be produced, it proves more or less destructive of the proper tissues of the organ, but it is not in itself a malignant disease, on the contrary, it is curable. Limited inflammation.

The mode of cure consists either in destroying it to a level with the scrotum by escharotics, removing it by the knife, or by ligature, and the last appears to be the most painful and most objectionable mode; the plan by excision the most effectual and speedy: pressure should be afterwards maintained, as in cases of hernia cerebri, to prevent subsequent protrusion.

Sinuses may also result from suppuration of the testis, and are most commonly connected with the epididymis, when so, they may remain open an indefinite length of time—for life, probably; and it often happens that the proper secretion of the gland is discharged from them. Sir A. Cooper recommends, when this is the case, that the vas deferens should be divided, or a seton passed to produce its obliteration; in other cases, injections of sulphate of copper, argentum nitratum, or sublimate, may be tried to cure them. Of sinuses.

The inflammatory affections of the testicle are liable to be confounded with other diseases occurring in these parts, and therefore it is essentially necessary that the latter should be thoroughly understood as well as the former: it would be Many diseases liable to be confounded with inflammatory affections of the testis.



Limited inflammations.

foreign to the purpose of this work to enter upon such a subject, and I must therefore refer to the works of Sir A. Cooper and the lectures of Mr. Brodie, for the most satisfactory information on this head.

WASTING.

I must however remark, that there is one consequence of inflammatory, or otherwise diseased action of the testis, namely, that it occasionally produces the wasting of the part; sometimes both suffer in this way, sometimes only one, and it often happens that while one enlarges, another shrinks perhaps to a bud, and yet this is as hard and more painful than the other. The process is not singular, for other glandular bodies, as the liver and the kidneys, are also found to waste as well as to enlarge from disease.

ORDER III. *Inflammation of Parts of Secondary Importance.*

GENUS I.—*Disposition to Resolve or to Suppurate, but especially to Resolve.*

SPEC. I. *Inflammation of Lymphatic Glands.*

—Inflammation of the lymphatic glands often takes place, especially in the groin, sometimes the inguinal, sometimes the external iliac being the seat of the disease, with characters peculiar to

itself. The inflammation is not so acute or prompt as in phlegmon, and has not by any means so decided a disposition to suppurate.

Limited inflammations.

It occurs in young men generally, of irritable, susceptible, and delicate habit, under the influence of constitutional disorder, by whatever cause induced, but generally from late and irregular hours, the use of too much fermented liquor and stimulating food, combined, perhaps, with over-exertion. To its production an irritable state of the urethra often contributes; and it may always be justly suspected, as this frequently suffices of itself to occasion it: I am well satisfied, however, that it often occurs without it; indeed I have met with instances in females.

Predisposition and causes.

In the first attack there is a good deal of pain, tenderness, and stiffness about one or more of the glands, which are enlarged; this state, however, has a tendency rather to subside than increase, if not irritated, and will often resolve in a few weeks, or even days, with proper care; or the swelling may continue in an indolent state; or gradually advance to suppuration.

SYMPTOMS.

If suppuration takes place, it is often attended with considerable pain; the pus has not the seropurulent character of scrofula, neither is the sore reluctant to heal, as in that state of the system.

Characters not those of scrofula.

Constitutional disorder, marked by much de-

Limited inflammations.

rangement of the digestive organs, precedes and generally accompanies this disease; and upon its removal the cure greatly depends.

TREATMENT.

The means chiefly to be relied on in the treatment are, regular and light meals, at regular and early hours; the avoidance of fermented liquors, or merely taking a little white wine in soda water at dinner; going to a pure air, and using as much exercise in an open carriage, or even on horseback, as may be taken without decided prejudice to the local disease, when these means are attainable. At the same time such medicines should be employed as will excite secretions from the alimentary system generally and produce a regular discharge from the bowels. The warm or tepid bath is also serviceable.

CONSTITUTIONAL.

LOCAL.

To the part a tepid lotion with superacetate of lead, applied by means of rag or poultice, or the liq. ammon. acetat. diluted, are useful applications; but in the commencement I have seen it rapidly subside under simple warm poultices, changed every hour. Leeches sometimes are of use in the commencement, but not unless in considerable number; and great care should be taken to remove the blood which crusts on the surface; the irritation of this, and of the bites, will often do more harm than the bleeding good.

When the actions are become more feeble, a

gum plaster, the emp. hyd. cum conio, or the sea-water poultice, will contribute to disperse the swelling, or with the same intention a blister may be applied over it. Limited inflammation.

If they proceed to suppurate, this must be promoted by all suitable means, to expedite the cure; and when that process is fully established, I believe it will be found, that the patient will recover sooner if a *free* incision be made, than if it is allowed to break.

When it is connected with disease of the urethra, it is in most cases desirable to remove that by the gentle use of the bougie; indeed it is often impossible to get rid of this disease on any other terms.

With due attention these cases can never be mistaken for buboes from venereal infection, and it would be a great reproach that they should be. Swellings of these glands sometimes arise from irritation of the lymphatics about the foot or leg, and this should be inquired into; such enlargements subside readily enough in most cases. DIAGNOSIS.

SPEC. II. *Inflammation of Salivary Glands.*— Character.
There is another glandular inflammation which requires to be noticed, namely, PAROTIDÆA; in this case it is a salivary gland which is affected, and the inflammation is of a specific nature, communi-

Limited in-
flammations.

cated by infection, with the remarkable circumstance, that as it declines in this gland, it is commonly translated to others of a different nature, and singularly enough to those connected with the generative system, namely, the testes in the male, and the mammæ in the female.

It is very remarkably its character not to suppurate; for although this may possibly occur, and by many has been considered as a not infrequent termination, I am very much disposed to believe that another inflammation in the same part, but of a very different nature, the angina externa, may have been mistaken for it.

The mumps is a very acute disease, accompanied with a degree of pyrexia, in many instances far greater than can be accounted for, from the severity of the local affection, which indeed it commonly precedes; and it may be, perhaps, regarded as a febrile disorder determining an inflammation of a specific character.

The swelling appears in the situation of one or both the parotid glands, and often becomes very considerable, involving frequently the maxillary; increasing till about the fourth day, when, if it follows the usual order, it diminishes, and swellings of the testis and mamma take place, which likewise subside in a short time.

Treatment.

This certainly is no case for any repellent application, neither does it appear desirable to en-

courage it by hot fomentations, if it follows the usual course; it suffices to keep the part warm, and to apply a liniment of oil, with a small proportion of ammonia, which relieves the stiffness and pain*. The ordinary remedies employed in febrile affections may be resorted to, and certainly laxatives and antimonials should be employed. When mumps either have suddenly gone back, without metastasis to the glands before mentioned, or have never fairly come out, the system sometimes is dangerously affected, but the symptoms which arise may vary, and the treatment demanded must differ accordingly.

Limited inflammation.

SPEC. III. *Inflammation of the Mamma.*—

It appeared a matter of doubt whether inflammations of the mamma should not be placed in the same subdivision with those of the testis, but the arguments preponderate against it; 1st, because the mamma is liable to all the inflammations which affect common parts in general, as phlegmon, boil, scrofula, &c., as well as to those which are peculiar to it, as a gland; and 2dly, because in the latter view there is this essential difference, that the mamma does not bear the same relation to the system of the female,

* Leeches are recommended, and in some cases, where the inflammation is high, may be proper.

Limited inflammations.

which the testis does to the male; that is, a primary organ and its existence, healthy state, or removal, produce a permanent and leading effect on the entire system of the individual; whereas the mamma is an auxiliary organ, itself dependent upon the existence of the ovaries; its removal alters the system but slightly, and its diseases do not produce a much greater influence than similar diseases would in many other parts; as a gland, too, it differs much from the testis.

As I have above stated, the mamma (which contains abundance of cellular and adipose substance) is liable at various periods of life to those inflammations which affect cellular substance in general, and I do not think it necessary to speak separately of them, only stating the necessity of our being aware of the fact with reference to diagnosis. It is my object here to describe those inflammations which affect it as a gland, and only at particular periods of life, namely, acute mammary inflammation, chronic mammary inflammation, and subacute mammary inflammation, the two former disposed to suppurate, the latter not*.

* In the course of this work, I have found myself obliged, in more than one instance, to describe in conjunction, diseases more or less dissimilar: thus, in the present case, I have, for convenience, spoken of milk abscess under the same division as the resolving inflammations of the same gland: I felt it would have involved some confusion to have done otherwise.

Milk Abscess.—In using the term acute mammary inflammation, I by no means wish to disturb a name which has, perhaps, been too long current to be abandoned; but it is impossible to avoid the remark, that milk *abscess* presupposes a condition which is not true, namely, that this inflammation necessarily suppurates: without, however, saying more on this subject, I shall proceed to a description of that disease.

Limited inflammation.
Milk abscess, or acute mammary inflammation.

Milk abscess occurs at any period during lactation, sometimes at the weaning. The occasional causes are, cold, pressure, sore nipples in a particular degree, or any other injury; and the breast is much disposed to it, if, with a large determination of blood, the milk is not freely secreted and carried off. Under these circumstances a *congested* state of the gland is produced, which is full, heavy, hot; the ducts hard in parts, and somewhat painful. Gentle friction with a light hand, and a little oil, together with the relief afforded by the child's sucking, or if that does not suffice by drawing, will often prevent this state proceeding further, especially if the bowels are kept freely open.

CAUSES.

CONGESTIVE STATE.

If, however, the congestion goes on to inflammation, a distinct lump will be perceived in some part of the gland, which increases, involving more or less of its substance, and is soon accompanied by great pain, tenderness, and weight, *shivering*, and much general fever. After a few days, if not

State of inflammation.

Limited inflammation.

resolved, the skin becomes red, and matter forms beneath; in many cases, however, this does not soon point, but makes its way deep in the substance of the gland between its lobules, and may,

Suppuration; its progress.

perhaps, involve the whole before it points; and it will be seen that the red margin dies away in streaks, marking the manner in which the mischief is propagated below. In this mode of extending, there is a considerable analogy between this inflammation and some of the family of boil, where the pus makes its way through the cellular membrane from want of *adequate* adhesive inflammation at the margins; and it is, probably, in consequence of this, that the skin does not point early. Sir A. Cooper states, that the process of pointing and bursting requires from ten days to three weeks for its completion, but varies considerably in different persons.

A great variety of means have been recommended in the treatment of these cases.

Treatment, local.

Leeches, plentifully applied, if at all, discutient lotions, either cold or tepid*, or fomentations of hot vinegar, assiduously employed at the beginning† (which I have often found useful), or poultices of bread, from which the water has been pressed, and then saturated with the liq. ammoniæ acetat. or

* Sp. vin. ʒj., aquæ vel liq. plumb. dil. ʒv. Sir A. Cooper. Or the liq. ammon. acetat. diluted, or used in poultice.

† Dewees.

other discutient lotions, are all serviceable remedies; but in some cases, tepid or hot fomentations, with or without a simple poultice, afford more relief, and when leeches are employed, are especially proper. If these means fail to resolve the inflammation, there is a question as to the mode of proceeding. Sir A. Cooper recommends in this case, that the suppuration should be promoted; others advise that the applications employed should still be calculated to check this, or to limit its extent*; the preferable plan, perhaps, is to employ the latter mode, if the patient is tolerably easy under it, if not, to adopt the former.

Limited inflammation.

But after all, much depends upon the management of the breast in other respects; it should be carefully suspended from the beginning, and the arm kept at rest; no cold air should come in contact with it, nor the patient touch cold water. A question which demands every attention, is that of the management of the milk, which some advise to be regularly drawn or sucked, while others enforce the necessity of removing the child from the breast†. If the breast can be completely and *easily* relieved by drawing the milk, and that is done only when

* Dewees; Clarke: the former recommends the following liniment: ol. oliv. opt. 3ij., liq. plumb. subacetat. 3j., æther. sulph. 3ij., tr. thebaic. 3j. misce: to be applied on rag.

† Particularly Mr. Lawrence. Lectures, Lancet, July 24th, 1830.

Limited inflammation.

it is distended, it appears to me to be the best mode; many women experience more pain from this than from the child, and in that case, the latter must be applied, but only when it is absolutely necessary to unload the gland. If the removal of the child from the affected breast were immediately followed by a cessation of the determination of blood to it, it would be well, but *often* this is not so, and the congestion which ensues greatly tends to aggravate the mischief.

Sore nipples.

There is one case, in which it is extremely desirable to remove the child, namely, when the disease is likely to be induced by sore nipples (a very frequent cause), and indeed the extreme pain occasioned by this apparently very trivial affection is of itself sufficient to demand great attention. It not only proves a cause of milk abscess, from the irritation it produces, but also by its deterring the mother from allowing the child to suck so often and so freely as it ought.

Various remedies have been proposed for this, of which the one I have seen succeed most frequently is the liniment with borax, oil, and water*. Borax is also useful in powder sprinkled on the part, and as a lotion combined with spirit†. The applica-

* Borat. sodæ. pulv. ʒi., ol. oliv. ʒij.: shake them well together, and add ʒiiss. of soft water.

† Borat. sod. ʒi., sp. vin. ʒss., aq. ʒiijss. Sir A. Cooper.

tion of lunar caustic is strongly recommended by Limited inflammation. Dewees, and is undoubtedly often beneficial, but most women are afraid of it. Solutions of alum, sulphate of zinc, and other astringent salts; brandy, &c. are often advantageously employed; other applications appear merely to have the property of affording an unirritating defence to the part, on the same principle probably as we use flour or cotton in burns, and one by no means contemptible is a mixture of arrow-root and cream. If the breast cannot be relieved by drawing, the nipple should be defended from the child's mouth by the interposition of an artificial teat (which, however, will not in many cases answer), and protected from the clothes by some smooth shell, or leaf, or a chalk cup, or by an artificial shield. It is very possible in many cases, when only one side is affected, to relieve that breast by drawing; to lessen the determination to it by hot vinegar; and so heal the nipple, and afterwards to restore the secretion when it is sound; but it is often necessary, when both sides are affected, to wean the child altogether.

The constitutional treatment of milk abscess is CONSTITUTIONAL. also of great importance. Saline purgatives, repeated daily, are of more essential consequence than any thing else, to prevent the formation of matter; they not only lessen the febrile excitement, but they determine the blood, and consequently the secretions from the breast. To soothe

Limited inflammation.

great irritation, opium may also be employed. Sir A. Cooper recommends it with saline draughts, or liq. a. acetat., to which the sulphate of magnesia may be advantageously added. I have given the tartrate of antimony in large doses, as in pneumatic inflammation, with the most marked benefit. The regulation of the diet is also of great consequence, but in women of weak frames, who wish to continue their duties as nurses, is often difficult.

Treatment when suppuration is established.

If these means fail, and matter forms, the next question is, what ought to be our conduct? Upon this point there is a difference of opinion, some maintaining that these abscesses should always be allowed to break, others advising that they should be opened, if circumstances seem to call for it, and I own this appears to me to be the most rational practice. It is true, if these abscesses are opened too soon, or injudiciously, it is no uncommon thing to have a second gathering, to which the milk breast is particularly prone; but on the other hand, in many cases, the whole gland becomes involved by the pus making its way between the tissue, and great destruction of the part with an enormous collection of matter may take place: such consequences should be prevented by a free opening; but when there is sufficient adhesive inflammation at the sides to cause the matter to make its way to the surface, it should be allowed to burst.

For many days after these abscesses are open, the discharge is copious, and partakes in a considerable degree of the character of milk; by degrees, however, and particularly under the use of slight astringent lotions with spirit, applied tepid, it decreases, and they may fill up again, or leave an opening, discharging when the child sucks, milky fluid for a very considerable time. Sinuses also may remain, which are best treated, according to Sir A. Cooper, by the injection of a lotion of sulphuric acid, much diluted, two or three drops to an ounce of rose water, applying the same solution on linen over the part. If they continue, it is necessary to lay them open.

Limited inflammation.
Subsequent stages and treatment.

Some degree of induration not uncommonly remains after these abscesses get well, which may often be dispersed by gentle frictions with camphorated oil and a small quantity of the ung. hydrarg., or by the application of the emp. hyd. cum ammoniaco, or the iodine ointment. Patients are afraid of these indurations becoming cancerous; such an event is very rare, and need never be allowed to weigh on the patient's mind.

It is necessary to say, that in some cases successive abscesses form in the same breast; in these, Sir A. Cooper recommends opium and quinine to lessen irritability and support strength.

Subacute Mammary Inflammation.—There is a state of the breast which may be deemed either

Limited inflammations.
Similar in nature to a very common inflammatory condition of other organs hitherto not sufficiently distinguished.

congestive or subacute inflammation, very similar I am persuaded to certain inflammatory affections of the lungs, liver, stomach, and brain; I might add the eye, testis, and joints, where, from some disorder in the constitution, a state of increased fulness of the vessels, and morbid condition of the nerves, is maintained for a long period, without any direct disposition to the ordinary terminations of inflammation. The following is a brief sketch of such a case.

SYMPTOMS.

The breast is commonly larger than the other; its temperature unequal, but often greater than natural*; the surface not red; at times it is exceedingly painful, at others tolerably easy; this pain is often increased extremely by handling, or by motion of the arm, or allowing the part to hang down, and is also much increased about the periods of the catamenia; the pain and tenderness extend to the surrounding parts of that side, particularly to the arm; it has little tendency to any termination, and may go on for months or years. The digestive organs are commonly much disordered; the uterine functions irregular and disturbed; and the cure mainly depends upon the restoration of these errors. It occurs both in the married and single state, but generally in the latter; or in married women who have not been pregnant; but

* Like some inflammations of joints, at times the part is cold, at others violently hot.

I have seen several instances in those who have Limited inflammations. had families. Both breasts may be affected, but this is rare.

There may be no separate tumor, but a general enlargement; the milk ducts may often be felt of a firmer consistence than in the other breast, as if granulated; or a lobule may be considerably indurated, from which, however, the ducts may be perceived to pass off into the surrounding substance, so as to destroy the feeling of any regular margin*.

Some differences may be observed in this disease. In many cases there is extreme soreness and tenderness to the touch, in others this is wanting; in some the uneasiness and pain are constant, in others periodical. The means which afford great relief in some cases are of no service in others.

Local remedies are often of great use; leeches, Treatment, local. especially in persons of robust and full habits, and where there is much heat; lotions of lead, or liq. amm. acet., with spirit and water; poultices made with bread from which the water has been expressed, and liq. ammon. acetat. subsequently

* Sir A. Cooper, under the denomination of irritable tumor in the breast, speaks of two forms of disease, in one of which there is, in the other there is not, a distinct and permanent tumor; the latter appears to me to be the affection in question, and in so many respects it possesses the character of an inflammatory affection, that I can hardly bring myself to think that it does not deserve the place I gave it in the first edition of this work.

Limited inflammation.

added, or simple poultices. Where nervous irritability predominates, narcotics should be employed, and none appears equal to the belladonna, either used extensively as an ointment, or in the form of a plaster to the part. The plasters of soap, or gum, may be tried, or the emp. hydrarg. cum ammoniaco. Plasters, however, are not well adapted for cases in which there is much action. Iodine, applied either as an ointment, or the tincture a little diluted as a lotion, are also sometimes beneficial; and I may mention that I have seen much advantage derived from setons passed at a little distance, when other means have failed.

Constitutional.

Constitutional treatment, however, is of the greatest importance; for as this disease must be deemed to be sympathetic either of disorder of the uterus, or digestive organs, or, as most frequently is the case, of both, the removal of the cause is the most effectual mode of removing the disease, when that is practicable. It would lead me into too extensive a field to detail the plans to be employed for this purpose; the measures which are calculated to restore and invigorate the health generally, and which by experience are found to improve the functions of the uterus, especially steel, are proper for this purpose; they all however fail at times.

Chronic mammary inflammation disposed to suppurate.

Chronic Mammary Inflammation.—The preceding species of inflammation I have denominated

subacute, as it very often exists in that degree, but Limited inflammations. it not unfrequently is more or less acute or chronic at intervals. There is, however, another species of inflammation affecting the mamma, differing widely from this, inasmuch as it is disposed to mass the tissue of the breast together, and to terminate in suppuration, while its actions as compared with phlegmon are very inferior in degree; it is not *the* disease of a breast during lactation, although I have seen it occur during that state. Dr. Kirkland and Mr. Hey both describe abscesses which appear to be of this character, although the latter states that in the beginning they do not differ from common abscesses.

The description of case to which I more par- DESCRIPTION. ticularly allude is an inflammatory tumor, sometimes of a portion, sometimes of the whole breast, and liable without care to be mistaken for other tumors of this part: the gland is more or less massed and solid; the skin not at first discoloured, but after a time it becomes red, and it is found that matter has formed beneath; this matter bursts out after a considerable time, externally, and a foul sore may follow; or it may burst in several places, which form sinuses not disposed to heal, and as Mr. Hey says, pushing out fungus; the parts are deeply affected.

The suffering is never very great, nor the in- TREATMENT. flammation acute in the cases I have seen, but the

Limited inflammations.

health is a good deal disturbed; it is a source of much anxiety, and Mr. Hey says may give rise to hectic. The ordinary means to disperse inflammation of the breast may be tried in the commencement, if a patient is seen at that time; subsequently, when matter either is already formed, or the inflammation has that disposition, decidedly, I believe the best plan is to apply warm fomentations and linseed poultices, with an addition of Venice turpentine, which I have seen promote a good suppuration in part of the tumor, while it has appeared very powerfully to resolve it in the rest. Mr. Hey enforces the necessity of laying open the sinuses which sometimes ensue, however deep they may be; and doubtless if they cannot otherwise be healed this should be done; I have, however, in several instances seen them get well without. The induration which still remains may be resolved by camphorated mercurial ointment.

Necessity of understanding the nature of other tumors of the breast, in order to form a clear diagnosis between them and the inflammations which attack it.

I cannot quit the subject of inflammations of the breast without stating that no clear diagnosis can be formed of the subacute or chronic forms which affect it, unless the surgeon is acquainted with the character of all the other diseases incident to this part with which they are liable to be confounded; thus the lacteal tumor of Sir A. Cooper*, arising from a simple obstruction of the ducts;

* Probably the lymphatic tumor of Dr. Kirkland.

the chronic tumor of Sir A. Cooper; the irritable Limited inflammation. tumor of the same author; the hydatid tumor; and medullary sarcoma, may all be confounded with the preceding species, if not well understood; while on the other hand I may mention, that even the best surgeons have mistaken scrofulous inflammation taking place rather deeply, for tumors of a different nature requiring removal. No author has advanced our knowledge on this subject so much as the distinguished surgeon to whom I have so often alluded.

GENUS II.—*Disposition chiefly to Suppuration.*

Phlegmon.—Having elsewhere stated the inconvenience which is likely to arise from applying the terms phlegmon and phlegmonous so indiscriminately as it has been usual to do, I should be disposed to apply the term, if strictly employed, to inflammation, possessing the following characters:— PHLEGMON.

Tumor circumscribed, commencing in cellular membrane, or glandular structure, attended with heat and pain; with a strong disposition to suppurate, the abscess pointing, if suppuration occurs; the matter being thick and white; the skin reddening early. It originates from constitutional disorder, and is accompanied by pyrexia, well marked, but not intense. DESCRIPTION.

Limited inflammation.

Phlegmon may take place in any part of the body; but there are some much more disposed to it than others; thus, it occurs more frequently in the glands under the chin, in children; in the axillæ in females, especially in those who are suckling. It often occurs in persons of a decidedly scrofulous diathesis, in such situations; but this is by no means invariably the case, the subjects are often free from scrofula. In the cellular membrane it often takes place near the rectum, constituting the phyma of the ancients; near the urethra, when there is irritation in that canal; also under the jaw, constituting the mild species of angina externa. Abscesses are prone to occur in all these situations at any period of life; but in the young the inflammation is phlegmon, in advanced life carbuncular.

Most common situations.

Again, phlegmonous abscesses occur in various parts of the body, after fever, measles, variola, or similar febrile diseases. In such cases large collections forming (often on the outside of the leg), with little comparative pain, yet they are acute in their character, point, and heal rapidly after they are open; in some parts of the body they advance to suppuration with extraordinary rapidity, as in the labia of females*.

The treatment of these cases must depend, in

* *Vide* Dr. Blundell in *Lancet*, Sept. 5, 1829.

every instance, on the propriety of attempting their resolution, and in many that must be a question of probability also; for in some it could not be accomplished, if it were proper, as in those which happen after fever; and in others it would often not be advantageous, as in the phyma connected with pulmonary disease.

Limited inflammations.
Admit either of resolution or suppuration.

When it occurs under the chin in children, resolution should generally be attempted, if it be only to avoid a mark; where it takes place in adults under the jaw, or near the urethra, from irritation, and in many other cases, it may also be advisable to employ means which will resolve the inflammation; it being understood that these are cases in which this is *one mode* of termination to which it is disposed; but as it also has a very strong disposition to suppurate, if we wish to avoid that result we must adopt those measures which will decidedly promote the former, rather than the latter object; hence, when this is the intention, the propriety of using leeches, and evaporating lotions or poultices, in preference to hot fomentations, and poultices of a greasy nature, which, however, are to be resorted to, either when the inflammation is so far advanced that suppuration *will* take place, or in any case of phlegmon, where, *for the sake of the constitution*, it is advisable to promote this termination.

LOCAL TREATMENT.

Will vary according to the propriety of promoting the first or second process.

When suppuration is fully established, the abscesses which are formed have every disposition to

Limited in-
flamations.

go regularly and speedily through the processes of pointing, breaking, and filling up, and it is rarely advantageous to open them, except in particular situations, as near the urethra or rectum. When open, I believe a light poultice is best calculated to allow the natural processes to go on properly.

CONSTITU-
TIONAL.

As these inflammations presuppose the existence of constitutional disorder, attention to diet and the state of the digestive organs is necessary ; a free state of the bowels will greatly assuage the local irritation, and dispose to resolution if that be within reach ; indeed such is their influence, that it is no uncommon thing to see matter, when formed again, absorbed without injury, under the use of an active vomit or purge.

GENUS III.—*Disposition to unhealthy Suppuration and Mor-
tification of Cellular Membrane and Lymphatic Glands.*

Species 1. Boil.

2. Carbuncle.

Carbuncular abscesses.

Angina externa.

Abscess juxta anum vel urethram
in advanced life.

Anthrax on the penis.

3. Pestilential bubo.

Glandular anthrax.

The peculiar characteristic of inflammations of this genus is their strong and almost irresistible disposition to terminate in the sloughing process more or less, and in the pus produced being of a bad description, and often of most irritating quality.

Limited inflammations.
CHARACTERS.

The cellular membrane beneath the skin is the original seat of the inflammation, with the exception of bubo and glandular anthrax, but it is communicated more or less speedily to the skin in all.

Cellular membrane much more readily perishes under unfriendly inflammation than skin; while, on the other hand, it has a much greater power of limiting inflammation by the adhesive process, hence the circumscribed character; but, at the same time, the strong disposition to form slough may be explained.

There is a considerable similarity in many respects between this inflammation and erysipelas phlegmonodes; but there is a leading distinction arising from the affection of the skin being subordinate in this, and in the greater disposition to limit the inflammation.

As the sympathetic affection of the constitution always bears a proportion to the risk of death or serious mischief, and as this is always considerable when there is mortification to any extent, it is not to be wondered at that it should often be great in such cases as these.

Limited inflammation.

It is not only their character to form slough, but pus of the worst description; healthy pus simply excites a disposition in the part to discharge it as a foreign body, but unhealthy produces excessive irritation, and acts like a poison lowering its powers. There is a strong exertion made to wall in matter so injurious; and this, contrary to the more general tendency, seems to extend to the surface, and hence it is longer confined; a passage being only effected after a long time by ulceration or mortification of the skin if the patient lives.

The danger, in general, chiefly arises from the confinement of sloughs and foul matter after they are formed: a leading point in the treatment, then, is to evacuate these as soon as possible; and although these abscesses, with the exception of acute boil, do not point like phlegmons, yet the peculiar feel and appearance, and the phlyctenæ which often form, afford pretty sure indications of their existence.

The degree of reaction will greatly depend upon the powers of the constitution, and as the subjects are often people of originally strong stamina, it is frequently very considerable; but there is an invariable and strong tendency in all cases to sinking of the nervous power, which, when sloughs are formed, often takes place very suddenly, and to a great degree. A hurried, anxious, and depressed

state of the nervous system exists, with tremors Limited inflammation. and low delirium. The very disordered state of the digestive organs is evinced by the furred and bilious tongue, the nausea, headache, and foul discharges.

They generally occur from the immediate effects Causes and predisposition. of cold, or some injurious cause in persons who have lived freely, grossly, or irregularly, whose digestive organs are particularly disordered, and generally loaded, and whose whole body and circulating fluids are often, in truth, an unhealthy composition.

SPEC. I. *Boils*.—Boils differ materially in character according to age and other circumstances, and it is only the worst which can be strictly comprehended under the preceding description; but to save time and, perhaps, confusion, I have thought it preferable to consider all the varieties together.

In youth they are generally of a mild character, approaching more to phlegmon; but even at an early age we meet with them large and excessively painful. In advanced life they are often more formidable, and approach much in character to carbuncle.

They generally occur in persons of a gross habit, Persons liable to them. or in those who have lived too plentifully; but although they sometimes indicate a permanently disordered state of the constitution, this is very far

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from being generally the case. The robust as well as the feeble are liable to them.

Predisposing causes.

A disordered state of the digestive organs is almost universally present, and probably a foul state of the blood; and there certainly is great reason to believe that their production is an effort of nature to relieve such disorder. They are often observed after fever, measles, or diseases of a similar kind. At times they appear to be epidemic.

Number, size, and situation, and immediate causes.

In some persons they occur in great number, and are small; at others they are large, and either solitary or few. Often they come out in successive crops.

There are very few parts of the body which are exempt from them, but they are most common on the nates and outside of the thighs, on the shoulder or arm, generally where the vital powers of the integuments are less active, and sensibility less acute than elsewhere; but the face is not an unfrequent situation, probably from its exposure to change of temperature, or the irritation of a decayed tooth, for their seat is often determined by local irritation, as on the nates from riding.

Anatomical character.

Boils appear to take place simultaneously in the skin and cellular membrane. M. Gendrin, who has examined their anatomical characters with great minuteness*, states that the cellular processes

* Hist. Anat. from 576 to 585.

which pass through the areolæ in the skin, to Limited inflammation. transmit to its surface vessels and nerves, are the seat of this inflammation, and the result is the formation of false membranes, which he says constitutes the cores which, it is well known, are commonly found in boils, and which hitherto have been considered as sloughs. As sloughs I should still regard them, for they indubitably are thrown off as sloughs in a great proportion of cases. As they extend to the cellular tissue beneath the skin, a gelatinous fluid first, then pus form around them, and by means of the little abscesses thus produced, they are discharged through the areolar openings, which M. Gendrin says are thereby dilated, but in which, at first, they are strangled*.

Be this as it may, the little inflammatory tumor DESCRIPTION. which at first appears in the skin extends itself more or less deeply in the subjacent cellular membrane, being conical with its base beneath, and its apex projecting from the skin, on which a pustule commonly forms, and it is very hard. The pus is contained in the cellular structure of the skin, and subjacent cellular membrane, which, especially in chronic boil, seem sodden with it, nevertheless there is sufficient adhesive inflammation to limit this. Whatever may be said of the dilatation of

* He says that the anatomical character of carbuncle is similar, differing only in the number of cores. I should think it probable that there are other differences.

Limited inflammation.

the areolæ giving vent to the cores, it is manifest that the skin, after a time, ulcerates, probably at these places, and gradually gives vent to the matter and to the cores; but the latter are either absorbed in some instances, or the inflammation is stopped before they are fully formed.

The colour of the inflammation is sometimes bright, often sublivid; the soreness extremely great, indeed proverbially so; yet on firm pressure the surface feels numbed or dead. Boils are very sensible to temperature, and cold injures them.

THREE VARIETIES:
Furunculus
mitis,
F. gravis, and
chronic boil.

There appear to be three varieties of boil: first, the mild species, generally small, in which it is not certain that slough or core always forms, and if it does it is inconsiderable; second, the furunculus gravis, in which there is a large slough, much local action, severe pain, and considerable disturbance of the constitution, and when it ulcerates it opens up widely; third, the chronic boil.

In the two first species, the constitution is often labouring only under temporary derangement, although this is far from being always the case, as the successive formation of fresh crops evinces; in the third there is always a state of cachexia, greater or less.

The duration of acute boil is uncertain, from four or five days to two or three weeks, depending on the size, the activity of the inflammation, and the treatment employed.

The treatment may either consist in promoting suppuration, or cutting them short by incision*, the utility of which, as far as the individual boil is concerned, is evident both from their anatomical characters before stated (for if the mischief depends in any degree upon the strangulation of the cellular processes in the areolar apertures, the relieving this by an incision must obviously act as a powerful means of relieving the disease), and also upon general principles, elsewhere explained, applying to every case where there is a formation or a disposition to form slough.

Limited inflammations.
TREATMENT
of the two
first species.

By incision.

Believing as I do that these boils owe their origin to constitutional disorder, and that they afford a means of relief to the system, which, indeed, has always been more or less the opinion of the world, I conceive it to be generally the wisest plan rather to promote their suppuration in most cases; indeed we often find that when an attempt is made to cure them by incisions, although it succeeds as regards the *individual* boil, it is often frustrated by the formation of others elsewhere.

By promoting
suppuration.

The application of steam I have seen more beneficial than any other, to acute boils: if suppuration has commenced it favours it, and facilitates the escape of matter; if it has not, they may often be observed to fade under its use: how far steam

FOMENTATIONS.

* When incisions are employed, they are advised to be made crucial; this may be sometimes proper.

Limited inflammation.

may, in addition to its ordinary beneficial qualities, add that of relaxing the stricture in the areolæ before mentioned, I will not undertake to say. The steam of the fomentations should be of a high temperature, and confined.

POULTICES.

Poultices may also be employed at times, and should, if so, be greasy and soft; the addition of

MEDICATED.

stimulating or resinous substances is often useful*; but poultices frequently prove weighty and troublesome and get cold, and, in the case of small boils, tend to produce fresh; when this is the case, the part should merely be kept warm in the intervals between fomenting, which should be repeated often and continued long.

Incisions after suppuration.

When suppuration is established, the boil may be scored through, to expedite the process, by giving vent more speedily to the core; it may also save the skin from more extended ulceration. When a vent is effected either by nature or art, a soft poultice, with elder ointment, is the best application, and after the core is discharged, it speedily heals with any thing.

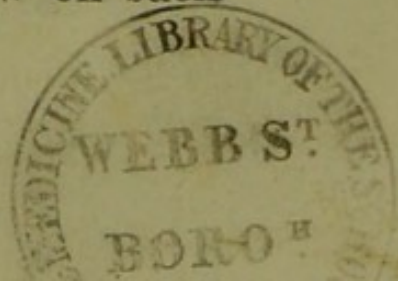
When they are numerous, it is hardly desirable to make incisions when they suppurate; for they commonly soon discharge, or heal without discharging, any slough, whether it be absorbed, whe-

* For this purpose, decoction of lily root, Venice turpentine, styrax, &c. are used; saffron, boiled figs, &c. are also employed. I may also mention the old epithem of oatmeal and honey.

ther it breaks down in the pus, or whether, in Limited inflammation.
truth, it never be formed.

The third variety, or chronic boil, is somewhat CHRONIC BOIL.
different in its character and progress, which is much slower; there is less pain, the part feels numbed, it is flatter in its form, dusky in colour, and large, with much surrounding inflammation; it does not point like the acute boil, nor open much, but discharges by a number of perforations like pinholes, a thin crude offensive matter departing widely from the characters of good pus, and if the skin be closely examined, this dusky brawny integument will be found to have the layer of the corion sodden with pus. It is very long before the slough can break down and be discharged through this kind of sieve, and by the time it is accomplished, the skin and cellular membrane are so much damaged, that the former will be left rigid and puckered, which, as it often occurs in the face, is unsightly. There is much constitutional disorder, but little fever.

The maturation of these boils may be attempted TREATMENT.
by fomentations and medicated poultices, as before mentioned; but I think the gum plaster, or the old styrax ointment, or the vulgar remedy of cobbler's wax, are both less troublesome and more efficacious; and I must here meet the ridicule which some may be disposed to bestow on such



Limited inflammation.

commendations, by expressing my belief that we have simplified our external remedies in inflammation rather too much. If it is allowed that many substances have a particular influence on particular ulcers; on what principle is it denied in the case of inflammations? I have no doubt that they are in like manner adapted to the *diseased sensibility* of parts in a state of inflammation. In the case of boil these adhesive applications will also prove beneficial by their quality of excluding the influence of cold.

There seems to be much greater reason for freely scoring through these boils than the acute, as soon as we may expect that the slough will separate. In the *face* it may be right not only to score these, but others, in the beginning, in order to prevent deformity.

Constitutional treatment of boils.

With respect to the general treatment of boil, it may naturally be supposed that it chiefly consists in such plans as will correct the disorder of the general health or cachexia, on which the disease depends. In the more acute varieties, it should commence with an active purgative of colocynth and calomel, followed by the cathartic mixture, which may be repeated, or purgatives with rhubarb employed, or rhubarb and soda given as an alterative with Plummer's pill. I have seen great advantage derived from a combination of sulphate

of soda, and soda, with bark*; likewise from Harrowgate water; sarsaparilla, in protracted cases, is useful. When the liver is much deranged, which in the middle of life is often the case, due attention must be paid to that. In many cases there is a feebleness of constitution, which demands tonics and generous living. In the commencement a light and rather sparing diet is proper, but this should not be carried too far, and as I have mentioned, cases not unfrequently occur where nutritious food with wine or porter may be allowed with advantage.

Change of air, particularly to the sea, and the use of the warm bath, are highly advantageous.

SPEC. II. *Carbuncle*.—The relation between boil and carbuncle is so great, that by some authors they are considered intrinsically the same†; their anatomical characters probably may be so, as M. Gendrin affirms, differing in this, that whereas a simple boil consists in the existence of one core, passing through one areola, carbuncle consists in many. The chronic boil last described, and carbuncle, differ little except in their situation and degree of inflammation.

Carbuncle occurs at a more advanced age, and

CARBUNCLE,
nearly allied
to boil.

DIF-
FERENCES.

* Sulphat. sodæ, ʒiſs. to ʒi., sodæ subcarb. ʒiſs., dec. cinchonæ, ʒiſs., tr. card. c. ʒi. bis die sum.

† Lawrence. Gendrin.

Limited inflammation.

in persons of more decidedly gross habits than the former; it is very rarely the disease of the poor, and never of the young, except under the influence of morbid poison, as plague; but those who have been subject to boil in their youth, are prone to carbuncle in advancing life.

The seat of true carbuncle is generally the back or head.

DESCRIPTION.

The tumor is large, flat, and little elevated, goes deep under the skin, is nearly immovable, very hard and very painful, the pain being of an intensely burning kind, and its colour of a fiery red, with more or less lividity; from the latter, or both, it derives its name. Its seat is chiefly in the cellular membrane, but the skin is also early and severely affected, livid pustules or vesicles forming on its surface, sympathetic, as I believe, of the sloughs below; it feels like brawn, and as in the chronic boil, its layers are sodden with pus; it is distinctly circumscribed.

Like boil, it commences with a pimple in the skin, but rapidly and extensively, as well as deeply, affects the cellular membrane, of which however the inflammation is disposed to limit, though a considerable portion dies under its influence. The skin also mortifies in the centre, and ulcerates in small holes around, which ultimately run into one common aperture, allowing sufficient vent for the slough and matter if the patient live, but until

this occurs the slough is pent up, and through the little apertures a yellow or greenish, and offensive sanies is discharged. After the slough is detached, a good suppuration is established, and the part does well.

Limited inflammation.

This disease is commonly preceded by much indisposition, and accompanied by considerable fever, the tendency of which is of the low kind, much aggravated by the confinement of the foul matter and sloughs, indeed the danger principally arises from this cause. In addition to the febrile excitement, we have want of sleep from the pain, anxiety, restlessness, delirium, especially when the head is its seat, and tendency to syncope.

Constitutional affection.

Of carbuncles, there are some whose character is chronic, and so similar to the boil which I have described under that denomination, that it would be unnecessary to say more of it; but the acute carbuncle has also been held to have two varieties, according to the degree of intensity, and hence the distinction of the benign, (if such a term could possibly apply to such a disease,) and the malignant, of which the plague carbuncle is a strong illustration.

Carbuncle acute and chronic.

With respect to the treatment, it is quite evident that in a disease so threatening to life, this must be efficient. The great source of danger has already been intimated; and here there is no question, that early and extensive incisions are the most im-

TREATMENT.
LOCAL.

By incision.

Limited inflammation.

portant point of practice. In the commencement, if a surgeon is applied to sufficiently soon, it is possible that free incision might stay the mischief; when sloughs are formed it is indispensable, and it is generally advisable to make a crucial incision, and that deep, to go to the bottom of the slough; indeed, in some cases of enormous and severe carbuncle, the best surgeons have multiplied their cuts to secure these objects: the practice seems more harsh than it really is, for the pain from them is often but slight; to these incisions warm dressings should be applied. Until the incisions are made, the disease commonly extends itself, so that their effect is to put a stop to this, as well as to set free the matter pent up.

APPLICATIONS.

To the carbuncle itself, hot and stimulating applications, such as poultices made with wine lees, or strong ale, or turpentine, seem to be the best with hot fomentations; emollient poultices, however, may sometimes be preferable, and are recommended by good authority.

Of the treatment by caustic or cautery to the part, or by the application of blisters, I can say nothing, having had no experience of either. They come, however, recommended to us in such a way as would lead us to think they might be serviceable. I can hardly believe, however, that they are so efficient as incisions.

CONSTITUTIONAL.

The constitutional treatment of carbuncle will

vary according to circumstances. There is almost Limited inflammation. invariably a loaded and foul state of the stomach and bowels, which especially requires relief: but some care is requisite that the purgatives employed discharge feculent matters, and do not lower by copious fluid secretion. Colocynth and calomel, followed by castor oil, or the compound decoction of aloes with rhubarb, constitute useful purgatives, and require to be repeated according to the occasion. Emetics may be proper if there is much load on the stomach. As there is considerable fever, effervescing saline draughts, generally with ammonia, are useful; and when there is a strong tendency to asthenia, camphor, ammonia, or serpentaria, may be freely given*. Such treatment will probably be particularly requisite in the more advanced stages, when (in broken constitutions especially) it will further be necessary to support the strength by the use of ordinary stimuli, due caution being had not to over-excite. If delirium attends, and is of a low kind, it will not contra-indicate these means; but if it is accompanied by much vascular action, it may be otherwise. This delirium, which is always an alarming symptom, especially when the carbuncle is on

* Quinine may be useful, and is recommended in carbuncle; but I rather apprehend that quinine is better adapted for inflammations, in which the disposition to limit is deficient.

Limited inflammation.

the head, or back of the neck, may be combated by evaporating spirituous lotions to the head, or blisters between the shoulders, or by sinapisms to the legs.

Bleeding has been recommended by some in the earlier stages; of this practice in true carbuncle I have had no experience; but without objecting to its propriety in some cases, must express my persuasion that they are not many, and can only be in those persons who have much vigour of constitution remaining.

When the pain is severe, opium is also useful; but it should be in combination with medicines encouraging the secretions.

Carbuncular Abscesses.—Anthrax and carbuncle literally mean the same*, and as terms applied to disease, are by most authors considered synonymous. It is a pity, however, that while the latter is understood to apply to the inflammation just described, the former might not be used to designate certain kinds of sloughy abscesses, which will next be described, namely, those which form in the anterior part of the neck, about the arms and urethra, or elsewhere: they differ from carbuncle in degree rather than in nature; in their situation; and in

* "Ἀνθράξ means a burning coal. Carbunculus, the carbuncle, a precious stone resembling hot burning coals.

the cause, which is partly local: they may be spoken of as carbuncular abscesses. Limited inflammations.

Although these abscesses resemble, yet still they have many points of difference from *true* carbuncle: the skin is not so early affected; it rarely becomes so dark and extensively gangrenous, nor perforated by numerous holes; the tumor is not so flat; there is not so large a proportion of slough, in comparison to the pus; they occur in parts more disposed to vigorous action than those affected in true carbuncle, and in persons often of different description, for instance, in females; and although they most frequently occur in those whose habits have been gross or intemperate, still they are not so precisely the diseases of the rich as true carbuncle. Carbuncular abscesses. In what respects they differ from true carbuncle.

Angina Externa.—The first I shall mention occurs in the neck, and by Dr. Kirkland was denominated angina externa; it has occurred to me to see several instances of this disease. From its situation it is liable to be confounded with parotidæa; but the subjects are generally of an age and habit not likely to be affected by that disease, and if other criteria for judging were wanting, the two circumstances which belong to mumps, namely, their being propagated by infection, and affecting the testes or mammæ, would establish the difference. Distinguishable from mumps.

Limited inflammation.

DESCRIPTION.

The patient, a person of unhealthy, and generally of full and gross habit, has a swelling deep seated in the side of the neck, generally towards the angle of the jaw, causing a great degree of pain in that side of the head (most probably from its effects on the nerves of the part), and accompanied with much fever. There is loading of the cellular membrane similar to that we observe in E. phlegmonodes, but limited, firmer, and more prominent. This takes place to a great degree, and the result is, that the patient is scarcely able to swallow, even fluids; breathes with great difficulty; and cannot sleep from the impending suffocation. The inflammation extends itself internally to the mucous membrane of the fauces and uvula, and thence often to the bronchial membrane; in extreme cases also there is great œdema of the face from the pressure on the absorbents.

The skin, which, if we see the case from the beginning, is then apparently unaffected, soon adheres and inflames, and thickens as it inflames, but does not point, or for a long time show any symptom of pointing, or giving way by slough or ulceration; meanwhile extensive sloughs and noisome pus form underneath, and do great mischief. These abscesses may extend into the cellular membrane within the upper part of the thorax; and I have seen them form on both sides of the throat.

Danger great.

There is great danger of their destroying life,

not only from the direct influence of such inju- Limited in-
flamations.
rious matters when confined, but by suffocation, if
proper relief is not afforded ; and although, if left
to nature, they will ultimately burst on the sur-
face, or into the throat, the patient may not live
for this to take place.

There can be no question that a free incision Treatment
by early in-
cision.
here is fully as important as in any case of carbun-
cular inflammation ; and although, from the nature
of the parts, the surgeon would be unwilling to do
this, if the necessity were not paramount, yet on
his conduct in this respect, the life of the patient
will mainly depend : a person accustomed to these
collections of foul matter beneath thickened inte-
guments, will detect its existence by the peculiar
feel of a doughy yielding matter under the tense
elastic skin.

The only author who had particularly men-
tioned this form of inflammation that I was aware
of, when this work was first published, was Dr.
Kirkland ; his description is very brief ; he gives
one case. There have since been others related
which I cannot doubt are of the same nature,
although by some they are considered as suppura-
tion of the parotids, which I am apt to believe is
very uncommon.

It should be observed that phlegmon occurs in

Limited in-
flammations.

this situation, and that is mere phlegmon in one constitution, which is the formidable disease I have now mentioned, in another.

It is important to recognize such a disease as angina externa, from the dangerous consequences its situation involves; this is not less true as regards the next variety I shall mention.

Abscess juxta Urethram.—Abscesses of a similar character form in the perinæum by the side of the urethra, commonly in persons who have stricture, and whose habits are bad, as gum boils do from the influence of neighbouring irritation. They are also often the result of direct effusion of urine. When they proceed from the latter, the symptoms are rapid and urgent, when from the former they are less violent, and may not be so readily understood.

DESCRIPTION

They generally form around the bulb, often above the fascia perinæi. In the commencement they cause no great suffering or inconvenience, but great disturbance of the system soon takes place, great pain and distress about the part, and the tumor which was at first indolent, and hardly affected the surface, becomes very tender and painful, and the skin inflames and thickens exceedingly; from the extension of the inflammatory disposition to the scrotum, the loose cellular membrane of that

Generally
carbuncular.

part soon loads enormously, so as to give the idea of urine having escaped; and if this still continues, either that mischief will happen, or the pressure may cause retention, or the patient may sink from the effects of the confinement of the sloughs and matter, and there are no cases where *ample and early incisions* are more strongly called for. It must be understood, however, that inflammation will occur in the young and healthy in the neighbourhood of the urethra, where there is stricture, and often from the imprudent use of the bougie, or other cause of irritation, but will again subside if proper measures are pursued; such are rest, the free application of leeches, tepid poultices, warm bathing, calomel and antimony, with castor oil to open the bowels, and Dover's powder at night.

Limited inflammation.

Treatment by incision.

In the young are often phlegmonous.

Treatment in them.

When urine has actually been effused, not a moment should be lost in evacuating it, as this fluid will commonly destroy the cellular membrane with which it comes in contact, and every fresh effort to void it increases the mischief; warm fomentations and poultices must be applied subsequently, and the powers supported.

IN URINARY ABSCESES.

Abscess juxta Anum.—The cellular membrane in the neighbourhood of the rectum is also frequently the situation of inflammation and abscess, which in the young is often determined by some

Limited inflammation.

unknown sympathy with the lungs, and is of a phlegmonous character, by the ancients denominated phyma. Mr. Pott also describes an inflammation which has much the character of boil *, as well as the deep carbuncular abscess; he mentions likewise a kind of œdematous erysipelas†.

Abscesses in this situation are often more immediately produced by the lodgement of hardened fæces, or other irritation of the rectum, and are prone to occur in gross and unhealthy persons, particularly those which are carbuncular in their nature. They often exist where the liver is diseased.

Their progress is often not very rapid, nor the symptoms severe at first, but by their mechanical interruption to the discharge of urine and fæces they may occasion much suffering and inconvenience; and if they remain unopened, after sloughs and foul matter have formed, the peculiar symptoms consequent on the confinement of these will ensue.

Treatment when phlegmonous.

In early age it may be right to attempt the resolution of phyma, by means similar to those mentioned under the head of abscesses near the urethra; but where the character is carbuncular, which may be collected from the age, the symptoms, and the colour of the skin, they ought to be opened at an early period. If any abscess in this situation continues long, it will destroy or absorb

* Vol. iii. p. 52.

† Ib. p. 50.

the cellular membrane close to the bowel, into which indeed it has often a tendency to burst, greater than that which it possesses towards the skin; and when this process of insulation is established, a fistula must follow, unless an opening be made including in it the lower part of the bowel, for reasons which it would be foreign to my purpose to dwell upon; if, however, an abscess here be freely opened, at an early period, it does often heal without the division of the rectum being necessary.

Limited inflammation.

WHEN CARBUNCULAR.

Mr. Evans* describes, under the title of Anthrax, those foul, sloughy abscesses beneath the integuments of the penis which occur in young men, and recommends bleeding for them. I believe that carbuncular inflammation, when it occurs in such constitutions and in such a part, does often require bleeding; and I may remark, that this is also the case when it occurs in the neighbourhood of the rectum or urethra, in the prime or middle of life, but in advanced age and gross habits the case is different.

Carbuncular inflammation of the integuments of the penis.

Glandular Anthrax.—Of the plague bubo I have nothing to say, but there is a kind of inflammation which might be called, without impropriety, glandular anthrax, which I should wish to mention. It often occurs in persons of scrofu-

Glandular Anthrax.

* On ulceration of the genital organs.

Limited inflammations.

lous constitution, although robust make; but it has by no means the subacute character of ordinary scrofulous inflammation; on the contrary, it often becomes very severe and painful, and is attended with much sympathetic fever. Matter forms and points, and when the abscess is opened a lymphatic gland presents itself, which generally sloughs and comes away; the wound does not put on a healthy appearance, but long remains foul, with hard irregular edges and sanious discharge, and a great disposition to form sinuses. I have seen them occur in the groins, in the thigh, and in the neck. Scrofulous persons, suffering from secondary syphilitic symptoms, are liable to them though less acute. The chronic carbuncle of Sir A. Cooper* is, probably, also nearly allied to it in nature, but may be less acute.

Bark and good diet, with proper purgatives, and in some cases conium and mercury with sarsaparilla, and change of air, seem to constitute the best mode of treatment after they are open.

Local means cannot be relied on with equal certainty as in other cases, for the discharge of the matter and the separation of the core do not, as in them, leave the parts healthy. The various modes of revolutionizing the actions of a foul and obstinate ulcer it is not for me to detail, but I may mention, among serviceable applications, equal

* Lectures, vol. i. p. 206.

parts of port wine and decoction of bark, applied constantly, on lint; and when in a chronic stage, an ointment composed of ung. resinæ, with bals. of Peru and the red oxide of mercury; also lotions with a small proportion of liq. arsenicalis.

Limited inflammation.

There is a kind of carbuncular inflammation which occurs on the fingers, not true paronychia, for it is unconnected with the nail, and equally so with the thecæ. It occurs often on the back of the first or second phalanx: it is dusky, excessively painful, and throws up a livid pustule or phlyctena. It may often be imputed to some morbid poison, but I have seen it occur where there was no reason to suppose this. It happens to persons of a bilious temperament and spare constitution. A very foul, sloughy ulcer ensues after the pustule is broken, and a core is often discharged.

Carbuncular inflammation on the fingers.

Sometimes an incision gives great relief, but I have also seen it aggravate the pain and inflammation. Poultices with opium, entire rest, purgatives, and opium to relieve pain, are necessary; and to the ulcer when formed, sometimes escharotic, at others sedative applications agree best. I may also mention the arsenical lotion.

These seem to bear the same relation to carbuncle, which whitlows in the last phalanx do to boil.

CLASS II.

SPREADING INFLAMMATIONS.

CHAR. *The Disposition to spread, from Failure of the adhesive Process, owing to a faulty State of the Constitution.*

IT is not to be understood that I have any intention of asserting that the disposition to limit is entirely absent in this class of inflammations; on the contrary, there appears to be a struggle in the part, and the general system, arising from the endeavour to effect that, which they are either totally, or for a long time, incapable of performing.

The disposition to spread may exclusively depend upon the nature of the part affected, as a surface; thus we have peritoneal inflammation spreading in a constitution decidedly capable of limiting inflammation elsewhere; but then the origin of such inflammation may commonly be traced to accidental circumstances, such as cold, metastasis, or injury.

But when inflammation arises on surfaces purely from the disordered state of the constitution, that

state will, I believe, be such as is now alluded to, and marked in common, by deficiency of nervous energy, generally owing to error in the digestive organs, or the result of intemperate habits, the influence of some morbid poison or morbid air; or the united effects of several of these.

Instead of believing that the peculiar symptoms and state which are remarkable in this class of inflammations are referable to the circumstance of its being some one of the surfaces which is inflamed, I am apt to think that in this state of constitution, there is a disposition to determine the inflammation *to surfaces*; but I will freely allow that a surface being inflamed, this will itself (as is very usual in the animal economy) become a cause in its turn, increasing the disposition to spread.

Let these inflammations be situated where they will, when they produce effusion, this is either of a serous nature, whether it be merely dark and unhealthy serum alone, or mixed with flocculi of lymph; or of pus, thin, sanious, brown or green, but always of an unhealthy character; and they are much disposed to occasion sphacelus. If they affect the skin, it has a strong disposition to separate in vesicles, or phlyctenæ; if the cellular membrane, to slough; if serous membranes, to pour out turbid dark serum, mixed with lymph;

if mucous membranes, in many cases to ulcerate or slough.

I may repeat, that it is not intended to affirm, that organizable lymph is not effused in these cases, and adhesions formed; it is by the super-vention of this process that the disease is arrested in general. Neither is it to be denied, that in the first class as well as in this, inflammation often terminates in the effusion of serous fluids, as happens sometimes in the peritoneal cavity (although that effusion has different characters in the first class, being generally of a reddish nature, mixed with flocculi of lymph), or in sphacelus: but these consequences are the result of its extreme violence, and may generally be prevented by proper treatment; whereas it is the prevailing *disposition* in the type now alluded to, to produce such results.

How far this disposition may depend on a contamination of the neighbouring parts, as seems probable where a poison has been applied; or in other cases, a disposition to a *similar action* is imparted (which is a mode of contamination), it is not for me here to discuss; but this is very certain, that it is communicated to a wide distance from the part, and, indeed, further than from any external character it might appear to have extended: thus in cases of sloughing inflammation of an extremity, it has been repeatedly found, that

if amputation be performed at a part of the limb which has undergone no sensible alteration, this will also presently run into gangrene. It may be that this is owing to the whole system being in accord with the local disease, but whether this accordance would determine gangrene if another limb underwent the same operation, we have no experience to determine.

Inflammation of Vital Organs.

Inflammations of the second class affecting vital organs are commonly the result of some febrile infection, or constitutional disorder; and as I have now proposed to consider only those inflammations which are more commonly held to be in the province of surgery, I shall say little on the subject; but I may remark, that the vascular excitement is much less in these, generally speaking, and the pain often so little (as in typhus), that its degree gives no adequate idea of the mischief which exists, and, indeed, sometimes has passed unobserved, although this symptom, generally more than any other, announces the existence of inflammation in such organs.

Next to inflammation of vital organs, I should be disposed to arrange in natural order those of the vessels, scarcely less than vital in their functions; it may be, however, more convenient to

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consider them together with other inflammations with which they are often implicated. I shall, therefore, proceed to speak of those which affect the external parts.

Inflammations having a Disposition to spread situated in external Parts.

Leading points of difference between external inflammations of the first and second class.

There is a very considerable difference both in the nature, and in the treatment of these cases, and of the external inflammations of the first class, arising from the alarm which is excited in the system by the disposition to spread, which induces a far greater degree of reaction; and although this very disposition to spread may be intimately connected with want of power, yet from its violence, bleeding and active antiphlogistic measures are called for much more frequently than in the external inflammations of that class. Also, there is a want of the disposition to terminate in the modes most salutary to the animal, and if they cannot be resolved, or subside under the influence of secretion, the tendency to adhesion is deficient; moreover, the suppuration is of a bad kind, not leading readily to the granulating process, for the abscesses are much disposed to extend, even after they have been opened, if not exposed throughout. These remarks must be understood to apply to the severe forms of spreading inflammations.

GENUS I.—CHAR. *To produce Morbid Secretions and resolve in most Cases.*

Inflammations of the Skin.

Each kind of cutaneous inflammation has its own peculiar mode of termination; but although some suppurate and others ulcerate, yet the greater number simply effuse, either upon, or under the cuticle, a morbid secretion, or produce an exfoliation, or altered secretion of that substance.

The world is greatly indebted to modern pathologists, especially to Dr. Willan and Dr. Bateman, for their very accurate and useful arrangement of these diseases, as well as for the valuable information they have given respecting the treatment of these very common maladies. I can have no intention of departing from the system they have proposed, which has fixed more precise notions of the number and the nature of the different varieties, and has rendered reference to authority far more easy than heretofore. It was, however, incumbent on me, while treating of inflammations, not to omit these, and in the general scheme of arrangement which I attempt, to point out what place they ought to occupy.

Advantages of the arrangements of cutaneous diseases.

An attentive consideration will show, that inflammations of the skin have a great tendency to

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Although inflammation appears only in parts, the whole or large regions are disposed to it.

spread, although not always continuously; for in measles and scarlatina, where the character is exceedingly diffuse, the inflammation appears in spots and patches; it is probable, in such cases, that the whole tissue is more or less affected, but not to the degree of redness, excepting in some parts; but let any irritation be applied to a part, before colourless, the eruption will be immediately ready to appear. It may be observed, that each inflammation of the skin affects more or less *particular* regions.

Terminate in secretion on the surface.

Inflammations of the skin generally relieve themselves by some secretion on the surface, and it is neither their quality to suppurate *within* the tissue nor to effuse lymph, with a very few exceptions; they, however, occasionally produce considerable serous infiltration.

Sympathy with mucous membranes.

They have a remarkable sympathy with the mucous membranes, and are more subject to metastatic changes than any other inflammations, excepting those of the fibrous membranes.

Connected with constitutional disorder, but their peculiarities are numerous and striking.

Of cutaneous inflammations in general, it may be observed that they invariably proceed from, or are connected with, constitutional disorder; that some having once occurred, never happen again, whilst others seem to have a great disposition to recur at regular intervals; that most, whether chronic or acute, have periods of augmentation or decline, and having run their course, become

extinct: some get altogether well in this way, while others are perpetually appearing in fresh places, yet ultimately wear themselves out; that while some owe their origin to occasional causes, others seem to form a part of the individual, and belong to him as much as the colour of his skin or hair; that some are of a nature to be greatly influenced by medicine, applied both externally and internally, while others appear to bid defiance to all attempts to put an end to them before they have exhausted themselves. It seems that some pave the way to others, or are convertible into others; while, on the contrary, there are many which, so far from being allied to each other, cannot exist at the same time.

Spreading inflammations,

Acute inflammations of the skin assume definite characters at certain periods, and will subside of themselves. They are often calculated to relieve constitutional disorder; and when fever precedes them, it is generally lessened on their appearance, provided an *excessive* eruption is not maintained, which excites too much sympathetic affection.

Acute inflammations observe regular periods. Often relieve constitutional disorder.

Of the acute inflammations of the skin it is alone my intention to speak, and of these to consider only such as are either commonly the subjects of surgical treatment, or from their resemblance may be confounded with them.

A few only to be considered here.

The first and most important is erysipelas, but

ERYSIPELAS.

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it will appear that only one variety strictly deserves to be considered as a cutaneous inflammation, namely, the superficial form, and I have therefore thought it most advisable not to consider it in so restricted a view.

ERYTHEMA.

Erythema.—Erythema has by many been confounded with erysipelas, and is certainly often mistaken for it, and therefore it is of material consequence to distinguish it from that much more important and dangerous form of inflammation.

Distinction between erythema and erysipelas.

Erythema may and does produce serous infiltration of the tissues of the corion, but it may be questioned whether it ever affects the subjacent cellular membrane. Erythema has little or no tendency to produce vesications, which erysipelas has, and it is attended with much less of painful sensation. Its colour considerably resembles erysipelas; its termination is not so abrupt; but I believe one of the most important diagnostics may be derived from the absence of any great degree of fever or constitutional affection. Again, erythema in many of its forms has a tendency to persist for a very considerable time without any result, while erysipelas will either resolve itself, or produce suppuration below, and vesication above the surface, in a very few days.

Erythema sometimes symptomatic, sometimes an original disease.

Erythema may either be the result of some local disease, as when it appears on the surface of a

diseased joint, or arises from the weakness and distension of the skin in anasarca; or it may be produced by constitutional disorder, as many other inflammations are.

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Erythema nodosum.—One of the most common forms of erythema so produced is the nodosum, which for the most part occurs in females, and *generally* in those of early years: it consists in various elevated inflamed lumps in the integuments, of considerable size and oval form, chiefly occurring in front of the legs, but occasionally in the arms or other parts of the body, and attended with pain, but that of no intense degree, neither is the heat great; they never suppurate, but after a week or ten days die away, first becoming bluish; they vary much in number; I have seen twelve or more; they are attended with slight febrile disorder.

If not recognized, these inflammations might excite unnecessary alarm; little is requisite for their treatment except attention to the bowels—saline antimonials, or the mineral acids: they demand no local applications.

E. læve in some of its varieties may be mistaken for a more formidable inflammation: it may not be amiss to mention a case illustrative of this. A medical gentleman, of full habit, after

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suffering from an inflammation of one of his eyes and throat, was attacked with inflammation of the left foot, attended with severe pain at its commencement. The whole of the back of the foot was much swoln, and pitted; the surface was of a dusky red, which in one or two places was particularly deep, so as to give at first sight the idea of a most alarming erysipelas, but there were no vesications; there was no sense of burning; no particular soreness; the skin felt thin (while in erysipelas the case is the reverse), and it did not extend with a defined edge; added to this, there was no head-ache, nausea, or oppression of the head; the spirits, on the contrary, were lively, but there was some febrile action. In a few days it got well.

Erythema lœve occurring spontaneously is attended often with a local anasarca; it also often supervenes upon anasarca*, and then, after great and long continued distension of the skin, terminates in spots of sphacelus, which spread, and if the cause continues, proves fatal; but if the anasarca can be relieved, the erythema ceases.

The local treatment of such cases of erythema consists in maintaining strictly a horizontal position, and obviating any excess of heat or cold; punc-

* A similar inflammation, with a less marked effusion, is occasioned after a time by the distension of aneurism or any species of tumor.

tures, when anasarca induces it, are often useful, Spreading inflammations. but most advantageously practised at a remote point. To the inflammation itself a dilute lotion of spirit, with superacetate of lead, applied tepid, is often useful. The constitutional disease demands its appropriate treatment.

Inflammation surrounding Ulcers.—The inflammation which surrounds many varieties of ulcers approaches more nearly to an erythema than any other form, but each ulcer has its own peculiar modification; the cure of the ulcer is that of the inflammation in most cases, but it not unfrequently happens, on the other hand, that the ulcer is but healed by treating the inflammation. It will be found in most cases where the surrounding inflammation bears an undue proportion to the ulcer, that the application of leeches and water poultices, or daubing the part with mercurial ointment, will cause the ulcer to heal more rapidly than other means.

The *E. marginatum* I have seen covering a limb affected with phlegm. dolens, and at first it was mistaken for *E. phlegmonodes*; but the superficial inflammation vanished, leaving the deeper-seated disease.

Urticaria may, I believe, always be distinguished URTICARIA.

Spreading inflammation.

by the wheals and the peculiar sensation of itching and tingling.

IMPETIGINES
ERYSIPELA-
TODES.

Of the *Impetigines*, the erysipelatodes is likely to be confounded with erysipelas, and it is difficult to distinguish it, excepting by the appearance of pustules instead of buccæ. The progress, duration, and result of the disease, are however different. I would refer to the work I have mentioned for a particular description of it.

ECTHYMA.

Ecthyma often becomes the subject of surgical treatment, occurring, I believe, universally in persons who have a cachectic state of constitution, often syphilitic; indeed, to me it appears that the eruptions are very similar in character to small boils; but the pustules which form, break and often ulcerate, instead of discharging like the former a core, and healing. In the more favourable varieties however, they form scabs and fall off.

If they ulcerate, the treatment adapted to foul and irritable ulcers must be adopted; but the main point is to rectify the error of constitution, and if the cachexia is syphilitic, the means must be influenced by that consideration.

RUPIA.

Rupia, as Dr. Bateman well observes, might be classed with ecthyma; it differs chiefly in its size, and in projecting a vesicle instead of a pus-

tule. In the R. prominens, the scab which forms Spreading inflammation. is raised continually by fresh depositions, widening at the base, so as to form a hard cone; this falls off, leaving a deep ulcer in the skin, or a sound surface, as the case may be; but if the former, the ulcer has less of true adhesive inflammation at its edges than in any species of ulcer I know; nevertheless, it does not spread with particular activity—in many cases, probably, from the little inflammatory action.

The treatment of this as well as ecthyma is nearly the same in principle as that of cachectic boil. The local treatment of these ulcers is however material, and may best be considered, perhaps, under the head Phagedæna.

Eczema is hardly to be considered an acute ECZEMA. inflammation; but on its first appearance may be confounded with erythema, or even erysipelas: the absence of fever, however, distinguishes it from the latter, and the appearance of numerous, though minute, vesicles proves it not to be an exanthema.

Of *Herpes* it is necessary to say more, as it is HERPES. sometimes a very severe and formidable disease, particularly when the vesicles become livid early.

Sometimes, as is well known, it surrounds half of the waist and is termed shingles; at others, it may be scattered on various points. I have seen

Spreading inflammations. it on the forehead, and frequently, and very severely, on the nates and thigh.

CHARACTERS. There is little apparent inflammation, but after a feeling of great and deep-seated darting pain in the flesh, and tingling, the vesicles appear of considerable size, rather flat, in clusters, often running into each other, with slight redness at the base, and no surrounding tumefaction worthy of mention; yet the pain is great, often intolerable, and described as attended with a gnawing and burning sensation, and great tenderness; and what is very remarkable, it often continues for a considerable period after the vesicles themselves have disappeared, frequently for days, weeks, and I have known it for many months; this pain being always felt deep in the flesh, and is so decidedly the leading local symptom, that it is not unreasonable to doubt how far this is justly considered merely a cutaneous disease. The clusters do not all come out at once, but the eruption is going on for about ten days or a fortnight; and as it takes about the same time for each to go through its course, the duration of the eruption is about three weeks altogether.

The fluid in the vesicles is at first transparent, then milky, and lastly becomes dark; and when this occurs very soon, and the lividity is great, the term phlyctenodes is given: in these cases, the appearance would seem to threaten formidable

ulceration or sphacelus, but it commonly happens Spreading inflammation. that the fluid dries into a scab, and this drops off, frequently leaving a pit, implying either a preceding ulcer, or little slough of the skin, to which the livid colour of the vesicles may probably be attributed.

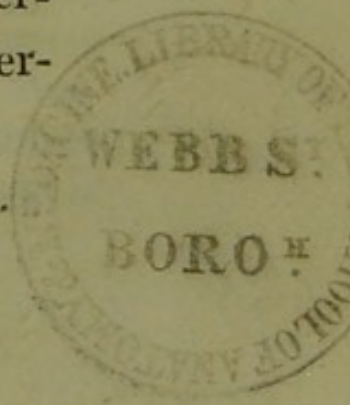
It by no means follows that, in all cases, the local symptoms should be so severe; but when they are, there is great disturbance of the constitution, considerable fever, with languor, oppression, sickness, great restlessness, and even tendency to delirium.

It mostly occurs in young persons, but frequently in females advanced in life.

When the pain is severe, I have known it TREATMENT. assuaged by poppy fomentations. Warm brandy, or more diluted spirit, or laudanum and water, applied warm, have appeared to give relief; but emollient and soothing applications have been most recommended.

In the severe cases, it generally happens that there is very considerable error of the digestive organs; often a foulness of blood, demanding a careful attention to the bowels. The saline draughts in effervescence are also useful given largely: in one case, where it shortly succeeded an attack of puerpera*, the free use of lemon juice was very ser-

* A similar occurrence is recorded in Burserius, vol. ii. p. 361.



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viceable. When the pain is very severe, anodynes must be given, properly guarded. Bleeding was formerly recommended, but I apprehend is rarely requisite.

The slight cases of herpes require little care.

It is necessary to recognize the herpes preputialis, a frequent form of local disease, either produced by irritation of the urethra, or disorder of the digestive organs, or both ; sometimes mistaken for the result of venereal infection, and maltreated with mercury.

The herpes labialis is also often a result of irritation of the alimentary canal in febrile disorders, and is almost invariably an omen of amendment.

The phenomena of inflammation in this tissue which are most easily observed remarkably oppose the theory which would make these phenomena depend on the tissue affected.

The foregoing appear to me to be the chief *acute* inflammations of the skin which may demand surgical treatment ; but I cannot quit this subject without remarking, that the phenomena of cutaneous inflammation are exceedingly opposed to the theory which would make these phenomena depend upon the tissue affected : for here, under our immediate observation, we have a number of inflammations differing in every possible character in the same tissue ; differing in their duration, in their appearance, in the result, and in the mode of sensation, and so extensively and decidedly that it cannot be maintained that they are slight modifications. I have little doubt that the differences are equally great, although not equally numerous,

in the other tissues; but less *proof* can be adduced than in this. Spreading inflammations.

It may be permitted to add, that the phenomena of one cutaneous inflammation appear to me to illustrate very satisfactorily some of the positions which it has been my object to support or establish. They tend to illustrate remarkably some of the leading principles of inflammation.

1st. The accordance of the general and local affections in variola may be deduced from the appearance of the inoculated pustule, for *from that* the character of the constitutional disease may be with much certainty foretold.

2dly. And the dependence of the character of the local disease on the general system appears from the *same* matter producing a distinct sort in one person and a confluent in another:

3dly. And, consequently, that the disposition to limit or to spread depends upon the type of constitution must be concluded also from the fact last stated*.

* The following case remarkably illustrates the dependence of the disposition to spread or to limit, on the healthy or unhealthy state of a part, and if of a part, *à fortiori*, of the whole.

A boy, æt. 13, received an injury from a bolt attached to some machinery, which was driven with great force into the arm, a little above the elbow, and inflicted a severe lacerated wound of the arm and fore-arm. In the course of a few weeks this injury was nearly repaired. About eight weeks after the accident the boy, who was in the hospital, caught small-pox in the natural way, and the eruption, although thick, was favourable. On the arm which had been injured and thereby rendered unhealthy, in the neighbourhood of

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In addition, we may observe the difference in point of danger when the type is spreading (confluent) or limited (distinct), and the danger after the eruption has appeared being proportionate to the amount and situation of the external inflammation.

Inflammation of Mucous Membranes, unattended with Inflammation of the Organs which they cover, commonly called catarrhal.

Analogy and sympathy with skin.

I mention these, because they appear naturally to group with inflammations of the skin. The two tissues have a great analogy, connexion, and sympathy, and hence the transference of inflammation so readily from one to the other.

The spreading character of these inflammations depends on the constitution.

That the disposition to spread, which attends these inflammations in a marked degree, is owing to the state of the constitution, may be with much probability concluded, from the circumstance, that mere mechanical irritation excites inflammation,

the elbow, the eruption was flat and confluent, and extensively surrounded by a dusky erysipelatous blush (none existing before its appearance), while elsewhere the pustules were elevated, distinct, and surrounded with circumscribed rosy inflammation.

I do not mention this as an unusual occurrence, but as one fact among many others calculated to establish the point, that *diffused* inflammation depends upon weak powers and an unhealthy disposition of the part, either from its own defect, or as a part of an unhealthy whole.

which is not propagated in a similar way, as is abundantly proved by the removal of polypus, and other similar facts.

Spreading inflammations.

Inflammations of the skin chiefly affect the secreting apparatus, and as these membranes may be considered *integuments* as strictly as the skin, whether as regards external parts, of which there can be no doubt, or internal, as the nares, bronchiæ, fauces, bladder, &c., it is natural to conclude, as really happens, that their mode of relief also would be by secretion from the surface and resolution. If, however, the inflammation be communicated to organs below, it will partake of the usual character of such inflammations; or if it is the nature of the particular inflammation of the mucous membrane to ulcerate, it becomes a more serious matter, as happens also in some inflammations of the skin.

Mucous membranes may be considered integuments, and their mode of relief in inflammation the same as that in the skin.

Of simple inflammations of the mucous membranes, as of skin, it may be observed, that it is their general character to run through a certain course, and subside after an increase of the secretions has taken place. This natural cure being provided, and their progress rarely attended with danger, it is generally sufficient to guide them to their termination; and the means which are to be employed are those which will tend to promote the secretions, to render those secretions mild and un-irritating, and to direct the blood as much as pos-

Spreading inflammations.

sible to the skin, which so readily sympathises with them : if they run on in a chronic state, from weakness, to employ tonics and change of air. But it would be foreign to my purpose to enter into any consideration of the different species of mucous inflammation.

GENUS II.—*Disposition to Suppuration.*

Inflammation in the Cysts of Chronic Abscesses, Bursæ, and Tumors.

It is not meant to consider the action which produces the formation of these tumors;

I do not here mean to enter into the consideration of that inflammatory or otherwise diseased action, which causes the formation of such cysts in the body, and the secretion of the fluids which distend them; these processes are generally chronic, and we know too little about them to speak with confidence upon the subject, excepting with regard to bursæ, in which it is very analogous with inflammation of other synovial membranes.

but the inflammation which ensues on their becoming open.

In general, sooner or later, these cysts either open of themselves, or are opened; in either case a different kind of inflammation comes on, and that very severe in most cases; and, as Mr. Hunter observes, while in genuine abscesses true suppurative inflammation diminishes from the moment they are opened, in these, on the contrary, it is the

signal for its commencement, although this is not Spreading inflammation. the case invariably, if abscesses are punctured in the manner recommended by Mr. Abernethy, or if bursæ are merely punctured.

In cases where the inflammation, consequent Its character. on an opening, is severe, the vascular action is amazingly excited: I have counted the pulse within thirty-six hours at 150, and the brain and spinal chord are affected with intense pain. It is irritative fever and irritative inflammation existing in a very aggravated degree; but this commonly soon subsides in suppuration, although the secretions produced hardly deserve the name: they are thin, sanious, and acrimonious.

If an attempt is made to maintain the union of external parts in any case where this state has supervened, the irritation is carried to the highest degree; and in a very short time a very alarming state is induced approaching to typhus, which can only be relieved by giving free exit to the matter, now become enormously fetid.

Symptoms of great severity do not come on in every case where such cysts are opened; they are, of course, in proportion to the extent of surface; and it appears, that large abscesses connected with diseased joints do not inflame with the same degree of intensity.

After a time, the severity of the symptoms sub- RESULTS. sides; but either, in the case of chronic abscesses,

Spreading inflammation.

an exhausting but imperfect suppuration continues from the cyst, or imperfect granulations are thrown up from its surface, in the cases of bursæ and encysted tumors, constituting fungus.

Curative processes.

It, however, not unfrequently happens, that the cysts of chronic abscesses, when open, become obliterated by pressure, or otherwise, and that the growth from the cysts of tumors and bursæ, however imperfect, suffices for the obliteration of these cavities, and in either case, health may be restored. If, however, as also often happens, these processes prove abortive, the discharge continues; or fungus is protruded, and the constitutional irritation being maintained, life often is sacrificed.

The inflammation which attacks these cysts when open, corresponds in its disposition to spread, with that resulting from an aperture in other shut sacs; and I may add, that it more frequently attacks with vehemence, when an opening has been made by art, than when it is the result of the spontaneous operations of nature. I may also add, that where either bursæ or encysted tumors have previously suppurated, there is a greater chance of restorative processes taking place than when no efficient suppurative action has occurred prior to an opening being effected*.

It should be observed, that the inflammation

* In a case of suppurating bursa, I have seen complete adhesion take place in twenty-four hours after an opening.

which now takes place, is by no means confined to the cysts themselves, especially in the case of encysted tumors and bursæ, but is communicated to the adjacent parts, and often extensively, assuming the character of erysipelas. To this inflammation the best application is a pretty strong solution of the superacetate of lead, as far as I can judge; and I may add, that the destruction of the fungous protrusion, which is insensible, by the repeated application of kali purum, appears to be the best method of destroying the diseased growth, and obtaining a cure. Internally, antimonials and opium must be administered freely.

Spreading inflammations.

TREATMENT.

As to the prior treatment of enlarged bursæ, and other inflammations of synovial membranes of tendons, whether by external irritants and discutients, which will often cure them (especially the application of mercurial and iodine ointment, to a blistered surface over them); by bursting them; by puncturing and irritating them with a probe; by incision, or, finally, by removing them, I shall say nothing; but as I have had opportunities of witnessing very serious, nay, fatal consequences, which have resulted from openings made into them, I can only urge the necessity of great caution in this respect, and should prefer the absolute removal*,

* Which is strongly recommended, in many cases, by Mr. Brodie.

Spreading inflammation.

when circumstances will admit of it, and milder methods fail.

GENUS III.—*Disposition to Resolve, or to Suppurate and Slough.*

Erysipelas.

Varieties: *a* Superficiales.

b Phlegmonodes.

c Œdematodes.

Preliminary remarks.

Erysipelas has received much of the attention of medical writers in all ages; nevertheless it may be stated, that the subject still remains in a state of considerable uncertainty; and if such a remark was justified when the first edition of this work was published, it is not wholly without foundation now, notwithstanding the very able essays which have since been published on this subject by men of the first talent. Differences of opinion still exist as the kinds of inflammation which ought to be included under this title; the nature of true erysipelas, and still more as to the plans of treatment.

The terms erysipelas and erysipelatos have been used by some, with the same latitude as scrofula.

and scrofulous. It has been applied to erythema*, Spreading inflammation. shingles†, inflammation of internal membranes‡, to burns and blisters§, and, in short, to every kind of spreading inflammation; whilst, on the other hand, it has been restricted to the skin only||; and it has even been doubted if it is an inflammation¶.

We shall never understand rightly what we are about, unless we have some definite signification for our terms. I should say then, that erysipelas Definition. is a spreading inflammation, affecting the skin in every case; communicated deeply to the cellular membrane in every variety but one, the superficiale (in which it often does not go deeper than the skin); having a tendency to terminate either in resolution, or in suppuration or sloughing of the cellular membrane; producing vesications on the skin, accompanied with considerable tumefaction, chiefly from the effusion of serous fluids, and ending abruptly in the surrounding skin, attended with fever, and terminating at an uncertain period, according to circumstances, but in cases not protracted, in about eight or ten days. After it, the skin peels, and the hair often falls.

* By no less authority than Cullen and Lawrence.

† Cullen.

‡ Hunter, Cullen.

§ Carmichael Smith.

|| Wetherhead; also Hunter, as regards true erysipelas; and Dr. C. Smith; also Lawrence, Lecture 34th, Lancet.

¶ Pearson.

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Disposition to spread.

Its disposition to spread is very remarkable, and it is probable that this is promoted in a considerable degree by its being a primary inflammation of the skin.

In a great majority of cases the inflammatory disposition is communicated to the cellular membrane, but as it spreads, the affection of the skin to me seems invariably to precede that of the cellular membrane, which it leads, if I may be allowed the expression*.

Terms—
E. PHLEGMONO-
NODES.

When the cellular membrane is materially affected, the seat of the disease is in part the same as in phlegmon, and its character is considerably modified; in these cases the term E. phlegmonodes has been commonly adopted, when the parts possess sufficient power; œdematodes or gangrenosum, when they do not.

E. GANGRE-
NOSUM, ob-
jectionable.

To the term gangrenosum, as applied to a particular species of erysipelas, strong objections occur, for gangrene is a termination to which all are liable in a greater or less degree, and, therefore, it is erroneous to bestow this title on one kind only.

E. ERRATICUM, objectionable.

In the first edition, I used the terms erraticum

* Dr. Duncan, to whose authority I should be greatly disposed to bow, as well as Mr. Lawrence, question the accuracy of this opinion; I have, therefore, narrowly watched the progress of the disease, and I cannot, after the best observation I have been able to give in numerous cases, see reason to alter it.

or superficiale, for that kind of erysipelas which Spreading inflammations. does not invade the cellular membrane; the former being employed by Willan; but although the erratic disposition is a very frequent character of the superficial erysipelas, it is not an invariable one; and it is a greater objection, that the E. phlegmonodes is also erratic, though in a less degree.

I cannot say that the term superficiale is wholly E. SUPERFICIALE. unexceptionable; but it is expressive as contradistinguished from the E. phlegmonodes; it must, however, be remembered that they are sometimes convertible, often co-existing at different periods. Mr. Lawrence has employed the term E. simplex to indicate this form; similar objections will likewise apply to it.

Dessault divided erysipelas into the bilious and Dessault's division. more purely inflammatory species; to a certain degree the division was warranted by a greater or less predominance of the one or other character in particular cases; yet, on the whole, it may not be amiss to abandon the terms without forgetting the fact.

Causes.—The predisposing causes depend on CAUSES; predisposing. the state of the person or the air; thus with re- State of the air. gard to the latter, there can be little doubt, that in hospitals, at particular times, there is a great tendency to erysipelas, whether referable to infection or not; that at particular seasons there is

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a great disposition to produce it, or analogous diseases, as is well illustrated by what occurred at Plymouth in the year 1824*.

INFECTION.

There seems to be the strongest reason for supposing that the disease is communicable by infection†, although that is not, perhaps, in all cases very active; and there is no inconsiderable ground for believing that the infection of erysipelas is capable of exciting *internal* inflammations‡, which probably may be of the same character though in different tissues.

State of constitution.

The state of constitution which most especially disposes to erysipelas is the bilious, but it will depend on circumstances what precise form it may assume: thus in the young, whose organs are sound, it will have a more favourable character, and be disposed to resolve; in the middle part of life we shall have the E. phlegmonodes with much of the bilious character, and with a greater disposition to slough and suppurate: when the constitution is shattered, the œdematodes.

Excesses of every kind, particularly in drinking

* *Vide* Butter on Irritative Fever. In 1813, I had the charge of a large number of cases at Romford, at a time when boils were also remarkably prevalent; and I could not help conjecturing, that a state of constitution, nearly similar to that which would otherwise have produced boils, occasioned this disease, if there happened to be a breach of surface.

† Dr. Stevenson, &c. Ed. Med. Chir. Trans. vol. ii. p. 128.

‡ Dr. Lee. Med. Chir. Trans. vol. xvi. part ii. p. 443-4.

malt and spirituous liquors, as well as most of those causes which dispose to inflammation generally, will to erysipelas; but among its causes the suppression of discharges of every kind may be especially mentioned, particularly from the healing of old ulcers. It may be further remarked, that it is very prone to occur in persons already labouring under some other disease, though trifling; and again, those who have once suffered an attack are very liable in future life to returns.

Spreading inflammation.

The immediate causes are in an especial manner any local disease or injury; thus a breach of surface, as from accident, leech bite, or operation; a sinus, ulcer, or issue will give rise to it in persons disposed thereto. When matter is confined in any way, an inflammation will take place on the surface, possessing many of its characters. The effect produced by a blast of cold air, or other similar impression, will frequently occasion it. In the face, head, and legs, it often occurs without any cognizable cause.

IMMEDIATE.

When erysipelas takes place a blush appears on the skin, of a more or less rosy hue, disappearing on slight pressure, but returning at once on its removal, spreading with a well defined margin, a little rough to the touch, and having a slight elevation; it ends abruptly. After a short interval, vesications, bullæ, or phlyctenæ appear. This inflam-

External character of the disease.

Spreading inflammation.

mation may either spread along the skin and die away with desquamation; or proceeding, the skin become loaded and tense, and the subcutaneous cellular membrane be affected, constituting the phlegmonoid form: it may be observed, however, that in the E. superficiale the cellular membrane under the skin is in a *slight* degree affected as well as the cellular tissue of the skin itself.

State of the parts beneath.

When it extends decidedly to the cellular membrane beneath, there is a copious serous effusion, discoloured and commonly more or less mingled with lymph, after a while pus is formed, and portions of cellular membrane, often very considerable, are prone to perish by sphacelus*.

The matter when formed is not contained in separate cysts walled in by adhesions, but pervades the cellular tissue, from the failure of the adhesive process; generally, however, there are deposits of pus more or less large in some places, where frequently large sloughs of cellular membrane will also be found, resembling wads of wet shamoy leather. The matter is often of a bad description, discoloured and offensive.

Deficiency of adhesive process in the cellular membrane and tendency to slough and suppurate.

Cellular membrane is naturally disposed to form adhesions readily, more so probably than skin, but in erysipelas this disposition is deficient; it is also

* Mr. Hutchinson observes, that the *adipose* membrane immediately under the skin is less severely affected than the *cellular* membrane beneath, connected with the muscles.

more prone to suppurate and slough, and hence these effects so often result from erysipelas extending to it. The copious effusion of serum, the common product of this inflammation, also lessens the powers of the parts, possibly by separating them, and thereby tends to defeat the adhesive process: be this as it may, we see those portions of cellular membrane which are looser in their texture most readily invaded, as in the eyelids; while in others, where it is particularly dense, as in the chin, erysipelas hardly ever extends itself.

Spreading inflammation.

When matter forms, the skin does not point over these collections, but there seems, as in carbuncular abscesses, a combination of two opposite actions in it, of adhesion to confine them, and of ulceration and sloughing to discharge them; the latter probably owing partly to the insulation of the integuments, as well as to the destructive influence of the subjacent matters.

Processes in skin rather tend to confine than to give vent to matter.

The evil may not stop here; for the fascia may likewise be involved*, and if it is, the affection will be communicated to the parts below, and spreading between and among the muscles occasion the most frightful mischief, their tendons often sloughing and coming away.

Fascia and parts below involved.

* This has been doubted (Lawrence. Med. Chir. Trans. vol. xiv. p. 15.); but I have had many opportunities of seeing that this is the case. Mr. Hutchinson appears to have witnessed this in very many instances, and Mr. Earle states the same fact.

Spreading inflammation.

Absorbent vessels and glands.

In a great many cases, and these some of the worst, the absorbent vessels inflame both upwards and downwards, carrying along them the inflammatory action to a great distance and with great rapidity. The lymphatic glands in their course often inflame also, and if they do, tend to arrest the progress of the disease; it is not uncommon to see many in succession attacked, and in them limited abscesses form, containing good pus. They may, however, again be resolved.

When inflammation of the absorbents is combined with erysipelas, it is most commonly when there has been a breach of surface.

TENSION.

When the skin and subjacent parts load, a degree of tension is produced, binding like a tight roller the parts below, while itself is greatly stretched; this much aggravates the disease and increases the disposition to slough; in this state, as in carbuncular abscesses, the skin feels like brawn. This tension of the skin does not seem to be owing simply to the effusion of serous fluid, for in common œdema the swelling may be much greater without any tension; it seems rather that this rigid state is the combined result of this effusion and the peculiar change in its own constitution*.

HEAT.

The heat of the part and of the whole body is

* In the superficial form, the loading of the skin is often very slight, and it is neither firm nor tight.

dry and frequently scalding to the touch, and intense to the patient's feelings. Spreading inflammation.

The pain, at first inconsiderable, becomes burning and sharp; and the tenderness, originally slight, often increases to a great degree. PAIN.

The colour in the more favourable cases is of a rosy red, but in proportion to the predominance of the bilious character, it assumes more or less of that tint which has been well designated as "rubor subflavescens;" and in the worst cases it becomes more deep and fiery, from which, and the intense heat, the old name of St. Anthony's Fire was attributed to it. A purple, dusky, or mahogany hue often precede the occurrence of gangrene. COLOUR.

In some cases there is considerable throbbing, in others this is altogether absent. THROBBING.

In a few days, probably, not more than a week, the disease will either run its course in the part first affected, and resolve with a subsidence of all the symptoms there, or it will proceed to the formation of matter or slough; but as it is its character to extend, it often happens that it shall subside in the part first affected, while it is spreading with augmented violence elsewhere, so that the duration and event of this disease are most uncertain. It is also not uncommon for the disease, when apparently extinguished by bleeding, or other mea- Progress of the disease.

Spreading inflammations.

sures, to recur in the same or some other part, the disposition of the system on which it depends not having been overcome.

This description applies to E. phlegmonodes more particularly.

The description here given is of the phlegmonoid form more particularly; if we abstract from this the affection of the cellular membrane, obviously the most important complication, we shall have the E. superficiale; and if, on the other hand, we add the influence of great asthenia, either from disease or debility, we shall have the E. œdematodes or gangrenosum, bearing to the other, probably, nearly the same relation which confluent small-pox does to the distinct.

But this is divisible into two kinds.

But it will be practically found that there are great differences in the *phlegmonoid* form of erysipelas: in many cases, the heat and tension of the part are less, and the colour not so strong, and the affection of the system differs, in correspondence with the local disease; a point which will be adverted to when considering the treatment.

Affection of the system.

In spontaneous erysipelas it is very common for pyrexia to precede the appearance of the inflammation; and in those instances, which originate from local causes, this is also often the case; but pyrexia does not always pre-exist. When the inflammation is proceeding, the sympathy of the

general system will be very truly proportioned to it, in degree and kind, and becomes, in its turn, a cause of aggravation of the local symptoms. Spreading inflammations.

By some eminent authorities this disease is regarded entirely in the light of a fever producing an external inflammation*; it is a question which I shall not enter into; but I may remark, that the effects of *local* treatment would induce us to think the contrary, as a general proposition; at the same time, cases frequently occur, where a state of fever is so much relieved by an eruption of erysipelas, and others, where so much disturbance is produced by its repulsion, that we cannot help believing, that in these, as in gout, the local inflammation *has* proved a relief to the constitutional affection, a circumstance which should be borne in mind in the treatment.

Rigors and sickness very commonly usher in Symptoms. the attack. The pulse are generally accelerated, but differ much in nature, being sometimes soft and quiet, at others hurried, very frequently bounding, and often tense; they are, however, exceedingly deceptive as an indication; I have known them chorded and vibratory, where the patient's strength has been so much sunk that he has fainted on being placed upright in bed, and where death speedily ensued.

* Mason Good, and S. Cooper, &c.

Spreading inflammation.

The skin is dry, often burning, the urine scanty and loaded.

There is almost invariably pain in the head, particularly over the eyes, often intense, and aggravated by the slightest motion, which frequently produces nausea; there is commonly a throbbing of the arteries. Delirium frequently ensues, and in the advanced stages, coma. The face is sometimes flushed, at others pale and sunk; the eyes red and dull; tremors not uncommon. Epistaxis is not an unfrequent occurrence, and greatly relieves.

The respiration is often accelerated, sometimes laborious, at others, frequent and anxious, a symptom of severe affection of the system.

The tongue is much coated, inclining in a greater or less degree to yellow in the beginning, becoming dark in the progress, and much disposed to dry.

The region of the stomach is often tender, as well as that of the liver, and the patient is frequently affected with nausea and vomiting, and with bitter taste in the mouth. The thirst is generally very great, bilious matters are often rejected from the stomach, and the alvine evacuations are commonly offensive, and often loaded with dark bile.

Accordance of the general and local affection,

The affection of the constitution increases or subsides with the progress of the local disease,

and when the latter occasions foul suppuration or slough, it partakes speedily of the character of typhus, and is relieved only by giving vent to such matters. I cannot, however, look at this fever merely as bilious fever, or typhus: it has many points of difference, which I should tire my reader with detailing; but there is one important feature to which I would call his attention.

Spreading inflammation.

The fever which accompanies this inflammation often assumes a mixed character after the earlier stages, from the circumstance just alluded to, namely, that in one part the sloughing process will be going on, and communicating to the system the typhoid disposition, which ensues from this cause, while in parts newly attacked, the inflammation rages with a different character, and the sympathy of the constitution will partake of the two; there will be still a high, bounding, though hurried pulse; while the dark tongue, delirium, offensive secretions, and complete depression of strength, give evidence of the typhoid state.

and peculiar character impressed by the latter.

Such, then, are the local and general symptoms which may be remarked in severe cases of E. phlegmonodes; but it is highly important to understand that between the mildest and severest forms of erysipelas, there are many shades of difference, not only in degree, but in nature, and hence it

Great many shades of difference in E. phlegmonodes.

Spreading inflammations.

arises, that *no general* mode of treatment can rationally be proposed for this disease.

But as regards E. phlegmonodes, may be particularly referred to two heads.

I have already adverted to the leading difference in the local characters of erysipelas, especially the phlegmonous, namely, that sometimes the skin is tense and deep coloured, with excessive heat, at others, the colour is paler, without any tension, and with little comparative heat: we shall generally find that in the former the febrile action is much higher, marked by high pulse, great heat, full and flushed face, and active delirium, and generally bears active depletion; while in the latter the pulse is soft, heat less, face rather pale and sunk, with comatose delirium, and great depression; and in these not only is large depletion often injurious, but a supporting plan is frequently found beneficial or indispensable: in many of these cases the external disease is the least part of the affection; relief to the system is sometimes obtained by encouraging it, and great injury arises from the use of repellents; while in the former the reduction of the inflammation by local means is most serviceable, and general depletion is commonly advantageous. But before I proceed to the subject of treatment, it may be right to say a few words on the prognosis.

PROGNOSIS.

The leading points may be collected in a considerable degree from what has been already stated;

but briefly, the danger is great in severe cases, in Spreading inflammation. advanced life, or in bad and broken constitutions; not so in youth, or in sound constitutions, generally speaking; but it may be affirmed of this more than of most diseases, that a great deal will depend upon the management.

If the colour is bright and good, and vesications Depends upon the appearance. form not phlyctenæ, and the colour of the serum effused on the surface of the skin is not dark—if the progress is not very rapid, and is rather from the centre of the system than towards it—if the part does not load greatly—if the inflammation subsides in that first affected without suppuration, as it spreads in the adjoining, and if the fever Progress, lessens towards the seventh or eighth day, we may augur favourably; but if the colour is dusky, and phlyctenæ form early—if suppuration and sloughing take place in the parts first affected, while it continues to spread, especially if rapidly and towards the centre—if the affection of the head comes on early, and is severe, particularly if delirium supervenes, still more if it continues through the day, the fever augmenting with the duration of the disease, instead of declining, the danger is more imminent, and the termination, in bad constitutions or under bad treatment, very often fatal. The situation, also, has much influence; for it is generally more dangerous when it affects the trunk than the extremities, also when the head or face



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and seat.

are attacked; indeed, erysipelas of the head is always to be viewed with great apprehension. I may remark, that as far as I have seen, suppuration and sloughing more frequently occur in the lower extremities than in the arms, and more frequently in them than in the trunk; but in the latter situation, in severe cases, the skin is apt to fall into gangrene without suppuration beneath it, and from the extent of surface affected, the constitutional sympathy is great.

The type of erysipelas appears, for the most part, to be asthenic; at least such an inference is deducible, from its disposition to terminate in sloughing, to occur in weak parts, and in weak persons, more especially since it is very apt to befall patients labouring under asthenic fever*.

TREATMENT.

Nothing can be more various, I might say opposite, than the methods of treatment, both local and general, recommended by the highest authorities, and as it would be unjustifiable to doubt the statements of such persons, we can only reconcile the differences by supposing that they are each useful under particular circumstances, though it may be difficult in all cases to point out exactly what these are.

CONTRARIETY OF OPINIONS.

Three stages may be distinguished in erysipelas.

It may not be amiss for the sake of perspicuity to divide the treatment of erysipelas into that

* Tweedie on Fever, p. 74.

adapted to three stages: the first before suppuration has taken place; the second after this has occurred, and before the matter and sloughs are completely discharged; the third, the state of *affaïssément* which remains after they have been discharged.

Spreading inflammations.

The local treatment in the first is now to be considered, and the abstraction of blood is one of the most material points; this may be effected by leeches, incisions, or punctures. The former simply remove blood from the part, the latter answer other purposes.

LOCAL TREATMENT.

Against the use of leeches there was long a very great prejudice, probably arising from the well-known fact, that from their bites erysipelas often ensues; and hence it was supposed that this quality in leeches would more than compensate for the benefit they render in other respects, and from the apprehension that these bites would readily become so many points for ulceration or gangrene to commence at; in practice, however, it will be found that neither of these objections are well grounded, and that leeches, in the commencement, are capable of rendering most important service; for this, however, it is requisite that their number should be large, and repeated according to the occasion. They possess this advantage, that the timid will allow them to be employed, who would not permit the more decided measure we are next to speak of.

Bloodletting by leeches.

Spreading inflammations.

Incisions as recommended by Mr. Hutchinson.

It is now many years since Mr. Hutchinson introduced into this branch of surgery a most decided improvement; I mean the practice of making incisions, not for the purpose of evacuating matter, but with the intention of abstracting blood, relieving the tension of the parts, and of allowing serum or other fluids to drain off; and it is really astonishing how effectually these objects are obtained by it in a great number of instances*. I believe that if this mode of treatment were adopted in most cases early in the disease, it would generally succeed in putting a stop to it; but so large a proportion do well without, that while the surgeon is unwilling to have recourse to this mode, until the danger is already considerable, the patient, it may well be supposed, is often averse to it.

Objects of this practice.

Besides the objects above stated, I cannot help thinking that there is a further purpose obtained, and that the actions of the part and the constitution are *quieted and allayed by the consciousness*, if I may be allowed the expression, that a *vent* is provided for any matter or slough *in process of formation*, that the disease, in fact, *is brought to the surface*. It is further probable, that the opinion

* To Mr. Hutchinson, I cannot but attribute this improvement in surgery, as regards the early stage of spreading inflammations; but it is manifest that O'Halloran, and others, in this country, and Quesney, and various foreign surgeons, were in the habit of employing them in the more advanced stages, although their theories misled them as to the object to be obtained.

of some French authors on the use of cautery, here-
after to be mentioned, may also be correct, and that
the actions of disease *are recalled from the cir-
cumference towards the centre* by such means as
these.

Spreading in-
flamations.

Mr. Hutchinson's plan consisted in making in-
cisions to the number of from four to eighteen,
according to the necessity of the case, of about an
inch and half in length, and from two to four
inches apart, down to the fascia. A person unused
to this practice might apprehend that the cuts
would be attacked with gangrene; but this will
not happen unless it must have inevitably occurred
otherwise, and there is, in fact, scarcely a surer
mode of preventing it.

Mode of car-
rying it into
effect.

It must be understood that this practice is alone
applicable to the phlegmonoid form of erysipelas.

Mr. Lawrence has adopted Mr. Hutchinson's
plan, with an alteration, which he strongly recom-
mends as more decidedly beneficial; it certainly is
less painful; it is that of making at once an in-
cision of great length: if it be in a limb, for instance,
he, without hesitation, carries the knife from one
joint to another, or nearly so, if the inflammation
is so extensive, and in severe cases he sometimes
makes a second. The objection to it is, that it
may lead to a greater loss of blood than the patient

Mr. Law-
rence's plan.

Spreading inflammation.

can bear : as far as I can judge of the two modes, the advantage of the one or other must chiefly depend upon the circumstances of the particular case, and the strength of the patient would probably determine the preference ; for I am bound to say that I have seen very large discharges of blood from these long incisions much less easily commanded than when they are small. In every case where they are employed, it is necessary to watch the bleeding carefully, and if excessive, control it by raising the part above the horizontal line, by cold, pressure, or ligatures, if practicable ; but I think it will generally be found, that it occurs from a number of small vessels, in which case pressure is more applicable ; and I may here mention, that a plan of using it I have found most available has been by introducing one or more of the fingers *longitudinally* into the cuts, and pressing steadily for a few minutes ; this gives time for the blood to coagulate in the mouths of the vessels, and when the finger is removed the bleeding is at an end ; while sponges, on withdrawing them, pull away the coagulum, and both sponge and lint irritate, from their roughness, and are apt rather to excite hæmorrhage.

If the bleeding is not in excess it should be encouraged, whether one or more incisions are used, by warm fomentations and bread and water poultices

thereafter, the cuts being subsequently dressed with simple cerate, or with basilicon, as recommended by Mr. Lawrence. Spreading inflammation.

In many cases they will prevent the sloughing process, if timely employed, but in the greater number the cellular membrane at *the part* is not prevented from perishing, but it will be found now to come away readily and without disturbance, no longer maintaining an irritation, which before caused much mischief *more remotely*, as well as in the spot.

They should be repeated if circumstances require it.

Dr. Dobson*, again, proposes another modification of this treatment, employing numerous *punctures*, varying in depth according to the degree of tumefaction; in length, from two to four-tenths of an inch, and in number from ten to fifty, repeated to the number and extent required, mostly twice a day, often three or four times in the twenty-four hours. Dr. Dobson states, that the plan is not only safe and effectual, but adapted to any form of the disease and any situation. Dr. Bright confines this statement, particularly with respect to the face, where incisions would produce Dr. Dobson's mode.

* M. C. T., vol. xiv. p. 207.

Spreading inflammation.

ugly scars, and punctures do not. Mr. Lawrence, indeed, says, that erysipelas occurring in the face is not attended with that serious inflammation of the subcutaneous structures, leading to suppuration and sloughing, which requires incisions; but it is common to see this part so enormously loaded, that this position may be questioned, as far as the affection of the cellular tissue is concerned; and if the observation relative to the comparative infrequency of suppuration is correct, as I believe it to be, this may depend upon another cause, namely, that it less frequently proceeds to suppuration and sloughing, on account of the higher vital properties of the part, excepting in old and shattered constitutions, where matter often forms under the jaw, or in the eyelids, a situation in which it not unfrequently occurs in persons of any age.

COLD LOTIONS.

Cold, either alone or in medicated lotions, is often employed with great advantage in erysipelas, arising from injury, especially in the phlegmonoid form, occurring in the extremities still more if the absorbents are inflamed; in such cases a poultice being applied to the breach of surface, if any there be, from whence it originated, cold should be used extensively to the limb: this is often advantageously combined with spirit and plumb. superacetat., the proportions varying according to

circumstances*; but in the more violent cases, and Spreading inflammations. in hot weather, to be effectual, nothing will suffice but large swabs wet with the coldest water, renewed constantly day and night; nor will it do to intermit the use of cold, for if after the actions are reduced by its efficient application, the patient be left at night with a negligent or sleepy nurse, the inflammation will return with equal or increased severity.

In many cases, especially of spontaneous erysipelas, cold is improper, but not invariably so, even when it occurs in the face.

Poultices of bread and water, or of linseed meal, POULTICES. are often preferable as applications to the whole extent of the inflammation when it is not excessively high; to these the lotion mentioned above may be added with much advantage. When poultices are employed, they cannot be renewed too often: I have frequently had them changed every hour; and in cases where it is desirable that they should continue warm, they are best applied on pulled tow.

Fomentations are often used with advantage, FOMENTATIONS. indeed by many are preferred to the preceding applications; the superiority of the one or the other will much depend on the character of the inflammation, especially on its violence; it often

* Commonly alcohol $\bar{3}j.$, plumb. sup. $\bar{3}ss.$, aq. $\bar{3}vij.$

Spreading inflammation,

may be used experimentally, and continued if it serves: the tendency of warm fomentations to encourage suppuration will often be an objection in these cases, where it is our object to prevent that termination.

Arg. nitr.

Besides these, there are other applications which exert a very powerful influence on erysipelas; and I have particularly to mention the arg. nitr. as employed by M. Higginbotham. I should say that it succeeds oftener than any other application, but I by no means would be understood to say invariably; if this were the case, we should have little occasion to trouble ourselves about other remedies. I do not think there is reason to believe it injurious, in cases where it does not prove beneficial. I should seldom adopt the severe mode by incision until this had been tried and had failed.

Ung. hydrarg.

The ung. hydrarg. daubed on the part, which has likewise been strongly recommended, has undoubtedly a very strong power in counteracting the inflammatory tendency in erysipelas, although, as far as I have had an opportunity of judging, in a less degree than the remedy mentioned above. It appears to me, that in the milder forms of erysipelas, or in the commencement, either of these remedies will very often succeed, particularly the former; but when the flame is raging strongly, then they are insufficient to extinguish it.

In many cases the application of spirit, such as brandy alone, or slightly diluted, or the lotion recommended by Dr. Peart*, are very valuable applications in erysipelas, more especially, I think, in the superficial form, spreading rapidly in weak constitutions.

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Stimulating lotions.

Blisters have been applied to the part, with the intention of producing a new action, or of determining the action more to the surface, and thereby averting the destructive processes which threaten the cellular membrane below; and I should apprehend that it is with these views M. Dupuytren recommends their employment. They have also been applied beyond the boundaries of an erysipelas, especially to surround a limb, with the view of arresting the progress of the disease, an experiment which I have often tried, but only once with decided success; they, however, appear to check, if not to stop the progress.

BLISTERS.

With somewhat similar intentions, and for the purpose, more especially, of concentrating the actions towards the centre of the inflamed parts, and thus arresting its progress towards the circumference, actual cautery has been employed, and I conceive the principle to be a sound one; and M. Larrey states that it is very successful; he applies it lightly to different points on the in-

CAUTERY.

* Subcarb. ammoniæ, superacetat. plumb. āā 3j., aq. rosæ, lbj.

Spreading inflammation.

flamed surface, at convenient distances, to the number of forty or fifty*. It is not improbable the arg. nit. may partly act in the same way.

PRESSURE.

Bandaging the part firmly has been extolled by Velpeau, Bretonneau, and others, and some very striking instances are recited of its success: the pressure must be made equally and firmly from the extremity of the limb, filling up the hollows carefully with compresses, and wetting the bandage assiduously; the effect for the first two or three hours is stated to be an increase of pain, subsequently ease, and an abatement of all the symptoms, which with little other treatment subside.

There can be little doubt that in all cases of spreading inflammation it is from want of the adhesive process the inflammation extends: pressure will be likely to prevent the effusion of serum, and dispose to that of lymph alone, and so far serve; it will also give that kind of support, which parts so circumstanced often require; upon such principles it appears to be beneficial; and it is a fact remarkably corroborative, with reference to the present disease, that the parts on which the patient rests are less frequently invaded by erysipelas. On the other hand, there is no surgeon who has not seen the injurious effects of bandages in inflammation, however carefully applied, or of

* Rev. Med., Fev. 1826.

the tension of the skin of inflamed parts, which Spreading inflammations. cannot act otherwise than as a bandage; and it may be further stated, in contrast with the cases above alluded to, that in some instances, in which this plan has been adopted, gangrene has been the result*.

Such remedies as these now mentioned are generally applicable rather to cases of erysipelas arising from a local cause, than to those of spontaneous origin, in which it is often advisable to abstain from all local applications; or at most to content ourselves with bathing the part with some mild tepid fluid, if the heat or itching are troublesome, or to dust it with flour, especially if the vesications are numerous and broken. The late The preceding methods less applicable to spontaneous erysipelas. experience we have had of the use of flour in burns and scalds will relieve such applications from the contempt in which they have been, I am willing to confess, undeservedly held: when other means are doubtful, these surely ought to be tried. Flour often advised and may be useful.

* Dr. Nelson's case, Trans. of Med. Chir. Soc. Edinb., vol. i. p. 453; also a remarkable case by Mr. Lawrence, in M. C. T. Lond. vol. xiv. p. 194.

For the details of successful cases, *vide* M. Velpeau's Memoir in the Archives Gen., July, 1826, p. 425; it may be added, that Dr. Balfour, so long since as 1815, published a Memoir in the Edinb. Med. and Surg. Journal, advocating, on similar principles, the use of pressure in rheumatism.

Spreading inflammation.

The objection to local remedies in spontaneous erysipelas may be carried too far.

Physicians have commonly held that it is neither safe nor useful to interfere locally with erysipelas occurring in the face. This may be a good rule in many cases, but it may well be doubted as applied to all; for when the tension, heat, and tumor are great, these may often be moderated with safety and advantage, and indeed the principle on which this is denied is questionable; for it must be remembered, that although other eruptive inflammations, as variola, scarlatina, measles, &c. may relieve the system by their appearance, and serious mischief arises from their repulsion, yet if the local symptoms are severe, they aggravate the fever without any perceptible benefit whatever. The same thing, I am convinced, frequently occurs in erysipelas.

Treatment in the second stage.

Paramount necessity of making incisions, why.

Hitherto we have been considering those measures which it may be proper to employ in the first stage, many of which may be beneficial subsequently; but if suppuration or sphacelus occur, what then becomes our duty? *beyond all question to make incisions.* Whatever difference of opinion may be entertained as to their propriety in the earlier stages, whatever reluctance we may then feel to put in force so painful a remedy, whatever the kind of erysipelas may be, it may now be stated that their employment is perfectly indispensable and imperative; for, as has been before

said, when foul matter and sloughs form in any part, they immediately communicate an unfriendly disposition to all those surrounding, and the type of the constitutional affection changes, and when confined their influence is greatly increased. These circumstances not only obtain in the present case; but as these matters are neither *led to the surface* by that process which is termed pointing, *nor walled in by adhesions* of the cellular membrane, not only is their residence in the parts particularly injurious, but their spontaneous discharge indefinitely delayed.

Although there is often great difficulty in ascertaining the existence, or the situation, of such collections, yet an accurate examination will probably detect them. The spot may *often* be discovered by a sensation as if there were a quag under the skin, if that be pressed upon pretty firmly; for although the skin itself remains hard and tense, the subjacent parts are not equally so; at these places too the colour is often more dusky, and if in addition to this there are phlyctenæ on the surface, there will be still greater reason for believing that matter is situated underneath: collections of pus, however, may form without any slough, and in these cases there is not the same dark appearance of the skin, nor of the phlyctenæ which exist when there is. In whatever species of acute inflammation this colour is observed, it commonly

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Mode in which collections of matter may be detected.

Spreading inflammation.

denotes the existence of, or imminent risk of, sphacelus under the skin, and sphacelus of the skin will commonly take place to give this exit if an incision is not made.

Mode in which the incisions should be made.

As the safety of the patient depends upon the timely evacuation of such matters, it is far better to err by making an incision unnecessarily, than by omitting to do so when it is required: from the former conduct no harm can accrue, from the latter the greatest. The plan I have long adopted has been that of thrusting into a part where there is reason to suspect such collections, a keen double-edged knife deeply, and if pus follows, converting the puncture, which gives little pain, into an ample incision. It is necessary that this should be deep, as it has to penetrate the loaded skin, and large, as a free opening is required to give sufficient vent to sloughs and matter, and also to answer another very important purpose, to free the tension. If we make small openings, such will be the stress upon their edges that they will rapidly ulcerate or slough, till by these processes they are rendered large enough; if we at once make them so, they will gape and immediately relieve the tension at the part, and presently of the whole limb, by giving vent to the deep-seated matters and allowing the serum to drain off. The bleeding also, even now, will be beneficial.

Wherever the matter may be contained, then

without hesitation openings should be made to discharge it, and they may be repeated as often as they are called for by the formation of fresh collections; for it is the property of this inflammation, after it has subsided in one part, to spread with the same mischievous consequences to others, and until all these are evacuated the disease will not end. I have seen instances when, after proper treatment has completely subdued the violence of the disease, and when there has been every reason to believe the patient free from danger, yet from foul collections, although of no great size, remaining unopened, lives have been lost; such collections as certainly would not endanger a person under any ordinary circumstances, but capable of producing extreme mischief to constitutions shattered as they have been by the effects of the disease; as a trivial misfortune will sink a ship which has been crippled by a storm.

Spreading inflammation.

Some may doubt whether, in a state of the integuments bordering upon gangrene, incisions should be made: it is my own belief, that whenever the affection of the cellular membrane predominates over that of the skin, they will be advantageous.

As the sloughs come away, great care must be taken to support the parts with bandages, moist-

Treatment in the third stage.

Spreading inflammation.

Of the drains.

Of the ulcerative process.

ened with a spirituous lotion, for the matter, unless prevented, will not cease to undermine the adjacent parts, often running under the fascia and separating the muscles extensively; and here I may observe, that many cases sink likewise under the exhaustion of such extensive drains, although the violence of the disease has ceased. The treatment now mentioned, if carefully pursued, will soon cause the sinuses and hollows to adhere and restore tone to the parts. On the mode of doing this effectually, Dr. Dewar* has given a most excellent paper, and although the principle he enforces is simple, it has not perhaps been enough attended to.

It is not only necessary to attend to the greatest mischief, the undermining process, but the ulcers on the surface often slough and ulcerate away with great rapidity, destroying large portions of integument; to these the best application I have found is lint dipped in equal parts of port wine and decoction of bark; the chlorides also are useful, or in a few cases fermenting or charcoal poultices.

General Treatment.

GENERAL TREATMENT.

Diversity of opinions.

On this as well as the local treatment of erysipelas, very various and even opposite opinions

* Med. Chir. Trans. vol. vii.

have been maintained; but as in many other mat- Spreading in-
flamations.
ters the apparent contradiction may perhaps be
reconciled by the consideration that there are, in
truth, so many differences in the disease itself, that
in *some* cases, or at *some* period of the disease,
most of them may be advantageous: nevertheless
it is highly important to ascertain which may be
the best in *the* case that presents itself.

The type and character of the inflammation, and Advantage of
considering
the differ-
ences of the
three stages.
the age, habit, and other circumstances of the in-
dividual must greatly determine this point; but I
believe a reference to the principle which has been
commented on, p. 386, may assist our judgment,
namely, the division into three stages: the first
preceding the formation of slough or matter on
the one hand, or the resolution of the disease on
the other; the second including the existence of
the matter or sloughs in a confined state, but often
combined with the processes of the first stage going
on in fresh parts; in the third, the inflammation
may no longer be spreading with activity, and a
vent for the contained matter has been obtained
by the efforts of nature or by art. In each of
these stages there will be a modification of the
constitutional affection, although it must be un-
derstood that they may be very much mixed, for
reasons already assigned*.

* P. 383.

Spreading inflammation.
BLEEDING.

Bleeding, as the most decisive remedy, deserves to be considered first. It has been strongly condemned by some writers, and extolled by others; the weight of authority, however, with limitation as to the nature of the cases, may be deemed in its favour, and there can be no doubt that in many of the severer cases of E. phlegmonodes it ought to be employed in the beginning, and repeated, if necessary, especially where there is a full and bounding pulse, combined with great heat, and a tense and loaded state of the inflamed parts, especially when the head is much affected, and more especially if there is an insufficient epistaxis.

The necessary quantity of blood may, in many cases, especially of erysipelas from local injury, with more advantage be taken from the part, as before stated; but in the idiopathic erysipelas, particularly of the face, or in other cases where the local depletion does not produce an adequate impression on the general system, venesection is preferable. I am not, however, prepared to believe that bleeding can be relied on as a cure for erysipelas, but rather that its legitimate use is to keep the inflammatory action within safe bounds, till the faulty state of the constitution on which it depends can be corrected, and so conduct the disease through the stages which it naturally passes. Bleeding inopportunately employed will exhaust the patient sooner than the disease, which will spread

under its liberal use, or appear in a different part of the body*.

Spreading inflammations.

Derangement of the biliary system, in a greater or less degree, is the invariable concomitant, if not of all, certainly of the severer forms of erysipelas, and hence the use of those remedies which evacuate bile. The great authority of Dessault long upheld the tartrate of antimony as a sole and almost infallible remedy in these cases; it must be confessed, however, that he over-rated its merits, or that its use was more successful in his hands than it has been in others; nevertheless, it is an important remedy.

Tartrate of antimony in free doses.

It may be questioned whether its beneficial actions so exclusively depends upon its effects on the biliary system; whether, in point of fact, they may not be explained upon the principle of its being an anti-inflammatory remedy in this disease, as well as in bronchitis and other inflammations. With reference to erysipelas, I may add, that although it often does good, on the other hand it is not unfrequently injurious, from increasing the

* This view of the case is borne out by the opinions of authors whose ability and extent of practice have given them the most ample opportunities of judging accurately: I should particularly refer to Dr. Hennen, p. 297. On the other hand, I am bound to admit that we have great authority for the almost unrestricted use of bleeding in erysipelas; and I refer especially to a very important paper on this subject in the *Edinburgh Journal*, 1821, by Dr. Duncan, jun. Many other weighty opinions might be cited on either side.

Spreading inflammation.

distressing nausea and vomiting which often attend this disease.

ANTIMONIALS IN SMALLER DOSES.

I have now alluded to antimony, used according to the method of Dessault, or of Laennec; but it may be stated, that any of its preparations given in smaller doses, in combination with other medicines, are often very serviceable.

EMETICS.

Emetics also, of any kind, are frequently very useful, not only at the commencement, when it has been most usual to employ them; but at any period, if the stomach becomes oppressed, which not unfrequently happens, from the slops taken and the medicines given under such circumstances; a small dose of ipecacuanha, combined with a sufficient quantity of ammonia, answer best, if late in the disease.

PURGATIVES.

Purgatives are of indisputable use; but it is by no means immaterial what means are employed for this purpose: in the first stage the cathartic mixture, combined with tartrate of antimony, preceded probably, by a dose of colocynth extract and calomel, is commonly very beneficial; and the evacuation of the bowels may be maintained by similar means, while fæcal matters which have been long retained in the canal continue to be discharged; or while the discharges are morbid secretions of a *fæcal* nature, while they improve under the plan, while the tongue at the same time cleans, the strength does not sink, nor the inflammation spread rapidly; but

when, from opposite indications, there appears reason Spreading inflammation. to alter the medicine to purgatives calculated to give more tone, rhubarb with tincture of senna will be advisable; and when there is a great tendency to sink, they should be altogether avoided, injections being employed to clear the bowels when required.

Saline neutrals are also highly useful in this as SALINE NEUTRALS. in most inflammatory complaints, most gratefully employed in effervescence, and ammonia is often the preferable alkali.

Mercury possesses great power in controlling Mercurial preparations. this disease, and may be much relied on, after the preliminary measures, which are always necessary; it is often advantageous to combine it with opium, in the proportion of three or four grains of blue pill, with about ʒss. of syrup of poppies, or three or four drops of liq. opii, given every six or eight hours: calomel may be given, if thought preferable: the use of these means may be easily and advantageously combined with that of saline effervescent, or of antimony. If the mouth becomes a little sore it will not be injurious*.

Opium may be employed, both upon the prin- OPIMUM. ciple of allaying irritability, in small doses, and also with the intention of subduing the pain; if this is allowed to act day and night, it is incon-

* I may remark, that although mercury, used both internally and externally, is often beneficial, yet I have seen erysipelas frequently occur in persons actually and fully under its influence

Spreading inflammation.

ceivable how much it tends to increase the mischief: to prevent this, opium may be most advantageously administered in a *full dose* at night, in combination with the preceding remedies, or in the more advanced stages with sulphuric acid: its good effects may be greatly promoted by applying cold cloths to the forehead and head, which, without preventing its sedative influence, obviate its injurious impression, and often converts a forced sleep into a calm repose. Opium, however, is hardly admissible where there is coma, and not very often in idiopathic cases.

Cold sponging of the head and body.

There is another remedy which should not be neglected in the earlier stages of erysipelas, *where the heat and fever are intense*, I mean the application of cold to the head and whole body by cold sponging, so as to subdue its excess.

BARK.

In the first stage of erysipelas, it will rarely happen that bark is advantageous (except in the E. superficiale, which it will often stop). But where the disease is advancing rapidly, and the strength of the patient is obviously incapable of stemming it, it is expedient to try it (after the alimentary canal has been evacuated) without loss of time; in other cases, also of a less asthenic character, where the means before recited fail, bark ought to be tried; and although modern authorities are much divided on the subject, perhaps, on the whole, against it; I cannot but express my

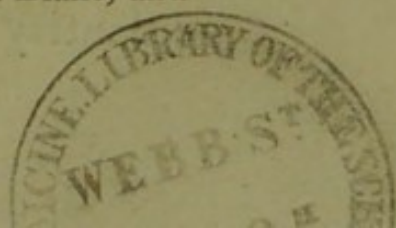
own conviction, that it is a most valuable remedy. Spreading inflammation.
I need not say how highly it has been thought of by some of the ablest practitioners*.

The difficulty seems to be, to determine on the time when it should be resorted to: we are often directed to wait till the tongue cleans, but this change may never take place; not to give it while it is dry, but the dryness may increase with the progress of the disease. I should rather judge by the state of the alvine discharges, for the presumption is, that when the old fæcal matters have been cleared away, and the secretions are copious and not very bad, it may be taken with advantage; or when they are copious, and cannot be improved by other means, that bark ought to be tried; but although no clear criterion may exist for its employment, when other means fail, it is too important a mean to be neglected, and no great harm can arise from the experiment in a doubtful case, if it be watched.

From what I have now stated, it may appear that it is a remedy which is liable to much mistrust; it does not, however, follow, that it may not be in many cases *the* remedy.

The sulphate of quinine is, doubtless, the best preparation; it may be variously combined with

* I may particularly mention Mr. Hunter, Sir Gilbert Blane, and Dr. Fordyce.



Spreading inflammation.

effervescing draughts, with mineral acids, or with serpentaria.

When the sloughs and matter have been evacuated in the third stage, and the secretions are free, nothing remains but to support the strength, and bark is often of the greatest service.

AMMONIA.

Ammonia will often serve at a period, when bark does not: it is more generally applicable, but, as far as my experience goes, less effectual; however, in the last stages, it is one of the most useful stimuli.

Sinapisms and blisters.

When the head is severely affected, sinapisms or blisters between the shoulders, and sinapisms or fomentations to the feet, are often extremely useful.

DIET.

The diet in the first stage, with a few exceptions, must be of the lightest and thinnest kind; in the second it is still necessary, in the majority of cases, to adhere to food nearly of the same nature, with the addition of beef tea, perhaps, or chicken broth; but if the strength sinks, it is often necessary to allow some portion of stimuli; a little wine either in soda water, whey, arrow-root, or gruel, in small quantities, rather as a stimulus to the stomach to enable it to perform its duties, than as a spur to the vascular system, is a medicine of great efficacy prudently given, but its quantity must be carefully regulated.

In constitutions broken by free living, stronger Spreading inflammation.
stimuli may be permitted; and thus, among the STIMULI.
lower classes, where intemperate habits have produced this effect, and caused the disease, Sir A. Cooper advises the use of gin, their favourite beverage.

In the last stage, whether it be the struggle against dissolution, the fever and the inflammation continuing, or it be the collapse general and local, which follows the subsidence of both in profuse discharges, there it is obvious that the only plan to be pursued is to give what support the patient can take; in the former he will have little inclination for food, but he *must* have stimuli; in the latter he will be able to take both freely: the object now is to prevent the patient from sinking, till by appropriate local treatment* the mischief can be stopped: it is to be recollected, that there is no *irremediable* mischief in these cases, and no patient should be despaired of while life continues.

During the whole process, cool, and fresh, and AIR.
healthy air, if they can be procured, are of infinite service, together with attention to cleanliness, and the removal of every thing which can give to the atmosphere in which the patient is placed the smell and qualities derived from a bed-room.

* P. 401-2.

Spreading inflammations.

CONCLUSION.

To conclude: on the subject of the general plan of treatment, I should say, that the impression on my mind is, that it is idle, quite idle, to lay down any absolute rules for the treatment of such a disease as erysipelas, which differs so materially in different cases; but it may be stated, that the E. superficiale, when not very extensive, and in constitutions possessing power, generally gets well under any treatment; that the less severe and malignant forms of the E. phlegmonodes will, under a moderate antiphlogistic plan, commonly do well; but in the more intense cases, or when the powers are feeble, much will depend upon the judgment and the energy with which the curative means proposed are employed and varied. I may also say, that a judicious combination of depletion, with the use of stimuli and support, often proves highly useful in this and other inflammations, upon the principle, that while the former plan reduces undue action, and evacuates morbid matter, the latter increases the nervous energy, and improves the tone of the digestive organs, from whose defect the local morbid actions mainly spring.

E. SUPERFICIALE.

In describing the disease as well as the treatment, it appeared to me to be the shortest and the best plan to select the phlegmonoid form, because the proper consideration of that will suffice, with proper allowances, easily to explain those dif-

ferences which obtain in the other varieties*; and Spreading inflammations. I have now merely to say, that the superficial form of erysipelas is a much slighter disease, commonly terminating in resolution, as might be expected from the cellular membrane not being affected; but on the other hand, it is not unusual to see its disposition to spread very great, almost, I should say, in an inverse ratio to the affection of the cellular membrane; hence instances are not uncommon, in which it has traversed the whole body, occupying a long time in this process; this disposition to travel has obtained for it the name of erraticum.

The disease may alter its character during its progress, and affecting the cellular membrane become the phlegmonoid; this, however, is not common.

When it is quite superficial, in persons of moderate strength, and is without any particular complication, the treatment is very simple, consisting of a mild antiphlogistic regimen, and attention to the bowels with saline neutrals; but when it is much disposed to spread, bark will often stop it. Locally, arg.

* Mr. Lawrence's treatise, which is one of the most valuable we possess, contains the following passage, which much confirms the views I have taken: speaking of treatment, he says, "The presence or absence of inflammation of the cellular texture will not afford the criterion we are in search of on this occasion; indeed the difference between simple and phlegmonous erysipelas is rather in the degree than in the seat of the affection."—Med. Chir. Trans., vol. xiv. p. 69.

Spreading inflammations.

nitr. is a very useful application ; repellents are often doubtful.

E. ŒDEMATODES.

The E. Œdematodes occurs when the powers are particularly languid. The effusion in the cellular membrane is especially deficient in lymph ; the heat and tension are not great, the colour dusky from the beginning, and there is a strong tendency to slough. In this form, the skin is as much disposed to gangrene as the cellular membrane. It occurs in shattered constitutions, and requires warmth externally, and stimuli internally, from its commencement, with the use of warm purgatives.

An inflammation often considered an erysipelas, but which I conceive ought rather to be considered an erythema, very commonly takes place in persons whose limbs are much distended by dropsy, and under that head I have placed it.

Erysipelas with inflamed absorbents.

Inflammation of the absorbents, it has been stated, often accompanies erysipelas, and constitutes, in some cases, a variety deserving particular attention. In the last edition of this work I considered it separately ; but having endeavoured now to collect all the principal points under one head, it would hardly be right to enlarge upon it here.

An erysipelatous inflammation seems often to

affect mucous membranes; I have seen several instances of it commencing in the fauces, a fact to which Dr. Stevenson first called the attention of the profession; and I have seen it suddenly disappear, and inflammation of the mucous membrane of the bowels supervene.

Spreading inflammation.
Erysipelas often affects mucous membranes.

An erysipelatous inflammation seems often to take place from causes which are purely local; thus, after a severe contusion, the integuments are frequently left in an œdematous state; in this, inflammation from slight causes is liable to come on, which resembles E. œdematodes, but rarely leads to mischief in good constitutions; it arises from *local* want of power simply. Sometimes erysipelas will pass off from the parietes of a limited abscess, which is often the case when the lachrymal sac suppurates; it is, however, a local affection, and rarely produces mischief.

Erysipelatous inflammation of a local nature.

In cases where blood is confined under the integuments, and has lost its vitality, inflammation will occur on the surface, the result of which is either ulceration or sloughing to give vent to such fluids. This inflammation is nearly allied to erysipelas; it may, however, be with certainty stopped by letting out the extravasated blood, unless the cavity inflames. The same occurs where matter is deep-seated. Such, then, being the natural

Spreading inflammations.

tendency, when the integuments are in themselves healthy, it is no wonder that when matter forms in erysipelas, in which, of course, they are the reverse, so great a disposition to ulcerate and slough should exist.

I shall also notice a form of inflammation sufficiently common; but which does not possess all the characters, though it mainly resembles erysipelas. A case will illustrate it.

A variety of E. phlegmonodes.

A stout woman, between fifty and sixty, of bilious habit, who had long been subject to ulcer of the leg, was attacked with inflammation of the whole leg and part of the thigh; it was attended with great loading of the limb, severe pain, and constitutional symptoms, as alarming as I recollect in the worst cases of phlegmonoid erysipelas; but although the skin perished very extensively, there was *no deep suppuration or slough*. Another circumstance deserves remark, that no vesications formed. She recovered from the immediate attack, under the use of stimuli; but many months afterwards sunk exhausted from the effects of the extensive and sloughy ulcer of the leg.

METASTASIS.

To this account I have simply to add, that erysipelas is very liable to repulsion and metastasis.

Secondary or concurrent inflammations.

I must also add, that it is very frequently attended with concurrent or secondary inflammations, either

external or internal, a subject which will be more particularly mentioned under the next head.

DIFFUSE INFLAMMATION OF CELLULAR MEMBRANE *.

In the first edition of this work no mention was made of this form of disease, nor indeed, when that was published, had it ever been discriminated from erysipelas and other species of inflammation. We owe our knowledge of its nature and peculiarities to the accurate observation of one of our most distinguished pathologists, Dr. Duncan†. I must, however, confess that I cannot go the whole length with Dr. Duncan in the opinions he entertains on the subject, which appear to me to be very much influenced by the restricted views he takes of the nature of erysipelas. “It is scarcely necessary,” he says, “to point out the diagnostic characters between diffuse cellular inflammation and erysipelas, or rather cutaneous inflammation, when they are pure and unmixed,” p. 615. Now this limitation of erysipelas excludes the larger and more important proportion of cases which have

This form of inflammation not described in first edition.

We owe our knowledge of it to Dr. Duncan.

* This term I have adopted from Dr. Duncan, as he has preferred it for the form of inflammation in question; but without entering into any discussion of the comparative merits of the terms diffuse or spreading.

† Edinb. Med. Chir. Trans. vol. i.

hitherto, and, I believe, justly, been considered under that head. Nevertheless it ought to be gratefully acknowledged, that he has established the fact of the independent existence of this species of inflammation in numerous cases, and greatly increased the accuracy of our pathology in the whole class of spreading inflammations. The subsequent publications and papers of Mr. Travers, Dr. Collins, Dr. Thompson, Mr. Shaw, Mr. Scott, and others, tend much to confirm his observations.

Analogy between this and E. phlegmonodes.

There is a very close analogy between E. phlegmonodes and this form of inflammation, both as regards the causes in many instances; the symptoms, effects, and I may add treatment; and it is probably owing to this near alliance that they have not been discriminated before. Why the same causes, and it may be added, the same state of constitution, should sometimes produce the one, sometimes the other, can hardly be determined.

DIFFERENCE.

The difference between them essentially consists in the cellular membrane beneath the skin taking the lead in this form of inflammation, while in E. phlegmonodes it appears to be consequent on that of the skin or at most to be coincident. There are many mixed cases, which might without impropriety be considered under either head; but as far as I can judge, from my own observation, inflammation under the form of erysipelas is much more common than this.

The remote causes so nearly resemble those which ^{Remote causes.} have been enumerated under the head of erysipelas, that it would be superfluous to recapitulate them.

The proximate have been stated by Dr. Duncan ^{PROXIMATE.} under the following heads :

1st. Venesection.

2d. Ligature of a vein.

3d. Wounds received in dissection.

4th. Pustule maligne.

5th. Bites of serpents.

6th. Acrid matters applied to the cellular membrane.

7th. Pricks and wounds without the application of morbid matter.

8th and 9th. Sprains and external violence.

10th. Cases occurring spontaneously without any obvious cause.

Now, without at all questioning the fact, that from these various causes inflammation of the cellular membrane of a diffuse character does arise, and often constitute the most essential character of the disease, yet many of these forms of inflammation have long been known with sufficient accuracy, and their symptoms and treatment clearly described ; such are inflammation from bites of serpents, pustule maligne, acrid matters applied to the cellular membrane, inflammation of the cellular membrane from lacerated wounds, &c. ; and therefore I have preferred

classing them under their appropriate heads. Inflammation of veins also will well deserve a separate consideration whatever be the cause; and it will then appear that there remain only puncture, either with or without morbid matter, and cases arising without any obvious cause.

Cases arising
from puncture in dis-
section.

Taking, then, a case of this nature, and for the sake of better illustration, one of the most complete and formidable, I mean such as arise from punctures received in dissection*; the following may be offered as a brief account of the symptoms and consequences which ensue.

Symptoms,
local.

In the part
injured.

The part punctured, shortly after the occurrence, will probably inflame more or less, often but by no means invariably with severe pain, and in such cases gangrene of that part may ensue; however, in many cases, the local disturbance of the part, where the injury was received, is but slight; but it is common for a vesicle to form there.

* The erythematous or serous inflammation of the cellular membrane of Mr. Travers.

Mr. Travers enumerates various kinds of inflammation of the cellular membrane, as thus: *simple, acute, or phlegmonous inflammation of the cellular membrane by continuity*. Under this head he seems to consider paronychia gravis from punctures, &c. The above mentioned *serous or erythematous inflammation of the cellular membrane, not by continuity*. *Erysipelatous inflammation of the cellular membrane*, which accords with what I should consider the worst forms of E. phlegmonodes, and *gangrenous inflammation of the cellular membrane*: the inflammation which follows very severe injuries.

Consequent on this, the limb may be and often is affected with *erysipelas*, probably with inflamed absorbents, spreading from the point injured; but in other instances that form of inflammation supervenes which constitutes the disease *now* under consideration. Acute, often excruciating pain is felt in the axilla, above the clavicle, about the shoulder, and side of the thorax, the intervening part of the limb, between the finger and axilla often remaining more or less or entirely free from disturbance, REMOTELY. excepting, perhaps, in the course of the absorbents; with this pain there is considerable tumefaction and tenderness of the parts about the axilla, &c. without any discoloration of the skin for a considerable time, and the disease may extend itself in the cellular membrane, down the side to the pelvis, or along the neck to the head. There is generally an inflamed gland in the axilla or above the elbow.

This inflammation of the cellular membrane is also propagated extensively to the muscles, and very commonly induces suppuration and sloughing, not only of their cellular membrane, but likewise of their fibres. The vessels and nerves are also involved in the mischief. It may be remarked, that it does not commonly pass beyond the mesial line.

After a while the skin reddens at some part or other, and ultimately ulcerates or sloughs, vesications often forming as a preliminary, and during

the process the same quaggy feel is perceived in the part which has already been described in speaking of erysipelas; and, in truth, at this period, the two forms of disease do most nearly resemble each other, and the subsequent stages need hardly be separately considered.

Secondary inflammations.

It often happens, too, not only that the disease thus extends from the axilla or other parts by continuity, but also, that from the constitutional affection, inflammation shall be set up in some distant part of the body, terminating rapidly in suppuration or gangrene; this may occur either in the extremities, trunk, or cavities, often in the joints, and affords a most dangerous complication of the disease, the more fatal often, because undiscovered before death: but for a fuller consideration of this subject, I must refer to secondary inflammations under the head phlebitis.

It is sometimes fatal, with hardly any local disturbance.

Such is the course which this form of inflammation takes in many of the severer cases, but it must, on the one hand, be understood that it is not always so uncontrollable, while, on the other, it will be seen that the cause (where morbid poison) may prove destructive long before it has produced such extensive local disease, by its impression on the nervous system, we may suppose.

It may be perhaps consistent with facts, to state in conclusion, that the disease presents itself in three forms, or it may be, in three degrees.

1st. The local symptoms can hardly be considered as having much influence on the fate of the patient; he dies from the immediate impression on the general system; such was the case of Mr. Elcock*.

The disease seems to exist in three degrees.

2d. The poison seems to be conveyed to the axilla, and thence inflammation spreads extensively to the trunk; here we have the impression of the poison, not immediately destroying the patient, but exciting through the constitution a powerful influence on the progress of the disease, while we have the local inflammation largely invading the trunk; and we have often secondary inflammations.

3d. We have the poison acting (it may be) with violence on the system, but the local disease takes place in the limb, and the struggle occurs more remotely from the trunk, and does not invade so large a portion of the body, but in this case it still often proves fatal; in this latter description of case, I should apprehend that the skin is commonly more early and decidedly affected, the local inflammation approaching more to the character of phlegmonoid erysipelas.

The introduction of morbid matter is, however, a question which, as well as some others, it is necessary to examine, because high authorities in the profession have doubted the reality of such a

Question as to the introduction of a morbid poison.

* Related by Sir A. Cooper.

cause. Absolute proof in such cases it is difficult to procure, because it may be contended that simple puncture is capable of producing similar effects. One very strong ground, however, for believing in its existence, is derived from the fact, that repeated instances are recorded of this inflammation occurring in two or three persons who have been engaged in the dissection of the same body; and although if it happened to one only, this might, with much probability, be ascribed to that person's constitution being in a disordered state at the time; yet it would hardly have much weight where several suffered, in whom no noticeable disorder of health had been previously observed. Again, it is a fact, that such consequences ensue in an infinitely greater proportion after the dissection of bodies recently dead than in others, and of such, many more occur when the cause of death has been an acute inflammation with serous effusion than in others. To these, which are arguments of fact, may be added, the consideration which deservedly attaches to the peculiarly rapid and strong impression which is produced on the constitution, and which has proved fatal like the infection of plague, before any considerable *local* affection has been produced: we might further add, the arguments analogically deduced, from the direct inoculation of animals experimentally, or of the human being accidentally, with the matter of

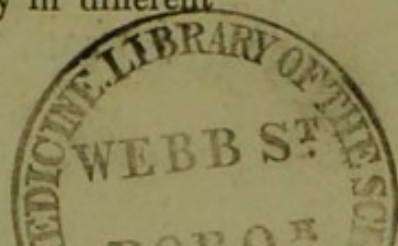
glanders or other sores, and this even when the individual secreting the matter was living*.

There are two other questions into which it is necessary here to inquire, the first is the mode in which the inflammation manifesting itself, as it commonly does, about the axilla, is more immediately produced. As we have often no trace of any morbid affection in the intervening space, excepting in the course of the absorbents (though by no means always *evident* in them), it seems not unreasonable to suppose that they may be the channel; Dr. Duncan, however, is strongly opposed to this opinion†. Mr. Travers explains the phenomenon in a way not greatly different, at least if I understand him rightly; he thinks that the poison may be silently absorbed, and produce this

Question how far the affection in the axilla is the result of an affection communicated by the absorbents, or otherwise produced.

* See a very remarkable example by Dr. Evans in the Ed. Journal for 1828.

† Ed. Med. C. Trans., p. 593-4, *et seq.*—"In the most alarming variety the affection follows the usual progress of inoculated diseases. First a pustule or vesicle takes place at the part to which the poison is applied; then there is high constitutional disturbance corresponding to the eruptive fever of exanthematous diseases, followed by severe diffuse inflammation in *some* part of the cellular tissue, rapidly extending in all directions, but not continuous with the primary local pustule, which often gives little uneasiness, and generally heals very quickly." This opinion I should not venture to object to, if the consequent inflammation took place either generally, as in exanthematous inflammations, or variously in different parts of the body; but neither of these is the case.



inflammation in the axilla as a secondary effect, by a reflected irritation, as he terms it*.

It is no small objection to these opinions, that the disease should invariably appear first on the side where the injury has been received, and commonly in the course of the absorbents, whereas when other constitutional diseases, as plague for example, produce secondary inflammations, they will occur in the axillæ or groins of *either* side. This objection has not escaped Mr. Travers, and his explanation is, that the inflammation is determined to that side, because a gland has been irritated by the transit of the poison†; but why we should not at once admit the greater probability, that the phenomena are an immediate and not a consecutive or “reflected” effect, I am at a loss to know.

It has been argued that the absorbents are not the channel through which the poison or irritation is conveyed, because they have not, in all cases, evinced unquestionable appearances of inflammation; but this is no certain criterion, for they have after death been ascertained to have been inflamed where no appearance showed itself during life‡;

* While in other cases it acts as a local irritant, producing more or less excitement and disturbance in the part actually injured.

† On Constitutional Irritation, p. 213.

‡ In Mr. Travers's seventh case. Mr. Graves.

and in very many instances the affection is indubitable. I may further add, that it by no means invariably happens, either that the affection shall be *continuous* on the one hand *from the part* injured, or on the other, that it should commence *at the axilla*, of which my own case and others may afford some proof*.

Again: in cases of fester, gall, or prick on the foot or leg, it very often happens that a gland enlarges in the groin, where there is no evidence of

* In the year 1821, I was engaged in the examination of the body CASE. of a diabetic patient, who, after being bled, had erysipelatous inflammation of the arm. I removed a portion of the vein and laid it across the fingers of my left hand to examine it more closely; on the middle finger of that hand there happened to be a nail spring. On the evening of the following day I went to London in perfect health; on the road I felt the inside of my upper arm sore, as if bruised, and on looking at it the following morning saw two inflamed absorbents over the biceps, *but no appearance or sensible tenderness of those vessels below*. I pursued my journey, but became so extremely ill that I was unable to reach town till I had reposed a short time at Hammersmith; and, in fact, had constant vomiting, depression, and approaching syncope: in the mean time my upper arm became very painful and loaded exceedingly, the skin soon becoming extensively reddened, the axilla tender; for about forty-eight hours I was extremely ill, but the symptoms then gradually subsided. Two foul sloughy collections of matter formed on the biceps, which were opened; the gland in the axilla subsided. A considerable and foul fester formed on the middle finger where the nail spring was, and it was long before it healed; and two pustules formed under the nails of the adjoining fingers, where there had been no breach of surface.

Dr. Duncan's thirteenth case, of Mr. Hercey, resembles this in many particulars.

Most probably owing to the absorbents proving the channel of irritation, whether morbid or simple.

the absorbents between being inflamed; still more, when the morbid poison of lues has been applied to the penis; yet we do not hesitate to believe in all these cases, that the absorbents have proved the channel through which the cause has produced its effect; and I do not see why it is necessary to have recourse to any other explanation in the present cases.

Not improbable that a gland in the axilla being affected it becomes the point from which the inflammation of the cellular membrane sets off.

In this disease it does appear probable, that through the absorbents the diseased action is communicated to the axilla, and when a gland there is affected, it is not unlikely that this may become a point from which the inflammation spreads itself indefinitely in the surrounding cellular membrane. Dr. Duncan thinks otherwise*: the question is not immaterial, for supposing this to be so, we can readily see how it happens, that many of the phenomena in these particular cases are produced; for these glands being situated beneath the fascia, the inflammation now runs along beneath it also, and when suppuration occurs, all the evils incident to confinement of matter may naturally be expected to accrue with peculiar force.

How far the skin may be deemed, in any case, in a state of inflammation without being red.

2d. It has been observed in the preceding account of the disease, that the skin has at first presented no redness, and from this we draw the conclusion that it is not inflamed; whether this is

quite correct may admit of question, for although the skin will not often continue permanently red without inflammation, I think it extremely possible it may be inflamed without being red; for so in many cases of injury, where a limb inflames and swells rapidly, the skin shall remain colourless for a considerable time, and yet fully participate in the general tumefaction; and also in cases of erysipelas, the integuments will be felt extremely sore and tender at a considerable distance beyond the redness, and such portion will at a subsequent period exhibit the same alteration in colour as the rest. It is, therefore, very possible, that the phenomena of inflammation may be going on in skin without the superficial network of vessels, as yet exhibiting any undue distension.

The constitutional symptoms which accompany diffuse inflammation of the cellular membrane are next to be spoken of, and they will be found much to resemble those which prevail in erysipelas and phlebitis, with this difference, however, that the affection of the nervous system is often more marked, especially where the cause has been morbid poison.

The depression and anxiety, even at a very early period, are often extreme; the countenance dejected and haggard, in the worst cases soon becoming yellow; vomiting takes place, rigors, restlessness, tremors, and delirium.

Constitutional symptoms.

THEIR CHARACTER.

Reaction may occur in a greater or less degree, and extensive local disease be accompanied with much fever *, which soon, however, assumes a low type, as the processes tend to suppuration and sphacelus; but it is hardly necessary to repeat what has been said on this head under erysipelas. The character of the disease, in this case, is what Mr. Hunter designated as “increased action without power,”—what Mr. Travers has since termed “prostration with excitement.”

TERMINA-
TION.

The termination may be fatal either in a very short period, when it may be apprehended the influence of a morbid poison has speedily subdued the vital powers, or after a greater or less degree of reaction and local mischief; or even at a more remote period it may be the result of undiscovered or unrelieved collections of matter; of disorganization of vital organs by secondary inflammation; or of exhaustion from the disease and long continued discharges †. On the other hand, the termination may be favourable, in the slighter cases, by resolution, or even in the more severe by the efforts of nature, or the effectual assistance of art, on

* This fever sometimes partakes more of the inflammatory, in others of the typhoid type; in the former the prognosis is more favourable. Duncan, op. cit. 632.

† The appearances on dissection do not differ much from those observed in *E. phlegmonodes*: it would be unjust to Dr. Duncan not to say that he has given a most minute and accurate account of them.

which it becomes my duty next to say a few words.

Various means have been resorted to, unfortu- TREATMENT.
 nately with very imperfect success; leeches in LOCAL.
 large numbers, hot fomentations, poultices, spi-
 rituous applications, turpentine, opiate liniments,
 cold, &c., and, we may add, bandaging. It cannot
 be said that any of them possess an efficacy on
 which we may depend; the increasing hæmorrhage
 from leeches in the early stage more, however, than
 the rest. The application of lunar caustic over
 the surface offers a probable means, although the
 inflammation be deep seated.

But of all the plans which present themselves, Especially in-
 there is none from which so much good has been cisions.
 actually derived, or may be anticipated, as from
 incisions*, and it is probable that the tardy recourse
 to them, so often observable, is a great cause of
 the fatality of this disease: all the reasons stated
 under the head of erysipelas apply here with double
 force; bring the disease to the surface, and you
 destroy in great measure its malignity; blood
 is also taken in this way more advantageously in
 most of these cases than from a vein, or by leeches;
 the pain ought not to be regarded, and wherever
 the disease may show itself by continuity, by me-
 tastasis, or by fresh formation, no time should be

* Dr. Duncan is a strong advocate for them, p. 629, *et seq.*

lost in meeting and preventing its ravages, or if too late for that, in providing free exit for the matter.

Injurious effects of the confinement of mere matter when capable of diffusion in the part.

It cannot be too well understood that matter, *mere matter*, wherever it is pent up, becomes a source of infinite mischief, where it is not limited (for it is not so when contained in a cyst, only when it is in a condition to diffuse itself). I may be pardoned for mentioning a striking example, derived from another form of inflammation, because it is particularly conclusive, as the effects could not be ascribed to any other cause*.

While on the subject of incision, it should not be forgotten that an incision at the point punc-

CASE.

* A very robust and healthy man had the upper part of the tibia and fibula shattered by the fall of a large block of stone; the fracture was compound, and the limb was long in great jeopardy; free openings were made to evacuate the matter formed, and at length every thing became quiet, a copious discharge however remaining. One morning, when at the hospital, I found this man's leg enormously loaded, red, hot, and painful, and he was labouring under a corresponding degree of fever. Upon examining the limb I found that the aperture through which the discharge had usually passed was blocked up by exuberant granulations; the consequence had been that the matter had made its way in every direction through the limb, beneath the integuments, and in the interstices of the muscles, producing all the mischief stated; and it only required a free incision giving this vent, to put an end at once to every symptom, general as well as local.

I do not relate this as a peculiar case; on the contrary, it occurs but too frequently; I mention it to show what are the effects in a healthy person of the *mere* confinement of matter, having the power of diffusing itself beneath the integuments.

tured should be made down to the bone, at the earliest possible period.

Among the local means, I have to mention PRESSURE. pressure by bandaging, which has been, as already stated, strongly recommended in France. In one case, where this was tried in this country, gangrene and death took place*. As a means of preventing the extension of the disease at a subsequent stage after vents have been formed, bandages are of the utmost use.

A ligature has been applied round the limb to LIGATURE. arrest the progress of the mischief, and Mr. Burton, in his own case, maintained it for several hours; the arm below loaded and inflamed immensely, but the inflammation did not seem to have passed the bounds where the ligature was applied, and where it may be presumed the adhesive inflammation was successfully established; the result, however, was, that extensive sloughs formed in the arm. Mr. Burton recovered †.

I have finally to mention, that in cases where PREVENTION. it is suspected that morbid poison has been introduced, efforts should be made to extract it by sucking (perhaps the application of a leech would

* Dr. Duncan's 31st case, communicated by Dr. Nelson. Mr. Evans, also, in the 95th No. of the Ed. Journ. mentions a case in which bandage was applied with some relief, but it was discontinued after a short time.

† Dr. Duncan's 20th case.

be useful in this way), or to destroy it in the part by caustic; perhaps more surely by excision*.

General
treatment.

With respect to general treatment, it may be stated that the majority of cases recorded have been met by the most active antiphlogistic plan; many, however, have been treated on opposite principles. There seems no reason to doubt that the former mode, especially bleeding, has exerted a powerful influence in checking the actions of this disease, and the patients have in many instances recovered under it; at the same time it must be stated, that of the number of cases thus treated, so large a proportion terminated fatally as to cause a reasonable distrust in the efficacy of this plan. I should be happy if I could say that the opposite mode had been more uniformly successful; but on this head it is but fair to state, that in the greater number of cases where stimuli and tonics have been tried, they have rather been employed in the advanced stages as a last resource than as an early remedy. There is nothing irrational in the combination of the two modes; for means which will

* Cases, perhaps, arise more frequently than is suspected from the absorption of matter from an abraded surface, of which the party is *unconscious* at the time of the examination; it is not difficult to detect such, by washing the hands with any slight acid fluid; and if a point offers itself where the cuticle is gone, it may be coated by touching it with arg. nitr. Such precautions may be proper where the body to be examined is one likely to produce the effects apprehended.

relieve the vessels when highly loaded, are by no means incompatible with the employment of medicines, which will give tone to the system, and to the inflammation a disposition to limit itself*.

Under any supposition the use of opium to allay pain and diminish irritability is proper; mercury should be tried in combination, and I need not say that suitable purgatives are also highly useful; this I can certainly affirm, that when they succeed in discharging from the body a quantity of foul feculent matter, the relief obtained is indescribable, and I am humoralist enough to think, that by this route the *materia morbi* is often discharged; that such exists in this disease is rendered more probable by the very remarkable quality of the perspiration observed in some of the cases†.

In the preceding account it has been supposed that a morbid poison has been introduced into the system; it is, however, very certain, that where the puncture or injury has been effected by an in-

Cases originating from simple puncture without morbid matter.

* The want of the adhesive disposition is the main cause of the terrible mischief; and although, when the circulation is loaded and hurried to a great degree, bleeding will prove extremely serviceable, by taking off the stress upon the minute vessels, which renders them incapable of effecting the processes of reparation, yet that disposition will not be produced simply by bleeding.

† Dr. Duncan's 12th case, especially. Mr. Whitelaw's.

strument free from every suspicion of this kind, symptoms of a similar description, but seldom so severe, have occurred; and, indeed, in by far the greater proportion the inflammation which occurs takes place in the limb: nor do I know any example where it has produced death without previously exciting a *severe degree* of inflammation*; usually in unhealthy persons, or states of constitution.

Cases arising
spontane-
ously.

Diffuse inflammation of the cellular membrane, however, may arise spontaneously, without puncture, or any other local cause†; and in such cases is, I believe, often confounded with rheumatism, until at length the skin reddens, and it will then commonly be found that enormous collections of matter have already been formed: a careful attention to the general symptoms, as well as to the local appearances, will seldom fail to ascertain the nature of the attack, but accurate investigation is here essential; large openings, and pressure afterwards, to obliterate or prevent the extension of the cavities, are most important.

* As in Mr. Travers's 16th case. A large proportion of the cases related by Dr. Butter originated from causes unconnected with any morbid poison; it should, however, appear, that the majority of these rather assumed the character of E. phlegmonodes than of diffuse cellular inflammation: still secondary inflammations were more frequent than is usual in a given number of cases of erysipelas.

† Dr. Duncan's cases, 23, 26, 27, 29, and 30 are of this kind.

Of phlegmasia dolens, I shall speak under the head phlebitis*.

Spreading inflammations.
Phlegmasia dolens.

INFLAMMATION OF ABSORBENTS.

When vessels inflame, whether arteries, veins, or lymphatics, otherwise than to produce adhesion in case of wound, or obliteration in case of contiguous ulceration or tumor, that inflammation commonly spreads by continuity of surface, and thus we find that, in consequence of the extent of surface afforded by the number of ramifications, and from the important connexion they have with life, very serious consequences are apt to arise; there are other circumstances which, perhaps, add to the mischief, which will be considered under the head of inflamed veins; I allude to the circulation of pus.

Inflammation of vessels produces an important influence, why?

The class of vessels which most frequently appear to inflame are the absorbents. In these, inflammation generally arises from the irritation of a sore, in a constitution *predisposed* to it; for there are no sores which do not engage absorbents; yet this kind of inflammation, when the number of wounds and ulcers is considered, is not a very common occurrence.

Absorbents inflame most frequently.

* The fatal termination of the operation of lithotomy is often owing to diffuse inflammation of cellular membrane. *Vide* Brodie's Lectures.

Spreading inflammations.

Most common seat and progress of this inflammation.

It is most frequently observed in the extremities, where running along these vessels, it is communicated to the surrounding cellular membrane; the skin inflames over them, and the progress is marked by streaks extending through the limb with much rapidity, both upwards and downwards; the great facility with which the inflammation is communicated to the surrounding parts, perhaps arises from the extreme tenuity of their coats. In their immediate vicinity lymph may be effused, occasioning some degree of hardness. The glands in their course often inflame, and at them the disease very often stops.

Termination.

This inflammation in its milder form subsides or terminates in abscesses of the lymphatics or their glands.

Constitutional affection.

The affection of the constitution is marked by a greater or less degree of irritation of the nervous system, anxiety, nausea or vomiting, rigors, head-ache, and often hurried pulse and respiration.

Often connected with erysipelas.

The inflammation passing off to the skin and cellular membrane often spreads extensively in these tissues, and when it does so, the case is generally considered as one of erysipelas or diffuse inflammation of cellular membrane; the complication has already been spoken of under those heads, and under the latter I have added my reasons for

supposing that the inflammation of the absorbents Spreading inflammation. greatly enhances the severity of the disease.

With respect to the treatment of simple inflammation of the absorbents, I may say that a bread and water poultice, made with or without the acetate of lead, appears to be an excellent application, a weak spirituous lotion being applied to the limb above; I am also bound to state that the application of arg. nitr., as recommended by Mr. Higginbotham, often succeeds. Treatment.

The general treatment most advantageously employed is the antiphlogistic; but it will be understood that the observations already made under the heads alluded to, apply to the severer cases of this affection.

I rather refer the reader to inflammation of veins, which is so very analogous, for more *details*; but I may here mention, that it appears from the researches of M. Dupuy, that the lymphatics are quite as often affected with inflammation, after parturition, as the veins, perhaps more so, often together with them; and it should also appear that the same train of symptoms may arise from either or from both.

PHLEBITIS.

On the subject of this important form of inflammation, our information is far more extensive Improved state of our knowledge respecting this form of inflammation.

Spreading inflammations.

than it formerly was. Within half a century none of its varieties appear to have been well understood. Mr. Hunter and Mr. Abernethy first called the attention of the profession to that which not unfrequently occurs as a consequence of the operation of venesection, and whose phenomena are so obvious, that we can only wonder it escaped discrimination so long; it is certain, however, that the inflammations of the absorbents, fascia, skin, or cellular membrane, which also frequently result from the same causes, induced a great degree of confusion respecting the nature of the affection. Since their Memoirs were published, the observations of Guthrie, Travers, Duncan, Rose, Arnott, Lee, Velpeau, Dance, Tonnelle, Dupuy, &c. &c., have thrown great additional light on the subject; from them we learn that inflammation of veins is much more frequent than was formerly supposed; that it not only occurs as a result of venesection, but also after *many* wounds and operations; that it also is a frequent result of the process of parturition, and that the disease long known by the extraordinary name of phlegmasia dolens, probably owes its origin to the same source.

DESCRIPTION.

Phlebitis consequent on Venesection.—Inflammation of veins, as it occurs in the arm after venesection, is the form most commonly noticed

and most easily recognized; it takes place with various degrees of severity, but it is peculiarly insidious even in severe cases. The wound festers, and matter escapes at the orifice, often mixed with blood; hard, sometimes knotty, chords extend upwards and downwards from this point in the course of the superficial veins, while the deep-seated also often inflame; the limb sometimes swells much, often, however, in no extreme degree, and the local mischief seldom appears so alarming as in some of the preceding species of inflammation: in the vessels themselves matter forms, and lymph is deposited in parts; in the cellular membrane matter also forms, but there is by no means such a tendency to slough as in erysipelas or diffuse cellular inflammation. The local symptoms much resemble those which attend inflammation of the absorbents, and can sometimes be discriminated in no other way but by the chords taking the course of the veins, and being larger and more solid than in the latter.

Spreading inflammation.

INFLAMMATION AFTER VENESECTION.

LOCAL SYMPTOMS.

All this may subside, and after some collections of pus have been evacuated, the limb may again become quiet, and although a few veins are obliterated, no permanent inconvenience will ensue from this cause; on the other hand, instead of the mischief being confined to the arm, the inflammation often spreads to the vessels of the trunk. In the former case, where the disease is limited to the

Spreading inflammations.

arm, no greater affection of the constitution often ensues than may be accounted for from the extent of the local disease; but in many cases (and, as it should appear, especially when it is not so limited) great, peculiar, and frequently fatal disorder of the constitution takes place, whether from the extension of the inflammation along the vessels, or from the circulation of pus, or from any other cause.

GENERAL.

The constitutional affection is of a character similar to that in inflammation of the absorbents, but in *many* instances much more severe. There is remarkable anxiety and hurried respiration. The rigors are uncommonly strong, and frequently recurring during the disease; there is a great tendency to perspirations, which are copious, partial, and often cold: the powers are depressed, and there is a peculiar sinking in the countenance; the pulse hurried, often small; the feet generally cold; there is frequently vomiting of bile, and the colour of the skin is yellow in the severer cases.

These symptoms are apt to subside a little and promise recovery, a reaction taking place; but they return, and again the patient seems to approach to his end, from which state he may be recovered by cordials; another and another relapse follows, and at length he dies in a state bearing a considerable resemblance to typhus, but in which the condition of the nervous system is materially

different, as appears to me, for the intellect is often perfect to the last. Spreading inflammation.

Nothing can be more uncertain than the duration of this disease; it may destroy in a few days, or even hours, as it were *proprio impetu*, or only after the lapse of several weeks, when the event seems to result from the exhaustion and the accumulated influence of disease existing in many points, the result of the peculiarly strong disposition to suppurative inflammation elsewhere, in the different viscera, membranes, muscles, and other parts. DURATION.

The particular conditions which dispose to this inflammation are not perfectly understood; in many cases it arises from the disturbance and irritation of the wounded vein, or from an improper instrument having been used. When it proceeds from operations or injuries, it is commonly when the sores are in a bad state. Its production appears to be much influenced by the state of the constitution, and it is remarkable how often it happens when persons have been bled for injury or disease of the thoracic viscera*, for inflammation of veins elsewhere, or for erysipelas, when nothing in the operation itself can account for it. In those cases which occur after parturition, we CAUSES.

* Remarked by Sir A. Cooper. Lectures, vol. i. p. 43.

Spreading inflammations.

have generally reason to believe that infection, or peculiar state of the air, have disposed to it.

I do not think we have sufficient data to enter upon the question of this inflammation being adhesive, phlegmonous, or erysipelatous; it is sufficient to know, that while it is a spreading inflammation it is most dangerous, when limited of less momentous consequence.

It is evident, however, that inflammation of veins must be a much more common process than has perhaps hitherto been contemplated, and it may be added a salutary one; for in no other way can we account for the obliteration of these vessels, under the influence of various causes which it would be long to recapitulate, but I may particularly mention destructive inflammation; yet *spreading* phlebitis is only an occasional result.

Morbid appearances.

If the limb be examined, a part of the track of the inflamed vein is occupied by pus, a part by lymph, which may either occlude the calibre of the vessel, or merely fur its sides; a part also is filled with coagulum of a dense nature, and partially deficient in red globules, similar indeed in character to that found in aneurismal sacs, while more genuine coagula are also contained in parts. A barrier of lymph has usually been found at the termination of the vein in the primary trunk, but beyond this the lining membrane has often been observed red,

which appearance in many instances has extended to the heart itself. In a few cases the principal trunks have been seen presenting similar appearances; and in many it has been propagated from the veins of the limb first affected, if a lower extremity to those of the opposite side. The calibre of the veins is generally enlarged, a singular result of inflammation as it should appear. Their coats are much thickened, excepting at places where pus is making its way through them. With the pus a little blood has occasionally been found mixed, but in a great number it is free from any mixture. In the limb itself serum is plentifully effused and matter, as in *E. phlegmonodes*, but sloughs are not common.

Spreading inflammation.

In other parts of the body the results of *secondary inflammation* are very frequently found; there are suppurations of almost every tissue in the body, of the membranes lining the great cavities, in the viscera, in the eye, very often in joints; also in the muscular structure, cellular membrane, and common integuments; frequently in many of these parts at a time; some constituting collections of considerable size, others very small but numerous, especially in the viscera, almost resembling tubercles. It is not matter alone, however, that has been met with, but the products of *every stage and degree of inflammation*: thus we have sero-purulent effusions in cavities, lymph deposited

Secondary inflammation.

Spreading inflammations.

The appearances militate against the hypothesis of metastasis of pus.

in organs, and pus fully formed; and here I cannot help remarking, that if there were any foundation for one hypothesis which has been entertained respecting these collections, namely, that they are owing to a true metastasis of pus*, we might expect to find that it would be deposited *as* pus, without the usual grades of the suppurative process being manifest. It must be allowed, however, that the suppurations which do take place occur with extraordinary rapidity, which M. Gendrin supposes is owing to the materials being present in the circulation, having entered it from the suppurating parts.

Secondary Inflammations.—In this place it is necessary to inquire into the phenomena of these secondary inflammations to which I have already frequently alluded, but which it appeared more convenient to consider here, that all the circumstances may be examined more fully.

Symptoms.

A.—During life they are sometimes indicated by the existence of severe pain, while at others they take place to a great extent and even in the same person (as is evident by the products found after death), without any direct indication.

B.—Nothing can be more uncertain than the parts they attack, as before stated; but when they

* An opinion not abandoned by so recent and considerable a pathologist as Andral. *Vide* vol. i. p. 502. translation.

fall upon the integuments, sometimes they manifest themselves in the form of erysipelas*, sometimes as cellular inflammation (whatever may have been the nature of the original inflammation), in which case deep-seated suppuration is found after death.

Spreading inflammations.

C.—They have been attributed to the admixture of pus with the blood, either by absorption or otherwise. In cases of *phlebitis* this is unquestionably a very natural opinion; but what are the facts? That in inflamed veins blood is only occasionally, I may say seldom, found mixed with the pus, and consequently it is fair to infer, that in these, pus has not mixed with the blood; a barrier of lymph is generally found to intercept the communication between the veins affected and the trunk, and in truth no circulation seems to continue through veins in this state. It is possible that matter may be secreted from their lining beyond the point where the barrier is formed and washed on immediately, but as none appears, this is mere conjecture.

Question as to the cause of their production.

First, admixture of pus with blood.

In phlebitis there is in many cases no sufficient evidence of admixture.

A remarkable case mentioned by Mr. Hodgson, which occurred to Mr. Frere of Birmingham, is worthy of attention with reference to this point. The saphena vein was tied and the symptoms

* Numerous large patches of erysipelas in different parts of the body are often observed.

Spreading inflammations.

came on in four hours, consequently long before pus could well have been formed*.

Nor do the phenomena occur in a great many cases where there is pus formed in phlebitis.

D.—Again: on the supposition that pus thrown into the circulation from the lining of the inflamed veins were the cause of the phenomena, we might expect to see it operate in *all* cases; but it is well known that in a *large proportion*, especially of phlebitis in the arm, not extending beyond the arm, and of phlegmasia dolens, *no* such consequences occur. It is further deserving of remark, that in horses, where phlebitis is a frequent result of venesection (from the mode of its performance probably), secondary inflammations rarely ensue.

Neither are secondary inflammations the result of phlebitis only.

E.—It is also certain that secondary inflammations are not solely the result of phlebitis, they are common in cases of erysipelas and of cellular inflammation; and, it must be allowed, that whatever be the cause, it *may* be the same in all. I am aware that it has been stated, that in such cases there is inflammation of veins†; but without questioning the accuracy of Mr. Arnott's observations, a vast number of examinations of these two species of inflammation are on record, *carefully conducted*, where no inflammation of the veins is mentioned‡.

* Hodgson on Arteries, &c. p. 550.

† Arnott, M. C. T. vol. xv. part i.

‡ A further confirmation of this, Dr. Lee gives in his Essay on *Phlebitis*, M. C. T. vol. xv. p. 417, where in some cases

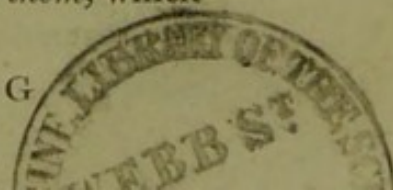
F.—If we take a more extended view of the phenomena, it will be found that in many other diseases remote inflammation and suppuration occur in the body, and often throughout the system; this is remarkably the case in small-pox, plague, &c., and in a less acute degree in scrofula.

In a great number of diseases similar phenomena occur.

G.—They are common when a large discharge has been put an end to, as when a limb suppurating after compound fracture has been amputated; when large and long established ulcers have been healed, and is remarkably frequent when fistula in ano has been cured by operation in persons of unsound constitution: now, in neither of these cases is there the least reason for supposing inflammation of veins or absorption of matter, for the phenomena do not occur during the irritated or suppurating state of the limb in the first case, but after a clean wound has removed it; not during the foul state of the ulcer in the second, but when it has healed kindly, and under

They are common where there has been much suppurative action, but not under circumstances which would warrant the supposition of the introduction of pus into the system;

in which similar phenomena occurred, and where every pains were taken to ascertain the state of the veins, “no morbid alteration of structure in their coats could be detected.” While on this point, I may mention Cruveilhiers’ doctrine, that in *ordinary* inflammation, the venous tissue is the principal seat of the phenomena. I imagine there can be no difficulty in believing, that the veins as well as the other vessels of the inflamed parts must be materially concerned; but I have found very small venous branches, in parts inflamed, free from the alterations which denote inflammation in *them*, which accords with the fact stated above.



treatment that cannot be accused of suddenly stopping the discharge; neither in the case of fistula can the after treatment have influence in either way*.

H.—If the phenomena in such cases as these were owing to the admixture of pus with the blood, by absorption or otherwise, we might expect to meet with them when the quantity of matter secreted is large and the part irritable, not when it has gradually lessened, and the surface has healthily healed; nor should we expect to find them when that surface has been a large and open ulcer.

and where collections of confined matter have been evidently absorbed, no such phenomena have occurred.

I.—It is a further argument against the supposition, that we have innumerable cases of collections of matter quietly absorbed, without any constitutional disturbance or secondary inflammation, and for this difference no good reason has been assigned, as far as I am aware.

Further explanation required.

K.—It is therefore necessary to seek a further and more satisfactory explanation of the fact, and in order to investigate the subject more thoroughly, it may be right to consider under what circumstances these and similar phenomena do occur.

* I cannot help observing in this place, 1st, that if a long continued inflammatory action in one part of the body is put an end to, some other will be very prone to assume it, unless due care be taken; and 2d, if that inflammation has been attended with suppuration, the suppurative action will also rapidly supervene in the new seat.

L.—In the first place, it is evident that these secondary inflammations are a very common effect of the introduction of morbid poison*, whether derived from the human being or other animals†; whether of a nature unknown or of a quality cognizable by its results, as in glanders, lues, variola, &c.; but it is essential to recognize the fact, that in many of these cases, it is not *pus* which is introduced, as in the case of the poison from dissection, and, therefore, it would be drawing a conclusion from a narrow view of the subject to suppose that the phenomena are invariably owing to the introduction of pus, because they sometimes are‡; and it will be further found with reference to one of these, namely, variola, that so far from

They often are the result of the introduction of morbid poison,

but this often is not pus;

* Particularly enforced by Andral, vol. i. p. 26. Trans.

† See a very interesting paper by Dr. Elliotson in M. C. T., vol. xvi. part i., and cases by Mr. Coleman in Mr. Travers' work on Irritation.

‡ Experiments have been made by MM. Gendrin, Bayle, and others, consisting in the direct introduction of matter into the vessels of animals, which produced extreme constitutional disturbance, secondary inflammations, and a state of the circulating fluids, approaching to puriform. When putrescent matter was employed, these effects were particularly remarkable, and gangrene was a very common result. Gendrin, 1688.

I may observe, with reference to this point, that when matter is confined and becomes putrescent, a circumstance which results sometimes from opening chronic abscesses, and endeavouring to heal them, extreme disturbance of the system takes place, and symptoms similar to those arising from the injection of putrescent matter; but if a free incision be made, they cease, from which I should infer, that *such* symptoms may arise from *sympathy* as well as *absorption*.

on the contrary, is more active in other forms.

the pus being a material cause, the effect produced by the halitus inhaled is greater than when pus is introduced*.

M.—It is quite obvious, that in the cases last mentioned, it must be mere conjecture to suppose inflammation of the veins has produced the phenomena; and as they also frequently occur after inflammation, arising from *simple* puncture or *spontaneously*, there is still more reason to conclude, that neither the introduction of morbid poison, nor inflammation of veins, are *essential* to their production.

But where suppurative action has prevailed in the system, if new inflammation is excited anywhere, it will be strongly disposed to suppuration.

N.—Although there is great reason to believe that these phenomena do not arise exclusively from one cause, there are circumstances belonging to those above mentioned, which we may well suppose will *powerfully contribute* to their production; thus it is their character to induce extensive suppuration, and in cases in which suppurative action has been long maintained, either the blood becomes altered in such a way as to afford more readily the products of suppuration, or the actions of the vascular system (on the principle of accordance) become strongly disposed to suppura-

* In whatever form morbid matter is introduced, it seems to act on the circulating fluids as a leaven (but I do not feel warranted in going into a subject so little understood), nor is the action confined to the fluids, for the same poison as small-pox will fail to produce its effect a second time.

tion, or what is extremely probable, both these results ensue*; and if under such circumstances, any organ or part is injured, or from any cause is disposed to diseased action, inflammation will readily occur in it, and the result of that inflammation may be a prompt suppuration: we have, therefore, only to find a cause capable of acting on such parts or organs.

O.—Now, we find that if the body is thrown into a state of general fever, local inflammations are often the result, quite independent of any extraneous cause, it is a state which has long been recognized by the common people, and they speak of it as “an inflammation of the blood.” They say of a person so affected, that he “has an inflammation all over him;” and it is common in such cases to see various parts or organs, both external or internal, affected simultaneously or in quick succession†; the phenomena here are remarkably analogous with those produced by extrinsic causes,

And when general febrile action prevails, many parts are often thrown into inflammation.

* A remarkable confirmation of this view is afforded by an observation of the French pathologists, namely, that in phlebitis after parturition, producing secondary inflammations, pus was secreted from the mamma instead of milk.

† There appears to be a remarkable resemblance between the phenomena of rheumatic fever and these secondary inflammations, only the former are confined to the fibrous system, and have no disposition to suppurate. Milk fever, also, gives rise to phenomena of the same kind.

and if we suppose such causes superadded, the effect no doubt would be increased.

To this general febrile action the predisposing state is often plethora with foulness of the blood; the latter the most essential.

That state of the body which disposes to such general inflammations is often one where plethora is combined with foulness of the blood, the latter depravity being probably the most efficient cause, as the phenomena are observable in all cachexiæ, even though the blood may be deficient in quantity, as is remarkably evinced in scurvy, &c. in which such inflammations, however, rapidly run into ulceration instead of suppuration.

And this foulness may be occasioned, either by the introduction or the retention of morbid matter.

Q.—Now the foulness of the blood, which has so much influence, will be produced in all cases, more or less, where morbid poison has been introduced, whatever be its form or nature, and hence it accords with the ordinary phenomena, where the blood is rendered foul, rather by the retention than by the introduction of injurious matters, that such effects should also be produced.

Explanation of the phenomena of secondary inflammations in erysipelas, in diffuse inflammation, and in phlebitis, on the principles stated.

It has been already stated, that these secondary inflammations have been particularly noticed in erysipelas, in diffuse cellular inflammation, and in phlebitis; will the explanation above given account for them?

On the supposition that morbid poison has been the agent, then the phenomena would result from the principle last stated (P. Q.); and where morbid poison is not introduced, then we may find an ex-

planation in the accordance of the actions of the general system with those of the part, exciting new inflammations (N. O.); and the disposition to run into a rapid suppuration would be another natural consequence, if the original inflammations have that character.

It is remarkable that these secondary inflammations should be so particularly liable to occur, where the primary inflammation has been a spreading one; the cause of this it would be desirable to ascertain; at present it must be a matter of conjecture; but it is highly probable that the state of the system in all these cases, as formerly stated, is peculiar: it is also clear, that very extensive surfaces are affected; the latter, however, is a phenomenon not peculiar to this class, but exists wherever membranes are the seat of inflammation *.

Why secondary inflammations should so particularly occur when the primary inflammation has been a spreading one.

* M. Gendrin states broadly, that "persons *having a local inflammation* present the same alterations in the mass of blood as those who labour under an idiopathic plethora;" and the over-excitement produced in them by these local inflammations afford a plausible explanation of the inflammations which occur in many organs in such individuals, and of the secondary suppurations which occur in individuals already labouring under severe suppurations: the blood then containing in excess the materials of pus, and the patients being really in the same state as animals into whose veins pus has been thrown. 1683.

There are some points in M. Gendrin's explanation which are very questionable; as, for instance, the necessary existence of plethora, and rich or stimulating particles; and it does not appear, from

The inquiry into the nature and causes of secondary inflammations not superfluous.

If any should deem this inquiry into the nature and causes of secondary inflammations superfluous, I can only say, that no endeavour to ascertain the cause of important facts in this or in any other science has been found unproductive, if it has contributed in any degree to the proposed end ; and although the application of a fact discovered may not be immediate, it has never ultimately been found useless. In the instance before us, I should say, that if there are any grounds for the opinions above stated, they would lead us to this important conclusion, that as the secondary inflammations which constitute the most dangerous features of phlebitis and diffuse cellular inflammation, and sometimes of erysipelas, appear to owe their origin where morbid poison has not been introduced, to the continuance and extension of the inflammation, inducing a corresponding state of the system, (and where it has gone on to suppuration, the suppurative disposition is superadded,) it behoves us to leave *no means untried* to put a *speedy* stop to the first inflammation. When morbid poison has been introduced, this must also be our object, but the task more difficult.

Practical application.

We must now proceed to the treatment of phle-

his statement, why *every* local inflammation should not *equally* produce secondary inflammations, as well as the class we have been now considering.

bitis, which, unfortunately, has too often proved fruitless, after secondary inflammations have been once established, and in our treatment of the slightest cases we never should lose sight of the probability of their occurrence. As regards venesection as a cause, we should never, from our own negligence, allow the patient to run any risk which could be avoided; and I must here take leave to remark, that in practical works on venesection it is common to find little labour bestowed in pointing out the dangerous consequences which hence arise, while abundant pains are taken in directing how the puncture of an artery is to be avoided, from which I will undertake to say the loss of life or limb is comparatively very unfrequent.

Treatment of phlebitis in cases from venesection.

Prevention.

The great object in treatment is to limit the inflammation to the arm, and to extinguish it as fast as possible: with the *former* intention, division, or ligature of the inflamed vein, or pressure to obliterate it, have been proposed; the two first modes are little entitled to confidence, although recommended by high authorities; for such is the disposition to spread through the continuous ramifications, that it is little likely such measures would intercept the progress of the inflammation. Pressure probably affords a better mode, and as far as the superficial veins are concerned, might, by placing their sides in contact, dispose them to adhere, and thus put a stop to the disease; there

LOCAL TREATMENT.

To arrest the mischief.

Spreading inflammations.

To reduce inflammation.

Bleeding.

Other means.

General treatment.

would still, however, be the risk of the internal vessels being affected.

Under the *latter* head we have first to consider bleeding, by leeches or otherwise. Where no reason as yet appears to suspect secondary inflammations, leeches may prove of infinite service. Where there is, I very much question the propriety of employing them; we cannot conquer the enemy by *attacking him in one part*; it is impossible to apply them to all, if we could ascertain them, but the chances are infinitely against our discovering them all; *if* bleeding, then, is the appropriate remedy where secondary inflammations have occurred, we should not fritter away our means by applying leeches to one part, but take blood effectively from the system; at least so it appears to me.

Evaporating lotions are often useful, and argenti nitratum, I think, should always be tried; its use will not prevent the employment of these lotions. Position and rest are especially to be attended to.

With respect to general treatment, when the *primary* inflammation alone is to be considered, I apprehend it cannot be too decidedly antiphlogistic; when from the continuance of the disease, or other symptoms, secondary inflammation may be suspected, this mode of treatment is more questionable, and its results often unfavourable. General blood-letting is certainly a remedy of

great efficiency where it is proper; but opinions are much divided on this head, and, at all events, when the secondary inflammations are running into rapid suppuration, it is likely rather to expedite this process than to prevent it*.

Spreading inflammations.

M. Sanson has treated phlebitis with tartrite of antimony with success; it is at all events a safer mode than bleeding. The mercurial treatment has also been recommended from authority, and is justified by analogy.

In the stages of depression, it is impossible to withhold stimuli, the patient would evidently sink without them; by many they have been employed early as the best method of cure, and it still remains to be decided which plan is the best; but when such mischief has occurred, as we often discover after death, it is clear no plan would be available, although one may prolong, another shorten, existence.

Inflammation of veins, consequent on operations or injuries, does not differ in its nature from that which arises from venesection; but it rarely happens that, in such cases, it does not invade the principal trunks, or that secondary inflammations do not ensue; when, therefore, it arises from such a cause, it is particularly to be dreaded.

Phlebitis consequent on operations and injuries.

* Dr. Lee, whose authority is entitled to much deference, is opposed to it in uterine phlebitis. M. C. T. vol. xvi. 458.

Spreading inflammation.

Phlebitis consequent on parturition.

There is another, and beyond all question a very frequent variety of phlebitis, as appears from ample though recent investigation in this country and on the continent, I mean that which is consequent on parturition. I cannot wholly pass it unnoticed, nor can I do it justice in this work, partly because my information is altogether borrowed, partly because it would occupy too much space to go fully into the details; it also belongs more to the consideration of internal inflammations.

It should seem that in a very large number of cases, of acute disease consequent on parturition, which has commonly been designated by the term puerperal fever, inflammation of the veins is present; at least, out of 222 victims of this disease, in the years 1828-9, at the Hospice de la Maternité, at Paris, inflammation of the veins was found in the greater number*, of the lymphatics also in a considerable proportion, often combined with phlebitis; it must be stated, however, that cases existed and terminated fatally, when there was no distinct evidence of either set of vessels being inflamed; neither was the inflammation confined to the vessels, indeed it would be quite in opposition to the results afforded in other cases if this had been so.

* In 132 out of 222 cases. In Dr. Lee's practice the proportion was not so large.

The peritonæum, the Fallopian tubes and ovaria, and the substance and lining of the uterus itself, were, in various cases, found exhibiting the phenomena of inflammation. In some a true sphacelus of its substance was found; in a great number, a peculiar softening of its structure, which has been often observed by other pathologists, and attributed to gangrene, but is probably connected with some other inflammatory condition; whenever it was found, however, typhoid symptoms had been present. The internal surface of the uterus, in many cases, presented marks of inflammation; but whether they were present or not, the secretions into its cavity were invariably most offensive and depraved.

Spreading inflammations.

Morbid appearances found in puerperal disease, besides inflammation of vessels.

There seems reason to believe, both from these and other statements, particularly from those of Dr. Lee, that either of the foregoing pathological conditions may exist independently; namely, peritoneal inflammation, inflammation of the uterine appendages, inflammation of the uterus itself, or inflammation of the vessels, or that they may be more or less combined; it should also appear that the character of the disease, and the treatment required, vary in a considerable degree, according to the independent existence, or perhaps predominance of the one or the other; nevertheless it is probable, from his statement, that the cause is capable of producing any of the varieties, the

Spreading inflammations. particular one being probably determined by circumstances not understood*.

Secondary inflammations. Secondary, or as the French term them, subsidiary inflammations, were frequently found. The suppurative action was remarkably rapid, and in one case proved fatal in little more than twenty hours.

Character of the accompanying fever. The fever which accompanied these local derangements was in some cases inflammatory, in others ataxic, in the great majority typhoid; and it is pretty clear that its character, in the case last-mentioned, was similar to that observed in other kinds of phlebitis. It is not my intention to enter further into this subject, excepting with reference to one of its consequences, or rather, I should say, one of its frequent consequences, I mean phlegmasia dolens.

LOCAL
SYMPTOMS.

Phlegmasia Dolens.—At an uncertain period, but generally about ten days, after delivery the following symptoms occur. The patient feels pain and tenderness in the iliac or pelvic region, which are sometimes tumid; then in one of the lower extremities, sometimes beginning at the *calf*, sometimes, however, extending down the limb from the groin; this pain is at times very acute, and occasionally accompanied with a sense of numbness; the great femoral vein becomes hard and

* M. C. T. vol. xvi. 444.

very tender, and this condition often extends to its branches; the limb swells, frequently very much, the swelling beginning from above; its surface remains white and glistens; it scarcely pits on pressure, and if punctured, serum does not exude, there is however pitting œdema of the foot. The temperature of the limb is generally increased, the sensation of heat always; the glands in the groin often enlarge and suppurate; occasionally, small abscesses form in the limb, (extensive suppurations in its substance, similar to those of diffuse cellular inflammation or erysipelas, are not common when the characters above stated are presented,) but it must undoubtedly be understood that from uterine phlebitis we have occasionally both extensive suppuration and sloughing, but coming on at a different period and in a different way*. The same train of symptoms which have been noticed above, often extends to the other extremity, perhaps when the first is getting well.

All writers on phlegmasia dolens agree, that the symptoms commonly show themselves at the period stated above. In uterine inflammation† they generally invade about the second or third

Spreading inflammation.

What is the cause of the difference in the character of phlegmasia dolens and acute puerperal disease?

* A well marked case of this kind is Dr. Lee's thirteenth, in vol. xv. of M. C. T.

† The designation adopted by Dr. Lee to include all the varieties. I doubt whether acute puerperal disease might not be better, as more general.

Spreading inflammation.

day, often within a few hours. This implies a difference, not in the cause perhaps, but in the form of the disease, and it is not improbable that the difference may be this: that in phlegmasia dolens (the least formidable consequence of uterine phlebitis) the venous inflammation of a milder character passes downwards towards the lower extremities, while in the more severe cases it passes upwards.

There is sometimes difficulty in making water, and it is muddy. The lochia are often, but not always, obstructed. The milk may continue to flow, but is often impeded.

Phlegmasia dolens is sometimes attended with secondary inflammations.

It not unfrequently happens that the same secondary inflammations take place as in other cases; in such, suppuration of the pelvic articulations appears to be a very common accompaniment; and it deserves to be noticed, that a peculiar and destructive disease of the eye has been observed in many instances, of which Dr. Marshall Hall and Mr. Higginbotham have given a very interesting account*.

Constitutional symptoms.

The constitutional symptoms are, generally speaking, much milder than in acute puerperal disease, or in other cases where phlebitis exists,

* In vol. xiii. of the M. C. T.—I may incidentally remark, that in some experiments made by M. Majendie, to ascertain how far dogs could be supported by a purely vegetable diet, one of the consequences was destructive inflammation of the eyes. Are both phenomena imputable to a foul state of the blood?

and recovery is much more common than a fatal termination; but when the disease is severe, more especially if secondary inflammations occur, the same train of symptoms which belong to them ensues, and very often with the same fatal result.

The duration appears to be extremely uncertain; often in the course of a few days the swelling and other symptoms abate, but it is long before the limb perfectly recovers itself, remaining stiff and feeble; the health also is long impaired, and there is much disposition to relapse. If supuration in the limb comes on, the progress is protracted.

Uterine phlebitis does not appear to depend upon the severity of the labour, indeed it takes place not only after parturition but after abortion, nay, it has been stated, after menstruation; and it should be understood, that cases extremely similar arise under circumstances not connected with parturition, but from disease of the uterus*, and others remarkably analogous occur in *males*†.

By some it has been attributed to a deposit of milk, but it should seem without sufficient grounds;

* *Vide* a case related by Mr. Lawrence in M. C. T. vol. xvi.

† Of this I have seen some instances, and in vol. v. of the Dublin Hospital Reports, there are some strongly marked cases of phlegmasia dolens, mentioned by Dr. Graves and Dr. Stokes. They express their conviction that the inflammatory swellings occurring after fever are similar in their nature; and although, in their opi-

Spreading inflammation.

also to obstruction of the lochiæ and to inflammation of the lymphatic glands, but there is more reason for regarding these as effects than as causes. The evidence for believing that it is produced, at all events in a great proportion of cases, by inflammation of veins, and those the uterine, is strong, as the appearances on examination will show.

Morbid appearances.

Inflammation of the iliac and femoral veins has been ascertained, in a great number of instances, to have existed, both by Dr. Davis* and Dr. Lee†, and the latter has traced the appearances of inflammation to the uterine veins, particularly the spermatic; so likewise has Mr. Arnott‡.

The limb itself exhibits little comparative serous effusion, but its dense tumefaction seems rather owing to lymph. This swelling has been imputed to the obstruction in the veins. The iliac glands are often in a state of suppuration, this may be owing possibly to the affection of the uterine lymphatics.

Curative process.

It is an important fact, that in many instances the process of recovery by the obliteration of the

nion, evidence is not wanting of the frequent occurrence of inflammation of veins in such cases, yet they lean to the opinion which Dr. Duncan has formed, that these are essentially cases of inflammation of the cellular membrane.

* M. C. T. vol. xii. p. 419.

† M. C. T. vol. xv.

‡ M. C. T. vol. xv. part i.

affected veins has been noticed, and there is no reason to doubt that in the majority of cases this does actually take place, the circulation being maintained through those which remain; hence the prognosis is not unfavourable in cases of phlebitis, when symptoms of secondary suppurations have not unequivocally occurred. Spreading inflammations.

The event of phlegmasia dolens is unquestionably frequently successful, probably from the mitigated character of the disease, supposing it to result from phlebitis. PROGNOSIS.

Blood-letting appears to be decidedly useful, but the evidence is in favour of the application of leeches to the hypogastric and iliac regions; and they should be plentifully applied, as it is not only an object to terminate the inflammation speedily on general principles, but as Dr. Davis has urged, to prevent the obliteration of veins as far as may be possible, and so obviate the necessity of opening the collateral channels, which protracts the cure and increases the risk. TREATMENT.

Evaporating lotions to the groin, &c. may next be mentioned, though by some fomentations are preferred.

Blisters also applied in the neighbourhood have also been strongly advocated.

When the state of the lochial discharge indicates

Spreading inflammation.

any thing wrong in the uterus, the frequent use of tepid injections *per vaginam* is highly useful.

Laxatives are proper, but strong purgatives are condemned: a cooling diet, saline neutrals, and quietude of mind and body are essential.

On carefully considering the history of these cases, it is impossible not to perceive that they generally appear to be very amenable to treatment, if the nature of the attack is understood, and that treatment is promptly and efficiently adopted; also that they are particularly liable to relapse if due caution is neglected. Examinations show us, that the process of cure is either by the obliteration of the inflamed veins, or by the resolution of the inflammation existing in them: for either, it may well be supposed that a considerable time will be required before they are *perfectly* accomplished; and that any exciting cause, prematurely applied, would much endanger a renewal of the inflammation, and that too under aggravated circumstances. It also appears that when death ensues, it is generally from the extension of the disease, and from secondary inflammations ensuing. The whole of these observations, therefore, would lead us strictly to forbid premature exertion, to raise the limb so as to facilitate the circulation, and to avoid every cause of excitement.

Considerable debility often ensues with a great tendency to perspiration; this may be advantageously obviated by the use of mineral acids; but unless under particular circumstances, it may be hazardous to give direct stimuli and tonics. Such circumstances however do exist, when the patient is actually endangered by exhaustion, or when secondary inflammations having ensued, and this mode of treatment affords the only chance of maintaining life.

Spreading inflammations.

When all active local symptoms have subsided, and the limb only remains swollen and stiff, frictions with discutient liniments may prove serviceable; but as it will be understood that the chief cause of the swelling is the obstruction of the venous circulation, so it cannot be reasonably expected that until this is re-established any means will contribute materially to its removal.

So far phlebitis has been considered as the result of some aperture in the veins; and no doubt this is the case in the greater number of instances; and Dr. Lee regards even the last mentioned cases of phlebitis, originating in the uterus, in this light*, and probably with much reason; for he says, that we may look upon the veins after parturition with reference to this point, as placed in the same circumstances as other wounded veins, the

Another variety of phlebitis independent of any solution of continuity.

* M. C. T. vol. xvi. p. 416.

Spreading inflammations.

Occurring in varicose veins,

and in the pregnant state acute.

Cases.

more especially as it is found that in a large proportion of instances, the spermatic are found to be inflamed, and it is over these veins that the placenta is usually attached. I think, however, it will appear that veins often inflame without being exposed by any breach of surface; and there is every reason to believe that this is the case very commonly in varicose veins, although in a less acute degree, and that the signal benefit derived from taking blood from them arises from its effects in reducing this inflammation.

I have also seen several cases of inflammation of veins in the lower extremities of pregnant women, *before parturition, of a very acute character*, of which the following are examples.

July, 1828.—I was desired to see Mrs. R., about five months pregnant. There was a swelling on the calf of the right leg, about the size of a filbert, soft to the touch; from this the branches of the saphena could be traced, very tender and thickened in its coats, as far as the outer ankle, with occasional knobs, corresponding probably with the valves: the tenderness spread in a slight degree to the thigh. There was a most distressing feeling of weight, when standing.

In about a month it yielded to the use of leeches, and a lotion with sup. plumbi, alcohol, and distilled vinegar, diluted, aided by the recumbent posture, and after a time by bandage; I say after a time, for

the inflammation in this case was sufficiently acute Spreading inflammations. at first to render even the pressure of a bandage insupportable, and the upright posture intolerable.

Mrs. H., a relation of the above, in the course of this year (1831), had a similar affection in the thigh chiefly, but even more acute, the upright posture could not be borne for a moment; in her the process of inflammation ended in the complete obliteration of the saphena and its branches, which might be traced as solid chords, and when this process was completed, her power of walking, before impossible, was perfectly restored*.

Arteritis.

Without this the account of the inflammatory conditions of the vascular system must be incomplete; nevertheless, it is my purpose to enter but briefly into it: in the acute form it is either so infrequent, or what is more probable, so little recognized, that at present our information is still very defective. That arteries, like all other parts of the body, are liable to inflammation cannot be doubted; that they frequently are the subjects of chronic inflammations has been long known; perhaps it will be found that in the acute degree in-

Few cases of acute arteritis recorded.

* Mr. Hodgson briefly alludes to cases of a similar nature, as it should appear, but not connected with the puerperal state, p. 540.

Spreading inflammation.

inflammation prevails more frequently than has been apprehended.

The symptoms in the cases alluded to by Mr. Guthrie are briefly stated by him to have been attended with "a very quick pulse, a rapid deterioration of the state of the patient, and degeneration into irritative fever, with low delirium followed by death*." They commenced with symptoms of obstruction of the circulation in the extremities, and the arteries exhibited unequivocal marks of inflammation after death.

Subacute may probably be more frequent than has been suspected.

Subacute inflammation of the arteries, I cannot help thinking, is of frequent occurrence; perhaps the erythism, from the use of mercury, is of this character; and where we meet with cases (whatever may have been the cause) in which the circulation is remarkably disturbed, the heat and secretions either particularly diminished or preternaturally increased; the capillaries of the extremities and face perhaps empty and pale, and there is a strong tendency to rigors, especially if no local disease exists, sufficient to account for these symptoms, and no reason to believe that the patient labours under any form of common fever (and such cases do present themselves); they are, in my belief, only to

* On Diseases of Arteries, p. 21. In the 5th vol. of the Dublin Hospital Reports, a very interesting case is related in a paper by Dr. Stokes and Dr. Graves; in the works of Hodgson and Gendrin, other cases are mentioned.

be explained on the supposition that they arise from a disordered or diseased state of the vascular system, probably the arterial. It has been usual to refer them to a morbid condition of the heart; but when it is considered that minute vessels are extremely sensible to impressions—are exposed to the contact of blood, much altered from its natural state—and that the larger branches are subjected to the continual influence of too great distension and impetus from plethora, and frequently excessive action of the heart, it will not seem wonderful that these may get disordered, and inflame as other disordered parts are wont to do.

Spreading inflammations.

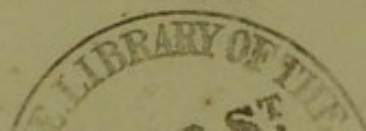
FASCIAL INFLAMMATION.

The next form of inflammation which I shall proceed to speak of is fascial inflammation; and I am bound to say, that for a more accurate knowledge of some of its varieties, we are indebted to the observation of late pathologists, especially Mr. Travers.

More accurately distinguished of late.

It is obvious that fibrous membrane, being an elementary tissue, almost as general and as extensive in its connexions as the cellular, when it is affected with inflammation, that may be most extensively propagated; and further, from its contact with cellular membrane, that, when propagated, the inflammation will commonly be communicated

The tissue very extensive, its inflammation communicated to the surrounding cellular membrane, and not always to be distinguished.



Spreading inflammations.

to it. From this it will happen that in many cases there must be an uncertainty as to the original seat of the disease (a matter, however, not of paramount importance as regards the treatment), while in others there can be little doubt.

Consideration of gout, &c. excluded.

It is not to be understood that the inflammation, now alluded to, is that produced by gout or rheumatism, of which fibrous membrane is the common seat, and which is as little disposed to suppuration as other forms of fascial inflammation are prone to produce it in the adjacent cellular membrane.

Besides these, three kinds of fascial inflammation.

The inflammations of fascia we have now to consider are of three kinds; one produced by external injury with wound; the second, that inflammation which is denominated paronychia gravis; the third, a species of fascial inflammation sufficiently common, but not, I think, hitherto accurately discriminated.

From wounds,

lacerated,

1st. When a portion of fascia is wounded, whether in the severer or slighter accidents of the body, inflammation may take place and extend far. In compound fractures, and other lacerated wounds, there can be little reason to doubt that the inflammation of the fibrous tissues is a severe consequence of that injury, though it must at all times be difficult in such cases to discriminate between the affection of this and the other tissues of the limb; and for the treatment of such cases I must refer to the head of wounds.

It, however, not unfrequently happens that fascia, Spreading inflammation. sheath, or tendon, are simply pricked, it may be by or punctured. a lancet in bleeding, or in any other way; and consequent on this we have an inflammation spreading widely, and running into the most destructive processes.

We may take for an example, a thorn running In the fingers. into the finger of a healthy labourer*. Pain, throbbing, and stiffness of the part, speedily ensue, and are communicated to the hand generally, and thence to the fore-arm; the parts load exceedingly, become red, matter forms, the fascia and tendons slough; yet from their dense structure refuse an outlet to the pus; this, then, is compelled to pass far between the interstices of the muscles; the upper arm may become affected; at last ulcerations of the surface will take place, about the ball of the thumb, in the interstices between the fingers, or above the wrist, or even high up the arm. Matter will drain in large quantities through these, and the dead fascia and tendons will be thrown off.

* It does not follow that serious inflammation will not occur without the injury reaching fibrous structure; it is not uncommon for very similar inflammation to ensue, when the cellular membrane beneath the dense skin is punctured, giving rise to diffuse cellular inflammation, or when the skin only is the part hurt, E. phlegmonodes may proceed from it; but so great is the resemblance between these different processes of inflammation, that it may be safe to explain the principles of treatment under one, the paronychia gravis.

Spreading inflammation.

The vents not being sufficiently free, the chambers beneath the surface will for an indefinite time continue in a state of suppuration, and may ultimately spoil the limb either entirely, or in a great degree, some parts being destroyed, and others indissolubly glued together, rendering it in a great measure or quite useless, or amputation even necessary to remove such a source of irritation from the system. The limb, indeed, sometimes mortifies, but this only in extreme cases, or in very unhealthy constitutions. But the bony phalanges of the finger first affected, I may mention, often perish under the high inflammation they are exposed to.

Without puncture.

2d. The same train of symptoms often occurs without any wound, in that form of paronychia which is denominated the *P. gravis*; here inflammation commences in the sheath of the tendons of the fingers, commonly in the middle phalanx, with a strong disposition to suppuration*, beginning probably in the synovial membrane which lines the sheath; but as this must be exposed to great pressure from the unyielding nature of the parts which surround it, so from this cause it has

* Authors describe a species of paronychia, which they state takes place between the periosteum and bone. I should suspect that these are simply cases of necrosis of the phalanx, inducing suppuration there, as it would in any part of the body. It does not extend like the usual inflammation, and may be distinguished by the hand not swelling, and the progress of the disease being much less rapid and intense. An incision here is demanded.

a great disposition to mortification also, which the fibrous sheath itself will no less possess, from the tendency of such tissues to perish under inflammation, as well from their imperfect vital powers as from the existing tension. Spreading inflammations.

Judging from what I have daily reason to observe, I should conclude that there are few diseases more serious to the labouring classes than this, for their lives are not unfrequently compromised by its consequences, and their arms, hands, or fingers, often rendered entirely useless or lost. Both very destructive to the limb.

The treatment will be nearly the same, whether the disease arise spontaneously, or from injury, and will chiefly be determined by the organization of the part on which the nature of the inflammation depends. Treatment.

It appears very clearly, that in the great majority of these cases there is no inherent disposition in the constitution causing it to spread, and that it does so, because the disease cannot by the efforts of nature at once bring its processes to a conclusion towards the surface; and this I infer, from the fact, that if we at once place it in a condition to relieve itself towards the surface, there is generally an end of the disease. If, therefore, at the commencement, we make a free incision of the inflamed parts, cutting completely through them, we By prompt incision.

Spreading inflammations.

shall rarely find that the inflammation will extend, and commonly all the mischief will subside.

It formerly was supposed, that the necessity for this arose from the existence of matter in the sheath of the tendon, which, until evacuated, occasioned the disturbance, and that it was not necessary to make an opening until such matter was formed.

The formation of matter not to be waited for.

That the formation of matter will enhance the severity of the disease, and that when formed, it will pervade the sheaths, extending the mischief, is not to be doubted; but an incision will prevent its production, and thus destroy the disease in its germ. It is true, that other means have been but too frequently resorted to, for while vainly endeavouring by their use to check the evil, the time has been lost which might have best availed for completely putting an end to it.

Other means which are sometimes employed.

Leeches, ice, or Goulard, perfect rest, with the hand in a much raised position, low diet, a saline purge, opium at night, are had recourse to for this purpose; firm pressure, very hot water, alkaline solutions, and turpentine, have also been recommended, and hot poultices, which are injurious, are too commonly employed.

Timid persons will not always allow an incision to be made at once, and it may be necessary to try such means as those mentioned above; but

should they fail, as is very probable, it will be Spreading inflammation. highly wrong to delay the opening, from which delay much harm, but no good can accrue: it is idle to wait for any indication of the formation of matter, for this will not show itself till the mischief is done; and we cannot too soon discard the idea, that openings are only to be made to let it out.

The incision, as before stated, should be as deep as the knife will go, and free, and the manner in which it is done is no light matter. A lancet should never be used, it will not give complete relief; and if the opening is too small, an ill conditioned fungus will push up, and any pus formed beneath will be denied an outlet.

It often happens, however, that a surgeon does not see these cases till great evil has accrued; much depends upon a name: these diseases are called whitlows, and as a viper may be confounded with a common snake, these are often thought by unscientific persons to be of no more importance than the whitlows at the extremity of the fingers, and under this persuasion, get no other treatment than an old woman's poultice, till the destructive effect on the hand and arm compel the patient to consult those who know better.

At whatever stage of the disease, however, we are called upon, the principle is still the same; it is inflammation bound down by fascia, or it is pus or slough which cannot find vent, that call for re- Treatment in the advanced stage of the disease.

Spreading inflammation.
Incisions.

In what manner.

lief. Incisions must still be made, but it is not now so easy to determine where, after the disease has been allowed to extend to the hand and arm, matter being contained under the fascia, and the skin above it immensely loaded: the whole hand appears equally swoln and tense, no point of selection offers itself, and no fluctuation can be satisfactorily distinguished; in such a case a free incision should be made deep in the original seat of the disease, till the matter fairly gushes out, and may, if necessary, be continued upwards to the head of the metacarpal bone supporting that finger, for we shall thereby give exit to matter contained beneath the fascia of the hand, without risk of dividing the digital arteries which might occasion serious hæmorrhage, that is to say, it *might* proceed beyond what could be safely borne, though, doubtless, within certain limits it would be of use. I once remember seeing a man who had lost a chamber-pot full of blood from one of the digital arteries, not from wound, however, but from ulceration; and I may observe, that hæmorrhage from this cause is not uncommon: such hæmorrhages can hardly be restrained by pressure, for the part will not often bear it. Tying the artery is often impossible. Turpentine will sometimes answer, but often fail, and so will other styptics; actual cautery may succeed; but the best plan is to give free vent to the discharges, which

will improve the sloughy condition of the wound, and thereby correct the ulcerative process. If the bleeding does not proceed from a point high up in the hand, amputation of the finger will often be the best plan, will enable us to secure the vessel, and by the vent it affords alter the condition of the sore, and save the hand probably at the expense of a finger already spoiled.

Spreading inflammation.

The points which naturally present themselves for making openings are, the interspaces between the fingers; because here the fascia is deficient, and there is in all cases a protrusion of fat, much increased by the loading of inflammation, and *if the matter is also protruded* at these places, as is often the case, an opening may here be made; but if this is not pretty clearly so, we might plunge in the knife to the great risk of wounding the vessels. The situation over the heads of the metacarpal bones is much more secure, and if it is desirable we may be able to get a director under the fascia and cut it up a considerable distance towards the wrist with the edge outwards, which is a safer plan than that of cutting into the hand towards the palmar arch. Authors direct us to make openings in these cases *coutè qui coutè*, and they are undoubtedly right; but if these can be made *without* incurring the risk of dividing a vessel which might bleed much, and perhaps seriously, under circumstances which render it a

Spreading inflammations.

matter of difficulty to secure it, it would be far better to pursue such a method than to cut at random. *Above* the wrist an opening may be made midway between the ulnar and radial arteries; but even here I have known profuse hæmorrhage occur from cutaneous branches under inflammation.

Other treatment.

Cold bread and water poultices moistened with the solution of lead, and cold applications to the arm, laid in bed and raised above the horizontal line, constitute the best mode of after-treatment: hot greasy poultices have not been condemned without sufficient reason*.

The general treatment of such cases must be conducted on the antiphlogistic plan; opium is often useful, but if the local disease be properly treated, the constitutional affection will speedily subside.

I have selected for the illustration of fascial inflammation cases often occurring, namely, those originating from lacerated wounds, from puncture, or paronychia gravis, as it is called; but it may be held that similar inflammations of fascia will

* When the collections of matter are freely opened in every part, the obliteration of the sinuses is to be procured, and indeed I may say, the extension of the suppuration to be prevented by bandages and spirituous lotions, upon the same principles as in E. phlegmonodes, &c.

arise in every part of the body as well as the hand, proceeding in a similar manner, and to be treated on the same principles. Inflammation of the tendinous aponeurosis of the arm from bleeding and of the head from wound, are very frequent examples. Spreading inflammations.

I have often seen boils give rise to another kind of fascial inflammation less severe, and not disposed to suppuration. When they are large and deep, the inflammation reaches the aponeurosis, and a great degree of tenderness, often with a slight degree of tumefaction, extends along it to a very considerable distance, but resolves as the boil gets well.

There is another species of fascial inflammation to which I have before alluded, and of which I have seen many cases in the fore-arm and hand, where, without any external cause, the aponeurosis has inflamed and remains in that condition perhaps for many months. There is not much tumefaction, but there is heat and considerable tenderness felt beneath the common integuments. The limb is rendered nearly useless, for the action of the muscles gives great pain, the flexor tendons indeed are in a constant state of contraction, its occurrence being generally on the palmar aspect. This inflammation is of a subacute kind, and not at all disposed to suppurate. It is also frequent in the Fascial inflammation without wound or puncture.

Spreading inflammations. neck, and is the cause of one kind of stiff neck, and consequently of curved spine in some cases*.

Treatment. The treatment which I have commonly employed with success has been the repeated application of leeches to the part most tender, and hot fomentations and successive blisters to the adjacent parts. When the tenderness is by these means removed, assiduous frictions with the camphorated mercurial liniment and the use of the hot air bath to the limb, has generally removed the stiffness; and I may here observe, that such means are eminently useful in all cases of rigidity and adhesions after inflammation†.

Case. * September, 1830.—A young gentleman, about nine years of age, was brought to me with his head drawn down close on his shoulder, the spine greatly incurvated, and the usual consequences ensuing in the thorax. The contraction was on the left side, and the degree may be inferred from the position of the head just stated. The surface of the neck was hot and very tender, and the slightest attempt to raise it was attended with extreme pain: the muscles of the neck were rigid, his health disordered. About three months before he had scarlatina, from the effects of which he did not seem to have completely recovered.

The treatment I employed was by repeated leeching and fomentations, and blisters behind the ears and to the nape of the neck, warm baths, and attention to the digestion; subsequently by gentle frictions with a very mild mercurial liniment. Under this plan he rapidly recovered from the affection of the fascia, and his spine has since regained its straightness.

† The inflammation which produces effusion of fluid into the sheaths of tendons and produces ganglion, is another form of inflammation affecting indirectly fibrous membrane; but it is not my purpose to enter into the subject.

Whitlow.—I shall now return to the subject of paronychia, a name most inaptly applied to that form of inflammation which was described p. 476, but not altogether so, when used to express the inflammation I shall now speak of.

These inflammations by no means belong to the same class, genus, or species as the last referred to, for they have not, either in themselves or arising from the organization of the part in which they occur, any particular tendency to spread; but from their character and the nature of the constitution they attack are, as far as I can judge, nearly related to boil; and if it were commonly agreed to call the paronychia gravis the thecal inflammation of the hand, and discard the term whitlow, as applied to it, then there would be no difficulty in arranging these with the species boil.

Genuine
WHITLOW
not spreading
inflammation.

A very accurate and discriminating account of true whitlow is given by Dr. Craigie, in the Edinburgh Journal, 1828, and with him I shall divide the whitlow of the last phalanx, the only one to which the term is applicable, into the cutaneous paronychia, and subcutaneous or cellular.

1st. *The cutaneous paronychia* occurs generally in persons of meagre habit, haggard aspect, and disordered constitution, and often in those advancing in life; it consists in an inflammation of the corion of the extremities of the fingers, generally near the nail: it is attended with a strong

First variety,
cutaneous
paronychia.

sensation of searing heat ; the part is very tender ; on being roughly handled faintness is produced ; the pain is great, and the health and rest are sometimes seriously disturbed.

It soon produces effusion under the cuticle, forming a phlyctena, yellow, whitish, or purple * ; the dense cuticle not giving way, the phlyctena enlarges, and the disease spreads under it, the nail is much involved, and often comes off in the sequel.

When the cuticle bursts the serous fluid is discharged, and after a time, if the disease does not make its way further under it, will get well ; but the vent *is* often imperfect, and the cure delayed.

The surgical treatment is by dividing and removing the separated cuticle ; and the sooner this is done the better ; if through the corion, at an early period it will end the disease. The mere division of the cuticle will give relief in cases not very severe ; but when the pain and restlessness are great, a deep incision is the plan which will serve most effectually. When the cuticle has been removed, the applications, after the cuticle is removed, are the calamine cerate or basilicon, as recommended by Dr. Craigie ; or simple lead ointment, or cold poultices, which I think are often very grateful.

* While a gelatinous effusion adheres to the corion.

Opium should be given to allay the pain, and the disordered state of constitution requires appropriate remedies.

The darker the colour of the phlyctenæ, the more severe is the disease; I have often seen them black, as in gangrene.

2d. *The subcutaneous whitlow* consists in an inflammation of the pulp of the finger, affecting the cellular membrane and corion, and having a great tendency to suppuration. It, as well as the last, often arises from the state of the constitution, and not unfrequently attacks more than one finger; a splinter, however, or thorn run under the nail, not uncommonly give rise to it. It generally occurs at an early period of life, and females are more especially prone to it*: it is in foul, but not particularly asthenic, habits, that this occurs.

Second variety, subcutaneous.

It may exist in various degrees of severity; in some cases is a trifling evil, in others it completely disorders the system; and, if neglected, may involve the loss of the last phalanx.

There is a very painful throbbing and sense of heat, which may either be resolved, or after a greater or less interval terminate in suppuration, and often sloughing under the corion or nail; in

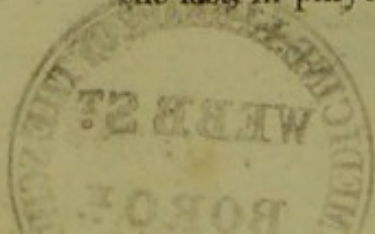
* I have a girl now under my care, who had them form at the same time at the extremity of each finger of each hand.

either case it will be long before it produces a discharge by ulceration, and the irritation will continue till a vent is provided; and it often happens, that before this occurs, it may extend to the bone, and prove destructive to it. When it has made its way through the corion and cuticle, some relief is obtained; but the opening is not large enough, and is generally soon closed by fungus shooting up, in which case, from want of sufficient vent, the matter still is doing mischief below. The corion ulcerates further; but still more fungus shoots up to close it, and the extremity of the fingers exhibits a frightful appearance. In the end the nail or phalanx, or both, are thrown off, and after a long period the part at length heals*.

The pain extends to the finger, hand, and arm; but this is not the case with the inflammation, which may produce great mischief in the last phalanx, and indeed, in some cases, in the second, but, I believe, never extends further.

Proper treatment will, at any period, avert this mischief. If the inflammation is inconsiderable in degree, and matter form under the nail, it may be evacuated by making many perforations through that part; or if a little matter should form by the side it may be punctured, and this

* The cuticle often separates in this form of whitlow, as well as in the last, in phlyctenæ.

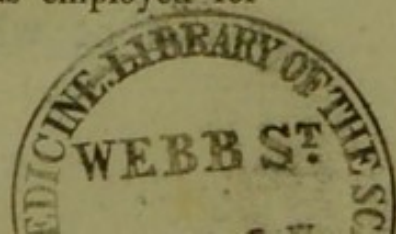


will suffice : but if it is a case attended with considerable pain and throbbing, it is the wisest plan to make an immediate and free incision, which will generally put an immediate stop to it. When matter has actually formed, this is peremptorily required, and it either should be made very long or crucial, for the following reason, namely, that there is, as stated, almost invariably a disposition *to push up fungus*; and so unyielding is the corion and its cuticle, that the opening remaining the same, is soon choked, and its advantages are lost; this is provided for by such incisions as I have mentioned.

Lotions with lead, or cold poultices, I think, constitute the best applications; and leeches, if the patient will not submit to the more effectual plan of incision: arg. nitr. deserves a trial.

From what has been said, it will be evident, that the diseases last mentioned differ entirely in their situation and character from the paronychia first described; and if I have spoken of them in the same section, it is only for the convenience of the reader, deprecating, at the same time, the application of a name to the thecal inflammation, which involves an absurdity*.

* Παρὰ ὀνύχ, near the nail, a term applicable certainly to the two species of genuine whitlow, but quite incorrect as employed for thecal inflammation.



Spreading inflammations.

GENUS IV.—*The Disposition to Ulcerate and Slough.*

PHAGEDÆNA.

In phagedæna the destructive processes first and often chiefly affect the skin.

The inflammations of the last genus, it has been stated, affect the skin and cellular membrane, and if they do not resolve, are disposed to produce suppuration or sloughing of the latter; and often sloughing or ulceration of the former. In this genus the inflammation chiefly falls on the skin, disposing it to ulcerate or slough, perhaps both, and is often communicated to the subjacent tissues.

It is not here meant to enter upon the numerous cases of ulcer which are so prevalent in the body, but merely to consider those to which, from the peculiar activity of the ulcerative process, the term phagedæna has been given.

Leading characters.

In all the inflammations of this genus, the disposition to limit is deficient, often remarkably so; the secretions widely depart from the properties of good pus, and are often capable of acting upon and hastening the destruction of the contiguous parts, or even producing similar diseases in other individuals; in short, they are often contagious.

There is reason to believe that the secretions are often absorbed, infecting the mass of blood; and that when the system is so corrupted, ad-

ditional energy is given to the existing local Spreading inflammation. disease, and others are often produced. In one species also (the hospital phagedæna), it should appear that it is capable of being propagated by the air; possibly it may in others.

Hospital Phagedæna.

The most remarkable example of the phenomena of this kind of inflammation is presented by the *hospital phagedæna*, or gangrene, as it is often termed; and there is no surgeon attached to a large institution of this kind who has not often witnessed its frightful ravages; nevertheless, the cases which present themselves in civil hospitals are fortunately few in comparison with the multitude which at times have come under the cognizance of military and naval surgeons, but particularly the former; hence to their experience I should look for the most accurate accounts of this disease*.

It is impossible to read the account which is given by the late Dr. Hennen, without being struck by the extreme force and accuracy of the description; and it will afford me an opportunity of paying a humble tribute to my sense of his merits in every way, to transcribe to these pages the leading features of that melancholy detail.

* "Perhaps there is no disease more destructive than this to an army on service."—Boggie, p. 2.

Spreading inflammation.

Description;
1st stage.

“Let us suppose that our wounded have all been going on well for several days, when suddenly one of our most promising patients complains of severe pain in his head and eyes, a particular tightness about the forehead, want of sleep, and loss of appetite, and that these feelings are accompanied with quickness of pulse and other symptoms of fever: his wound, which had been healthy and granulating, at once becomes tumid, dry, and painful, losing its florid colour, and assuming a dry and glossy coat. This is a description of the first stage of our Bilbao hospital gangrene; and if a brisk emetic was now exhibited, a surgeon not aware of the disease that was about to form, would be astonished at the amelioration of the sore and the unusual quantity of bile and of indigested matter evacuated by vomiting. In many cases, and particularly if the ward was well ventilated and not over-crowded, nothing more was done except to change the patient to another room, or, if that was not practicable, to remove his bed from the place where it stood, particularly if in a close corner of a ward, and not raised from the floor by boards and tressels, and to order him an entire change of bedding, while at the same time he was well washed with tepid water. If, however, this incipient stage was overlooked, the febrile symptoms very soon became aggravated; the skin around the sore assumed a higher florid colour, which shortly

became darker, then bluish, and at last black, Spreading inflammation.
 with a disposition to vesicate, while the rest of
 the limb betrayed a tendency to œdema. All these Rapidity of the progress.
 threatening appearances occurred within twenty-
 four hours; and at this period also the wound,
 particularly if it was situated on a muscular part
 of the thigh, buttock, or calf of the leg, whatever
 might have been its original shape, soon assumed
the circular form. The sore now acquired hard Circular form.
 prominent ragged edges, giving it a cup-like ap- Edges.
 pearance, with particular points of the tip of a
 dirty yellow colour, while the bottom of the cavity Bottom.
 was lined with a flabby blackish slough.

“ This rapid progress and the circular form of
 the ulcer were highly characteristic of hospital
 gangrene, and obtained almost universally in every
 wound infected with it, wherever situated. I have
 seen the external ear and the palpebra destroyed in
 this manner, as if in a series of concentric circles. Concentric extension.
 Even upon surfaces barely contiguous, as the
 fingers and toes, it generally spreads in a similar
 way; so that the sore, which might have been on
 the middle finger or toe, and confined entirely to
 it at the morning dressing, by night engaged the
 adjoining sound ones, and in less than twelve
 hours more embraced the whole foot or hand.
 The originally affected spot was always the centre
 of this wide spreading diseased circle. Over
 the ribs, also, or over the interdigitations of the

Spreading inflammation.

2d stage.

Fresh sloughs.

Inflamed lymphatics.

serrati muscles, the surface of the wound preserved the circular form, although the bottom was irregular or angular. The discharge in this second stage became dark coloured and fetid, and the pain was extremely poignant.

“ The gangrene still advancing, fresh sloughs were rapidly formed, the increasing cup-like cavity was filled up and overtopped by them and the erysipelatous livor, and vesication of the surrounding skin gained ground, while chains of *inflamed lymphatics* could be traced from the sores to the adjoining glands, there exciting inflammation and suppuration, which often furnished a new nidus for gangrene. The face of the sufferer assumed a ghastly anxious appearance; his eyes became haggard, and deeply tinged with bile; his tongue loaded with a brown or blackish fur; his appetite entirely failed him; and his pulse was considerably sunk in strength, and proportionally accelerated. In this stage the weakness and irritability of the patient was such, that the slightest change of posture, or the most delicate examination of the sore, put him to torture, increased by his inability to steady the limb, which, if moved at all from the bed, was seized with tremors and spasmodic twitches. I have never observed this spasmodic affection increase to tetanus in any one instance of the many hundreds which I have seen, and I have been almost tempted to imagine the two diseases incom-

patible. When these nervous affections came on, Spreading inflammation. the bravest soldier betrayed a symptom which, in those of less strength of mind, formed a striking feature in every stage of the disease; viz. the greatest imaginable impatience of pain, and depression of Depression. spirits. Men who had borne amputation without a groan, shrunk at the washing of their sores, and shuddered at the sight of a dead comrade, or even on hearing the report of his death, instantly predicting their own dissolution, and sinking into sullen despair. I have never in one single instance seen this irritability wanting; and I am therefore led to suppose, that those practitioners who assert that they have seen whole muscles, nay limbs, come away without pain, must have mistaken the nature of the disease they witnessed, or have seen hospital gangrene in its chronic state, when large sloughs were separating after the febrile disease had subsided.

“ The third and last stage was now fast ap- 3d stage. proaching: the surface of the sore was constantly covered with a bloody oozing, and on lifting up the edge of the flabby slough, the probe was tinged with dark-coloured grumous blood, with which also its track became immediately filled; repeated and Hæmorrhage. copious venous bleedings now came on, which rapidly sunk the patient; the sloughs, whether falling off spontaneously or detached by art, were quickly succeeded by others, and discovered, on

Spreading inflammation.

their removal, small thickly studded specks of arterial blood. At length an artery sprung, which, in the attempt to secure it, most probably burst under the ligature; the tourniquet, or other pressure, was now applied, but in vain; for while it checked the bleeding, it accelerated the death of the limb, which became frightfully swelled and horribly fetid. Incessant retchings soon came on, and with coma, involuntary stools, and hiccough, closed the scene. Often, however, the patient survived this acute state of the disease, and sunk under severe irritation, absorption of putrid matter, and extensive loss of substance, without any other symptoms than those of hectic fever arising from other sources."

May die, worn out.

Such is the picture given us by Dr. Hennen; and those which have been presented by other authors differ in no very material circumstance: the circularity of the sore; the peculiar fetor; the surrounding inflammation; the successive deposit of lymph, which sloughs as it is thrown out; the affection of the lymphatics; the hæmorrhages at the last,—are the leading characteristics of this formidable disease.

CAUSES.

Infection,

Of its causes it is necessary to speak in the next place, and here we cannot doubt that it is often produced by infection. An abundance of facts prove that it is communicated from one individual to an-

other, whether the poison is incautiously conveyed by means of sponges, lint, or other dressings*, or through the medium of the air†. It also appears that although it commonly attacks those who labour under wounds, burns, or sores of any kind, not excepting those of a specific nature; yet it will affect those who have no breach of surface, but merely contusions; and lastly, that it will seize persons labouring under no local injury whatever‡; and it is probable that it sometimes exists as a local disease, without the peculiar fever.

Spreading inflammations.

By contact of matter or by the atmosphere.

Attacks injuries of every description,

and sometimes those who have no injuries.

Sometimes the local disease exists without the fever.

But specific contagion is not the sole cause, for it should appear that it has been generated, in many instances, by the atmosphere of other diseases, as dysentery, typhus, or common gangrene, &c. &c. §; also by want of cleanliness without any

Also produced by other causes as well as specific contagion.

* Hennen, p. 221.

† One of the most remarkable facts proving this is related by Professor Brugmann:—"At Leyden, in the end of the summer of 1798, in the French military hospitals, gangrene prevailed in one of the low wards, whilst the patients who had slight wounds, and who were placed above this ward in a well aired garret, were found to escape the disease. The surgeon judged it necessary to make an opening in the floor, in order by that means to afford an outlet to the air of the infected ward by the roof. Thirty hours afterwards those patients who lay next to the opening were attacked by the disease, which soon spread through the whole ward."—From Hennen, p. 235. Considerable alteration has been observed also by M. Brugmann in the air of wards so infected.—Op. cit. p. 243.

‡ In many cases it began with pustules or boils. *Vide* Thompson, p. 477. Quotation from Brigges and Jarvis.

§ Delpech.

Spreading inflammations.

such causes*: and Dr. Boggie is of opinion, that the irritation produced by the continual disturbance of wounds will generate it†; or that it may be occasioned by the excitement of stimulating food or drink in wounded persons‡. That it may occur sporadically I have not the least doubt, for although where I have seen it in hospitals it has commonly prevailed in several cases, or where there have been many bad sloughing sores, yet I have seen solitary but severe instances of its occurrence.

Both robust and feeble liable, but depression tends to produce it.

When the influence of contagion is strong, both the robust and feeble are liable to its attacks, and it spares neither§; but M. Delpech insists upon causes of a depressing nature particularly disposing to it. A high temperature also seems to increase its ravages and influence the type; and those hospitals have been most liable to its attacks which are placed in unfavourable situations.

Not necessarily a disease of hospitals.

While on this subject, however, I ought to say, that cases have occurred independent of the influence of any hospital atmosphere||.

It is common for the local disease to precede the manifestation of the febrile attack, but this is very far from being so, invariably.

* Boggie. Ed. M. C. T. vol. iii. p. 13.

† Ibid. p. 23.

‡ Ibid. p. 17-18.

§ Hennen, p. 222.

|| Boggie, p. 3-12-24. Rollo on Diabetes, vol. ii. p. 262.

Of the various tissues, the skin should appear to be affected in the most remarkable degree, and it either commences in a little vesication upon it, or a small portion of any sore first exhibits the peculiar circular spot, which spreads and often multiplies. The cellular membrane is also severely ravaged, but there is not that strong disposition to suppuration and sloughing below entire skin, which has been noticed in some of the preceding species, still there is a considerable resemblance to *E. phlegmonodes* in the character of this disease, especially to that form which is combined with inflamed absorbents*, and the disease runs along these vessels to a distance.

Spreading inflammation.

Skin originally attacked.

Considerable analogy with *E. phlegmonodes* with inflamed absorbents.

The muscles resist more powerfully than the integuments, but they go likewise with their fibrous membranes, and not even the bony structure is exempt, the earthy matter being absorbed, and the disease attacking them in the same circular manner as the soft parts. Dr. Hennen describes a very singular effusion from them resembling cartilage, which takes place under these circumstances†.

Muscles and bones.

* This analogy, which Dr. Boggie remarks, p. 11, I had pointed out in the first edition of this work, p. 253. I must remark, that in the summer and autumn of 1813, the period at which hospital gangrene raged with such severity at Bilbao, I had a large number of cases of *E. phlegmonodes* with inflamed absorbents under my care at Romford barracks, during a very high temperature.

† P. 224.

Spreading inflammation.

Vessels.

The blood-vessels resist with greater power, but they also are destroyed, even the larger ones, and hence the hæmorrhages which occur, not however till about the tenth or eleventh day *.

Disposition to recurrence.

Duration.

So fatal is the character of this disease, that Dr. Hennen states that it invariably destroys if unchecked†; but as no case perhaps is ever allowed to run on without remedies being applied, some allowance must be made as regards the value of this opinion. But there is one fact of great importance to attend to, namely, that after being stopped it has a great tendency to recur, and that often repeatedly‡. The duration is from three days to three weeks.

It is remarked of this, what is true of other phagedenic sores, that the processes of ulceration, granulation, and cicatrization, sometimes are going on in different parts at the same time.

Treatment.

The subject of treatment divides itself into the removal of the causes or their abatement, and the management of the local and general symptoms respectively.

Prevention and avoidance of causes.

With respect to the first head, it must be obvious that no person should be exposed to the atmosphere of a hospital, if generally tainted, or of a ward that may be particularly infected, unless

* Hennen, p. 225.

† P. 222.

‡ P. 229.

the necessity is absolute; and if this should unhappily be the case, every endeavour should be made, by practising the utmost cleanliness, the freest ventilation, and by placing the beds wide asunder, and high from the floor, to lessen the influence of the causes as much as possible; daily whitewashing and fumigations should also be practised.

Spreading inflammation.

The inoculation of the disease should be sedulously avoided; and hence such articles should be employed in cleansing the sores as may be readily sacrificed, and there is strong evidence of those once used on such sores, *although purified with care*, having produced the infection anew.

And as the air is also capable of infecting sores, it surely would be advisable to expose none to its influence, which might by any means be protected from it.

Of the surgical treatment of the local disease much is to be said, and I must here state my belief, that those are right who deem this a matter of at least equal importance with the general, although Dr. Hennen holds it to be secondary*. It is the nature of these diseases to augment in a peculiar degree their own force; the fluids they secrete destroy fresh parts, increase the surrounding inflammation, excite additional sym-

Local treatment.

Spreading inflammation.

pathy, nay probably are largely absorbed, and the influence on the system is nearly inversely as their extent. That this is true, is proved by the fact, that those measures hereafter alluded to, which have the power of suddenly quenching the local disease, shall at once reduce the constitutional symptoms to a tractable state, in a great number of cases; at the same time, it is not to be denied, not only that the system is conjointly, but sometimes independently affected; still circumstances of extreme aggravation, if we regard the proceeding destruction, the increasing inflammation, or the horrible pain, are by these means removed; to say nothing of the deleterious fluid on the sore. On the other hand, it must be understood that the constitutional treatment is of the utmost consequence, that in some it will put an end to the malady at the beginning, and in many cases the local would avail little without it.

By applications which destroy both the poison and the surface of the sore.

The first class of remedies of which I shall speak are those which will destroy the surface of the sore, and of course the poison, or the poison without destroying the surface of the sore. They will also commonly excite the adhesive inflammation.

On a small scale, the effect of such remedies is nowhere better shown than by the application of arg. nitr. to a sloughing ulcer of the cornea. In

the present class of cases, if adopted early, while the sore is small, they will often succeed in arresting its progress, and that without any great degree of pain; but when the sore has gained a great size, each application becomes a severe operation, a strong reason for not leaving to the last that mode of cure which would be most effectual also at first.

Spreading inflammations.

Of those means which destroy the surface of the sore, we may especially mention the concentrated acids, particularly the nitric, actual cautery, argen-
tum nitrat. and arsenic.

Concentrated acids.

For some observations on the nitric acid, I shall refer to venereal phagedænas, observing that from such experience as I have had in this class of diseases, it appears to possess great efficacy.

The actual cautery, perhaps, does not destroy the surface more completely; but I am apt to believe that it gives less pain, though apparently more formidable; it has been little used by British surgeons. The French speak most highly of it, especially M. Delpech, Dupuytren, &c.

Actual cautery.

It is necessary to add, that when the sloughs produced by such means are thrown off, it happens that the sore still remains foul, or that the disposition speedily returns; if so, the application must be repeated again and again.

Repeated applications necessary.

Arsenic has been recommended by Mr. Black-
adder, and it probably does more than simply de-

Arsenic.

Spreading inflammations.

As employed by Mr. Blackadder.

stroy the diseased surface; it seems reasonable to believe that it has the power of changing the disposition of the part.

The mode of employing it is as follows: "The sore should be made perfectly clean and free from the viscous discharge; a weak solution of subcarbonate of potass, either tepid or cold, being poured over it for this purpose, until it is effectually cleansed, the gelatinous matter adhering to it being detached by means of small dossils of fine tow or lint. A piece of fine dry lint should then be laid over the surface, and gently pressed into all its depressions, and this should be repeated with fresh pieces until the surface is made perfectly clean and dry. The arsenical lotion should then be applied. It is generally sufficiently powerful when diluted with an equal quantity of water: sometimes two of the latter to one of the former; sometimes, but rarely, undiluted. The pieces of lint, so wetted, should be of the same shape, but a little larger than the sore, and fresh should be applied every fifteen minutes or half an hour, as may be necessary, from the evaporation of the moisture. When the parts are in a very inflamed state, the additional application of cloths, wet with cold water, to the limb extensively, may be useful, which should be separated from the solution by a piece of oiled silk.

"The period required by this application for

effectually destroying the morbid action in the sore is longer or shorter according to the progress made by the disease and the nature of the original sore. The best rule to go by is to continue its use until an insensible, dark-coloured and dry slough occupies the whole surface of the sore, and until the patient is completely relieved from the burning and lancinating pain, which is in some degree characteristic of the disease.”

Spreading inflammation.

A caustic solution of the argent. nitr. may be employed with the same intention as the preceding fluid applications; but the evidence in this disease is not so strong in its favour, perhaps it has never been sufficiently tried. The French have applied it finely powdered.

Argent. nitr.

The same remedies in a more diluted form, and others of a somewhat similar nature, are also used in this disease, and partly by their influence on the sore producing a new action, partly perhaps by their neutralizing the poison, prove beneficial; such are the diluted mineral acids, the chlorates, citric acid, a more diluted arsenical lotion, &c. &c.

Applications which destroy or neutralize the poison, or revolutionize the action of the sore.

With a similar view fermenting and charcoal poultices are adopted; but although they are very serviceable in many cases of sloughing sores, they are hardly sufficiently powerful to influence these, and poultices are liable to the objection of being

Medicated poultices.

Spreading inflammations.

too relaxing, and have been supposed to give further activity to the poison*.

Other dressings.

Powdered charcoal, bark, tr. myrrh, and bals. copaib., terebinthinate dressings, are also at times advantageous; but, with the exception of the first, less so when the sloughing process is going on with activity than subsequently; but when the sloughs are separating, or afterwards, many of these are highly beneficial.

Dressings to separate the sloughs.

Mr. Blackadder particularly recommends an ointment composed of equal parts of oil of turpentine and ung. resin., or of two parts of Venice turpentine and one of ung. resin., to be melted and poured over the sore, as hot as the patient can possibly bear it, in order to detach the slough formed by the application of arsenic.

Bandages.

All authorities agree in advising the use of a bandage, moderately firm, in this stage of the disease.

Cold lotions.

It remains to say, that in the highly inflammatory cases, cold lotions are often useful, applied liberally to the limb, either as an auxiliary to other means employed, or they may be advantageous of themselves. The superacetate of lead forms a very

* This appears to be the opinion of Mr. Blackadder and Dr. Thompson. Dr. Hennen used the fermenting poultice commonly, p. 227; but his view of the inferior efficacy of local means would lead us to rely less implicitly on his opinion in this respect.

useful addition to these. Narcotic applications Spreading inflammations.
 are also often serviceable; none that I have seen Narcotics.
 answer better than the lotio opii, applied by wetted
 lint, or in poultice.

The removal of all filth is essential, and the se- Cleanliness.
 creted matter should never be allowed to accumu-
 late: the dressings, therefore, must be changed often.

Of scarifications, or local incisions, I do not feel
 warranted in saying any thing.

Hæmorrhage is best restrained by pressure with Hæmorrhage.
 a sponge or compress dipped in ol. terebinth. Am-
 putation is a last and most doubtful resource for
 this complication.

The constitutional treatment, in the next place, General treat-
ment.
 requires to be considered; and here we have not
 only to deal with the disturbance produced by a
 most formidable local disease, but with a fever ca-
 pable of originating such a malady, and that com-
 bined, in all probability, with the existence of the
 peculiar morbid matter in the blood.

There can be little question that blood-letting Venesection.
 ranks among the most important measures in this
 disease. Dr. Hennen, whose testimony is most
 valuable, states that during the winter months it
 was accompanied with the most decided relief,
 and he was led to employ it, in consequence of
 the great benefit which appeared to accrue from
 spontaneous hæmorrhages, after having pursued a

Spreading inflammation.

different course for a long time; and as Dr. Hennen had been previously acting upon the opinion, that the stimulating system was the right, there can be no reason to suspect any prejudice in favour of the opposite mode*. Dr. Boggie contends in the strongest terms for its employment in a large proportion of cases†; and it is also supported by the authority of Dr. Trotter.

Antiphlogistic regimen.

In conjunction with bleeding, an antiphlogistic regimen is ordinarily proper.

EMETICS.

All authors appear to agree in the commendations they bestow on emetics, especially in the beginning; very frequently they will at once cut short the disease‡. Purgatives, likewise, are highly necessary; opium to allay irritation is also, at times, *very useful*; and saline neutrals. Tepid or cold sponging, especially in hot weather, and when the fever is high, should be resorted to; in truth, the constitutional treatment does not differ much from that which has been more fully detailed under the head of erysipelas.

Purgatives and salines.

Sponging.

Treatment when symptoms of depression prevail.

At particular seasons the disposition to pass rapidly into a low type will more prevail; in par-

* Hennen, p. 226. It was remarkable, that although previously to the employment of bleeding every puncture festered, the lancet wounds never did, p. 227.

† But he also states, that the fever has often been observed to partake of a typhoid type, and when so, the treatment should be varied accordingly, p. 6.

‡ Hennen, Boggie, Dusassois, Brigges, &c. &c.

ticular cases this will originally be so, and then Spreading inflammation.
it will be necessary to adopt the plan of treatment which has already been mentioned under the head of the disease just alluded to, in similar circumstances.

In every case, separation of those affected should be accomplished if possible.

This disease may prevail with less acuteness of character, as stated by the authors so often quoted, Character sometimes chronic.
and in this form we not unfrequently see it in civil hospitals*.

It may be right to mention, that in hot seasons, A fever producing sudden gangrene after operation.
a fever, possessing much of the character of that which attends the hospital gangrene, is apt to prevail, and will fall upon those who have suffered from wounds, particularly from amputations, and destroy them with great rapidity†.

Finally, it should be stated, that there are many gangrenous ulcers which present themselves, but especially in hospitals, and occurring chiefly in the lower extremities, where from filth, heat, intemperance, or poor living, a sloughy state is induced, but in which the peculiar characters of the phagedæna, now described, do not prevail; in

* Boggie, p. 6, 7. Hennen, p. 236.

† Hennen, p. 242. Boggie, p. 47.

Spreading inflammations.

such, rest, cleanliness, fermenting or simple poultices, proper diet and purgatives, soon restore the part to a healthy condition.

Syphilitic Phagedæna.

The poison of hospital and syphilitic phagedæna probably distinct, although the phenomena of the diseases are in many respects similar.

This variety of phagedæna deserves a distinct notice, because, although the leading characters bear a great resemblance to those of hospital phagedæna; yet there are sufficient grounds for believing that there is an essential difference between them *. If the matter of common sores can acquire, as appears probable, the power of communicating such a disease as the latter, why should not also the matter of venereal sores, *with the superaddition* of their own specific qualities?

We have not sufficient facts to *prove* that the two poisons are distinct, but there is a very strong presumption that they are so, arising from the following circumstances; namely, that the phagedenic form of venereal sore, although very liable to affect other ulcers of the same description, and probably without contact, as appears from its spreading to different persons in the same foul ward, yet has never been observed to attack those labouring under other sores, although it is not unusual to remove, under urgent circumstances, the subjects of them

* Mr. Welbank considers them the same. M. C. T. vol. x. p. 361.

from the foul wards to others; and because hospital phagedæna is certainly less disposed to attack syphilitic sores than others, though they are not exempt from its influence*. Again, an agent which is very apt to bring on the phagedenic state of venereal sores, mercury, has no such power, as far as I have had an opportunity of judging, in common sores. Acute V. Phagedæna also takes place on, or in, the neighbourhood of the genitals. It will further appear presently, that there are some points of difference in the history of the diseases themselves.

Spreading inflammations.

Be this as it may, nearly the same causes which occasion hospital phagedæna produce this; namely, confined air, filth, exposure to contaminated atmosphere, the irritation of motion, and, in an especial degree, intemperance.

Many causes capable of producing hospital phagedæna, also will induce it in venereal sores.

The subjects are often females, of fair complexions, light or red hair, and much *embonpoint*, especially if of intemperate habits in drinking. Particular localities, also, appear to have an influence in determining its production†. It is by no means confined to hospitals; and many cases occur among persons of good condition.

Subjects are females as well as males.

Not confined to hospitals.

It has been conjectured that a peculiar quality

* Hennen, &c.

† In London it has been observed to rage among the inmates of particular alleys.

Spreading inflammations.

Whether peculiarity of virus is in any cases the cause.

of syphilitic virus is the cause. As a sole cause it cannot be sustained, and Mr. Evans has sufficiently disproved it* ; but, although the recipient of the ordinary syphilitic poison may have phagedæna, from the operation of other causes mentioned above, I cannot see any reason why we should discard, in many cases, the direct agency of such a virus, as has been shown by the analogy of hospital phagedæna, to be capable of at once producing similar effects in an individual every way healthy.

ACUTE V. Phagedæna commonly arises on, or near, the genitals ; but the sloughy disposition may arise from the state of the constitution.

Primary sores, either on the genitals or groin, most commonly are the seat or source of the V. Phagedæna, to which I allude ; and by some the disease has been regarded as local, and the constitutional affection has been held to result from it as it proceeds†. This may be so, probably often is so ; but as intemperance and mercury frequently bring it on (as well as other circumstances), we must regard the state of the constitution as a material cause, and always as producing an important influence ; the result of treatment further confirms this opinion.

Distinction between the acute and subacute cases of V. phagedæna.

It is perhaps desirable to distinguish that kind of phagedæna, in which the progress is altogether

* On ulcerations of the genital organs, p. 123-4.

† Welbank, M. C. T. vol. x. 365. On the other hand, Mr. Evans regards it generally as the result of constitutional derangement, p. 120.

slow, and sloughing (except in the last stage) uncommon, and which occurs in cases of old standing; from the more rapid and quickly destructive attacks which occur in primary sores. The many circumstances, however, and especially the injurious influence of mercury, will often exalt the more chronic phagedæna I have now alluded to, into a very acute and fatal character, especially in the throat. Spreading inflammations.

Many authors seem to consider cases of phagedæna, when simply attended with ulceration, and those with sloughing as distinct; I cannot think them so: the latter are, I believe, invariably attended with ulcerative action, the former are very liable, in some part of their course, to assume the sloughing process; in fact, in the acute cases they are commonly combined, in the chronic the ulcerative generally exists alone, but has always a propensity to slough.

The disease will sometimes commence on the mucous membrane of the genitals, with a vesicle, as in ordinary syphilis, but quickly assume the characters I have to mention: at others it will attack a sore already existing, and frequently, especially in females, it will appear in the cleft between the nates, probably from acrid matter passing back from the external genitals. When it Local symptoms.

Spreading in-
flamations.

begins on the skin, it has often the character of a little boil in the beginning*; an ulcer of circular shape speedily forms, and spreads with great rapidity; its bottom is excavated, foul, and soon fills with a pulpy slough, and discharges a thin, fetid, brownish ichor, which excoriates. The edges are commonly elevated, coated, and thick, but sometimes do not exhibit even so much of the adhesive disposition; they give way partly by the ulcerative process, partly by the formation of (black) sloughs: the surrounding parts are commonly of a vivid red, often dusky, and extensive tumefaction takes place in the cellular membrane. Excessive pain attends this process; as it proceeds, the sloughs are thrown off, leaving the sore ragged, with a shreddy appearance, and fresh are formed. Hæmorrhage may take place†. The patient sinks, if the disease is not arrested. The skin and cellular membrane are chiefly implicated‡.

It often happens that this process is slow at first, giving little idea of the impending evil; at others it breaks out like the hospital gangrene, with horrible severity.

* Many females in whom it has occurred appear to have been long subject to discharges.

† In the early stage of acute phagedæna, hæmorrhage with fever; in the latter is very injurious.

‡ Sir A. Cooper, I think, states, that its progress becomes so extremely destructive when it reaches the cellular structure.

Mr. Babington has pointed out a difference which occasionally exists, namely, that instead of the vivid and deep inflammatory colour around, there is a narrow border of pale-coloured inflammation; the surrounding integuments appearing bloodless; the slough looking like yellow fringe attached to the surrounding skin, and the edges fast melting away, as he happily expresses it; and they are without thickening. He describes four other varieties; but it may be questioned whether more than these mentioned here need practically be considered as the acute V. Phagedæna; for I cannot help thinking that the 1st, 3d, and 5th varieties he describes are modifications of the same*: the 4th will be mentioned hereafter.

Spreading inflammation.
Two varieties.

The constitutional symptoms closely resemble those already described under H. Phagedæna; a rapid and irritable pulse, hot and dry skin, anxiety, excessive restlessness and want of sleep, foul dry tongue, sometimes red and glazed, and haggard countenance. The tendency to delirium is remarkably small—to diarrhœa particularly great.

Constitutional symptoms.

In some cases, with great action, there is little comparative want of power in the system; in others it is very great; and the important point of treatment greatly depends upon these conditions. Mr.

Treatment.

* The first is distinguished by the arterial colour of the surrounding inflammation; the third by the browner character; the fifth answers to the general description given by Mr. Welbank.

Spreading inflammations.

Babington says the best criterion is to be found in the inflammation surrounding the sore* ; if that is high coloured, and denotes much activity, mercury, blood-letting, and the antiphlogistic regimen will be proper ; if it is deficient, and the edges are not thickened, the opposite mode of treatment is beneficial ; where the colour is dark and venous also, he declares tonics to be necessary, and mercury injurious ; and in those cases which occur in dissolute and intemperate females he regards opium as a specific ; but it must be in large quantities, in fact sufficient to subdue the pain.

Nitric acid.

As far as my own experience has gone in V. Phagedæna, no remedy has appeared to me to equal the application of nitric acid, in the manner proposed by Mr. Welbank ; and to fulfil the intentions he lays down, namely, to extinguish the poison and destroy the morbid action of its surface, it is necessary that it should be applied with an unrelenting hand. It sometimes causes severe pain, but I fully agree with him, that in very many instances the pain is inconsiderable, and generally temporary, and the subsequent relief so great, that the patients are wont of themselves to demand its repetition. While the slough produced by it occupies its situation, the patient is easy, and the symptoms abate ; but it is astonishing how soon,

* Lond. Med. Journ. vol. lviii. p. 288.

in some cases, it is thrown off and the symptoms are renewed, this must be met by fresh applications; and I have found it necessary to do this as often as twice in the day. When the slough separating leaves a healthy surface, and the surrounding parts are quiet, it is no longer necessary to use it, and it would only give unnecessary pain; but it often happens, that certain portions may remain foul and require its reapplication. The surgeon may be reluctant to use it, when it may appear to aid the destruction already going on in a most important part, but he must consider, that the sacrifice will not be less certain if he withholds his hand.

Spreading inflammation.

Of the mode of applying it, it is sufficient to say, that the surface of the sore should be thoroughly dried, Mr. Welbank then presses upon it a piece of lint of the size of the sore, dipped in the undiluted acid, and allows it to remain till it has converted the surface into a slough. I have often employed for the purpose a large pad of lint secured on a stick; after it has been applied, dossils of fine soft dry lint should be set on the sore, and all the surrounding parts assiduously cooled with the saturnine lotion.

Of the other applications, it is necessary to make some mention; and those already specified under the head of Hosp. Phag. may be, in some cases, advantageous; certainly narcotics, and strong so-

Other applications.

Spreading inflammation.

lutions of lead, appear beneficial, but they are not to be set in comparison with the nitric acid. This acid, much diluted, is also a useful remedy when we have not to deal with a disease of great severity.

In the sloughing phagedæna on the penis, leeches are often of eminent use.

General treatment.

The general treatment has also great influence; by some its importance is considered paramount. There can be little doubt, that when V. Phagedæna is attended with much surrounding inflammation of a vivid colour, and the system shows much action, free blood-letting is extremely useful, and there is no reason why it should not be combined in such cases with the local use of the nitric acid.

Bleeding.

Mercury.

In cases, also, attended with *high local action, denoted by the colour of the surrounding inflammation*, it is stated that mercury should be employed*; and as this position is laid down by a surgeon of much experience, I dare not gainsay it; at the same time, I have so often witnessed V. Phagedæna of this description come on during the use of mercury, that I have myself withheld it, and should be reluctant to employ it. In any other description of case with sloughing, there can

* Babington, op. cit., p. 287. "It may be assumed as a principle, that as long as acute inflammation exists, mercury never either occasions or aggravates sloughing."

be no doubt that its employment would be likely Spreading inflammations. to prove most destructive*.

In those cases which occur in so horrible a form Opium. in females, Mr. Babington states that opium in adequate doses is a remedy surely to be relied on†; I cannot say that I have seen reason to be satisfied of this, although I have pushed it to a great degree; at the same time there can be no question that it exerts a powerful influence, and, indeed, there is no form of V. Phagedæna attended with much pain and irritation, in which it is not very serviceable. It should be given in large, often very large, doses at regular intervals.

In those cases where the absence of any sufficient Support and stimuli in asthenic cases or states. degree of surrounding inflammation, or the dusky colour, (if there is a considerable degree,) indicate either the want of counteraction to the disease, or the inadequacy of this; when it will commonly be found that the powers of the system are deficient, although the actions may be great; the supporting plan will be necessary, and quinine here is often especially useful; a supporting and stimulating diet are also generally requisite, and will prove

* It may be well to remark, that mercury eminently possesses the property of producing *ulceration and sloughing*, of which we have many instances in the mouth, when employed for diseases totally different in their nature.

† "This sore never resists full doses of opium," p. 291.

Spreading inflammation.

very beneficial if the state of the digestive organs is such as will readily assimilate it; hence wine or porter, with animal food, have been employed by the best surgeons with great advantage.

Combination of bleeding with the supporting plan.

The *combination* of blood-letting, with the tonic plan, is also beneficial in many cases, on principles which have already been repeatedly pointed out.

Diarrhœa.

It is necessary to remember that diarrhœa is very apt to supervene in this disease, hence the employment of purgatives should be watched; and although great benefit is derived, as in all other cases from clearing the alimentary canal, and by this route procuring a discharge for morbid matter, yet the continuance of a diarrhœa is greatly to be feared and should be checked.

Purifying the blood by saline neutrals.

Saline neutrals in effervescence are very advantageous in many cases, either with antimonials, opium, or quinine; they allay fever, and improve the condition of the circulating fluid. I have also known yeast beneficial. The mineral acids also are often useful.

By pure air.

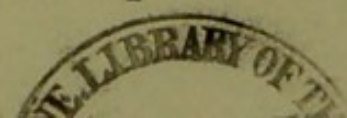
A leading indication is to purify the blood, for it is to be borne in mind, that the cause of all the mischief is the impregnation of the blood with morbid matter, which irritates and injures the nervous system, and prevents the vessels in the inflamed part from acting healthily. It is a main

object to expose a patient, under such circumstances, to abundance of cool, dry, and pure air if possible. Spreading inflammation.

The phagedæna we have now been describing is acute in its character, often horribly so; it combines the processes of ulceration and sloughing, and it equally destroys the skin and cellular membrane. But there is a kind of phagedæna, far less acute, which, with few exceptions, possesses the ulcerative character alone, and which rarely passes beneath the skin, and, indeed, has little disposition to attack cellular membrane.

Subacute Syphilitic Phagedæna.

It occurs as a secondary symptom on any part of the body, but most frequently on the scalp, forehead, face, or extremities: an ecthymatous pustule shows itself, and, after bursting, ulcerates, or that kindred form of eruption, termed rupia, presents itself, and when the scab falls off, a foul *ulcer* is found beneath, which spreads circularly or ovally, and invades the greater part of the thickness of the skin, but seldom extends to the cellular membrane beneath; from this, a kind of sordes is secreted, and no appearance of granulation is presented. The edges are neither elevated, coated, nor often in any way thickened; when it spreads Is commonly a secondary symptom. Its character.



Spreading inflammation.

fast, they are somewhat ragged and sharp, and when so, it is attended with much pain, and there is a blush of inflammation extensively around, with a kind of œdematous tumefaction; but when the disease is gradually depascent, there is no action excited in the parts about to be destroyed, and no effort to produce adhesion. It often happens that the morbid disposition wears out in the centre of these sores, which then throw up strong and healthy granulations and heal, while at the edges they spread; and it is also very common for them to heal at one edge, while they spread from another. They multiply sometimes very fast in different parts of the body, covering the unfortunate subject with most frightful sores, and leaving no part exempt for him to rest upon. Sometimes, but not very frequently, the sloughing process supervenes, and rapidly hurries on a fatal termination.

Sloughing may be super-added.

This more frequently the case in the throat.

It is not unusual for them to occur in the throat, and then they are very liable to go into the sloughing state; and from the pain, irritation, and great constitutional disturbance they produce, as well as from their depriving the sufferer of the power of sufficient deglutition, they often prove fatal rapidly; although it is not uncommon for them to infest this region for months, at times relenting, at others augmenting, in severity.

Causes.

It has been considered by some high authorities that these sores owe their peculiarities to the quality

of the primary sore or infection*. That this may prove a cause frequently I am by no means disposed to gainsay; but I think it is very evident that they often supervene, on an injudicious use of mercury, arising either from the mismanagement of that remedy, or from some idiosyncrasy; and in hospitals it not uncommonly arises from the patient breathing the tainted air of a foul ward: in either case it induces a manifest state of cachexia; sometimes, however, attended with considerable febrile excitement, sometimes otherwise; and while the subjects occasionally retain a considerable share of strength and power, in others they are miserably exhausted; and in all cases, if the disease goes on, are reduced to a most pitiable state of debility.

Spreading inflammations.

Connected with great cachexia.

To consider the treatment of these cases as fully as I could wish would require me to go into the whole subject of the nature of syphilitic diseases, and their mode of treatment; and I do not feel that I should be justified in such a proceeding here; what I have therefore to say must be briefly stated.

In these cases it is manifest, as in all others, where the local disease is fast multiplying from the fault of the constitution, that local treatment, however important, must be subordinate.

Spreading inflammations.

Constitutional treatment of most importance.

Different and opposite remedies.

With respect to the general treatment I may say, that I have often seen small bleedings repeated, serve in that state of the system in which there is much febrile excitement, and the frequent use of saline effervescent, often with antimony, prove very useful, with an unstimulating diet; it may be remarked, however, that this disease is often thrown out, or exacerbated during a febrile attack of a few days; and it is only so long as this continues that such treatment can be proper, and it must not be adopted in exhausted constitutions, whether from the disease, or from original defect.

Tonics, at the head of which is quinine, and good diet, will probably be found better adapted to the majority of cases, and in that bloodless cachexia which sometimes accompanies it; steel is often eminently useful, either in the form of mist. ferri, or what appears to me preferable, the carbonate; lemon juice, given as in scurvy; the mineral acids particularly the nitric, chlorine, &c. are often useful; and where the progress allows time, the vegetable decoctions of sarsaparilla, burdock, or goosegrass, are often very beneficial: the narcotics, also, especially opium or conium, are often required, and very useful. But there is no remedy which appears at all equal to the effect of *pure air*; and that should *often be changed*, if possible. The diet should be nutritious and invi-

gorating, often with stimuli *; but it is astonishing Spreading inflammations.
how much the digestive powers are sometimes impaired in these cases, rendering the most liberal supplies of nourishment useless; and there is a proneness to diarrhœa which is very exhausting.

The use of mercury may, in some cases, and in Question as to mercury.
some forms, especially that of fumigation, when the throat is affected, be proper; but as a general principle, I believe it is unwise to employ it in this kind of disease. The discrimination of the cases in which it is applicable is most difficult; but an ulcerating edge, thin and rapidly giving way, I believe generally contra-indicate it.

With respect to the sores themselves, they often Local remedies.
will bid defiance to any local plan of treatment, the constitutional disease remaining; but it will frequently happen that they do amend under the use of local remedies; of these the best are either the mineral solutions, as those of sulph. cup., arg. nitr., sulph. zinc., liq. arsenic, &c. weak, and aq. menthæ is often a serviceable vehicle; or the mercurial applications, such as the washes with lime-water and calomel, or sublimate, or the red precipitate blended in an ointment, weak; or the acid lotions,

* I have, in several instances where persons had nearly perished from sloughing of the throat rendering deglutition impossible, recovered them simply by throwing daily into the stomach large quantities of nutritious and stimulating liquid food, through an elastic tube.

Spreading inflammations.

of which that with nitric acid most frequently answer; recent lemon juice is also often beneficial; or stimuli and tonics, and I should here mention equal parts of port wine and dec. cinchonæ, or the tr. myrrh and lime-water: powders, such as that of bark alone, or blended with others, such as myrrh, &c.; and last, the simple dressing with cold water, which will often benefit these sores, teased and fatigued, it may be, with the unsuccessful trial of the numerous remedies mentioned above. In some cases, where the pain is very great, simple cerate on the sore, and tepid poultices over it, can alone be borne.

When in the throat, argent. nitr. or nitric acid.

The destruction of the edges or surface of these sores, or both, by the nitric acid or arg. nitr. will sometimes answer, but often fail on the surface of the body, but in one situation they appear to me to be of paramount importance, I mean to say, where they are situated in the throat: when we have merely ulceration to deal with, the use of a strong solution of arg. nitr. is often preferable. When, however, the part is sloughing, the nitric acid, as applied to the acute phagedæna, is, I believe, by far the best application; it requires quickness and dexterity to dry the fauces rapidly, by a large bolster of lint secured on a rod, and immediately to touch the part with the strong acid, ready on another rod, and then instantly to cause the patient to throw some water into the fauces, or

do so with a syringe ; but the relief and benefit obtained will often repay the surgeon for the attempt, and that very speedily. It is often necessary to repeat it daily till the ulcer assumes a healthy appearance, as in other cases when it is employed. I believe Sir C. Bell first proposed this apparently hazardous practice, but it fully merits the commendations he bestowed on it, as far as I have had an opportunity of judging.

Spreading inflammation.

The diseases just described either directly owe their origin to morbid poison, or a state of the constitution is generated from peculiar circumstances in which similar effects are produced, and in which a morbid poison should appear to be developed. I have next to speak of certain forms of phagedæna which equally owe their origin to a faulty state of constitution, and often result from other well-known diseases, as measles, scarlatina, &c., although in some cases, as it will appear, the cachexia is not the result of *any* particular disease.

Cancer Oris.—The most frequent of these occurs chiefly, but not exclusively, in children. It happens generally about the second dentition*, but sometimes earlier; in point of fact, it appears to be more especially a disease of early childhood, and

* Underwood on Diseases of Children. Dr. Burn says it occurs about either period of dentition.

Spreading inflammation.

would of course be more likely to attack during the irritation of dentition, and during the first, from the tender age of the patient, is more formidable.

Dr. Corrigan, who has lately spoken of this disease*, describes it as occurring chiefly in stout and healthy children; my own observation would lead me to say that it is by no means confined to them, but that children of full habit are often the subjects of it. He also truly states, that it often occurs in adult females.

An ulcer appears in the gums, most commonly of the under jaw, extends along them to a considerable distance, and often affects the inside of the cheek: in the aggravated cases the alveolæ are bared and destroyed and the teeth fall out; there is commonly a great flow of saliva and a very offensive smell. The power of deglutition of solid food is much impaired. The child, if not evidently cachectic at the beginning, becomes so. The complaint is commonly curable, particularly as the age of the child is more advanced, but not unfrequently with considerable damage to the mouth; sometimes it is very rapid in its progress.

Internal treatment has a powerful influence on this complaint, for it mainly arises from a disordered state of the digestive organs. Emetics, which are strongly recommended by Dr. Corrigan,

* In Ed. Med. Journ. civ. p. 93.

are very useful, and where the disease is obstinate they should be repeated. Purgatives of an active nature, of which *calomel* constitutes an ingredient, and repeated *daily* till the alvine discharges are brought into a proper state, I have also found very beneficial in most cases; in others great advantage from rhubarb and quinine combined, taken twice a day. Finally, quinine, when there is debility, has commonly proved very serviceable, and as nourishing a diet as the child can get, with a little wine or malt liquor. The charcoal recommended by Mr. Bush, of Frome, I have not tried*.

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To the part I have applied the chlorates, muriatic acid, and honey lotion and also in many instances and with advantage touched them with nitric acid or the nitrate of silver. I have also used the bals. Peruv. recommended by Mr. Thompson†. On the whole, the lotions of muriatic acid, or of chloride of lime or soda, appear to me to have been most serviceable‡.

Phagedæna of the Cheek and Mouth.—Under the denomination Erosion of the Cheek, Mr. Dease, Underwood, and others, have described a disease

* Carbon. lign., mell. comm. aa ʒj. m. sum. coch. min. sæpe vel 4ta quaque horâ.

† Vide Thompson, of Whitehaven, Med. and P. Jour., June, 1812.

‡ Acid. mur. gtts. xx., mel. rosæ, ʒss., aq. simp. ʒiiss. misce: vel Chlorid. sodæ, ʒij., mel. ʒss., aq. ʒvj. misce.

Spreading inflammation.

of a highly malignant character, affecting the cheek, lip, or mouth. Dr. Hall has lately given an interesting paper on the subject, under the title Gangrenous Ulcer*, while Dr. Parr and Mr. Burn describe by the term Noma a sphacelus of the cheek, which, as it occurs from the same causes and is very similar in its effects, I should hardly think right to separate from the other, especially as I have seen gangrene of the cheek and ulcer of the mouth simultaneously occurring in the same patient.

Subjects female children.

The subjects of this complaint are generally, if not always, female children†, and it seems to occur after an attack of measles, scarlatina, variola, or fever, particularly after the former, even when the patient appears to be convalescent. It is more common in winter, as Dr. Hall has observed; but I cannot agree with him in saying, that it occurs exclusively at that season.

Description.

The cheek or lip are swoln, hard, and of a pale red‡, not at first indicating the malignancy of the impending disease; in the centre of this a gan-

* In Edinb. Journ. for 1819.—Dr. Hall truly remarks, that in children the skin and subjacent tissues are very prone to slough.

† Dr. Hall, op. cit. p. 548.

‡ I have notes of a case in which there was not the slightest appearance of inflammation, or reaction, but close to the mortification the parts were like wax, or rather like those of a corpse; this was a case occurring after fever, and was slow in its progress, but proved fatal.

grenous spot appears, which spreads (a margin of Spreading inflammation. inflammation preceding it) and may involve the whole cheek, lip, nose, and eye: internally, phagedenic *ulceration* (perhaps from the moisture of the part) falls on the gums and tongue, and also on the alveolar processes, so that the teeth fall out.

In the mean time the constitution, which at first was *not remarkably* deranged, feels the effect of the local disease; and as the mortification spreads, exhibits those characters which belong to this state of system, and which it is needless here to repeat.

It is not unusual for phlyctenæ to appear in the course of the disease in distant parts of the body, and when the system is fully influenced, mortification may show itself in the extremities also.

We can have little difficulty in recognizing, as the predisposing cause, that state of constitution (probably a vitiated state of the fluids) which follows the acute diseases above mentioned; but why it should so peculiarly affect female children does not at all clearly appear.

As a disordered state of the digestive organs is strongly marked, and the discharges from the bowels are extremely faulty, there can be little doubt as to the necessity of the early and assiduous use of purgatives, and calomel may be usefully employed. Here I may remark, that suspicion has attached to this medicine as a cause, but as

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Dr. Hall observes, unjustly ; for it will occur when no mercurial has been administered.

The free use of wine, nourishing food, and quinine, also appears to be indicated, and with this the topical application of strong spirituous lotions externally, while internally attempts may be made to check it by the concentrated acids, arg. nitr. or actual cautery, which however in children it is difficult to employ. Wine, with or without bark, should be assiduously applied on the part, by means of lint, or the chlorides may be tried.

It must be confessed, however, that these measures too often prove fruitless, and the little sufferers are carried off, or, if not, recover with great mutilation of the face.

Sloughing of eustachian tube after scarlatina.

Phagedenic sloughing of the posterior fauces, nares, and eustachian tube are apt to occur from scarlatina, and much resemble in nature the more acute cases of the form of disease here described.

Sloughing state of blisters after measles, &c.

After measles and other exanthemata, it is also not unusual for surfaces to which blisters have been applied to become sloughy, and indeed to such an extent, that the life of a feeble patient may be sacrificed after the apparent danger of death had passed away. In these cases the surface, instead of being disposed to heal, exhibits a lardaceous coat, with a good deal of surrounding inflammation and much pain and irritability, after a while it sloughs more deeply. In these cases

the most useful applications, in the first stage, are those best calculated to allay irritation, and I should particularly mention the liniment made by melting together equal parts of diachylon and oil, with a soft poultice over it; under this treatment they will often suppurate kindly, and do well. Spreading inflammations.

Phagedæna of the Labia of Female Children.

—Under the denomination of *Noma*, Mr. Burn, Dr. Parr, and others, have described a disease of which a more particular account has been given by Mr. Kinder Wood, in the seventh volume of M. C. Transactions, but which it should seem Mr. Burn* and Dr. Hall consider as the same disease as that which has just been described as affecting the face, and as it exclusively attacks female children, it is not unreasonable to view it in this light; but I must remark, that I have met with several cases in which it was not immediately preceded by measles, or any other particular disease, simply by cachexia.

Mr. Kinder Wood speaks of it as incident to female children from one to six years old, affecting the labia pudendi, and the cases he relates seem to have proved uncommonly fatal. He mentions having seen twelve cases, of which ten died, but he ascribes this extreme fatality in a considerable

* Mr. Burn states, that in the cheek the predominant disposition is to ulceration, in this form to gangrene, p. 376.

Spreading inflammation.

degree to these patients not having received proper care and early medical attendance.

A very disordered state of health with fever precedes for about two or three days the appearance of an inflammation resembling erysipelas on the labia, one or both, which is shortly followed by an eruption of aphthous vesicles, extending along the perinæum to the anus, and to a considerable distance around, terminating in deep ulcerations, which continue to spread till the little patient is destroyed.

It differs from *E. infantilis* in the age, in the situation, in the sex, being always in female children, and in the result of treatment, this not bearing stimuli, which are very beneficial in that.

The paleness of the countenance is marked and peculiar, the bowels torpid, the stools dark and unhealthy.

There is extreme pain in voiding urine, so as to cause the child to retain it for a great length of time.

In one case only he saw it produce mortification instead of ulceration.

Treatment.

His *local* plan of treatment is by bathing the part in a tepid lead lotion, and applying bread poultices made with the solution of lead, and when the ulcers clean, dressing them with an ointment made with the white oxyd.

His *general* plan, by laxatives of calomel and

rhubarb or senna; and as he considers it an inflammation of low character, by giving bark, con-
fect. arom. and support by diet. Spreading in-
flammations.

I have met with several instances of this disease*, in some of which the first appearance has somewhat differed from that described by him, namely, the occurrence of a black spot in the first instance. I have employed opium lotion, or saturnine applications, when the irritation has been great; I have also seen much advantage derived from the lotion of port wine and decoction of bark, or from fomentation with the decoction of bark.

GENUS V.—*Disposition to Mortification predominating.*

In the last genus the disposition to phagedenic ulceration prevails in every species, excepting perhaps the last: in all it is an invariable attendant; in these, on the contrary, mortification appears to be decidedly the leading character; and in some of the varieties it is so strong and immediate, that inflammation hardly seems to precede it, and if ulceration accompanies it, it is only when that process is necessary to separate the mortified part.

* I have described four in the first edition of this work, whose result was favourable.

Mortification from an Error in the System.—

The first species I shall describe considerably resembles some of the last-mentioned in the nature of the causes, but not in the nature of the disease itself. I allude to those cases of mortification which are consequent on fever, poverty, scurvy, &c.

From Fever.—Pressure often proves the immediate cause of sphacelus in such persons, but it will occur independently, in various parts of the body, often in the legs. The part becomes discoloured, presently turns black; there is often little disposition to tumefaction, and is not much disposed to spread: it is not uncommon for it to appear in various parts of the body at a time*. It may be attended with severe pain. Sometimes the sloughs being thrown off are followed by a rapid phagedenic ulceration. Some of these cases spread with very great rapidity, as sphacelus, without any activity of inflammation or reaction. Pressure very frequently produces it on the sacrum, trochanters, and nates, and many patients who have got through the fever have perished from this species of mortification.

The local treatment of sphacelus after fevers, most commonly advantageous, is by the application of warm spirituous fomentations and cataplasms, with wine, ale, turpentine, &c., and the general

* O'Halloran on Gangrene, cases 8th and 9th, p. 356.

treatment recommended by the old surgeon to whom I have alluded, I shall quote in his own words. "For my part," says he, "I am careful to support my patient with strong and seasoned broths, fresh eggs, a glass of claret, port wine whey, &c.; these are my cordials, and will be found by experience preferable to the filthy and poisonous slops of the shops." I must however say, that the use of bark, especially the quinine, of opium, or both, are often necessary, care being at the same time taken to keep the bowels in a proper state. It must also be understood, that if these affections come on during fever, the appropriate treatment of that fever is paramount, rarely however, in such cases, differing materially from the plan mentioned above.

From Poverty, bad Food, Scurvy, &c.—Mor-tification not very different is apt to occur in persons whose blood is vitiated, not as the result of any febrile disease, but of a more chronic character, induced by the use of unsound food, or from mere poverty and cold. The peculiar disease caused by the ergot* is a remarkable example of the former, and the cases mentioned by Dr.

* The effects of bad or improper food in producing ulceration and gangrene are sufficiently proved by the experiments of Majendie on animals. I allude to his endeavouring to ascertain how far dogs could be supported exclusively on vegetable food.

Gangrene, induced by the alteration, or, as he terms it, vice of the



Wollaston* are of a somewhat similar description ; but of these it is not my intention to speak so particularly as of the cases which present themselves continually to us, especially in cold weather, when the toes, ears, nose, or other parts, fall into a state of sphacelus. These are not genuine frost-bite, for the degree of cold is often not extreme ; neither are they simply the result of debility, for persons extenuated by excessive hæmorrhage or fasting do not appear particularly subject to such results ; but it should appear that in any case when the fluids have been rendered impure from disease, as in the preceding, or from bad and deficient food, as in this species, this kind of sphacelus is apt to supervene, especially if the influence of cold is superadded. That the blood is impure in these cases seems further probable from the petechiæ, bleeding gums, &c., which often accompany it ; and the subjects are generally people plunged in a state of abject poverty and distress, addicted in an especial degree to the abuse of spirituous liquors.

In these cases there is little disposition to spread, and if moderate warmth and light nourishing diet

humours, is the subject of a very elaborate essay in the first volume of the *Mem. de l'Acad.* by M. Quesnay.

Sea scurvy is notoriously capable of producing gangrene and ulcers of a most destructive description, but such cases I have not witnessed myself.

* In *Phil. Trans.*

can be obtained, the sloughs soon separate, and the patient does well. When persons having already ulcers, especially on the legs, are exposed to the influence of similar causes, these ulcers will get into a sloughy state; but there is little disposition to spread, if proper care be taken, and therefore they can hardly be regarded as possessing a true phagedenic disposition*.

Mortification from a defective State of the Circulation.

From Arterial Obstruction.—In the next place we have to consider cases of mortification which arise from some mechanical obstruction to the circulation; and the first which offers itself are those which proceed from the interruption of the supply of arterial blood, by the wound or ligature of an artery.

When the principal artery of a limb is wounded or ruptured, especially if a lower extremity, although little other mischief is inflicted, gangrene will often take place, not at the part wounded, however, but at the extremity of the limb, which becomes cold and numbed, and pale, as in a corpse, with no surrounding inflammation; this often is not observed until three or four days have elapsed, sub-

1st. From sudden interruption of the main circulation by wound or ligature.

* Sir A. Cooper has spoken of these, Lect. v. i. p. 190; he particularly recommends dilute nitric acid as the best application.

sequently the part, say the foot, becomes of a dull red, with a sense of burning, but without any, or with little, tumefaction; subsequently the colour may become greenish, as in bodies lying in a dissecting room; phlyctenæ also often form; this gangrene spreads upwards, at first with no great rapidity, but subsequently its progress becomes more active*: sometimes it will stop at the calf, at least I have known it do so; but its more general tendency, according to Mr. Guthrie, who has given an admirable description of it, is to invade the limb as high as the part where the artery is ruptured or wounded; but it is commonly the fate of the patient to perish, or to have lost his limb, ere this occurs.

The constitutional affection is not by any means severe at first, and those who do not appreciate the nature of the injury will be little prepared for the subsequent event; after the lapse of some days, however, the usual sympathetic affection ensues, and the fever is very decidedly of a low type, with great tendency to affection of the nervous system; delirium is very prone to supervene, and in one case I have seen tetanus occur, and accelerate the death of the patient.

* Mr. Guthrie says, "In the course of a few hours the limb swells to the calf, is very painful, tumid, yellowish, and streaked with bluish lines, the swelling almost visibly extends, it passes the knee, the patient expresses much anxiety, becomes delirious, and dies in a few hours." P. 66, on Gunshot Wounds, 1st ed.

Before this state of the constitution has taken place, we have to deal with a simple injury, often in a healthy person, and if the only remedy which can be relied on be adopted early, there is every chance of the patient's life being saved, this is amputation, which, as Mr. Guthrie lays down, should be performed at the part where the artery has been injured, although the gangrene may as yet be very remote from it*. If this period is allowed to pass, and the patient is invaded with the more formidable symptoms, the expectation of success is far less. I have, however, found it answer, even when delirium and jaundice had occurred, and the patient was so reduced that he could not bear removal from the table after the limb had been amputated. The reason for delaying its performance, in the case alluded to, was one which will not unfrequently apply in civil practice. The artery had been ruptured without an external wound, by a *waggon* passing over the thigh, and there was so much injury inflicted at this point, that although the nature of the accident was perfectly understood, it was thought advisable to delay the operation, in order that the disorganization of the bruised thigh might be retrieved as far as possible before an amputation was performed through parts in such a state; no inconvenience arose from this,

* He says it should be adopted as soon as the gangrene passes beyond the toes, p. 61.

for many days, till at last the symptoms suddenly increased, as Mr. Guthrie has described, with a great degree of severity.

How far the occurrence of gangrene may be sometimes *prevented* by such means as those which will be mentioned under the next head, I do not feel entitled to say; but when that process is once set up, and is spreading, there can be but one plan of treatment.

I have stated that this is only an occasional consequence of the wound of an arterial trunk. I believe it more frequently results from an injury which at the same time damages the upper part of the limb to a considerable extent, or where sufficient care has not been taken in the first instance to obviate its occurrence; and this is one reason, probably, why gangrene occurs so seldom where a surgeon ties a wounded artery, or operates for aneurism; for in these cases every precaution is used.

2d. From aneurismal pressure or ligature employed to cure it.

In the next variety, that of aneurism, gangrene may also result, either from the direct obstruction of the tumor, which I should apprehend is very rare, or after the trunk has been tied, to cure the disease: in this case, however, the circulation of the limb is in a very different state from the last; for the anastomosing branches have gradually been opened, and are in a condition to maintain

it, due care being employed; indeed the usual effect of the ligature is to increase the flow of blood through the smaller branches, and to raise the temperature; nevertheless, this circulation is not at once so efficient as the old one, and if the limb be placed in a depending position, or exposed to any injurious cause, gangrene will supervene; and I cannot find that this differs materially from that just described, either in nature or progress*.

The general plan is to prevent the occurrence of this gangrene, by assisting the circulation by position, and maintaining an equal and proper temperature; also by preventing it from resting too long on one part; should any symptoms threaten its approach, gentle frictions might prove serviceable, and tepid fomentations, with diluted spirit, might be proper. Should gangrene occur and spread, as in the last species, I presume a similar mode of conduct should be pursued; I mean with reference to amputation, when practicable, at the part where the artery is tied, without waiting until it had spread too far; it has never, however, been my fortune to witness a case of this kind.

Very similar in their nature, but hopeless generally, are those cases of sphacelus which occur in

3d. From obstruction of the general arterial circulation.

* Hodgson on Diseases of Arteries, &c. p. 265.

persons who have obstruction of the arterial circulation from disease of the heart or aorta. It is, however, astonishing to how minute an aperture the orifice of the aorta may be gradually reduced without such a result occurring in any part of the body, although no care is taken to prevent the supervention of this calamity. Corvisart states it to be very infrequent *, and indeed appears to doubt (though without good reason) gangrene being the result of the obstructed supply of arterial blood.

4th. Obstruction to the return of venous blood.

Next in order I should place mortification resulting from the obstructed return of venous blood. It is manifest, that where all the minute vessels are already loaded with black blood, it must equally be deprived of the benefit of arterial, as in the foregoing cases ; in addition to which they are submitted to the injurious influence occasioned by the presence of venous blood as well as by the distension of the part ; hence this is a frequent occasional cause of gangrene in parts otherwise healthy, as in strangulated intestine, and in many accidents, from the injudicious application of tight bandages, &c. ; in cases of wounds, also, where the great vein is implicated, it becomes so frequent a cause of this affection, that Mr. Guthrie states it to be a reason

* Sur les Maladies du Cœur, 173.

for amputating, paramount to that of the artery itself*. The spontaneous obliteration of the large venous trunks may likewise prove a cause.

Where the obstruction can be relieved, the further ravages of the disease may often be stopped; where it cannot, there may be a question of amputation; but, I apprehend, hardly any other can be reasonably entertained.

Under the same division naturally falls that description of disease which has been so impressively described by Mr. Pott, and which is commonly attributed to an ossified state of the arteries†.

5th. From ossified state of the arteries, or, more probably, a diseased state of the minute vessels.

There can be no question that these cases usually occur in persons of advanced age, and generally in parts where ossification of arteries has been observed, consequently it does not appear unreasonable to draw such a conclusion. It will, however, appear from a case which I shall refer to, that such mortification does occur where there has been no reason to suppose the arteries ossified‡;

* P. 62.

† Mr. Pott does not consider it the result of ossification.

‡ The case to which I allude is one mentioned in the first edition of this work, which I saw by the kindness of my first preceptor, Mr. Johnson, of this city.

M. W., æt. 42, a woman whose face and gums indicated those appearances usually termed scorbutic, and of feeble and sickly constitution; *eighteen years before* she had mortification of the little finger of the left hand, subsequently most of the toes and fingers sloughed, and with great pain; yet there was no evidence whatever of ossification in any of the arteries, and from her sex and

and it is equally a fact, that we every day meet with persons where that alteration of their structure has taken place, but where this consequence has never resulted from it.

To me it does not appear improbable, that in old persons such an alteration in the condition of the minute vessels as leads to the deficient nutrition of the body, whether it arises from the obliteration of many, or the defective condition of all, may, in point of fact, lead to this species of destruction—I will not call it death—of a part, and that ossification of the larger branches should be coincident, is not an improbable circumstance.

The general condition of these people is such as to warrant the supposition, for commonly they are males who have by intemperate living disordered the condition of the vascular system, and loaded it with matter foreign to its natural state; and we may observe much confirmation of the opinion, in the general appearance of the patient, indicating by the loss of hair, and of teeth, the general decay of the body, while the dull colour and coldness of the extremities marks a defective circulation.

It may be demanded whether more direct proof

age it is little probable; she was, however, subject to palpitation. Her life was prolonged by the humanity of her attendant; but she has died since this work was first published. A case apparently similar is related by Morgagni.—Letter lv. art. xxiv.

can be brought for such a supposition? the answer is, that at all times we observe that the processes of inflammation are carried on with more energy in youth, when they are perfect, than in old age, and no more remarkable example of this can be given than the processes consequent on the application of kali purum; if this is applied to an aged person, the eschar formed is larger, (if I am not much mistaken) in proportion to the surface rubbed, and the subsequent ulcerative action extends widely the chasm; indeed, I have seen in those advanced in life, whose condition approached to that indicated above, an enormous destruction of the soft parts ensue. There is another phenomenon which arises probably from the same cause, namely, the tardiness of the process by which the slough is separated in old persons.

This defective state of the vessels will obtain most in the extremities, particularly the lower; and hence it happens, as is well known, that when old persons receive trifling injuries on the foot, as in cutting a corn, &c., destructive inflammation and sphacelus are wont to set in and destroy the patient with great rapidity; such injuries are apt to excite extensive inflammation at all periods of life, when the health is disordered; but now, in addition to this disorder, we have to encounter a state of the vessels, in which they are incapable of supporting the bare nutrition of the part, much

When in this state of the vessels persons receive trifling wounds, inflammation of a spreading nature will sometimes occur as in others, and then rapidly terminate in mortification;

less are they able to combat the injurious influence of disease, or accomplish the actions of reparation.

and the part
will often
mortify with-
out the oc-
currence of
any injury.

When the nutrient vessels are in such a state, it is no wonder that from slight causes, or even without one, apparently, a portion of the limb should perish; nor can we fail to see in such a process a resemblance to that phenomenon which is incident to all vegetable life. Animals perish commonly from the sympathy produced by some local disease, but vegetables which do not possess such a share of sympathetic feeling die from the gradual decay of the extremities in most instances*.

But to pass from these inquiries into the cause of this remarkable disease, to the description of it, I cannot better give this than in the words of Mr. Pott.

Description.

“In some few instances it makes its appearance with little or no pain, but in by much the majority of these cases the patients feel great uneasiness through the whole foot and joint of the ankle, particularly at night, even before these parts

* The opinion I have here and formerly supported of this species of mortification being attributable to a diseased or disordered state of the minute vessels, derives some confirmation from a case narrated in the fifth volume of the Dublin Hosp. Rep. by Dr. Graves and Dr. Stokes, of arteritis of a subacute character, in which mortification took place, and seems to have been caused or accelerated by applying warmth too liberally to the limb.

show any mark of distemper, or before there is any other than a small discoloured spot on the end of one of the little toes. It generally makes its appearance on the inside, or at the extremity of one of the smaller toes, by a small black or bluish spot: from this spot the cuticle is always found to be detached, and the skin under it to be of a dark red colour. Its progress in different subjects, and under different circumstances, is different; in some it is slow and long in passing from toe to toe, and from thence to the foot and ankle; in others its progress is rapid and horridly painful*.”

Mr. Pott adds, that it is a disease incident particularly to the voluptuous, and rather to those who have been great eaters; that it is most frequent in males; and that although most frequent in advanced life, it is not peculiar to old age.

I have known it continue for weeks, months, or even years, and the following case will illustrate the state which such a patient will exhibit.

An old man, whose great toe had been removed, three years before, by my friend and colleague, Mr. Barnes, was re-admitted into the hospital, after the lapse of that time, and became my patient. There was on the dorsum of the foot a large deep

Sometimes
very slow in
its progress.
Case.

* Pott on the mortification of the toes and feet, vol. iii. p. 332, *et seq.*

ulcer of about one and a half inch by one inch, with hardened white edges, and a glassy bottom, *in which there was no trace of granulation*; and there was commonly a piece of loose slough towards the upper edge which was slowly giving way, nevertheless the pus formed was tolerably good. There was a good deal of pain attending it, which became exquisite, when any dressing was applied, not according with the sensibilities of the part, and when any way irritated, a good deal of inflammation possessing the characters of oedematous erysipelas was excited. His arteries were universally ossified; he lived about six months afterwards, and died in the severe winter of 1819.

Sometimes
very rapid.

In some cases the progress is very rapid, and will prove destructive in a very short time; in general, however, it spreads, and is again arrested at intervals. We are led to hope that the dead parts will be thrown off, and so they are sometimes, and the patient may recover and survive for years. More commonly, however, the adjacent parts appear incapable of completing this process, and effecting that of repair, and after a time the inflammation and sloughing commence anew; the countenance becomes more and more haggard; an increased degree of pyrexia is induced, and, perhaps, the patient may now sink, or it may once

more stop, and again go on in a similar manner till death ensues. It rarely reaches the thigh*.

Mr. Pott recommends opium as the great remedy Treatment. in these cases, and speaks well of its success in putting a stop to the disease. He gave it in considerable doses, *i. e.* a grain every three or four hours, and continued it nearly in the same quantity, until the disease was checked by it, which in many cases was the result. The remedy is a valuable one, but there can be no doubt that it often fails; if, however, its only object were to allay the sufferings of the patient, it would be an important remedy. Sir A. Cooper recommends it, combined with ammonia†. In addition to this, suitable and well-directed support are required, and proper attention should be paid to the state of the bowels.

Mr. Pott leans strongly to the use of emollient fomentations and poultices. Sir A. Cooper prefers poultices made with oatmeal and port wine, or stale beer grounds‡: the use of gentle stimulants we might rationally expect to serve in such cases;

* So fatal is this disease in decrepit old age, that Van Swieten thus expresses himself: "Neque, quantum novi, ullis observatis constitit, curatam fuisse gangroenam in *decrepita* senectute sponte in pedum digitis ortam."—Comm. in Boerhaave, tom. i. p. 769.

† Lectures, vol. i. p. 242. From gr. vij. to x. of carb. ammon. with from ℥ xx. to xxx. tr. opii, a combination he strongly recommends in gangrene generally.

‡ P. 242.

but if they produce pain, it would be unwise to persevere with them.

Question of
amputation.

I apprehend the question of amputation will be rarely entertained in these cases; nevertheless, having once performed it with success, I think it necessary briefly to state what reasons induced me to adopt this measure, and what was the result.

Case.

J. W., æt. 68, was admitted a patient of the hospital in April, 1807, the left foot having mortified as high as the ankle, after repeated attempts to limit and throw off the dead part; the effects of age had been increased by free living at an earlier period; the arteries generally were thickened; his hands, the right foot, and face were of a dusky colour, approaching to livid, and the blood pressed out of the small vessels returned at a very tardy pace. He was thin, sluggish, partly deaf, and toothless.

Such a man, perhaps, held life by a valueless tenure, and it might be deemed cruelty rather than kindness to arrest his progress to the grave; but he suffered extreme and constant pain, which opium very inadequately mitigated. I felt it my duty to state to him what might be done, at the same time fully explaining the objections. To be brief, he eagerly embraced the chance afforded by an operation, being only anxious that his misery should be terminated.


I grounded the probability of its succeeding on the fact, that higher in the limb, the powers of

the parts might be equal to the repair of a wound, although below incapable of throwing off a slough and healing; I also relied, in some measure, on the firmness and steadiness of the pulse.

Several vessels bled freely; the femoral was much thickened, but no trouble arose in this quarter. It was probable that mortification might attack the stump; but this did not happen, excepting in two or three patches of skin, which were more exposed to pressure than the rest; the suppuration, however, was bad, and there was much disposition to the ulcerative inflammation.

For the first few days there was constant tremor and subsultus, muttering delirium, and the sweat of relaxation: however, by constantly supplying him with wine, brandy, opium, and suitable nourishment, he was kept up. To the wound I early applied lint dipped in equal parts of decoction of bark and port wine, which, as I have elsewhere mentioned, I have often found useful when a grateful stimulus is required, and the parts want tone.

From the good diet he enjoyed, perhaps also from the reduction in the quantity of parts requiring supply, this man got into better condition than he was before, and the stump having healed, he was discharged in the autumn of 1818, and lived till the winter of 1819-20, when he sunk under the cold of that very severe season.



Mortification probably resulting from deficient nervous Energy.—So far mortification has been considered in this section as the result of some defect of the circulating system; but a deficiency of nervous energy will also often prove a cause powerfully contributing to its production, if not absolutely giving rise to it, and hence it is that injurious impressions of no extraordinary power will frequently occasion it in paralysed limbs. But it is by no means improbable that some disorder of the nerves will alone suffice to produce it; and I cannot help remarking by the way, that the remarkable quality of opium in the species of mortification last described affords some grounds for the belief, that nervous derangement may have some influence in producing these cases; the previous pain in the part and burning sensation which belongs to this (as well as almost all mortifications) lend a further degree of probability.

The cases to which I allude more particularly are such as these:—A gentleman, about the middle period of life, had a paralytic affection invading his feet and hands by degrees, first affecting one, then another of his toes and fingers, till at last the whole became attacked. This gentleman had at separate times necrosis of the bones of three of his toes, in one it was attributed to a slight blow; the ulcers which formed had much the character of that described p. 549, with occasional tendency

to slough, but there was no apparent defect in the circulating system generally. I have since seen a case which was in the hospital under Mr. Barnes, in whom there was a similar paralytic affection coming on by degrees, and the os calcis perished; there was a larger ulcer in the heel of very similar appearance. In a rather remarkable case of paralysis, in a young married woman, which occurred lately, and where the cause probably arose from some disease in the spinal chord, deep sloughy ulcers of a similar character formed on the sacrum and trochanters on which she lay, and by a *slow* but certain process destroyed the parts, even at the upper part of the thighs, which were not at all subjected to pressure, until she was at last worn down by the constant discharge and irritation.

Mortification from Pressure.—It remains to say a few words on the subject of mortification from pressure. The occurrence is a frequent one: whenever parts have been long subject to it in any considerable degree, especially when the persons are unhealthy, hence it not only ensues in febrile disorders, as has been already mentioned, but frequently befalls those who are worn down by any lingering disease, as consumption, spinal diseases, &c.; whereas in persons who are simply bed-ridden, as it is called, there is no such tendency to it.

Where pressure operates on healthy persons, it will simply produce ulceration, of which many instances present themselves, especially in cases of fractures of the lower extremity, when it has been necessary to apply tight bandages, or the part has rested long on ill-adapted splints; these ulcers will heal with great rapidity as soon as the exciting cause is removed; in others, however, whose constitution is feeble or wrong, it is well known how vexatiously we are sometimes thwarted by sloughs forming whenever a point becomes in the slightest degree pressed upon.

It is, however, especially on the sacrum or trochanters, that we meet most frequently with this evil, when the soft parts have been deprived of the protection of fat, and have been galled by the projecting bones. The skin becomes dark red, painful, sometimes ulcerates, sometimes sloughs at once; but the process has little disposition to spread, excepting when the constitution labours under fever of a low type. The irritation of urine, or of other filth, will greatly tend to bring it on, or increase it.

In many diseases it is of great importance to prevent this from occurring, for it may never heal afterwards, and give rise to great misery. If the pressure can be relieved by change of position, this is the best plan; where this cannot be accomplished, hollow pads or cushions may be adapted

to transfer the pressure to other parts; or where this cannot be done, rendering the surface of the bed perfectly smooth, and covering it with a hare skin, or shamoy leather, may prevent it; bathing the skin with brandy, or diluted eau de Cologne, may give more powers of resistance to the vessels, or thick leather spread with soap cerate may form a kind of artificial skin. Where there is as yet merely a slight ulceration, powdering the part with oxyd of zinc, ceruse, or other drying powder, is sometimes useful; but when once a slough is formed, and the ulcerative process, as is common, exists at the same time, I believe that dressings of a terebinthinate nature, or with balsam of Peru, or stale beer, yeast, or charcoal poultices, are the best applications. When warm dressings are employed, it is a good plan to lay a large linseed poultice underneath to lessen the effects of pressure, as well as to supply a comfortable warmth: should any of these remedies produce pain, simple poultices will be preferable.

I have omitted saying any thing of that species of mortification which arises from the use of ergot; it does not appear to have occurred in this country, at all events I have never heard of any case; and as I have not in the course of this work described any disease of which I have not myself seen some examples, I have also omitted that species of inflammation which has obtained the name of

pustule maligne: doubtless there are many others, which, although deserving notice, have not been described, or if described, have not received that full attention to which they are entitled; as far, however, as my opportunities have hitherto extended, it has been my endeavour to procure, and to give, such information as may prove useful to those who may honour this work with their perusal.

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